



# ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

Mountaineer Plant  
Graham Station Road  
Mason County  
New Haven, West Virginia

October 27, 2016

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**ASH POND SYSTEM-  
CCR LOCATION  
RESTRICTION  
EVALUATION**



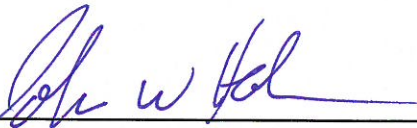
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## CONTENTS

Acronyms and Abbreviations.....	iv
1. Objective .....	1
2. Background Information.....	2
2.1 Facility Location Description .....	2
2.2 Description of Bottom Ash Pond CCR Units.....	2
2.2.1 Embankment Configuration.....	2
2.2.2 Area/Volume.....	2
2.2.3 Construction and Operational History .....	2
2.2.4 Surface Water Control.....	3
2.3 Previous Investigations.....	3
2.4 Hydrogeologic Setting.....	4
2.4.1 Climate and Water Budget .....	5
2.4.2 Regional and Local Geologic Setting .....	5
2.4.3 Surface Water and Surface Water Groundwater Interactions.....	5
2.4.4 Water Users.....	5
3. Isolation from the Uppermost Aquifer .....	7
3.1 Uppermost Aquifer and Piezometric Analysis .....	7
3.1.1 Piezometric Analysis .....	7
3.1.1.1 Horizontal and Vertical Position Relative to CCR Unit .....	7
3.1.1.2 Overall Flow Conditions.....	7
3.1.2 Uppermost Aquifer.....	8
3.1.2.1 CCR Rule Definition.....	8
3.1.2.2 Common Definitions .....	8
3.1.3 Identified Onsite Hydrostratigraphic Unit.....	8
3.2 Compliance with Isolation Distance .....	8
4. Wetlands .....	9
4.1 Local Wetlands .....	9
4.2 Compliance with Wetland Restrictions .....	9
5. Fault Areas.....	10

# ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

5.1	Description of Regional Geologic Structural Features.....	10
5.2	Compliance with Fault Area Restrictions .....	10
6.	Seismic Impact Zone .....	11
6.1	Definition of Seismic Impact Zone .....	11
6.2	Compliance with Seismic Impact Zone Restriction.....	11
7.	Unstable Areas.....	12
7.1	Definition of Unstable Area and local Conditions.....	12
7.1.1	CCR Rule Definition .....	12
7.1.2	Poor Foundation Soils .....	12
7.1.3	Mass Movements .....	12
7.1.4	Karst .....	12
7.1.5	Subsurface Mining.....	12
7.2	Compliance with Unstable Areas Restriction.....	13
8.	Summary, Conclusions, and PE Certification .....	14
9.	References.....	15

## TABLE

Table 1. Water Level Data

## FIGURES

Figure 1. Site Location Map

Figure 2. Plant and CCR Unit Location Map

Figure 3. Bottom Ash Pond Layout and Well Location Map

Figure 4. Cross Section Location Map

Figure 5. Cross Section A-A'

Figure 6. Simulated Groundwater Flow

Figure 7. Surface Water Features

Figure 8. Nearby Fault Locations

Figure 9. Seismic Impact Zones

Figure 10. Nearby Landslides and Related Features

Figure 11. West Virginia Karst Areas

## APPENDICES

- A Boring/Well Construction Logs
- B Banks Well Inventory Report
- C Photographic Log

## 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
ft	feet
LBR	Little Broad Run

## 1. OBJECTIVE

This report was prepared by Arcadis U.S., Inc. (Arcadis) for American Electric Power Service Corporation (AEP) to assess location of the bottom ash ponds (BAP) 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 BAPs (CCR Unit) at the AEP Generating Plant (Plant) located on Graham Station Road in New Haven, 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 BAPs (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 two onsite BAPs (east and west BAPs) and the offsite Little Broad Run (LBR) landfill (**Figure 2**). The evaluation of the LBR landfill is not included in this report and will be completed under separate cover.

Initial evaluation of the monitoring well network was completed in late 2015 into February 2016 and included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the BAPs, as well as publicly-available geologic and hydrogeologic data. Gaps in the monitoring well network, as well as in the characterization of subsurface geology, were identified during this initial evaluation. Additional monitoring wells were installed from April through June 2016 to address these data gaps. Drilling activities were performed by a West Virginia-licensed drilling contractor (DLZ) 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 includes a description of the uppermost aquifer.

## 2. BACKGROUND INFORMATION

The following section provides background information for the AEP Mountaineer Generating Plant BAPs.

### 2.1 Facility Location Description

The AEP Mountaineer Generating Plant is located in Mason County, bounded by Little Broad Run to the west and the Ohio River to the east. The Plant is approximately 2 miles east of New Haven, West Virginia. The BAP CCR units are located on the south side of the Plant, adjacent to and on the west side of West Virginia Route 62 (Graham Station Road). The BAPs are located approximately 0.5 miles southwest of the Ohio River (**Figures 1 and 2**).

### 2.2 Description of Bottom Ash Pond CCR Units

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

#### 2.2.1 Embankment Configuration

The BAP CCR Unit includes two separate west and east BAPs. In general, embankments of the BAPs are constructed of earthen material. North, west and east embankment material is comprised from excavation of the ponds and consist of compacted silty sand with some gravel. The embankment crest widths range from 20 to 45 feet (ft), and are approximately 35 ft or less in height. This corresponds to crest elevations that range from 620 ft above mean sea level (amsl) on the north side of the BAPs. The BAP interior and exterior embankments have crest elevations of approximately 620 ft amsl (Woodward-Clyde, 1985). Embankment slopes are typically graded at horizontal to vertical ratios between 3:1 and 2.5:1 (Shaw, Stone and Webster, 2006).

#### 2.2.2 Area/Volume

The BAPs occupy an estimated combined surface area of approximately 28 acres (EPRI, 1999). Specifically related to the ponds that receive CCR products, the west BAP has a normal pool area of 14.1 acres and the east BAP has a normal pool area of 13.9 acres. The normal reservoir volume of the west and east BAPs are 193 and 152 acre ft, respectively. The maximum design volume of the west and east BAPs are 266 and 225 acre ft, respectively (Shaw, Stone, and Webster, 2006).

#### 2.2.3 Construction and Operational History

The AEP Mountaineer Generating Plant is a single-unit coal-fired generating plant and began operations in September 1980. The BAPs were constructed between 1978 and 1980 and were completed when the generating plant became operational. The original configuration is similar to the current configuration (**Figure 3**). All ponds are lined with a 3-ft clay liner with clay derived from offsite borrow areas (Woodward-Clyde, 1985). In 2006, the downstream (i.e. north) embankment of the BAPs was re-

designed to a steeper slope from 3:1 to 2.5:1. This design change was to accommodate the installation of two gypsum conveyors. Modifications to the downstream BAP embankment and installation of the gypsum conveyors were completed by the first half of 2007.

Currently, the BAPs receive all process wastewaters from the Plant via above ground and below ground steel piping. The BAPs are filled in an alternating fashion, with one BAP generally receiving waste streams while the other BAP is being cleaned out. Bottom ash is either used for beneficial reuse or disposed of in the LBR Landfill (EPRI, 1999).

### 2.2.4 Surface Water Control

The perimeter of the BAPs is graded such that surface runoff is directed away from the ponds. This grading is accomplished by either natural topographic relief or constructed embankments, such as the main dike along the northwest side of the BAPs (**Figure 3**).

Surface water flow within the BAPs is controlled by a series of slide gates, corrugated metal pipes, vertical inlets, and overflow concrete channels. Pond elevations are maintained so that surface water flows via gravity or pumping to ponds in the following order: east and west BAPs and subsequently to east and west wastewater ponds, and the reclaim and/or clearwater pond (Woodward-Clyde, 1985). The stage levels of the BAPs are generally maintained no greater than the normal operating levels ranging from 603 to 612 ft amsl (H.C. Nutting, 2009). From the clearwater pond, water flows to the Ohio River through a National Pollutant Discharge Elimination System permitted outfall via underground piping (EPRI, 1999).

## 2.3 Previous Investigations

Prior to BAP construction, Casagrande Consultants performed site investigations from 1976 to 1977 related to suitability of onsite soils for pond and embankment construction and stability (Casagrande, 1977).

In 1985, Woodward-Clyde Consultants performed an assessment of dam safety for the BAPs (Woodward-Clyde, 1985). This assessment included review of AEP-provided data and previous site investigations and a complete visual inspection of the dikes and secondary structures. The Woodward-Clyde Consultants report concluded that dike and pond condition was satisfactory.

From 1995 through 1998, AEP worked in coordination with Ish, Inc., META Environmental, Inc., HIS GeoTrans, Inc., and the Electric Power Research Institute (EPRI) to evaluate groundwater quality associated with a number of AEP power generating facilities, including the Mountaineer Plant. The primary objectives of these site investigations were to characterize hydrogeology, identify potential contaminant source areas, establish existing groundwater quality, and identify constituents that exceeded West Virginia Groundwater Standards. These studies are described in detail in the report *Groundwater Quality at the Philip Sporn and Mountaineer Power Plants, Mason County, West Virginia* (EPRI, 1999). Field work for these investigations included 19 direct push technology groundwater sampling points, installation and sampling of 5 permanent monitoring wells (MW-001 through MW-005), surface water sampling, and geotechnical soil characterization.

## ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

In 2006, H.C. Nutting Company performed site investigations associated with planned modifications to the main dike in preparation for construction of two gypsum conveyors (H.C. Nutting, 2006a; H.C. Nutting, 2006b). These investigations involved foundation inspections, compaction testing of fill material, geotechnical analysis of soil samples, and concrete testing associated with conveyor construction. Also in 2006, Shaw, Stone, and Webster, Inc. performed stability analysis related to the gypsum conveyor construction (Shaw, Stone, and Webster, 2006). Additional slope stability analyses for the north, west, and east embankments related to the gypsum conveyor construction in 2009 was also performed by Shaw, Stone, and Webster, Inc. The results of this analysis showed that, in general, embankment slopes would be stable under static and seismic loading. However, a blanket drain was recommended at the toe and cut faces of the embankment along gypsum conveyor #2 to prevent saturation and slumping (Shaw, Stone, and Webster, 2009).

H.C. Nutting performed a geotechnical investigation of the BAPs in 2009, specifically related to upstream and downstream embankment slope factors of safety under static and seismic conditions. Field methods involved drilling, logging, and sampling 6 soil borings through select embankments (B-09-01 through B-09-06). 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 piezometers (PZ-09-03, PZ-09-04, and PZ-09-05). This site investigation included numerical slope stability modeling, and concluded that the embankment slopes had adequate factors of safety for both long-term and earthquake stability (H.C. Nutting, 2009).

### 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 unconfined deeper sand zones. Maximum alluvium thickness is approximately 80 to 90 ft and thins westward towards the edges of the valley. Groundwater flow direction within the alluvium is generally towards the Ohio River. However, there are active production wells (East 1, West 1) and firewater supply wells (Well 5, Well 6) at the Site (**Figure 3**) that withdraw water from the alluvial aquifer. Groundwater flow is influenced towards those wells during pumping conditions.

In the upland areas surrounding the Site, bedrock consists of the Pennsylvanian age sandstones, shales, limestones, and coal of the Monongahela Group. At higher elevations, the hilltops are capped by the Permian age Dunkard Formation, which is lithologically similar to the Monongahela Group. Sandstone and shale of the Monongahela Group immediately underlie alluvial sediments at the Site.

Cross section A-A', which extends through the BAPs further illustrates the geology. The cross section A-A' trends from southwest to northeast as shown on **Figure 4** and is depicted as **Figure 5**. Boring logs and well construction diagrams are included in **Appendix A**.



### **2.4.1 Climate and Water Budget**

The climate of Mason County, West Virginia is characterized as humid continental with an average rainfall of approximately 42 inches annually. The average maximum temperature is 68 °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 Ohio River alluvial plain along the western bank of the Ohio River. Alluvial sediments consist of clay, silt, sand and gravel deposits that generally coarsen downward. In general, shallow clays and silts range in thickness from 10 to 40 ft. Some fill material is present near the Ohio River, which was likely derived from on-site excavations. This fill material varies from silty clay to gravelly sand. Unconsolidated mine wastes can be found in the base of the BAPs and blanketing the BAP embankments in thicknesses ranging from 3 to 7 ft (Shaw, Stone and Webster, 2006; H.C. Nutting, 2009).

Bedrock is present underlying the alluvial deposits near the BAPs, as well as bounding ridges of the Ohio River alluvial valley. The primary regional bedrock units are sedimentary rocks of the Permian age Dunkard Formation and the Pennsylvanian age Monongahela Formation. The depositional environment for these formations is characterized by a gradually subsiding shallow sea with alternating marine and freshwater strata. Sedimentary rocks associated with the Monongahela Formation, which immediately underlie the alluvial sediments beneath the Site, consist 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. The base of the younger Dunkard group, which caps surrounding ridges and is lithologically similar to the Monongahela Formation, is marked by a thick, massive conglomeritic sandstone (EPRI, 1999).

### **2.4.3 Surface Water and Surface Water Groundwater Interactions**

The Site is adjacent to the Ohio River, and the BAPs are located approximately 0.5 miles southwest of the Ohio River. Little Broad Run is immediately adjacent to the west of the BAPs. Groundwater flow direction is generally to the northeast and discharges to the Ohio River, although local pumping from Plant operations influences groundwater flow to the north. Groundwater recharge is primarily from precipitation. Despite its proximity, Little Broad Run is generally not connected to groundwater at the Site. The base of Little Broad Run is perched on surficial clay deposits and is at an elevation of 580 to 590 ft amsl (EPRI, 1999), which is approximately 30 to 40 ft above the groundwater table. The Ohio 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 Ohio River at 538 ft amsl (EPRI, 1999).

### **2.4.4 Water Users**

There are currently five active pumping wells associated with the Plant that extract groundwater from the deep unconsolidated sand and gravel aquifer. Two of these wells (West 1, East 1) are alternately

## ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

pumped for process water and are located approximately 2,200 feet and 2,600 feet northeast of the BAPs, respectively. At the time of this report, average pumping rates from September 6 through September 26, 2016 for West 1 and East 1 were 566 gallons per minute and 144 gallons per minute, respectively. There are also two pumping wells (Wells 5 and 6) which are used for fire water supply. Well 5 is located approximately 1,200 ft north of the BAPs and Well 6 is located approximately 2,700 feet northwest of the BAPs. A fifth well (Well 4) is used in the plant's wastewater system and is located approximately 2,500 feet northeast of the BAPs. Well location coordinates, production test data, and boring log for the pumping wells are included in **Appendix A**. The screened intervals for each of these wells is from 63 to 78 feet below ground surface, which is near the base of the alluvial aquifer. There are no potable groundwater wells at the Site.

In 2014, a water well inventory for the Mountaineer Plant indicated information on one other groundwater well located within a 0.5-mile buffer of the Site (Banks, 2014) (**Appendix B**). The well is registered with the United States Geological Survey and is assumed to have been used for monitoring. The well is located approximately 3,700 feet east of the BAPs.

## 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 water table elevation in the unconfined sand and gravel deposits, which ranges from approximately 543 to 556 ft amsl in the immediate vicinity of the BAPs. The base elevation of the BAPs (i.e. bottom of clay liner) is estimated to be approximately 586 to 597 ft amsl (Woodward-Clyde, 1985). Based on this information, there appears to be at least 30 ft of separation between the top of the saturated sand and gravel zone and the base of the CCR Unit, which is illustrated in cross section A-A' (**Figure 5**).

The vertical extent of the aquifer likely extends to the base of the unconsolidated deposits in the valley to the bedrock interface. There are no significant clay or silt layers within the aquifer. The saturated thickness of alluvial deposits is at least 20 to 30 ft, and likely greater where alluvial deposits are thickest. The uppermost unconsolidated aquifer appears laterally extensive in all directions around the BAPs. The uppermost aquifer pinches out towards the bedrock valley wall to the west. The soil liner beneath the ponds limits hydraulic connection of the BAPs to the subsurface.

##### 3.1.1.2 Overall Flow Conditions

Regional groundwater recharge occurs from precipitation infiltration and from leakage from tributary streams crossing the Ohio River floodplain. Bedrock, to a lesser extent, likely contributes recharge of the uppermost unconsolidated aquifer from the west of the Site where the alluvial valley is in contact with the valley wall.

Available groundwater elevations are summarized on **Table 1** for 1997 through 2016. Current groundwater flow conditions that includes influence from groundwater pumping at the Mountaineer Plant was evaluated using the U.S. EPA's Wellhead Analytical Element Model (WhAEM2000; Kraemer et al., 2007). Results of the current understanding of groundwater flow from the model under current pumping conditions and BAP use is shown on **Figure 6**. Groundwater flow direction as depicted is predominantly north to northeast towards the Plant pumping wells and the Ohio River. As presented in **Table 2**, wells included in the monitoring network have been designated as up or down gradient.

Vertical hydraulic gradients in the immediate vicinity of the BAPs are generally upwards. Groundwater elevations measured on September 26, 2016 indicated upward vertical hydraulic gradients ranging from  $6.0 \times 10^{-4}$  ft/ft (MW-1605S/MW-1605D) to  $9.9 \times 10^{-3}$  ft/ft (MW-1604S/MW-1604D). A downward vertical gradient of  $1.8 \times 10^{-3}$  ft/ft was measured at the MW-1606S/MW-1606D well pair.

### 3.1.2 Uppermost Aquifer

#### 3.1.2.1 CCR Rule Definition

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).

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 unconfined sands and gravels. This aquifer is used locally for groundwater supply related to plant operations, but is not known to provide other private or industrial water use in the area.

## 3.2 Compliance with Isolation Distance

The estimated base of the CCR unit is estimated to be approximately 586 to 597 ft amsl, based on the depth of the bottom of the 3-feet of clay liner beneath the BAPs (Woodward-Clyde, 1985). The highest observed water level in the immediate vicinity of the BAPs is 556.42 ft amsl, measured in October 1997 at MW-5. Based on this review of historical data, there is nearly 30 ft of separation between the upper limit of the uppermost aquifer and the estimated base of the CCR unit. This is illustrated in cross section A-A' (**Figure 5**). This CCR unit meets the location restriction for separation of 5 ft from the uppermost aquifer.

## 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 12, 2015 site visit and review of available published information, the BAPs are not located within any areas that exhibited wetland characteristics that would be classified as a regulated wetland. There was one potential wetland area, Little Broad Run, observed to the west of this CCR unit. Little Broad Run is located adjacent to the southwest embankment on the west side of the gypsum conveyor and discharges into the Ohio River (**Figure 3** and **Figure 7**). Photos of these areas are included in **Appendix C**.

### 4.2 Compliance with Wetland Restrictions

Based on the August 12, 2015 site visit and review of available information, the BAPs are 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 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 regional structural feature in the vicinity of the Site. The axis of the syncline is located approximately 11 miles east-southeast of the Site and it trends northeastward. Regionally, bedrock dips gently to the east-southeast towards the axis of the syncline. Locally, however, bedrock dip is essentially flat lying and is affected by isolated anticlines and mild up-warping of the bedrock strata (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, all of Paleozoic age (USGS, 2005; WVGES, 2013). As shown on the figure, the nearest faults that do exist are at least tens of 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 West Virginia, as published by the United States Geological Survey (USGS) Earthquake Hazards Program (USGS, 2014). 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 BAPs. Woodward-Clyde Consultants performed an assessment of dam safety for the BAPs and concluded that the pond conditions and stability were satisfactory (Woodward-Clyde, 1985). There were additional embankment stability analyses performed in 2006 and 2009 by H.C. Nutting and Shaw, Stone, and Webster. The 2006 and 2009 H.C. Nutting reports consisted, in part, of compaction testing of embankment soil, laboratory soil analysis, and numerical stability modeling (H.C. Nutting, 2006a; H.C. Nutting 2006b; H.C. Nutting 2009). The Shaw, Stone, and Webster analyses performed in 2006 and 2009 consisted of 2-dimensional modeling of seismic and static loading (Shaw, Stone, and Webster, 2006; Shaw, Stone, and Webster, 2009). 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 BAPs are 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 BAPs are not located within an area susceptible to mass movements (USGS, 1978).

#### 7.1.4 Karst

**Figure 11** presents a map of known karst features in West Virginia. As shown on this figure, the BAPs are not located in a karst area.

#### 7.1.5 Subsurface Mining

The Redstone Coal unit is the only coal member in the immediate vicinity of the Site with previous mining activity. There are inactive underground mine workings located beneath the southern corner of the BAPs, and the depth to the coal seam is approximately 150 ft below ground surface (Figure 3).



## ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

In 2005, GAI Consultants, Inc. performed stability analysis associated with previous mining activities associated with the Redstone Coal (GAI, 2005). As part of this investigation, GAI reviewed existing boring logs and rock cores, performed point load strength testing of core samples, and performed stability calculations of mine pillars and ground movement from proposed future mining operations. GAI concluded that the Site is not expected to experience adverse impacts from past or future mining of the Redstone Coal.

### **7.2 Compliance with Unstable Areas Restriction**

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



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## ASH POND SYSTEM-CCR LOCATION RESTRICTION EVALUATION

Woodward-Clyde Consultants, Inc., 1985, Report on Dam Safety Inspection, Bottom Ash Pond Complex, Mountaineer Generating Plant, New Haven, West Virginia, Prepared for American Electric Power Service Corporation.

# TABLE



# FIGURES



# APPENDIX A

## Boring/Well Construction Logs



# APPENDIX B

## Banks Well Inventory Report





# APPENDIX C

## Photographic Log



Arcadis U.S., Inc.

100 E Campus View Boulevard

Suite 200

Columbus, Ohio 43235-1447

Tel 614 985 9100

Fax 614 985 9170

[www.arcadis.com](http://www.arcadis.com)

A decorative graphic consisting of three thin orange lines: one horizontal line extending across the width of the page, and two parallel diagonal lines extending from the bottom left towards the top right.

# TABLE



**Table 1**  
**Water Level Data**  
**AEP Mountaineer Generating Plant - Bottom Ash Ponds**  
**New Haven, West Virginia**

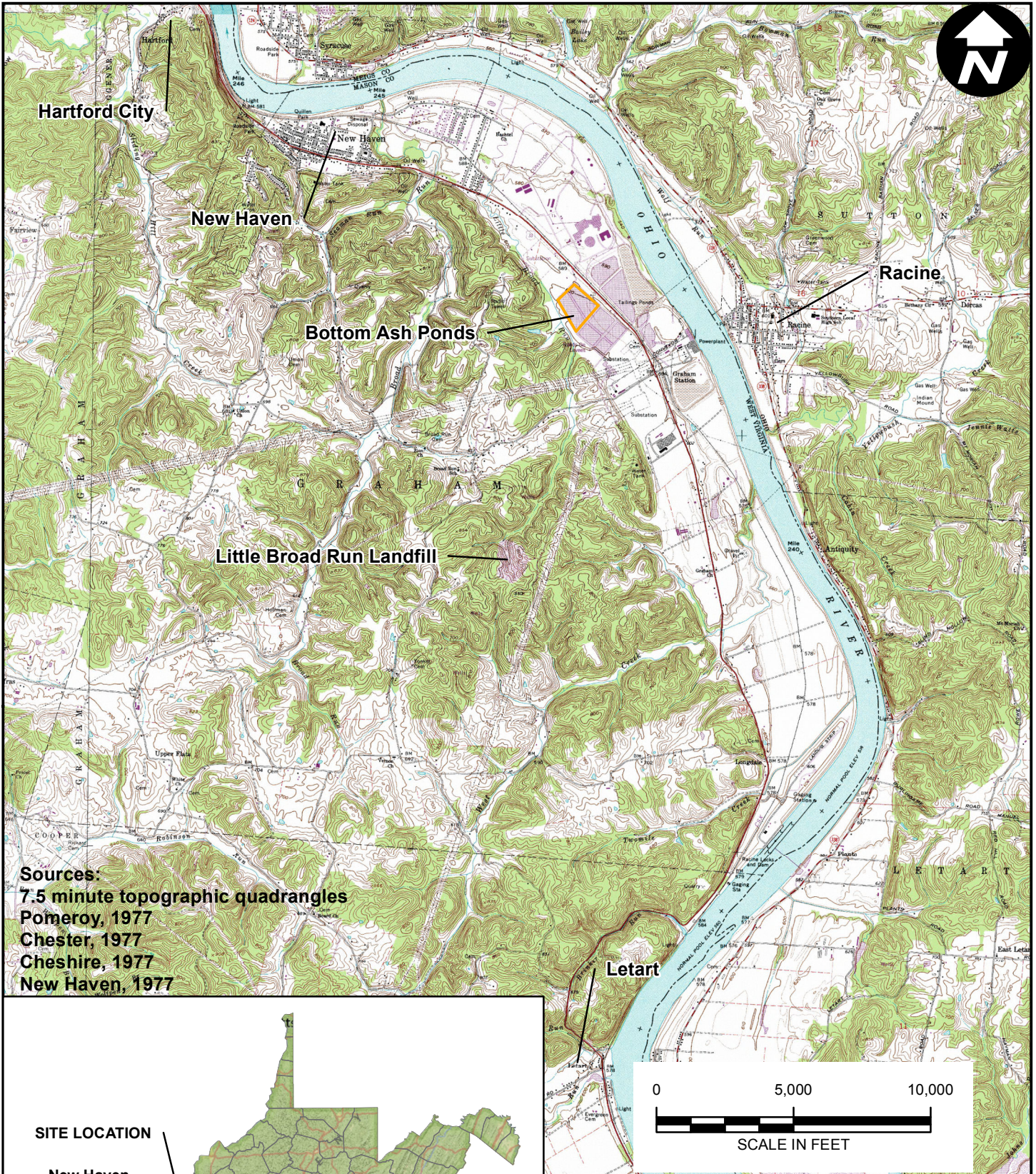
Well ID	5/1/1997	8/1/1997	12/1/1997	7/1/2008	10/1/2008	1/1/2009	4/1/2009	12/1/2009	3/10/2010	6/10/2010	9/10/2010	12/1/2010	4/1/2011	11/1/2011	6/12/2012	12/17/2012	6/11/2013	12/3/2013	6/10/2014	12/16/2014	6/9/2015	9/26/2016
	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl	GW Elev. <sup>a</sup> ft. amsl
<b>Gravel Zone Wells</b>																						
<b>Downgradient</b>																						
MW-001	NA	542.19	542.41	542.20	541.13	541.79	542.69	541.18	545.06	541.51	539.81	542.78	544.6	540.8	540.70	541.75	540.91	540.52	541.66	540.80	541.35	539.25
<b>Sand Zone Wells</b>																						
<b>Upgradient</b>																						
MW-1601A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	544.58
MW-1602	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	544.76
MW-1603	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	543.67
MW-1608	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	541.35
<b>Downgradient</b>																						
MW-002	NA	541.76	542.30	541.87	540.91	541.56	542.73	541.39	545.59	541.43	539.74	542.96	544.79	540.67	540.58	541.84	540.87	540.57	541.5	540.80	541.2	539.95
MW-003	NA	554.86	553.42	NA	NA	NA	NA	NA	NA	NA	545.18	545.06	dry	dry	dry	dry	dry	dry	dry	dry	dry	NA
MW-004	NA	541.65	542.19	541.74	540.79	541.46	542.63	541.26	545.54	541.34	539.71	542.81	544.65	540.59	540.48	541.77	540.76	540.44	541.42	540.67	541.14	540.15
MW-005	NA	556.42	555.05	NA	550.17	548.62	547.57	545.85	547.79	545.84	544.57	544.68	544.3	544.61	544.54	dry	545.14	544.66	545.84	544.17	545.71	NA
MW-016	NA	NA	NA	548.13	546.38	545.37	543.89	541.09	541.09	541.3	540.25	541.45	542.15	542.01	542.03	540.08	543.26	541.62	543.08	541.32	543.30	541.30
JTMN-1	NA	541.80	542.66	541.13	540.10	540.03	541.56	540.48	544.39	540.19	539.06	542.15	542.88	539.63	539.43	540.84	540.42	539.97	540.38	539.93	540.20	539.40
JTMN-2	NA	542.61	543.40	541.35	540.35	540.20	541.50	540.30	544.18	540.04	538.99	541.95	542.77	539.53	539.32	540.65	540.38	539.90	540.30	539.84	540.15	539.24
MW-1604S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	542.54
MW-1604D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	542.74
MW-1605S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	542.51
MW-1605D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	542.52
MW-1606S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	543.19
MW-1606D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	543.15
MW-1607S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	543.52
MW-1607D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	543.56
<b>Piezometers</b>																						
<b>Downgradient</b>																						
PZ-09-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	592.65
PZ-09-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	572.23
PZ-09-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	561.61
<b>Sporn Wells <sup>b</sup></b>																						
MW-006	NA	551.48	551.13	NA	NA	NA	NA	NA	601.00	542.64	541.23	543.08	543.28	541.67	541.17	541.02	542.61	541.83	542.50	541.58	542.18	541.20
MW-008	NA	543.58	544.46	NA	NA	543.94	545.45	543.82	550.26	527.28	542.01	545.23	546.45	542.46	542.03	543.71	542.25	542.52	543.41	542.75	542.62	NA
MW-009	NA	543.48	544.33	535.64	534.40	535.63	537.16	535.78	540.94	536.16	533.90	537.27	538.38	534.39	533.93	535.86	533.97	534.45	536.35	534.75	534.45	540.97
MW-011	NA	557.51	554.95	NA	NA	552.21	551.04	551.46	556.52	570.44	552.17	551.79	552.4	547.43	548.34	547.86	547.05	549.22	550.05	547.99	547.67	NA
MW-013	NA	541.24	541.69	NA	NA	NA	NA	NA	581.21	542.99	540.47	544.18	545.81	540.36	540.82	542.90	540.92	541.22	542.40	541.61	541.41	540.33
MW-014	NA	540.14	541.70	NA	NA	NA	NA	NA	588.44	542.49	540.11	543.97	545.75	540.59	540.12	542.36	540.56	539.84	541.48	541.11	540.83	540.08

**Notes:**  
a. Source: EPRI. June 1999. Groundwater Quality at the Philip Sporn and Mountaineer Power Plants, Mason County, West Virginia  
b. Sporn wells used for the simulated groundwater flow model only. Sporn wells are not used for the CCR well network.  
Elevation in feet above mean sea level  
Unless otherwise noted, water level data collected during AEP well gauging events  
amsl - above mean sea level  
Elev - elevation  
ft - feet  
GW - groundwater  
NA - not available

# FIGURES







**Sources:**  
7.5 minute topographic quadrangles  
Pomeroy, 1977  
Chester, 1977  
Cheshire, 1977  
New Haven, 1977

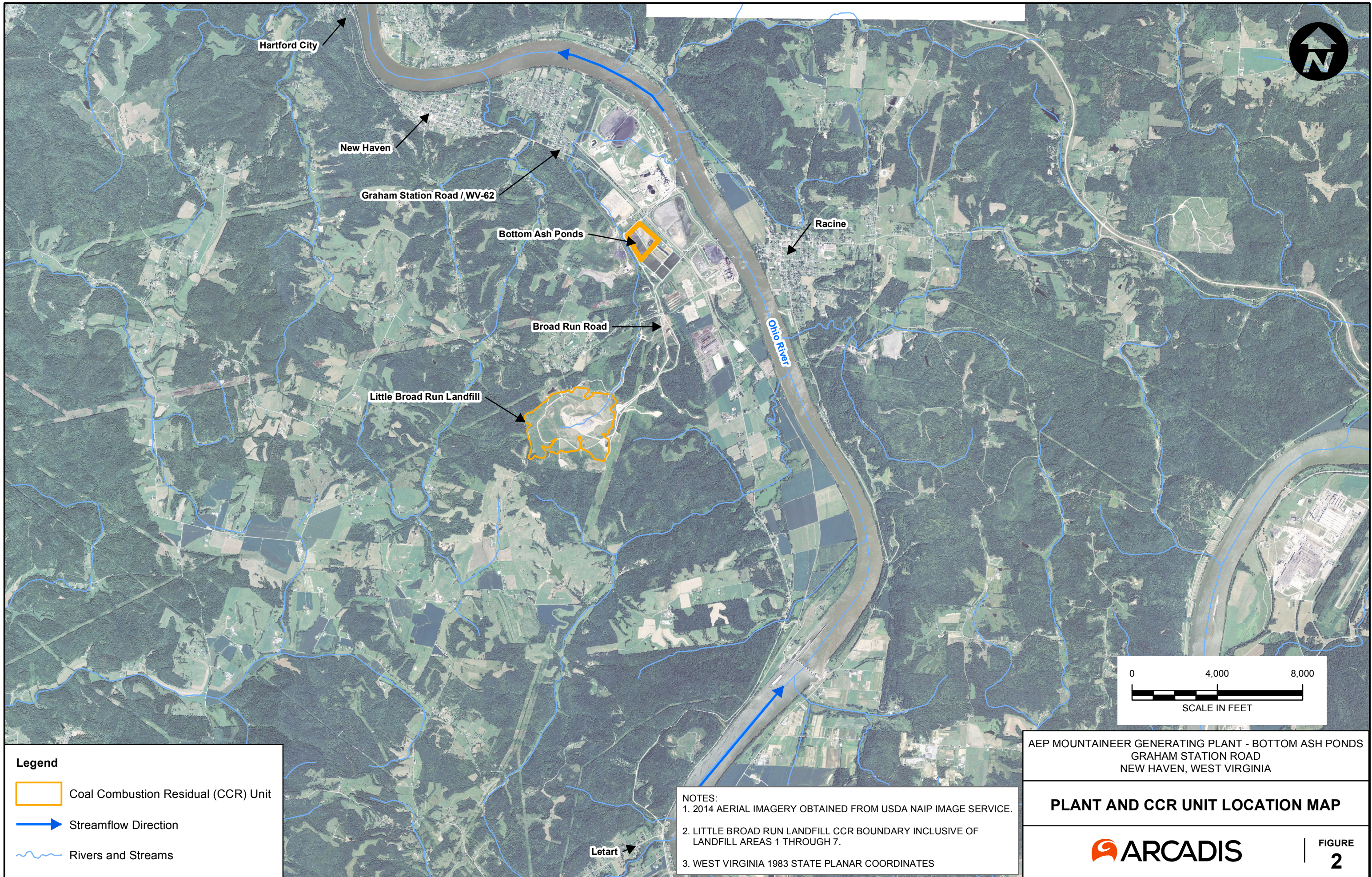


AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
GRAHAM STATION ROAD  
NEW HAVEN, WEST VIRGINIA




**SITE LOCATION MAP**



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OH:015976.0009.00001 (Mountaineer Ash Pond)  
Z:\GIS\PROJECTS\_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\F2\_MountaineerRegionalMap.mxd 9/28/2016 2:42:50 PM



**Legend**

-  Coal Combustion Residual (CCR) Unit
-  Streamflow Direction
-  Rivers and Streams

- NOTES:
1. 2014 AERIAL IMAGERY OBTAINED FROM USDA NAIP IMAGE SERVICE.
  2. LITTLE BROAD RUN LANDFILL CCR BOUNDARY INCLUSIVE OF LANDFILL AREAS 1 THROUGH 7.
  3. WEST VIRGINIA 1983 STATE PLANAR COORDINATES

AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
GRAHAM STATION ROAD  
NEW HAVEN, WEST VIRGINIA

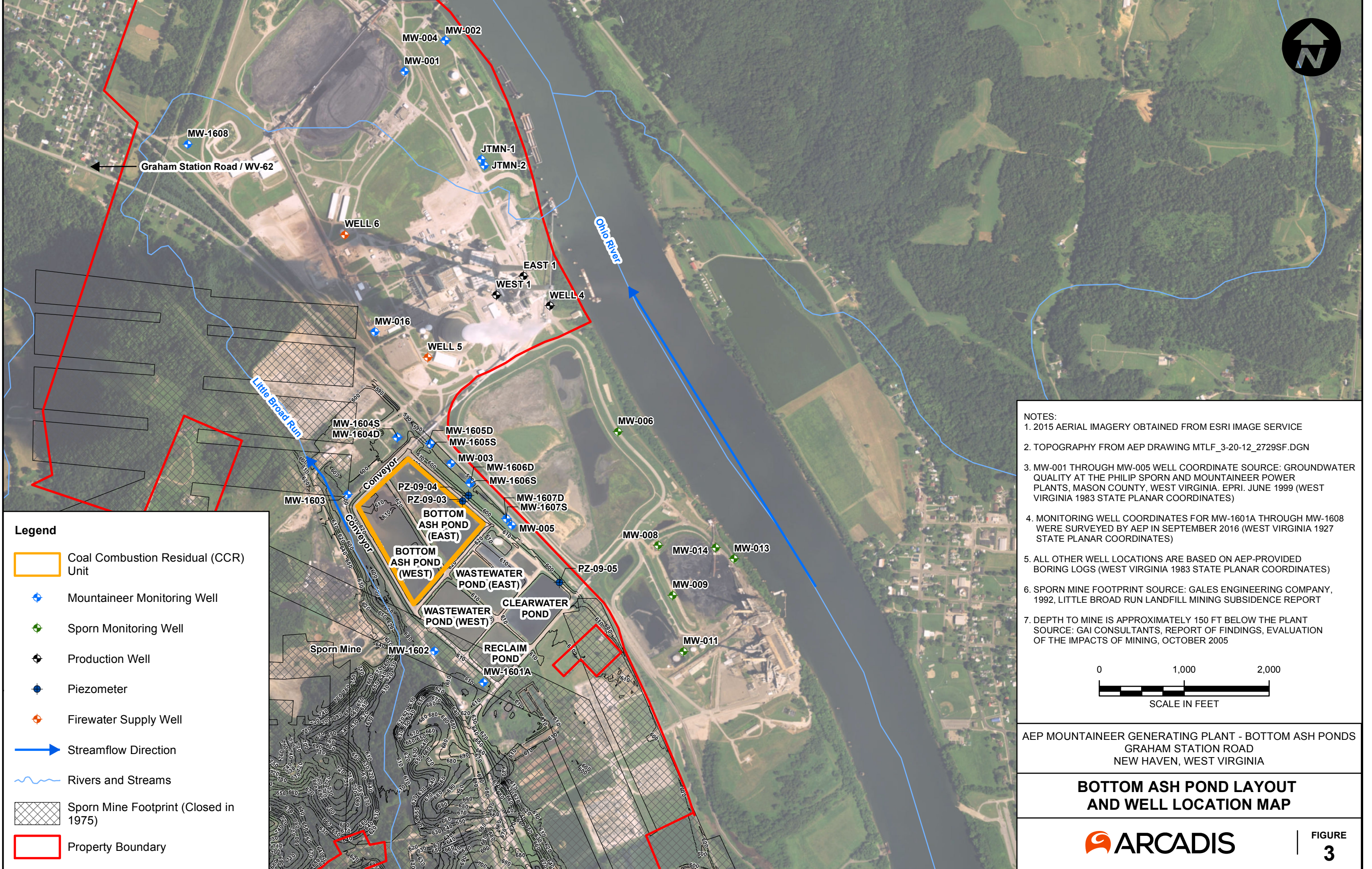
**PLANT AND CCR UNIT LOCATION MAP**



FIGURE  
**2**



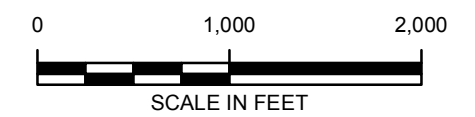
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**Legend**

- Coal Combustion Residual (CCR) Unit
- ◆ Mountaineer Monitoring Well
- ◆ Sporn Monitoring Well
- ◆ Production Well
- Piezometer
- ◆ Firewater Supply Well
- ➔ Streamflow Direction
- ~ Rivers and Streams
- Sporn Mine Footprint (Closed in 1975)
- Property Boundary

- NOTES:**
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
  2. TOPOGRAPHY FROM AEP DRAWING MTLF\_3-20-12\_2729SF.DGN
  3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
  4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
  5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
  6. SPORN MINE FOOTPRINT SOURCE: GALES ENGINEERING COMPANY, 1992, LITTLE BROAD RUN LANDFILL MINING SUBSIDENCE REPORT
  7. DEPTH TO MINE IS APPROXIMATELY 150 FT BELOW THE PLANT SOURCE: GAI CONSULTANTS, REPORT OF FINDINGS, EVALUATION OF THE IMPACTS OF MINING, OCTOBER 2005

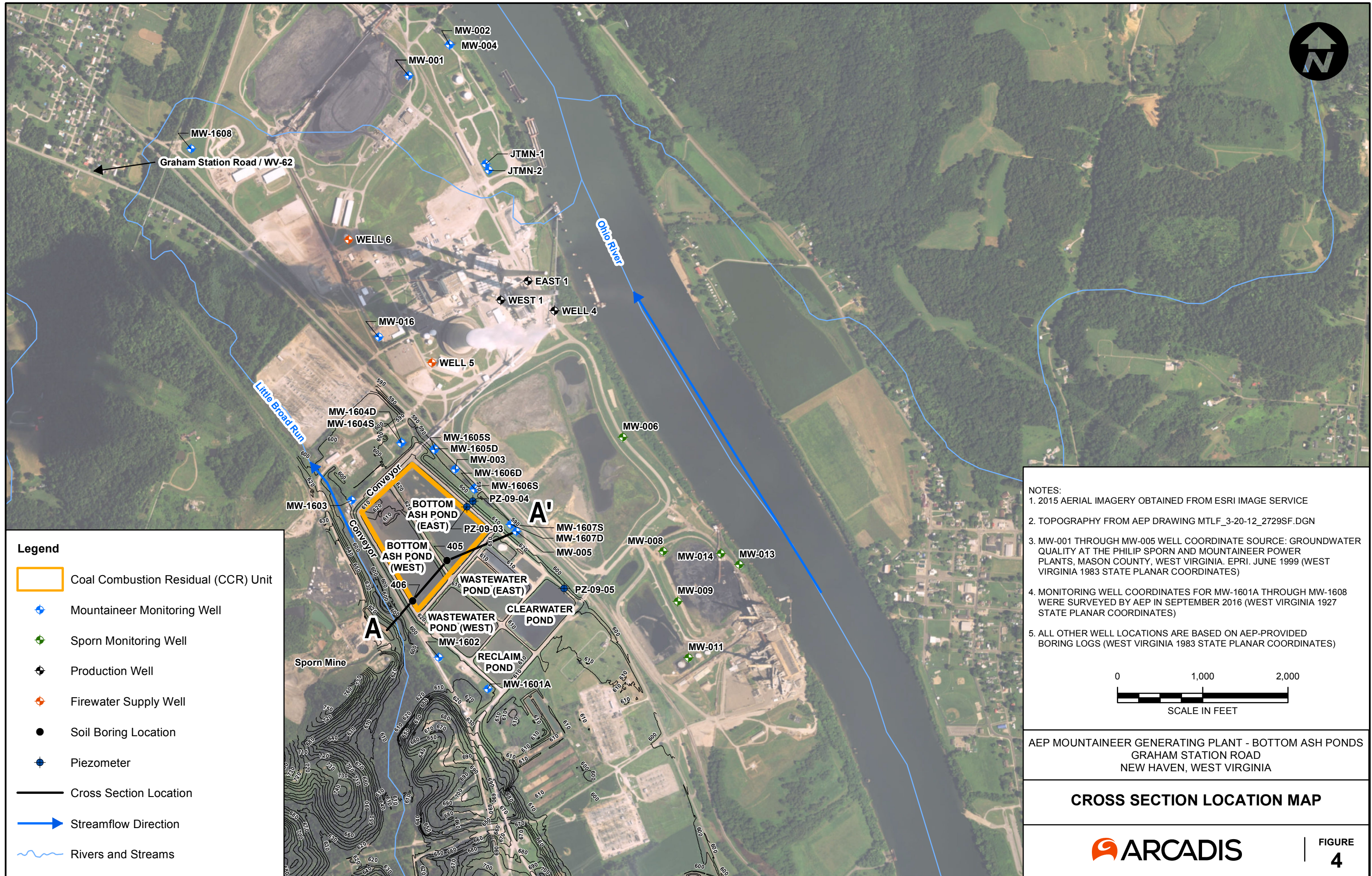


AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

### BOTTOM ASH POND LAYOUT AND WELL LOCATION MAP



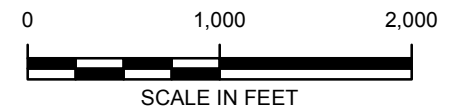




**Legend**

- Coal Combustion Residual (CCR) Unit
- ◆ Mountaineer Monitoring Well
- ◆ Sporn Monitoring Well
- ⊕ Production Well
- ⊕ Firewater Supply Well
- Soil Boring Location
- ◆ Piezometer
- Cross Section Location
- ➔ Streamflow Direction
- ~ Rivers and Streams

- NOTES:**
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
  2. TOPOGRAPHY FROM AEP DRAWING MTLF\_3-20-12\_2729SF.DGN
  3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
  4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
  5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)



AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

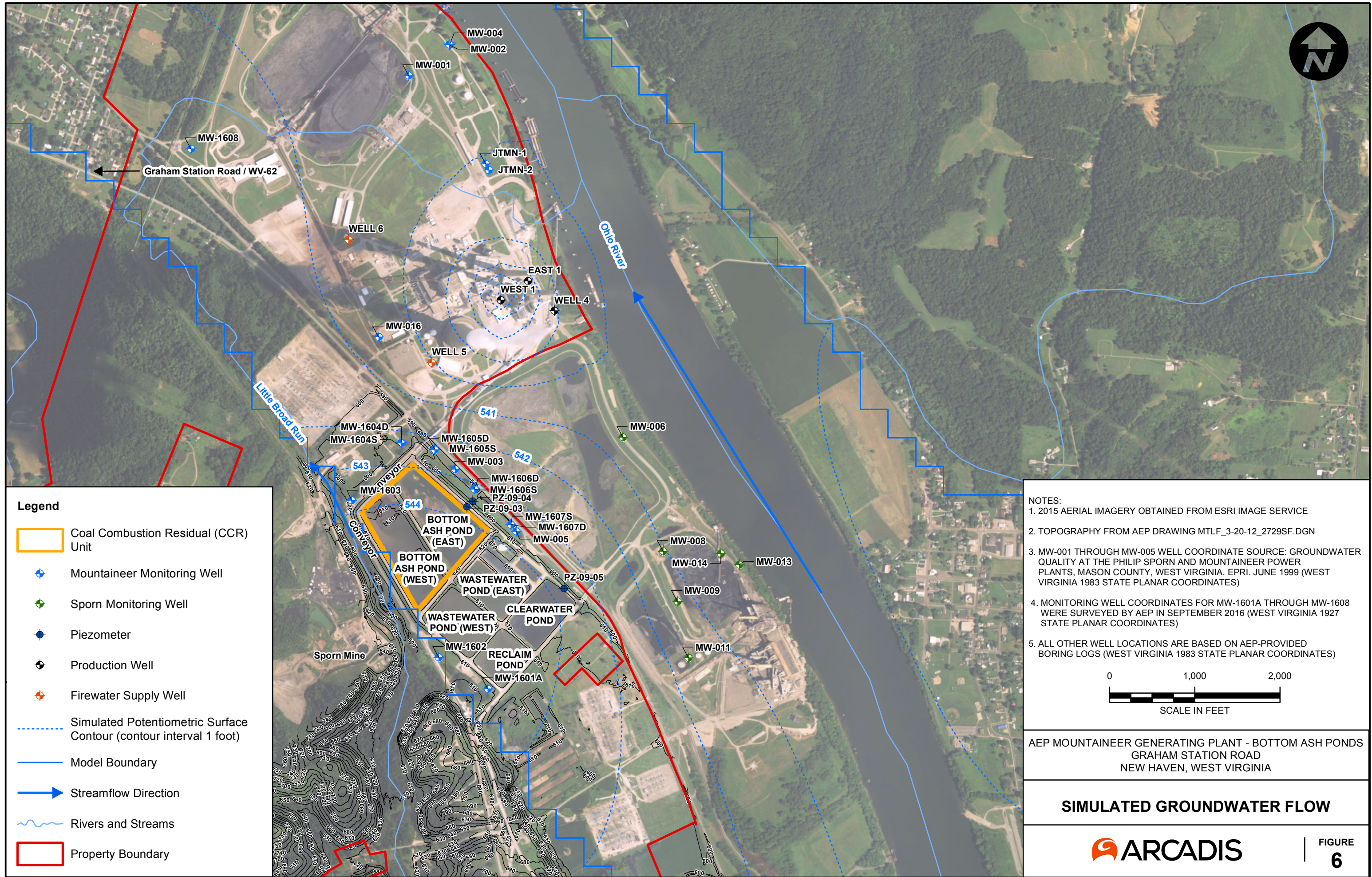
**CROSS SECTION LOCATION MAP**









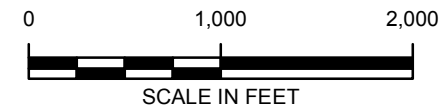


**Legend**

- Coal Combustion Residual (CCR) Unit
- Mountaineer Monitoring Well
- Sporn Monitoring Well
- Piezometer
- Production Well
- Firewater Supply Well
- Simulated Potentiometric Surface Contour (contour interval 1 foot)
- Model Boundary
- Streamflow Direction
- Rivers and Streams
- Property Boundary

**NOTES:**

1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
2. TOPOGRAPHY FROM AEP DRAWING MTLF\_3-20-12\_2729SF.DGN
3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)



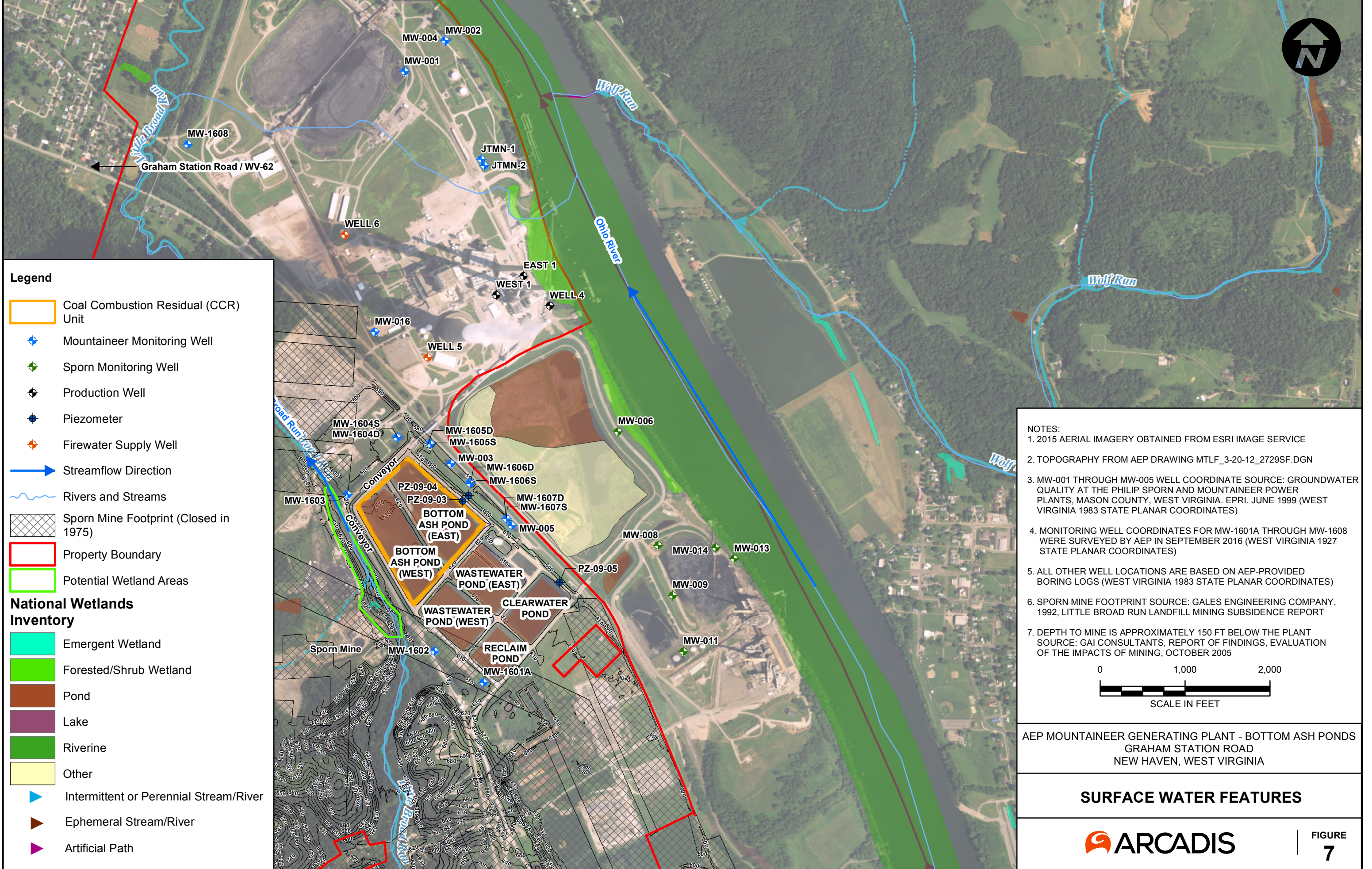
AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

**SIMULATED GROUNDWATER FLOW**





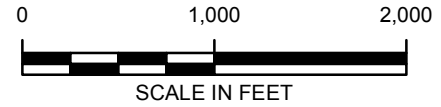
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**Legend**

- Coal Combustion Residual (CCR) Unit
  - ◆ Mountaineer Monitoring Well
  - ◆ Sporn Monitoring Well
  - ◆ Production Well
  - ◆ Piezometer
  - ◆ Firewater Supply Well
  - ➔ Streamflow Direction
  - ~ Rivers and Streams
  - Sporn Mine Footprint (Closed in 1975)
  - Property Boundary
  - Potential Wetland Areas
- National Wetlands Inventory**
- Emergent Wetland
  - Forested/Shrub Wetland
  - Pond
  - Lake
  - Riverine
  - Other
  - ▶ Intermittent or Perennial Stream/River
  - ▶ Ephemeral Stream/River
  - ▶ Artificial Path

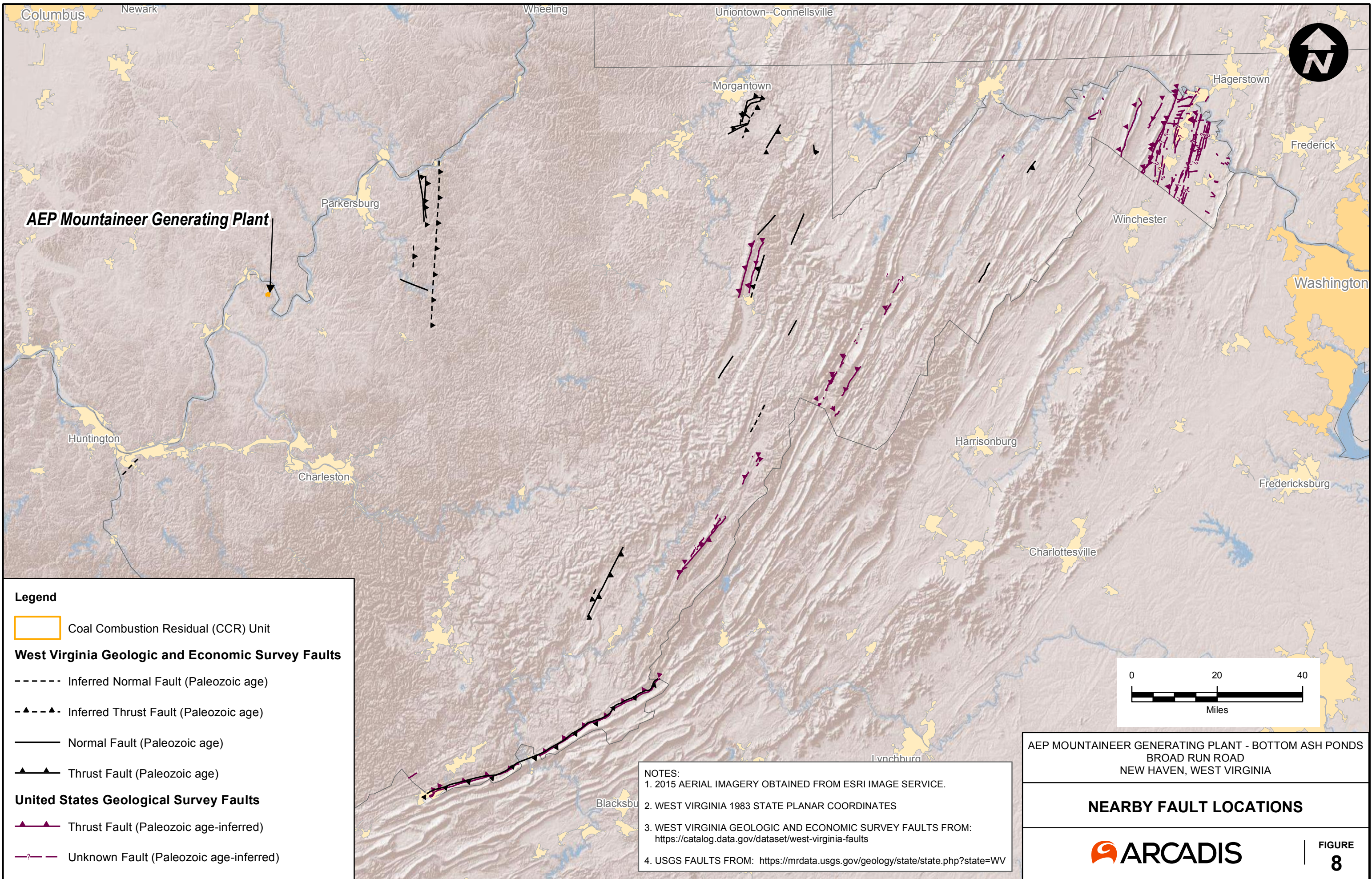
- NOTES:**
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
  2. TOPOGRAPHY FROM AEP DRAWING MTLF\_3-20-12\_2729SF.DGN
  3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
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AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

**SURFACE WATER FEATURES**





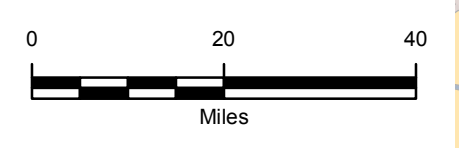
**AEP Mountaineer Generating Plant**

**Legend**

- Coal Combustion Residual (CCR) Unit
- West Virginia Geologic and Economic Survey Faults**
- Inferred Normal Fault (Paleozoic age)
- ▲-▲-▲ Inferred Thrust Fault (Paleozoic age)
- Normal Fault (Paleozoic age)
- ▲▲▲ Thrust Fault (Paleozoic age)
- United States Geological Survey Faults**
- ▲▲▲ Thrust Fault (Paleozoic age-inferred)
- ?— Unknown Fault (Paleozoic age-inferred)

**NOTES:**

- 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
- WEST VIRGINIA 1983 STATE PLANAR COORDINATES
- WEST VIRGINIA GEOLOGIC AND ECONOMIC SURVEY FAULTS FROM: <https://catalog.data.gov/dataset/west-virginia-faults>
- USGS FAULTS FROM: <https://mrdata.usgs.gov/geology/state/state.php?state=WV>



AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
BROAD RUN ROAD  
NEW HAVEN, WEST VIRGINIA

**NEARBY FAULT LOCATIONS**

**ARCADIS**

**FIGURE 8**

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb  
OH:015976.0009.00001 (Mountaineer Ash Pond)  
Z:\GIS\PROJECTS\_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\F8\_Mir Ash Pond Nearby Fault Locations.mxd 9/29/2016 8:41:07 AM







G:\ENV\CAD\Columbus-OH\ACT\015976 - AEP MOUNTAINEER\0090001 - AEP MOUNTAINEER\MTR\_PONDS\_LANDSLIDES AND RELATED FEATURES.dwg LAYOUT: AMOS WV AHS PONDS\_LANDSLIDES MTR\_PONDS\_LANDSLIDES AND RELATED FEATURES.dwg PLOTTED: 9/30/2016 12:12 PM BY: SMITH, BOB



**AEP Mountaineer Bottom Ash Ponds (Approximate)**

Landslides and related features interpreted from aerial photographs:  
 1:250,000 SCALE BLACK AND WHITE 1960  
 1:125,000 SCALE COLOR INFRARED 1973  
 1:80,000 SCALE BLACK AND WHITE 1975

Photointerpretation and field check 1978. This map has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

**LANDSLIDES AND RELATED FEATURES**

OF THE NEW HAVEN, W.VA.-OHIO QUADRANGLE

by GREGORY C. OHMACHER

U.S. Geological Survey

OPEN FILE MAP 85-80 (8-1)

**NOTE**  
 Information shown is intended as a general guide to ground conditions as of the date of field check. Additional landslides and rockfalls should be anticipated in all map units. The map unit depicts the dominant condition in the area delineated and variations in slope stability may occur at any point in the unit. This map is suitable for general planning purposes and as a supplement to more detailed studies for site selection. The map cannot be used as a substitute for detailed geologic and engineering investigations to establish design and construction criteria of specific sites. Some symbols may not appear on this map because the description is applicable to a series of maps.

**MAN-MADE FEATURES**

Strip mines (combination of letter symbols indicates complex formed or more than one type of strip mine)

- sh bench with high wall
- st furrowed with high wall
- sd multiple furrows and multiple benches
- ss hilltop removed
- sfy reclaimed by grading
- sru reclaimed by secondary use
- sh/r regraded in part, high wall remains
- Coal refuse banks identified on aerial photographs, not classified in field check
- rb not burnt nor on fire
- rbt burnt
- rbd burning
- rbs sludge
- Quarries
- q quarry site
- Gravel pits
- g site of gravel pit
- Slides in man-made features
- af earth flow in fill
- a/s earth flow in strip castings
- a/r earth flow in coal refuse

- ACTIVE OR RECENTLY ACTIVE LANDSLIDE**  
 Complex landslide composed of earthflow, debris slide, earth and rock slump. Identified from historical records, and from scars, debris and other field evidence. Ground extremely unstable; sliding accelerated by excavation, loading and changes in drainage conditions. May include areas with several active slides too small to be shown separately.
- OLD LANDSLIDE**  
 Area of extensive hummocky ground caused by earthflow and earth and rock slump. Lacks clear evidence of active sliding. Relatively stable in natural, undisturbed state, generally not affected by small structures properly sited in areas away from the edge of the toe, can be reactivated by extensive, rapid excavation, loading, and changes in ground water and surface water conditions. Area of old landslide probably includes recent ones not identified from field evidence or otherwise documented. Upslope boundary of landslide generally defined by modified scarp, but downslope (toe) may be gradual and not well defined.
- COLLUVIAL SLOPE**  
 Valley wall along major streams with slope as steep as 40° (85%), stony, clayey silt soil up to 50 ft. (15 m) thick; commonly buttressed by a terrace or bench at the toe of the slope, very susceptible to sliding by cutting of toe area, removal of terrace or bench, and overloading. Slides commonly activated without apparent cause.

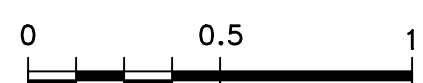
- AREAS SUSCEPTIBLE TO DEBRIS FLOWS AND DEBRIS AVALANCHES**  
 Primarily shallow, narrow ravines and chutes with accumulation of stony colluvium generally 10 ft. (3 m) or less in thickness; susceptible to rapid movement during intense rainfall. Most ravines and chutes designated show evidence of former debris flows and avalanches. Symbol 2 designates historical debris flow or debris avalanche.
- AREAS SUSCEPTIBLE TO ROCKFALL**  
 Steep, locally vertical, natural and man-made slopes and cliffs, 15 ft. (4.5 m) or more high, formed dominantly of sandstone, limestone, sandy shale, mudstone and claystone. Interbedded mudstone, claystone and shale weather rapidly leaving sandstone and limestone rock faces unsupported.
- SOIL AND ROCK SUSCEPTIBLE TO LANDSLIDING**  
 Soil and rock similar to that involved in landslides elsewhere in map area; primarily areas underlain by claystone, mudstone and shale associated with other rock types. Rock weathers rapidly on exposure forming clayey soil highly susceptible to sliding. Includes caves (U-shaped, shallow valleys) containing thick layers of clayey soil that are very susceptible to sliding where excavation breaks continuity of slope and where overloaded by artificial fill.

**AREAS LEAST PRONE TO LANDSLIDES**  
 Map areas in which no patterns or symbols are shown, primarily valley floors, ridge tops and broad benches, modification by excavation and fill may lead to local landslides.

The first four digits of the open file number designate the specific 1:250,000 scale map sheet of which this quadrangle is a part. The last two digits designate the position of the quadrangle on the map sheet. The location of this quadrangle is shown by the black square.

**SOURCE:**  
 West Virginia Landslide Study, West Virginia Geological and Economic Survey by Robert B. Erwin, Director and State Geologist. Saint Albans 7.5' Quadrangle, 1975.

**SOURCE:**  
 USGS National Geologic Map Database, Landslides and Related Features of the New Haven, West Virginia Quadrangle



SCALE IN MILES  
 SCALE IS APPROXIMATE

AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

**NEARBY LANDSLIDES AND RELATED FEATURES**



FIGURE  
**10**







# APPENDIX A

## Boring/Well Construction Logs





**Casagrande Consultants 1977**

**Soil Boring Logs**

**401 to 415, 505, 506, 513, 514,  
701 to 703, 801 to 803**

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_  
Company Appalachian Power Company  
Project Project 1301 - Ash Ponds

Boring No. 401 Date 1-21-77 Sheet 1 of 3  
Type of Boring Auger Rig B-50  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun 1-21-77 Boring completed 1-24-77  
Ground Elevation 596.14' referred to \_\_\_\_\_ Datum \_\_\_\_\_  
Field Party: King and Smithson

Location of Boring:	
Water Level	<u>47'</u>
Time	
Date	<u>1-24-77</u>

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
					4		
	<u>1</u>	<u>3.5-5</u>	<u>5/6</u> <u>10</u>	<u>14"</u>	4		<u>Medium brown clayey silty sand.</u>
					5		
					6		
					7		
					8		
					9		
	<u>2</u>	<u>8.5-10</u>	<u>5/5</u>	<u>6"</u>	9		<u>Same as sample number 1.</u>
					10		
					11		
					12		
					13		
					14		
	<u>3</u>	<u>13.5-15</u>	<u>5/6</u> <u>6</u>	<u>6"</u>	14		<u>Same as sample number 1 but more sandy.</u>
					15		
					16		
					17		
					18		
					19		
	<u>4</u>	<u>18.5-20</u>	<u>16/17</u> <u>18</u>	<u>4"</u>	19		<u>Sand and gravel.</u>
					20		<u>Large gravel in end of spoon.</u>
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 401 Date 1-24-77 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
					24	//	
	5	23.5-25	19/ 25/24	10"	25		Medium brown coarse sand and gravel.
					26		
					27		
					28		
					29	//	
	6	28.5-29.5	45/ 60	6"	30		Dense sand and gravel.
					31		
					32		
					33		
					34	//	
	7	33.5-35	14/ 17/21	10"	35		More sand.
					36		
					37		
					38		
					39	//	
	8	38.5-40	13/ 16/17	12"	40		Same as sample number 7.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 401 Date 1-24-77 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: King and Smithson

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43.5-45	15/ 19/ 25	14"	44		
					45		Wet medium brown sand and gravel.
					46		
					47		Water
					48		
	10	48.5-50	15/ 20/ 21	16"	49		
					50		More sandy.
					51		
					52		Washed out 3' plug in augers.
					53		
	11	53.5-55	16/ 23/ 29	8"	54		
					55		Same as sample number 10.
					56		
					57		Washed out 2' plug in augers.
					58		
	12	58.5-60	32/ 16/ 23	10"	59		
					60		Medium brown sand and gravel w/sandstone fragments Stopped here at 60.0' 1-24-77
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Proposed Ash Pond Area

Boring No. 402 Date 10-28-76 Sheet 1 of 3

Type of Boring Auger Rig B-61





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 10-28-76 Boring completed 10-28-76

Ground Elevation 597.40' referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	45.5'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
					3		
	1	3-4.5	4/4/6	17"	3		Medium brown clayey silt.
					4		
					5		
					6		
					7		
					8		
	2	8-9.5	3/4/5	13"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
					13		
	3	13-14.5	3/4/4	13"	13		Medium brown clayey fine sand.
					14		
					15		
					16		
					17		
					18		
	4	18-19.5	3/9/10	14"	18		Same as sample number 3
					19		
					20		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**





Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	45.5'
Time	
Date	

Boring No. 402 Date 10-28-76 Sheet 2 of 3  
 Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_  
 Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	7/7/5	12"	24		Medium brown sand and gravel.
					25		
					26		
					27		
					28		
	6	28-29.5	7/8/10	13"	29		Medium brown sand w/trace of gravel.
					30		
					31		
					32		
					33		
	7	33-34.5	10/14/17	14"	34		Same as sample number 6 w/more gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	9/15/13	1"	39		Same as sample number 6 - Large gravel in end of spoon.
					40		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 402 Date 10-28-76 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level	45.5
Time	
Date	

Field Party: Roush and REitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	9/6/8	-	44		No recovery.
					45		Water
					46		
					47		
					48		
	10	48-49.5	6/9/11	13"	49		Medium brown sand w/trace of gravel.
					50		
					51		
					52		
					53		
	11	53-54.5	7/8/10	12"	54		Same as sample number 10.
					55		
					56		
					57		
					58		
	12	58-59.5	8/11/12	11"	59		Same as sample number 10. Stopped hole at 59.5' 10-28-76
					60		
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Boring No. 403 Date 10-29-76 Sheet 1 of 3

Type of Boring Auger Rig B-61

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun 10-29-76 Boring completed 10-29-76

Ground Elevation 591.09 referred to \_\_\_\_\_ Datum

Project Project 1301 - Proposed Ash Pond Area

Location of Boring:	
Water Level	50.5
Time	
Date	

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
	1	3-4.5	4 5/7	17"	3		Medium brown clayey silt.
					4		
					5		
					6		
					7		
	2	8-9.5	4 3/4	13"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
	3	13-14.5	6 7/6	13"	13		Same as sample number 1. Medium brown, medium grain sand and gravel.
					14		
					15		
					16		
					17		
	4	18-19.5	4 5/5	12"	18		Same as sample number 3 w/less gravel.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 403 Date 10-29-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	50.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23-24.5	5/ 5/4	12"	24		Medium brown, medium grain sand w/trace of gravel.
					25		
					26		
					27		
					28		
	6	28-29.5	4/ 5/7	12"	29		Same as sample number 5 w/medium and fine grain gravel.
					30		
					31		
					32		
					33		
	7	33-34.5	6/ 6/8	12"	34		Same as sample number 5 w/more gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	5/ 8/12	13"	39		Same as sample number 7.
					40		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 403 Date 10-29-76 Sheet 3 of 3

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	50.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from top (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	8/ 13/ 14	14"	44	///	Light brown medium grain sand w/trace of gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	9/ 15/ 19	15"	49	///	Medium brown sand and gravel.
					50		Water
					51		
					52		
					53		
	11	53-54.5	7/ 10/ 13	0	54	///	No recovery.
					55		
					56		
					57		
					58		
	12	58-59.5	8/ 11/ 12	13"	59	///	Medium and dark brown sand and gravel. Stopped hole at 59.5 10-29-76
					60		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Proposed Ash Pond Area

Boring No. 404 Date 10-28-76 Sheet 1 of 3

Type of Boring Auger Rig B-61

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 10-28-76 Boring completed 10-28-76

Ground Elevation 600.27' referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	47.0'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		Boring off set about 15' east because of corn field.
					1		
					2		
	1	3-4.5	3 1/4 / 6	17"	3		Medium brown silty clay.
					4		
					5		
					6		
					7		
	2	8-9.5	3 1/6 / 8	13"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
	3	13-14.5	3 1/4 / 6	7"	13		Medium brown clayey sand.
					14		
					15		
					16		
					17		
	4	18-19.5	6 / 5/8	12"	18		Medium brown sand and gravel.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 404 Date 10-28-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	47.0'
Time	
Date	

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	5/9/9	12"	24		Medium brown fine sand and gravel.
					25		
					26		
					27		
					28		
	6	28-29.5	11/6/5	11"	29		Same as sample number 5.
					30		
					31		
					32		
					33		
	7	33-34.5	4/5/5	7"	34		Medium brown fine sand w/trace of gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	12/12/11	14"	39		Same as sample number 7 w/light brown sand
					40		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 404 Date 10-28-76 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	47.0'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	5/8/13	13"	44		Medium brown fine sand w/trace of gravel.
					45		
					46		
					47		Water
					48		
	10	48-49.5	4/6/9	14"	49		Same as sample number 9.
					50		
					51		
					52		
					53		
	11	53-54.5	3/4/6	18"	54		Same as sample number 9 w/medium grain sand.
					55		
					56		
					57		
					58		
	12	58-59.5	4/7/8	-	59		No recovery.
					60		Stopped hole at 59.5'
							10-28-76
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Ash Pond

Boring No. 405 Date 1-24-77 Sheet 1 of 3

Type of Boring Auger Rig B-50





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 1-24-77 Boring completed 1-25-77

Ground Elevation 603.14 referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: King and Smithson

Location of Boring:	
Water Level	51.0'
Time	
Date	1-24-77

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3.5-5	2/ 4/3	5"	4		Fragments of clay with silt.
					5		
					6		
					7		
					8		
	2	8.5-10	5/ 6/7	8"	9		Brown sand.
					10		
					11		
					12		
					13		
	3	13.5-15	7/ 8/9	7"	14		Same as sample number 2 w/some larger grains.
					15		
					16		
					17		
					18		
					19		
	4	18.5-20	4/ 4/7	6"	20		Same as sample number 3.
					21		
					22		
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		
					36		
					37		
					38		
					39		
					40		
					41		
					42		
					43		
					44		
					45		
					46		
					47		
					48		
					49		
					50		
					51		
					52		
					53		
					54		
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					57		
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					81		
					82		
					83		
					84		
					85		
					86		
					87		
					88		
					89		
					90		
					91		
					92		
					93		
					94		
					95		
					96		
					97		
					98		
					99		
					100		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_



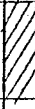

Boring No. 405 Date 1-24-77 Sheet 2 of 3

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	4/ 4/8	6"	24		Light brown sand.
					25		
					26		
					27		
					28		
	6	28.5-30	6/ 8/7	5"	29		Larger grain sand with small gravel light brown.
					30		
					31		
					32		
					33		
	7	33.5-35	8/ 11/11	6"	34		Medium grain sand - light brown.
					35		
					36		
					37		
					38		
	8	38.5-40	11/ 11/15	6"	39		Gravelly sand - light brown.
					40		
					1		

Engineer \_\_\_\_\_



## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 405 Date 1-25-77 Sheet 3 of 3

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: King and Smithson

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		
					41		
					42		
					43		
	9	43.5-45	4 1/6	5"	44	//	
					45		Same as sample number 8 with more gravel.
					46		
					47		
					48		
	10	48.5-50	9 9/11	8"	49	//	
					50		Small gravel with some sand.
					51		Water
					52		
					53		
	11	53.5-55	4 1/8	10"	54	//	
					55		Brown medium grain sand.
					56		
					57		
					58		
	12	58.5-60	4 4/7	8"	59	//	
					60		Fine medium brown sand. Stopped hole at 60.0'
					1		1-25-77

Engineer \_\_\_\_\_

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Ash Pond

Boring No. 406 Date 1-25-77 Sheet 1 of 3

Type of Boring Auger Rig B-50





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 1-25-77 Boring completed 1-25-77

Ground Elevation 603.14 referred to \_\_\_\_\_

Field Party: King and Smithson Date \_\_\_\_\_

Location of Boring:	
Water Level	51.0'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
	1	3.5-5	3/ 5/7	18"	3		
					4		Silty clay.
					5		
					6		
					7		
					8		
	2	8.5-10	3/ 4/5	8"	9		
					10		Same as sample number 1.
					11		
					12		
					13		
	3	13.5-15	5/ 6/7	6"	14		
					15		Light brown sand.
					16		
					17		
					18		
					19		
	4	18.5-20	4/ 4/6	8"	20		
					21		Medium grain sand with trace of small gravel.
					22		
					23		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 406 Date 1-25-77 Sheet 2 of 3

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: King and Smithson \_\_\_\_\_ Date \_\_\_\_\_

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	5/6/7	9"	24	[Hatched]	
					25		Light brown medium grain sand.
					26		
					27		
					28		
	6	28.5-30	5/6/7	6"	29	[Hatched]	
					30		Same as sample number 5 w/larger grain.
					31		
					32		
					33		
	7	33.5-35	10/12/12	6"	34	[Hatched]	
					35		Light brown to light gray sand.
					36		
					37		
					38		
	8	38.5-40	8/12/16	10"	39	[Hatched]	
					40		Same as sample number 7.
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 406 Date 1-25-77 Sheet 3 of 3

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_  
 Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					41		
					42		
					43		
	9	43.5-45	18/ 18 1/2	9"	44	[Hatched Box]	Same as sample number 8.
					45		
					46		
					47		
					48		
	10	48.5-50	10/ 17 1/2	6"	49	[Hatched Box]	Medium brown sand w/trace of coal.
					50		Water
					51		
					52		
					53		
	11	53.5-55	10/ 14 1/2	5"	54	[Hatched Box]	Grayish gravelly sand.
					55		
					56		
					57		
					58		
	12	58.5-60	14/ 16 1/7		59	[Hatched Box]	Small gravelly sand (dark)
					60		Stopped hole at 60'
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Proposed Ash Pond Area

Boring No. 407 Date 10-27-76 Sheet 1 of 3

Type of Boring Auger Rig B-61





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 10-27-76 Boring completed 10-27-76

Ground Elevation 613.27' referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	<u>Dry</u>
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3-4.5	3/4/3	8"	3		Medium coarse and brown sand.
					4		
					5		
					6		
					7		
					8		
	2	8-9.5	3/3/3	8"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
					13		
	3	13-14.5	3/4/6	12"	13		Same as sample number 1.
					14		
					15		
					16		
					17		
					18		
	4	18-19.5	11/7/6	14"	18		Same as sample number 1.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Boring No. 407 Date 10-27-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	6/6/7	10"	24		Medium brown and medium coarse sand.
					25		
					26		
					27		
					28		
	6	28-29.5	6/7/9	12"	29		Fine medium brown sand.
					30		
					31		
					32		
					33		
	7	33-34.5	9/10/15	12"	34		First six tenths fine sand. Second six tenths sand with small gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	17/19/16	12"	39		Sand and small gravel.
					40		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Boring No. 407 Date 10-27-76 Sheet 3 of 3  
 Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_  
 Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		Ran through bolder.
					43		
	9	43-44.5	30/ 50 1/2	6"	44		Sand with larger gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	15/ 20 1/4	12"	49		First six tenths sand. Second six tenths sand and gravel.
					50		
					51		
					52		
					53		
	11	53-54.5	13/ 20 1/8	14"	54		Sand with small gravel.
					55		
					56		
					57		
					58		
	12	58-59.5	20/ 18 1/2	14"	59		Same as sample number 11. Stopped hole at 59.5' 10-27-76
					60		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Proposed Ash Pond Area

Location of Boring:	
Water Level	59.5
Time	
Date	

Boring No. 408 Date 10-27-76 Sheet 1 of 3





Type of Boring Auger Rig B-61

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 10-27-76 Boring completed 10-28-76

Ground Elevation 608.06' referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		Boring offset about 40' because of corn field
					1		
					2		
	1	3-4.5	3 1/4 / 4	8"	3		Medium brown fine sand w/trace of gravel.
					4		
					5		
					6		
					7		
	2	8-9.5	3 1/4 / 4	18"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
					13		
	3	13-14.5	3 1/3 / 5	14"	13		Same as sample number 1.
					14		
					15		
					16		
					17		
					18		
	4	18-19.5	4 1/3 / 3	12"	18		Same as sample number 1.
					19		
					20		
					1		

Engineer \_\_\_\_\_



**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 408 Date 10-27-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_




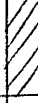
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Project _____	
Location of Boring: _____	
Water Level	_____
Time	_____
Date	_____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	3/4/5	8"	24		Medium brown fine sand.
					25		
					26		
					27		
					28		
	6	28-29.5	8/12/14	14"	29		Light brown fine sand w/some gravel.
					30		
					31		
					32		
					33		
	7	33-34.5	12/14/20	18"	34		Light brown coarse sand w/some gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	8/8/6	14"	39		Light brown coarse sand and gravel.
					40		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Boring No. 408 Date 10-27-76 Sheet 3 of 3





Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	15/ 30/34	18"	44		Light brown sand and gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	20/ 29/21	18"	49		Light brown coarse sand w/some gravel.
					50		
					51		
					52		
					53		
	11	53-54.5	10/ 11/10	14"	54		Light brown fine sand.
					55		
					56		
					57		
					58		
	12	58-59.5	5/ 6/6	12"	59		Coarse medium brown sand.
					60		Water
							Stopped hole at 59.5
							10-28-76
					1		





Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_  
 Company Appalachian Power Company  
 Project Project 1301 - Proposed Ash Pond Area

Boring No. 410 Date 10-26-76 Sheet 1 of 3  
 Type of Boring Auger Rig B-61  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun 10-26-76 Boring completed 10-26-76  
 Ground Elevation 604.65 referred to \_\_\_\_\_ Datum  
 Field Party: Roush and Retimire

Location of Boring:	
Water Level	51.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		Boring offset 5' east.
					1		
					2		
	1	3-4.5	2/4/4	5"	3		Medium brown fine sand.
					4		
					5		
					6		
					7		
	2	8-9.5	3/4/5	12"	8		Same as sample number 1 w/light colored sand.
					9		
					10		
					11		
					12		
	3	13-14.5	5/5/6	14"	13		Same as sample number 2.
					14		
					15		
					16		
					17		
	4	18-19.5	6/7/8	14"	18		Same as sample number 2 w/some gravel.
					19		
					20		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 410 Date 10-22-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: Roush and REitmire

Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level	_____
Time	_____
Date	_____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
	5	23-24.5	8/10/11	14"	23		Medium brown sand and gravel.
					24		
					25		
					26		
					27		
	6	28-29.5	8/8/8	13"	28		Same as sample number 5.
					29		
					30		
					31		
					32		
	7	33-34.5	6/9/12	15"	33		Same as sample number 5.
					34		
					35		
					36		
					37		
	8	38-39.5	6/10/12	13"	38		Same as sample number 5.
					39		
					40		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 410 Date 10-26-76 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	51.5'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	12/17	8"	44		Medium brown sand w/trace of gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	5/10	13"	49		Same as sample number 9.
					50		
					51		Water
					52		
					53		
	11	53-54.5	7/10	17"	54		Same as sample number 9 w/more gravel.
					55		
					56		
					57		
					58		
	12	58-59.5	14/13	16"	59		Same as sample number 11. Stopped hole at 59.5 10-26-76
					60		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_  
Company Appalachian Power Company  
Project Project 1301 - Proposed Ash Pond Area

Boring No. 411 Date 10-27 76 Sheet 1 of 3  
Type of Boring Auger Rig B-61  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun 10-22-76 Boring completed 10-26-76  
Ground Elevation 607.25 referred to \_\_\_\_\_ Datum  
Field Party: Roush and Reitmire

Location of Boring:	
Water Level	55'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		Moved boring 5' north
					1		
					2		
	1	3-4.5	3/4/4	14"	3		Medium brown fine sand.
					4		
					5		
					6		
					7		
	2	8-9.5	3/4/4	12"	8		Same as sample number 1.
					9		
					10		
					11		
					12		
	3	13-14.5	8/3/5	14"	13		Same as sample number 1.
					14		
					15		
					16		
					17		
	4	18-19.5	5/5	12"	18		Same as sample number 1.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 411 Date 10-26-76 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	55'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	7 1/5 / 4	8"	24		Medium brown fine sand.
					25		
					26		
					27		
					28		
	6	28-29.5	5 1/4 / 5	5"	29		Light brown fine sand.
					30		
					31		
					32		
					33		
	7	33-34.5	6 1/8 / 5	8"	34		Medium brown sand w/trace of gravel.
					35		
					36		
					37		
					38		
	8	38-39.5	4 1/5 / 5	10"	39		Light brown fine sand.
					40		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 411 Date 10-26-76 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	55'
Time	
Date	

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	8 9/13	14"	44		Medium brown sand and gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	5 6/11	13"	49		Same as sample number 9 w/less gravel.
					50		
					51		
					52		
					53		
	11	53-54.5	6 9/12	13"	54		Same as sample number 9
					55		Water
					56		
					57		
					58		
	12	58-59.5	8 6/6	15"	59		Same sample number 9.
					60		Stopped hole at 59.5' 10-26-76
					1		

Engineer \_\_\_\_\_



## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_  
 Company Appalachian Power Company  
 Project Project 1301 - Ash Ponds  
 Location of Boring: \_\_\_\_\_  
 Water Level 52.0'  
 Time \_\_\_\_\_  
 Date 1-26-77

Boring No. 412 Date 1-26-77 Sheet 1 of 3  
 Type of Boring Auger Rig B-50  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun 1-26-77 Boring completed 1-27-77  
 Ground Elevation 600.49' referred to \_\_\_\_\_ Datum \_\_\_\_\_  
 Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
					3		
	1	3.5-5	$10\frac{1}{11}$ / $15$	18"	4	[Hatched Box]	Sandy, silty clay.
					5		
					6		
					7		
					8		
	2	8.5-10	$11\frac{1}{8}$ / $8$	8"	9	[Hatched Box]	Red sand - medium grain.
					10		
					11		
					12		
					13		
	3	13.5-15	$3\frac{1}{4}$ / $7$	9"	14	[Hatched Box]	Medium grain brown sand.
					15		
					16		
					17		
					18		
	4	18.5-20	$3\frac{1}{4}$ / $3$	5"	19	[Hatched Box]	Fine grain brown sand
					20		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 412 Date 1-26-77 Sheet 2 of \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: King and Smtihson

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	11 7/7	6"	24		
					25		Medium grain sand - light brown.
					26		
					27		
					28		
	6	28.5-30	4/ 3/3	9"	29		
					30		Medium to fine grain sand.
					31		
					32		
					33		
	7	33.5-35	6/ 6/6	8"	34		
					35		Same as sample number 6.
					36		
					37		
					38		
	8	38.5-40	8/ 11/10	6"	39		
					40		Medium grain sand w/one large gravel.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 412 Date 1-27-77 Sheet 3 of \_\_\_\_\_  
 Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		Soil type, color, texture, consistency, sampler driving not blows per foot on casing, depths wash water lost, observe fluctuations in water level, notes on drilling ease, etc.
					41		
					42		
					43		
	9	43.5-45	10/9/15	7"	44		
					45		Medium grain sand - light brown Trace of coal.
					46		
					47		
					48		
	10	48.5-50	9/12/15	7"	49		
					50		Same as sample number 9 w/no coal.
					51		
					52		Water
					53		
	11	53.5-55	8/9/8	12"	54		
					55		Medium grain sand.
					56		
					57		
					58		
	12	58.5-60	16/9/11	-0-	59		
					60		No recovery. Stopped hole at 60.0' 1-27-77
					1		

Engineer \_\_\_\_\_





AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_  
 Company Appalachian Power Company  
 Project Project 1301 - Ash Pond Area

Boring No. 413 Date 3-3-77 Sheet 1 of 3  
 Type of Boring Auger Rig B-50  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun 3-3-77 Boring completed 3-3-77  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_  
 Field Party: Smithson and Smith

Location of Boring:	
Water Level	50'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3.5-5	<sup>5</sup> / <sub>5</sub> 6	6"	4		Medium brown sand w/small pea gravel.
					5		
					6		
					7		
					8		
	2	8.5-10	<sup>4</sup> / <sub>3</sub> 4	7"	9		Same as sample number 1.
					10		
					11		
					12		
					13		
	3	13.5-15	<sup>5</sup> / <sub>3</sub> 4	9"	14		Medium brown sand w/legnite.
					15		
					16		
					17		
					18		
	4	18.5-20	<sup>4</sup> / <sub>7</sub> 8	10"	19		Medium brown sand w/some pea gravel.
					20		
					1		

Engineer \_\_\_\_\_

## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 413 Date 3-3-77 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Smithson and Smith

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	7 6/7	8"	24	/ / / / /	Medium brown sand w/trace of pea gravel.
					25		
					26		
					27		
					28		
	6	28.5-30	6 7/6	7"	29	/ / / / /	Same as sample number 5.
					30		
					31		
					32		
					33		
	7	33.5-35	9 12/12	11"	34	/ / / / /	Medium brown medium coarse sand and gravel.
					35		
					36		
					37		
					38		
	8	38.5-40	6 8/11	12"	39	/ / / / /	Same as sample number 7.
					40		
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 413 Date 3-3-77 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Field Party: Smithson and Smith

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		
					41		
					42		
					43		
	9	43.5-45	12/ 15/14	15"	44	///	Light brown sand and gravel. Very small claylike seam.
					45		Light brown sand and gravel.
					46		
					47		
					48		
	10	48.5-50	18/ 26/24	10"	49	///	Dark brown silty sand and gravel.
					50		Water
					51		
					52		
					53		
	11	53.5-55	10/ 12/11	12"	54	///	Light brown fine sand w/trace of gravel.
					55		
					56		
					57		
					58		
	12	58.5-60	5/ 8/10	9"	59	///	Dark brown silty sand.
					60		Stopped hole at 60.0' 3-3-77
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Ash Pond Area

Boring No. 414 Date 3-3-77 Sheet 1 of 3

Type of Boring Auger Rig B-50





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 3-3-77 Boring completed 3-3-77

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Smithson and Smith

Location of Boring:	
Water Level	48'
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3.5-5	4/7/10	12"	4		Light brown silty clay.
					5		
					6		
					7		
					8		
	2	8.5-10	4/4/5	8"	9		Medium brown, medium silty sand.
					10		
					11		
					12		
					13		
	3	13.5-15	5/4/4	7"	14		Same as sample number 2 w/trace of pea gravel.
					15		
					16		
					17		
					18		
	4	18.5-20	6/5/5	10"	19		Same as sample number 3.
					20		
					1		

Engineer \_\_\_\_\_

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 414 Date 3-3-77 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Smithson and Smith

Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	7/8/8	11"	24		Medium brown coarse sand and pea gravel.
					25		
					26		
					27		
					28		
	6	28.5-30	8/8/9	9"	29		Light brown fine sand.
					30		
					31		
					32		
					33		
	7	33.5-35	8/8/10	13"	34		Medium brown coarse sand and gravel (pea)
					35		
					36		
					37		
					38		
	8	38.5-40	8/10/10	8"	39		Same as sample number 7.
					40		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 414 Date 3-3-77 Sheet 3 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_

Field Party: Smithson and Smith





Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level \_\_\_\_\_

Time \_\_\_\_\_

Date \_\_\_\_\_

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		
					41		
					42		
					43		
	9	43.5-45	5/6/8	10"	44		Dark brown medium to coarse sand and pea gravel.
					45		
					46		
					47		
					48		Water
	10	48.5-50	10/13/14	14"	49		Medium brown silty sand and pea gravel.
					50		
					51		
					52		
					53		
	11	53.5-55	7/8/10	4"	54		Medium silty sand w/gravel.
					55		
					56		
					57		
					58		
	12	58.5-60	15/19/20	10"	59		Medium brown fine to medium coarse sand.
					60		Stopped hole at 60.0' 3-3-77
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project I301 - ASH Pond Area

Boring No. 415 Date 3-8-77 Sheet 1 of \_\_\_\_\_

Type of Boring Auger Rig B-61

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation 3-8-77 referred to 3-8-77

\_\_\_\_\_ Date \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
	1	3-4.5	2/4/4	14"	3		Medium brown clayey silt.
					4		
					5		
					6		
					7		
	2	8-9.5	4/5/7	13"	8		Medium brown clayey silt.
					9		
					10		Medium brown sand.
					11		
					12		
	3	13-14.5	3/4/6	8"	13		Medium brown, medium grain sand
					14		
					15		
					16		
					17		
	4	18-19.5	2/3/5	8"	18		Medium brown sand.
					19		
					20		
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

 Boring No. 415 Date 3-8-77 Sheet 2 of 3

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

 Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
	5	23-24.5	3 1/4 / 7	15"	23		
					24		Medium brown sand w/trace of pea gravel.
					25		
					26		
					27		
	6	28-29.5	5 / 8 / 8	13"	28		
					29		Same as sample number 5 w/more pea gravel.
					30		Medium brown coarse sand and pea gravel.
					31		
					32		
	7	33-34.5	6 / 10 / 12	14"	33		
					34		Medium brown sand and pea gravel.
					35		
					36		
					37		
	8	38-39.5	10 / 22 / 28	16"	38		
					39		Medium and medium brown coarse sand and gravel.
					40		Medium brown medium coarse sand and pea gravel w/trace of large gravel.
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 415 Date 3-8-77 Sheet 3 of \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_









Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					41		
					42		
	9	43-44.5	10/ 12/14	13"	43		
					44		Medium brown gravelly sand.
					45		
					46		
					47		
	10	48-49.5	11/ 13/15	14"	48		
					49		Medium brown sand and pea gravel. Water
					50		
					51		
					52		
	11	53-54.5	10/ 12/13	10"	53		
					54		Medium brown sand with pea gravel and lignite.
					55		
					56		
					57		
	12	58-59.5	11/ 12/15	11"	58		
					59		Medium brown coarse sand and pea gravel.
					60		Stopped hole at 59.5' 3-8-77
					1		

Engineer \_\_\_\_\_



**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company Appalachian Power Company  
Project Project 1301 - Conveyor

Boring No. 505 Date 11-17-76 Sheet 1 of 4  
Type of Boring Auger Rig B-61  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun 11-17-76 Boring completed 11-18-76  
Ground Elevation 586.9' referred to \_\_\_\_\_ Datum

Location of Boring: \_\_\_\_\_  
Water Level \_\_\_\_\_  
Time \_\_\_\_\_  
Date \_\_\_\_\_

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
	1	3-4.5	<sup>2</sup> / <sub>3</sub> / 6	10"	3		Medium brown clay silt.
					4		
					5		
					6		
					7		
	2	8-9.5	<sup>2</sup> / <sub>3</sub> / 5	8"	8		Top .3 medium brown silt remainder medium brown very wet pure silt.
					9		
					10		
					11		
					12		
	3	13-14.5	<sup>2</sup> / <sub>2</sub> / 5	6"	13		Same as sample number 2.
					14		
					15		
					16		
					17		
	4	18-19.5	<sup>15</sup> / <sub>17</sub> / 23	8"	18		Medium grain brown sand with gravel some broken gravel.
					19		
					20		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 505 Date 11-17-76 Sheet 2 of 4

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level	_____
Time	_____
Date	_____

Depth of Casing, ft.	Sample No.	Sample depth from top (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	16/ 18/22	10"	24		Sand and gravel with more smaller gravel.
					25		
					26		
					27		
					28		
	6	28-29.5	15/ 17/18	10"	29		Light to medium brown sand with medium amount of gravel.
					30		
					31		
					32		
					33		
	7	33-34.5	13/ 11/12	8"	34		Same as sample number 6.
					35		
					36		
					37		
					38		
	8	38-39.5	13/ 14/18	10"	39		Fine to medium grain sand with gravel. Some broken gravel.
					40		
					1		

Engineer \_\_\_\_\_

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 505 Date 11-17-76 Sheet 3 of 4

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush & Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		Water
	9	43-44.5	13/ 18/15	6"	44		Sand with small amount of small gravel.
					45		
					46		
					47		
	10	48-49.5	11/ 13/11	6"	48		Large grain sand with traces of larger gravel.
					49		
					50		
					51		
					52		
					53		
	11	53-54.5	11/ 11/13	6"	54		Top.3 large grain sand Remainder small to medium grain sand.
					55		
					56		
					57		
					58		
	12	58-59.5	11/ 13/15	10"	59		Medium to dark sand with small amount of gravel with traces of coal in the top of spoon.
					60		
					1		

Engineer \_\_\_\_\_

## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 505 Date 11-18-76 Sheet 4 of 4

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					60		
					61		
					62		
					63		
	13	63-64.5	11/ 22/36	6"	64	//	Medium brown and grain sand with a few gravels.
					65		
					66		
					67		
					68		
	14	68-69.5	11/ 12/13	6"	69	//	Medium brown with large grain sand with some gravel.
					70		
					71		
					72		
					73		
	15	73-74.5	11/ 12/14	0	74	//	No recovery.
					75		
					76		
					77		
					78		
	16	78-79.5	65/ 2	0	79	//	Large gravel in end of spoon
					80		Rock Stopped hole at 80.6'
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Conveyor

Boring No. 506 Date 11-17-76 Sheet 1 of 4

Type of Boring Auger Rig B-61





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 11-17-76 Boring completed 11-17-76

Ground Elevation 579.43' referred to \_\_\_\_\_ Datum

Field Party: Roush and REitmire

Location of Boring:	
Water Level	37.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		Elevation changed about 1' lower.
					1		
					2		
	1	3-4.5	2/4/4	6"	3		Dark brown pure silt.
					4		
					5		
					6		
					7		
	2	8-9.5	6/2/3	6"	8		Top .2 dark brown silt Remainder medium grain brown sand with small pieces of gravel.
					9		
					10		
					11		
					12		
	3	13-14.5	14/18/21	8"	13		Fine grain light brown sand with some small gravel.
					14		
					15		
					16		
					17		
					18		
	4	18-19.5	15/23/24	2"	18		Gravel with medium grain dark brown sand - one fragments of broken sandstone.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 506 Date 11-17-76 Sheet 2 of 4

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
	5	23-24.5	24/ 31/39	12"	24		Medium and light brown sand and gravel.
					25		
					26		
					27		
					28		
	6	28-29.5	26/ 56/50/ .3	12"	29		Same as sample number 5 w/large gravels in spoon.
					30		
					31		
					32		
					33		
	7	33-34.5	28/ 30/33	13"	34		Same as sample number 5.
					35		
					36		
					37		Water
					38		
	8	38-39.5	16/ 10/10	4"	39		Medium brown sand and gravel.
					40		
					1		

Engineer \_\_\_\_\_



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_  
Location of Boring: \_\_\_\_\_  
Water Level \_\_\_\_\_  
Time \_\_\_\_\_  
Date \_\_\_\_\_

Boring No. 506 Date 11-17-76 Sheet 3 of 4  
Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_  
Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
	9	43-44.5	11/ 10/13	7"	44		Medium brown sand and gravel.
					45		
					46		
					47		
					48		
	10	48-49.5	10/ 22/34	6"	49		Medium brown, dark brown sand and small gravel w/traces of coal.
					50		
					51		
					52		
					53		
	11	53-54.5	13/ 15/18	5"	54		Medium brown sand and gravel.
					55		
					56		
					57		
					58		
	12	58-59.5	17/ 13/14	7"	59		Same as sample number 11 w/small gravel.
					60		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 506 Date 11-17-76 Sheet 4 of 4

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire




Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level \_\_\_\_\_

Time \_\_\_\_\_

Date \_\_\_\_\_

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					60		
					61		
					62		
					63		
	13	63-64.5	15/ 24/30	14"	64		Medium brown sand and gravel.
					65		
					66		
					67		
					68		
	14	68-69.5	12/ 19/23	9"	69		Same as sample number 13.
					70		
					71		
					72		
					73		
	15	73-74.5	17/ 26/44	6"	74		Same as sample number 13.
					75		Stopped hole at 75.6'
					76		11-17-76
					77		
					78		
					79		
					80		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY





LOG OF BORING

Job No. \_\_\_\_\_  
 Company Appalachian Power Company  
 Project Project 1301 - Coal Handling

Boring No. 513 Date 2-3-77 Sheet 1 of 4  
 Type of Boring Auger Rig B-50  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun 2-3-77 Boring completed 2-3-77  
 Ground Elevation 573.73 referred to \_\_\_\_\_ Datum

Location of Boring:	
Water Level	33.5
Time	
Date	2-3-77

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3.5-5	5/6/8	13"	4		Medium light and medium brown mottled silty clay.
					5		
					6		
					7		
					8		
	2	8.5-10	5/12/17	18"	9		Very stiff mottled brown silty clay.
					10		
					11		
					12		
					13		
	3	13.5-15	5/9/12	18"	14		Very stiff mottled brown silty clay.
					15		
					16		
					17		
					18		
	4	18.5-20	4/8/12	18"	19		Same as sample number 3.
					20		
					1		

Engineer \_\_\_\_\_

## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 513 Date 2-3-77 Sheet 2 of 4

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Project _____	
Location of Boring: _____	
Water Level	33.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
	5	23-24.5	3 1/4 / 5	18"	23		
					24		Loose medium brown silty sand.
					25		
					26		
					27		
	6	25-29.5	23 1/2 / 25	14"	28		
					29		Dense medium brown gray sand w/trace of silt.
					30		
					31		
					32		
	7	33.5-35	8 / 12 / 11	10"	33		Water
					34		Medium brown to medium gray sand w/trace of silt.
					35		
					36		
					37		
					38		
	8	38.5-40	1 / 1 / 4	6"	38		
					39		Loose medium brown and gray sand w/trace of silt.
					40		
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 513 Date 2-3-77 Sheet 3 of 4

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Project _____	
Location of Boring: _____	
Water Level	33.5
Time	_____
Date	2-3-77

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
					3		
	9	43.5-45	5/7/9	0	4		Sand and gray wash water.
					5		
					6		
					7		
					8		
	10	48.5-50	5/9/11	4"	9		Medium brown sand and gravel.
					10		
					11		
					12		
	11	53.5-55	9/14/16	8"	14		Dense medium brown gray sand w/trace of silt.
					15		
					16		
					17		
					18		
	12	58.5-60	12/20/25	10"	19		Dense medium brown, gray sand.
					20		
					21		
					22		
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		
					36		
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					43		
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					90		
					91		
					92		
					93		
					94		
					95		
					96		
					97		
					98		
					99		
					100		

Engineer \_\_\_\_\_

## AEP CIVIL ENGINEERING LABORATORY LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 513 Date 2-3-77 Sheet 4 of 4

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Location of Boring:	
Water Level	33.5
Time	
Date	2-3-77

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					60		
					61		
					62		
					63		
	13	63.5-65	13/ 23/27	6"	64	//	Very dense medium brown and gray sand w/trace of silt.
					65		
					66		
					67		
					68		
	14	68.5-70	11/ 18/60	12"	69	//	Same as sample number 13. .2 gray sandstone in end of tube.
					70	//	
					1		Stopped hole at 70.0'
					2		2-3-77
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					0		
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301- Coal Yard

Boring No. 514 Date 2-4-77 Sheet 1 of 4  
 Type of Boring Auger Rig B-50  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun 2-4-77 Boring completed 2-4-77  
 Ground Elevation 573.09 referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	1	3.5-5	5/9/13	12"	4		Mottled light brown and rusty sandy silty clay w/rock fragments. Very stiff - dry -
					5		
					6		
					7		
					8		
	2	8.5-10	11/22/27	14"	9		Medium brown silty clayey sand w/gravel. dense-dry
					10		
					11		
					12		
					13		
					14		
	3	13.5-15	15/20/19	12"	15		Medium brown coarse sand and gravel. - dense-dry-
					16		
					17		
					18		
					19		
	4	18.5-20	15/16/20	10"	20		Medium brown coarse sand and gravel. dense - dry
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 514 Date 2-4-77 Sheet 2 of 4

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson





Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level \_\_\_\_\_

Time \_\_\_\_\_

Date \_\_\_\_\_

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
					24		
	5	23.5-25	19/19/20	8"	25		Medium brown sand and gravel dense and dry
					26		
					27		
					28		
					29		
	6	28.5-30	11/9/15	6"	30		Medium brown damp sand and gravel - medium -
					31		
					32		
					33		
					34		Water
	7	33.5-35	12/15/13	6"	35		Medium brown wet - sand and gravel. - medium -
					36		
					37		
					38		
					39		
	8	38.5-40	4/6/7	5"	40		Medium brown gravelly sand - wet -
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 514 Date 2-4-77 Sheet 3 of 4

Type of Boring Auger Rig B-50









Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
					44		Washed out plug 2'
	9	43.5-45	7 1/4 / 15	-0-	45		- Lost sample -
					46		
					47		
					48		
					49		
	10	48.5-50	11 1/8 / 21	7"	50		Medium brown sand and gravel Dense - wet
					51		
					52		
					53		
					54		
	11	53.5-55	6 7/8 / 12	12"	55		Medium brown fine to medium sand
					56		
					57		
					58		
					59		
	12	58.5-60	13 25/17	-0-	60		Washed out plug 2' Lost sample
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 514 Date 2-4-77 Sheet 4 of 4

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					60		
					61		Augers settled down after drilling 6"
					62		
					63		
					64		
	13	63.5-65	12/22/23	-0-	65		No recovery. * Used stiff spring.
					66		
					67		
					68		
					69		
	14	68.5-70	24/30/80	8"	70		Medium brown sand and gravel w/trace of sandstone fragments in end of spoon.
					71		
					72		Stopped hole at 70' 2-4-77
					73		
					74		
					75		
					76		
					77		
					78		
					79		
					80		
					1		





Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_  
Company Appalachian Power Company  
Project Project 1301 - Flyash Pipe Bridge

Boring No. 701 Date 2-4-77 Sheet 1 of 5  
Type of Boring Auger Rig B-50  
Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
Boring begun 2-4-77 Boring completed 2-9-77  
Ground Elevation 584.92 referred to \_\_\_\_\_ Datum \_\_\_\_\_  
Field Party: King and Smithson

Location of Boring:	
Water Level	<u>40.0'</u>
Time	
Date	<u>2-4-77</u>

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
	<u>1</u>	<u>3.5-5</u>	<u>6/9/12</u>	<u>15"</u>	4		<u>Silty medium brown to gray clay.</u>
					5		
					6		
					7		
					8		
					9		
	<u>2</u>	<u>8.5-10</u>	<u>5/5/8</u>	<u>8"</u>	10		<u>Sandy silt.</u>
					11		
					12		
					13		
					14		
	<u>3</u>	<u>13.5-15</u>	<u>5/9/7</u>	<u>8"</u>	15		<u>Medium grain brown sand and silt.</u>
					16		
					17		
					18		
					19		
	<u>4</u>	<u>18.5-20</u>	<u>15/20/22</u>	<u>11"</u>	20		<u>Medium grain sand w/trace of gravel.</u>
					21		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Boring No. 701 Date 2-7-77 Sheet 2 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
					24		
	5	23.5-25	8 13/17	9"	25		Fine sand w/trace of coal and some gravel.
					26		
					27		
					28		
					29		
	6	28.5-30	7 8/11	8"	30		Medium grain sand w/small gravel.
					31		
					32		
					33		
					34		
	7	33.5-35	5 6/8	12"	35		Medium grain sand - medium brown
					36		
					37		
					38		
					39		
	8	38.5-40	4 9/11	18"	40		Light brown medium grain sand. Water at 40.0'
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 701 Date 2-8-77 Sheet 3 of 5  
 Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_  
 Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_  
 Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_  
 Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring: \_\_\_\_\_

Water Level \_\_\_\_\_

Time \_\_\_\_\_

Date \_\_\_\_\_

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					40		
					41		
					42		
					43		
					44		
	9	43.5-45	4/6/7	-0-	45		No recovery.
					46		
					47		
					48		
					49		
	10	48.5-50	2/4/7	3"	50		Medium grain sand w/small gravel.
					51		
					52		
					53		
					54		
	11	53.5-55	17/12/15	16"	55		Medium grain sand w/several large gravel.
					56		
					57		
					58		
					59		
	12	58.5-60	6/12/16	8"	60		Medium grain sand w/small gravel.
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Boring No. 701 Date 2-8-77 Sheet 5 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					80		Auger refusal at 80.5'
					81		Started coring at 80.5'
					82		
					83		
					84		
	Core	80.5-90.5		7.6'	85		Gray coarse grain sandstone.
					86		
					87		
					88		
					89		
					90		Stopped hole at 90.5'
					91		2-8-77
					92		
					93		
					94		
					95		
					96		
					97		
					98		
					99		
					100		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Fly ash Pond

Boring No. 703 Date 2-1-77 Sheet 1 of 5

Type of Boring Auger Rig B-50





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 2-1-77 Boring completed 2-2-77

Ground Elevation 567.70 referred to \_\_\_\_\_ Date \_\_\_\_\_

Field Party: King and Smithson

Location of Boring:	
Water Level	39.0
Time	
Date	2-1-77

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
					3		
					4		
	1	3.5-5	5/7/7	16"	5		Silty clay.
					6		
					7		
					8		
					9		
	2	8.5-10	3/4/5	12"	10		Sandy, silty clay.
					11		
					12		
					13		
					14		
	3	13.5-15	1/3/3	12"	15		Sandy clay.
					16		
					17		
					18		
					19		
	4	18.5-20	13/22/19	5"	20		Sand and medium large gravel. Trace of coal.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 703 Date 2-1-77 Sheet 2 of 5

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun \_\_\_\_\_ Boring completed 1

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Project \_\_\_\_\_

Location of Boring:	
Water Level	39.0
Time	
Date	2-1-77

Field Party: King and Smithson

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					20		
					21		
					22		
					23		
					24		
	5	23.5-25	10/ 15/18	8"	25		Medium grain sand, light gray.
					26		
					27		
					28		
					29		
	6	28.5-30	7/ 8/11	5"	30		Medium grain sand w/trace of coal.
					31		
					32		
					33		
	7	33.5-35	5/ 6/10	7"	34		Medium grain sand, medium brown.
					35		
					36		
					37		
					38		
					39		Water
	8	38.5-40	5/ 5/5	8"	40		Same as sample number 7.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 703 Date 2-1-77 Sheet 3 of 5

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Project \_\_\_\_\_

Field Party: King and Smithson

Location of Boring:	
Water Level	
Time	
Date	<u>2-1-77</u>

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
					44		
	9	43.5-45	4/6/7	1"	45		Washed out. Two large gravels and medium grain sand.
					46		
					47		
					48		
	10	48.5-50	5/4/6	10"	49		Same as sample number 9.
					50		
					51		
					52		
					53		
					54		
	11	53.5-55	8/8/10	10"	55		Smaller gravel - medium grain sand.
					56		
					57		
					58		
					59		
	12	58.5-60	15/20/22	8"	60		Medium brown - medium grain sand.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 703 Date 2-1-77 Sheet 4 of 5

Type of Boring auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Project \_\_\_\_\_

Field Party: King and Smithson

Location of Boring:	
Water Level	39.0
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					60		
					61		
					62		
					63		
	13	63.5-65	7 1/6 / 14	5"	64		Several large gravel and medium grain sand.
					65		
					66		
					67		
					68		
	14	68.5-70	15 / 20 1/2 / 22	10"	69		Medium grain sand w/trace of gravel and shale.
					70		
					71		
					72		
					73		
	15	73.5-75	12 / 12 1/4 / 14	9"	74		Large grain sand and small gravel.
					75		
					76		
					77		
					78		
					79		
	16	78.5-80	56 / 20 / 17	10"	80		Same
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 703 Date 2-1-77 Sheet 5 of 5

Type of Boring Auger Rig B-50

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum

Field Party: King and Smithson

Project _____	
Location of Boring: _____	
Water Level	_____
Time	_____
Date	_____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					80		
					81		
					82		Rock
					83		
					84		
	Run #1	82.7-92.7		10.0	85		82.7' started coring.
					86		
					87		
					88		
					89		
					90		
					91		All sandstone core 100% recovery.
					92		Stopped coring at 92.7' 2-2-77
					93		
					94		
					95		
					96		
					97		
					98		
					99		
					100		
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Truck Bridge Crossing

Boring No. 801 Date 3-16-77 Sheet 1 of 5

Type of Boring Auger Rig B-61





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 3-16-77 Boring completed 3-16-77

Ground Elevation 594.95 referred to \_\_\_\_\_ Datum

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from top (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					0		
					1		
					2		
	1	2.5-4	21/ 24/27	15"	3		Black fly ash and dark brown sand and gravel. (FIII)
					4		
					5		
					6		
					7		
	2	7.5-9	11/ 4/5	13"	8		Dark fill brown sand and gravel.
					9		
					10		Medium brown clayey silt.
					11		
					12		
	3	12.5-14	2/ 3/4	14"	13		Medium brown clayey, sandy silt.
					14		
					15		
					16		
					17		
	4	17.5-19	3/ 4/5	16"	18		Medium brown clayey sand.
					19		
					20		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 801 Date 3-16-77 Sheet 2 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
	5	22.5-24	10/ 15/17	15"	23		
					24		Medium brown gravelly sand.
					25		
					26		
					27		
	6	27.5-29	8/ 13/17	16"	28		
					29		Same as sample number 5.
					30		
					31		
					32		
	7	32.5-34	5/ 6/9	15"	33		
					34		Medium brown sand w/trace of gravel.
					35		
					36		
					37		
	8	37.5-39	6/ 8/11	14"	38		
					39		Medium brown sand.
					40		Water
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 801 Date 3-16-77 Sheet 3 of \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_





Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

\_\_\_\_\_

Field Party: \_\_\_\_\_

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
	9	42.5-44	2 3/4	13"	43		
					44		Medium brown sand w/trace of gravel.
					45		
					46		
					47		
	10	47.5-49	6 7/8	1"	48		
					49		Same as sample number 9.
					50		
					51		
					52		
	11	52.5-54	4 4/7	2"	53		
					54		Same as sample number 9.
					55		
					56		
					57		
	12	57.5-59	7 12/13	14"	58		
					59		Medium brown sand.
					60		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 801 Date 3-16-77 Sheet 4 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_





Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_

Field Party: Roush and Reitimre

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					60		
					61		
					62		
	13	62.5-64	8/9/13	13"	63		
					64		Medium brown sand.
					65		
					66		
					67		
	14	67.5-69	8/10/12	10"	68		
					69		Same
					70		
					71		
					72		
	15	72.5-74	4/8/13	11"	73		
					74		Same
					75		
					76		
					77		
	16	77.5-79	10/26/27	12"	78		
					79		Same
					80		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 801 Date 3-16-77 Sheet 5 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_


Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_

Field Party: Roush and Reitmire

Project \_\_\_\_\_

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					80		
					81		
					82		
					83		
	17	82.5-84	12/ 18/21	6"	84		Medium brown sand and gravel.
					85		
					86		Auger refusal at 86.8'
					87		Stopped hole at 86.8'
					88		3-16-77
					89		
					90		
					1		
					2		
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					0		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Truck Bridge Crossing

Boring No. 802 Date 3-17-77 Sheet 1 of 4

Type of Boring Auger Rig B-61





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun 3-17-77 Boring completed 3-17-77

Ground Elevation 588.46 referred to \_\_\_\_\_

Field Party: Roush and Rietmire

Location of Boring:	
Water Level	34.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		
					1		
					2		
					3		
	1	3.5-5	5/8	17"	4		Medium brown and gray clayey silt.
					5		
					6		
					7		
					8		
	2	8.5-10	3/4	16"	9		Medium brown and gray sandy, clayey silt.
					10		
					11		
					12		
					13		
	3	13.5-15	2/5	14"	14		Medium brown clayey sand.
					15		
					16		
					17		
					18		
					19		
	4	18.5-20	7/8	8"	20		Medium brown gravelly sand.
					21		
					22		
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		
					36		
					37		
					38		
					39		
					40		
					41		
					42		
					43		
					44		
					45		
					46		
					47		
					48		
					49		
					50		
					51		
					52		
					53		
					54		
					55		
					56		
					57		
					58		
					59		
					60		
					61		
					62		
					63		
					64		
					65		
					66		
					67		
					68		
					69		
					70		
					71		
					72		
					73		
					74		
					75		
					76		
					77		
					78		
					79		
					80		
					81		
					82		
					83		
					84		
					85		
					86		
					87		
					88		
					89		
					90		
					91		
					92		
					93		
					94		
					95		
					96		
					97		
					98		
					99		
					100		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 802 Date 3-17-77 Sheet 2 of 4

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Location of Boring:	
Water Level	34.5
Time	
Date	

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23		
	5	23.5-25	5/7/10	14"	24		Medium brown sand - fine grain
					25		
					26		
					27		
					28		
	6	28.5-30	3/7/9	14"	29		Same as sample number 5 fine grain.
					30		
					31		
					32		
					33		
	7	33.5-35	13/14/13	15"	34		Same as sample number 5 w/medium and coarse grain sand.
					35		
					36		
					37		
					38		
	8	38.5-40	4/7/8	13"	39		Same as sample number 5 w/medium and coarse grain sand.
					40		
					1		

Engineer \_\_\_\_\_



AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 802 Date 3-17-77 Sheet 3 of 4

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	34.5
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					40		
					41		
					42		
					43		
					44		
	9	43.5-45	3/ 5/6	13"	45		Medium brown sand - medium and coarse grain.
					46		
					47		
					48		
					49		
	10	48.5-50	6/ 8/10	14"	50		Same as sample number 9, medium grain.
					51		
					52		
					53		
					54		
	11	53.5-55	5/ 6/10	12"	55		Same as sample number 10 - medium grain.
					56		
					57		
					58		
					59		
	12	58.5-60	8/ 10/14	13"	60		Same as sample number 11 - medium grain.
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 802 Date 3-17-77 Sheet 4 of 4

Project \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Location of Boring:	
Water Level	34.5
Time	
Date	

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: Roush and Reitmire

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					60		
					61		
					62		
					63		
	13	63.5-65	13/14/17	13"	64		
					65		Medium brown sand - fine grain - medium coarse grain.
					66		
					67		
					68		
	14	68.5-70	5/8/12	12"	69		
					70		Same as sample number 13 - medium and coarse grain.
					71		
					72		
					73		
	15	73.5-75	8/15/22	15"	74		
					75		Same as sample number 13 - medium grain.
					76		
					77		
					78		
	16	78.5-80	9/14/20	14"	79		
					80		Same as sample number 13 - medium and coarse grain.
					1		Auger refusal at 82.5'

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

 Company Appalachian Power Company

 Project Project 1301 - Truck Bridge Crossing

 Boring No. 803 Date 3-15-77 Sheet 1 of 1

 Type of Boring Auger Rig B-61

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

 Boring begun 3-15-77 Boring completed 3-16-77

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

 Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from top (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					0		*Boring offset about 25' east because of power lines.
					1		
					2		
	1	2.5-4	3/4/6	14"	3	/	
					4	/	Medium brown clayey silt.
					5		
					6		
					7		
	2	7.5-9	4/5/5	13"	8	/	
					9	/	Medium brown, medium grain, gravelly sand.
					10		
					11		
					12		
	3	12.5-14	4/4/5	7"	13	/	
					14	/	Same as sample number 2 w/fine and medium grain sand.
					15		
					16		
					17		
					18		
	4	17.5-19	5/6/7	14"	19	/	
					20	/	Medium brown sand and gravel.
					21		
					22		
					23		
					24		
					25		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Boring No. 803 Date 3-15-77 Sheet 2 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Datum \_\_\_\_\_

Field Party: Roush and Reitmire

Project _____	
Location of Boring: _____	
Water Level	_____
Time	_____
Date	_____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					20		
					21		
					22		
					23	/	
	5	22.5-24	10/ 11/ 13	12"	24	/	Medium brown sand and gravel.
					25		
					26		
					27		
					28	/	
	6	27.5-29	6/ 8/ 6	1"	29	/	Medium brown gravelly sand.
					30		
					31		
					32		
					33	/	
	7	32.5-34	8/ 10/ 5	6"	34	/	Medium brown, medium grain gravelly sand.
					35		
					36		
					37		
					38	/	
	8	37.5-39	5/ 6/ 8	14"	39	/	Same
					40		
					1		

Engineer \_\_\_\_\_

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

 Boring No. 803 Date 3-15-77 Sheet 3 of 5

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_

Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_ Date \_\_\_\_\_

 Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					1/0		Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					1/1		
					1/2		
	9	42.5-44	5/4/6	13"	1/3	[Hatched]	Medium brown, medium coarse grain gravelly sand.
					1/4		
					1/5		
					1/6		
					1/7		
	10	47.5-49	7/8/10	12"	1/8	[Hatched]	Medium brown, coarse grain sand w/some gravel.
					1/9		
					1/10		
					1/11		
					1/12		
					1/13		
	11	52.5-54	6/8/12	6"	1/14	[Hatched]	Same as sample number 10 w/medium grain sand trace of gravel.
					1/15		
					1/16		
					1/17		
					1/18		
					1/19		
	12	57.5-59	8/10/12	7"	1/20	[Hatched]	Same
					1/21		
					1/22		
					1/23		
					1/24		
					1/25		
					1		

Engineer \_\_\_\_\_

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

Job No. \_\_\_\_\_

Company Appalachian Power Company

Project Project 1301 - Truck Bridge Crossing

Boring No. 803 Date 3-15-77 Sheet 4 of \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_





Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: Roush and Reitnre

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
					60		
					61		
					62		
	13	62.5-64	7/11/15	6"	63		
					64		Medium brown coarse grain gravelly sand.
					65		
					66		
					67		
	14	67.5-69	13/17/25	5"	68		
					69		Medium brown fine sand.
					70		
					71		
					72		
	15	72.5-74	6/9/13	13"	73		
					74		Same
					75		
					76		
					77		
	16	77.5-79	8/13/20	13"	78		
					79		Same - medium grain.
					80		
					1		

Engineer \_\_\_\_\_

**AEP CIVIL ENGINEERING LABORATORY**  
**LOG OF BORING**

Job No. \_\_\_\_\_

Company \_\_\_\_\_

Project \_\_\_\_\_

Boring No. 803 Date 3-15-77 Sheet 5 of \_\_\_\_\_

Type of Boring \_\_\_\_\_ Rig \_\_\_\_\_


Casing used \_\_\_\_\_ Size \_\_\_\_\_ Drilling mud used \_\_\_\_\_

Boring begun \_\_\_\_\_ Boring completed \_\_\_\_\_

Ground Elevation \_\_\_\_\_ referred to \_\_\_\_\_

Field Party: Roush and Reitmire

Location of Boring:	
Water Level	
Time	
Date	

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
							Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
					80		
					81		
					82		
	17	82.5-84	8/10/22	1"	83		
					84		Medium brown gravelly sand.
					85		
					86		
					87		
	18	87.3-87.4	50/.1	-	88		
					89		Hit rock at 86.8'
					90		No recovery
					91		Started coring at 87.6'
					92		100' recovery.
					93		8.0' of +.4 core
	Run #1	87.6-97.6		10.0	94		10.0' medium gray medium grain hard sandstone.
					95		
					96		
					97		
					98		Stopped hole at 97.6'
					99		3-16-77
					100		
					1		

Engineer \_\_\_\_\_





**AEP 1990, 1996, 1997, 2001,  
2008**

**Monitoring Well Boring Logs**

**MW-001 to MW-16, 96-01 to 96-  
06, 96-101 to 96-110, JTMN-1,  
JTMN-2**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,498.7 E 1,733,165.9**  
 GROUND ELEVATION **569.2** SYSTEM **State Plane using NAD27**

BORING NO. **001** DATE **7/23/15** SHEET **1** OF **2**  
 BORING START **6/18/97** BORING FINISH **6/18/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.14** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **27.0** BOTTOM **37**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>24.9</b>	▼	▼
TIME			
DATE	<b>6-18-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.5	3.0	4-5-4	1.0		5		ML	<b>Road gravel, grass and fill material</b>  <b>SILTY SAND</b> Dark, yellow, brown, 10yr 4/2, with minor cl- silty clay at base, also gravel and limestone aggregate, dry, no contamination no odor, 80% sand, 20% silt, fine to medium grain.		11' TO 13' SHELBY TUBE TAKEN 6-25-97.
2	SS	6.5	8.0	4-3-3	1.5	10		SM	<b>SILTY CLAY</b> Dark yellow, brown, 10 yr 4/2, >50 % fines, 80% clay, 20% silt, dry, no contamination, poorly graded, CL grades into SM medium sand, 10yr 4/2, <15% gravel, well sorted, 95% sand, medium to fine 25% silt, moist, black streaking interbedded, no contamination, grades to CL.			
3	SS	11.5	13.0	1-2-3	.7	15		CL	<b>silty clay</b> Moderate yellow brown, 10 yr 5/4, 80% clay, 20% silty, moist, slight plasticity, no contamination, no odor, grades into SM @15'			
4	SS	16.5	18.0	1-3-4	.7			SM	<b>MODERATE BROWN 5 YR 4/4 SILTY SAND</b> 95 % sand, 5% silt and gravel. Sand well washed, medium to fine grain, sub-rounded, no contamination, no odor, moist.			

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **001** DATE **7/23/15** SHEET **2** OF **2**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/18/97** BORING FINISH **6/18/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
5	ST	21.5	23.5		.7		25			<b>MATTER BROWN 5YR 4/4 SILTY SAND</b> 85 % Sand, 15% silt, moist, sand is medium to fine grain, quartz sub-rounded, with minor clay.		SHELBY TUBE TAKEN TO MUCH GRAVEL NO GOOD.
6	SS	26.5	28.0	3-4-9	1.5		30		SW	<b>DARK YELLOW BROWN 10 YR 4/2 TO MODERATE BROWN 5YR 4/2 GRAVELLY SAND</b> Well graded sand, <15% gravel, 90% sand, course to fine grain, well graded, quartz sub-rounded, wet, no odor, no contamination.		27.0 TOP OF SCREEN.
7	SS	31.5	33.0	7-12-11	1.5		35			<b>DARK YELLOW BROWN 10 YR 4/2 MODERATE BROWN 5YR3/4 GRAVELLY SAND</b> Well graded, <15% gravel, 90% sand, course to fine grain, quartz sub-rounded while gravel is sub-angular to sub-rounded, wet, no contamination, no odor, grades into ml @ 35'.		GRAIN SIZE ANALYSIS SAMPLE COLLECTED.
8	SS	36.5	38.0	4-6-4	.9				ML SM	<b>LIGHT BROWN 5 YR5/6 CLAYEY SILT</b> Interval grading in SM. <b>PALE YELLOW BROWN 10YR6/2 SAND</b> 60% sand, fine grain, 40% silty\clay grading into SM, silty sand, 80% sand with minor gravel 20% silty and clay, wet, no odor, no visible contamination.		37.0 BOTTOM OF SCREEN 37.5 BOTTOM OF SAND.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,857.8 E 1,733,650.5**  
 GROUND ELEVATION **580.8** SYSTEM **State Plane using NAD27**

BORING NO. **002** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **6/19/97** BORING FINISH **6/24/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **1.99** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **60.5** BOTTOM **70.5**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>37.8</b>	▼	▼
TIME			
DATE	<b>6-25-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.6	3.1	4-11-11	1.4		5		ML	<b>FILL MATERIAL, GRASS AND GRAVEL WITH TOP SOIL</b>		
									CL	<b>MODERATE BROWN 5YR4/4 SANDY SILT</b> 60% silt, 40 % sand, minor clay, sub-rounded with quartz gravels 1/2-3/4", dry, no contamination.		
2	SS	6.6	8.1	4-4-3	1.5		10		CL	<b>MODERATE BROWN 5YR4/4 SANDY SILT</b> 60% silt, 40% sand grading to ML, 60% silt, 30% clay, 10% sand ? in gravel (quartz) to CL, dark yellow brown 10 yr4\2, 70% clay, 20% silt, 10% sand, sand fine grain, minor gravel and black interbedded clay, moist, no contamination.		
									CL	<b>10 YR5/4 MODERATE YELLOW BROWN SILTY CLAY</b> 90% clay, 10% silt, minor sand, clay very stiff, light gray interbeds with some root zones, moist, no contamination, no odor.		
3	SS	11.6	13.1	3-5-6	1.1		15					
4	SS	16.6	18.1	3-4-5	1.5					<b>MODERATE YELLOW BROWN 10YR5/4 SILTY CLAY</b> 90% clay, 10% silt, minor sand, very still, with light gray to black interbedded root zones, moist, no contamination, no odor, some mica present.		

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **002** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/19/97** BORING FINISH **6/24/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.6	23.1	2-1-3	1.5		25		SC	<b>MODERATE BROWN TO LIGHT BROWN 10 YR 5/4 TO 5YR 4/4 SANDY CLAY</b> 60% clay, 40% sand fine grain, mica and quartz, clay moderate stiff, moist, interbedded with CL from above 6" at 22.0 to 22.6, moist, no contamination, no odor.		
6	SS	26.6	28.1	1-1-2	1.5		30		SC	<b>MODERATE YELLOW BROWN 10YR5/4 SILTY CLAY</b> 80% clay, 20% silt, minor sand-very fine grain, moist, interbedded of black material, very minor, stiff clay, sand is mica and quartz, no contamination, no odor.		
7	SS	31.6	33.1	1-1-1	0							
8	SS	34.6	36.1	1-1-2	1.5		35		SC	<b>MODERATE BROWN 5YR4/4 SANDY CLAY</b> 60% clay, 40% sand, clay moderate stiff, sand fine grain, mica and quartz, with iron coloring at base, very red minor black (organic?), sample wet at base.		Sample wet at base (perched).
9	SS	36.6	38.1	1-1-1	1.5				SW	<b>LIGHT BROWN 5YR 5/6 SANDY CLAY</b> 60% clay, 40% sand from 36.6 to 36.9 grades to SM clayey silty sand, light brown 5yr5/6, 80% sand, 20% silt/clay, sand is quartz, mica, fine grain, grading to reddish brown 10r 4/6 at base, moist.		
10	SS	41.6	43.1	1-8-13	1.5		40			<b>LIGHT BROWN 5YR 6/6 SILTY CLAYEY SAND</b> 80% sand, 20% silt/clay, same as above from 41.6-42.3, 42.3-42.7, the color change to dark yellow orange 10yr6/6 to SC sandy, medium gray n5 40% clay 60% sand, clay is moderate stiff, wet, sand is quartz, mica, fine grain, wet, grading into sw at 1.8 -2' well graded sand, dark yellow brown 10yr4/2 medium to coarse sand 90% sand, 10% silt/clay, sand quartz, sub-rounded, wet.		Water in sample. Will add water inside augers. Water in sample.
							45		SW	m=sc		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **002** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/19/97** BORING FINISH **6/24/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	SS	46.6	48.1	11-12-14	1.5		50			<b>MODERATE YELLOW BROWN SAND</b> Well graded, 95% sand, 5% silt, minor clay sand coarse to fine with gravel quartz, granite(?), minor silt, no clay, wet, no contamination.		
12	SS	51.6	53.1	5-6-7	.2		55			<b>PALE YELLOW BROWN 10 YR 6/2 SAND</b> Well graded, 95% sand, 5% silt/minor clay, quartz, sand medium to fine grain 51.6-52.4 grades medium coarse sand of quartz, granite(?) with gravel and clay, fine sand, light brown 5yr 5/6 to moderate brown 5yr 4/4 from 52.4-52.7, grades into medium sand. 95% sand with 5% 52.7-53.1 silty clay, wet, no contamination.		54.1 Top of seal.
13	SS	56.6	58.1	6-6-7	1.3		60		SP	<b>DARK YELLOW BROWN 10YR 4/2 SAND</b> 95% sand, 5% silt/clay, sand is medium to fine grain with quartz, sandstone grains (quartzite), wet, no contamination.		57.9 Top of sand.
14	SS	61.6	63.1	5-5-10	1.5		65			<b>PALE YELLOW BROWN SAND</b> Poorly graded, 98% sand, 2% silt, sand is clean to white, fine grain, sand has some rounded, medium grain, mostly sub-angular, wet, no contamination.		60.5 Top of screen. Grain size analysis sample collected.
15	SS	66.6	68.1	8-4-5	.9		70		SW	<b>BROWN GRAY 5YR 4/1 SAND</b> Well graded, 100% sand from fine to coarse with gravel, sand is quartz, quartzite gravel with angular gneiss pieces, wet, little to no fines-clay, sand is sub-rounded, large quartzite gravel in bottom of spoon, no contamination.		70.5 Bottom of screen

Continued Next Page

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **002** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/19/97** BORING FINISH **6/24/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
16	SS	71.7	71.9	50/2	.2					<p><b>LIGHT GRAY SANDSTONE N7</b> Medium grain sand, friable at top of sample, competent at base, loosely cemented, quartz grain, sub-angular to sub-rounded, dry.</p> <p>Auger return includes sub-angular cobbles and gravel of granite, quartzite, gneiss from bottom of borehole.</p>		71.8 Bottom of sand. Approximately 200 gallons water injected into bore hole during augering.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,877.2 E 1,733,713.7**  
 GROUND ELEVATION **604.9** SYSTEM State Plane using NAD27

BORING NO. **003** DATE **7/23/15** SHEET **1** OF **2**  
 BORING START **6/25/97** BORING FINISH **6/25/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.30** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **32.3** BOTTOM **42.3**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>31.9</b>	▼	▼
TIME			
DATE	<b>6-26-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.5	3.0	3-5-6	1.5		5		ML	<b>GRAYISH ORANGE TO DARK YELLOW ORANGE 10YR 7/2 TO 10YR 6/6 SILTY CLAY</b> 80% clay, 20% silt, dry, mottled, some mica, iron, staining possibly, no contamination.		
2	SS	6.5	8.0	3-2-4	1.5		10			<b>GRAYISH ORANGE 10YR 7/4 SILTY CLAY</b> 70% clay, 30% silt, moist, clay content decrease with depth, mottled, iron staining, mica no contamination.		
3	SS	11.5	13.0	2-2-3	1.5		15		CL	<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY</b> 90% clay, 10% silt, increase in clay, moist to minor water, some mica, no contamination.		Perched water.
4	SS	16.5	18.0	5-6-8	1.1				SW	<b>MODERATE YELLOW 10yr 5/4 BROWN SAND</b> Well graded, 95% sand, 5% silt, some coarse grain gravel, sand is medium to coarse, sub-rounded, quartz, dry, no contamination.		

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **003** DATE **7/23/15** SHEET **2** OF **2**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/25/97** BORING FINISH **6/25/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.5	23.0	8-9-9	1.2		25			<b>MODERATE YELLOWISH BROWN 10YR 5/4 SAND</b> 95% sand, 5% silt/fine sand, some coarse gravel of quartzite/granite, sand is medium to coarse grain quartz, dry, subrounded, no contamination.		
6	SS	26.5	28.0	4-4-5	1.2		30			<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silt, sand sand medium to coarse minor silt, sand rounded to sub-rounded quartz, minor mica, some gravel, moist, sand increase in sorting, no contamination.		25.3 Top of seal. 28.1 Top of sand.
7	SS	31.5	33.0	3-2-3	1.2		35		SM	<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silt, no gravel, sand fine to medium, poorly graded, wet, no contamination, SW at bottom sand.		32.3 Top of screen.
8	SS	33.0	34.5	2-2-2	1.5		35			<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silt, sand is fine to medium quartz, some mica, poorly graded, no contamination.		Grain size analysis sample 35.3-36.8
9	SS	36.5	38.0	1-1-2	1.4		40			<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silt, sand medium to fine grain quartz, where poorly graded.		100 gallons of water used in augers. Filled augers with water.
10	SS	41.5	43.0	7-10-7	1.5		40			<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silt, sand medium to fine, quartz, wet, poorly graded and uniform grain size, no contamination.		42.4 Bottom of screen. 43.4 Bottom of sand. Advance augers to 43.4 to install screen.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,865.9 E 1,733,643.4**  
 GROUND ELEVATION **581.1** SYSTEM State Plane using NAD27

BORING NO. **004** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/26/97** BORING FINISH **6/30/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.05** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **37.6** BOTTOM **47.6**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>37.6</b>	▼	▼
TIME			
DATE	<b>6-30-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
							5					
							10					
							15					

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
	NQ-2 ROCK CORE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
	6" x 3.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
	9" x 6.25 HSA			RECORDER <b>T ROGERS</b>								
	HW CASING ADVANCER	4"										
	NW CASING	3"										
	SW CASING	6"										
	AIR HAMMER	8"										

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **004** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/26/97** BORING FINISH **6/30/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							25					
1	ST	26.0	28.0									26.0 Shelby tube.
							30					30.0 Top of seal.
												32.8 Top of sand.
							35					
												37.6 Top of screen.
2	SS	41.5	43.0	4-6-7	1.5		40		SC	<b>MEDIUM GRAY N5 CLAYEY SAND</b> 60% sand, 40 % clay, clay slight plasticity, sand is medium to fine , quartz, mica, wet, well sorted.		
3	SS	43.5	45.0	8-13-21	1.2				SW	<b>DARK YELLOW BROWN 10YR 4/2 BROWN SAND</b> Well graded, sand is medium to coarse, 90% sand, 10 % silt/clay, sand quartz, sub-angular, wet, no contamination.		Grain size analysis 43.5-45.0
							45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING




JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **004** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/26/97** BORING FINISH **6/30/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
												47.6 Bottom of screen. 48.2 Bottom of sand.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,152.8 E 1,734,428.9**  
 GROUND ELEVATION **591.0** SYSTEM **State Plane using NAD27**

BORING NO. **005** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **7/1/97** BORING FINISH **7/1/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.19** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **37.7** BOTTOM **47.7**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>33.8</b>	▼	▼
TIME			
DATE	<b>7-2-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	2.0	3.5	3-3-4	1.1		5		ML	<b>GRASS. ORGANIC MATTER SOILS. SILT, FINE SAND</b>		
									ML	<b>DARK YELLOW, ORANGE 10YR 6/6 CLAYEY SILT</b> 60 % silt 40 % clay, silty v-fine grain, mottled, root, some of black organic, iron stain, dark, no contamination.		
2	ST	7.0	9.0		2.0		10		SC	<b>Sample from bottom of shelly tube MOTTLED YELLOW BROWN 10YR 5/4 CLAYEY SAND</b> 80% sand, 20% silt/sand, moist, sand is fine grain w/ subrounded quartz, no contamination.		
3	ST	12.0	14.0		1.8		15		SM	<b>Sample from bottom of shelly tube MOTTLED YELLOW BROWN 10 YR 5/4 CLAYEY SAND</b> 90% sand 10% silt/clay, moist, sand is fine to medium grain subrounded, quartz, no contamination.		
4	SS	18.5	20.0	6-6-7	1.25				SW	<b>MOTTLED YELLOW BROWN 10YR 5/4 SAND</b> Well graded 95% sand, 5% silt, sand is medium to coarse grain quartz subrounded, moist, no contamination, some gravel is granite.		

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **005** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/1/97** BORING FINISH **7/1/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	23.5	25.0	2-1-2	1.4		25		SP	<b>MOTTLED YELLOW BROWN 10YR 5/4 SAND</b> Poorly grade, 95% sand, 5% silt, sand is medium to fine grain , very well sorted, moist, sand subrounded quartz, no contamination, stringers of coal .25" thick at 22.7'.		
6	SS	28.5	30.0	3-4-5	1.5		30		SW SP	<b>DARK YELLOW ORANGE 10YR 6/6 SAND</b> Well graded sand, 95 % sand, 5% silt, medium to coarse with fine interbedded rounded quartz, grades into SP, poorly graded sand <b>DARK YELLOW ORANGE 10YR 6/6 SAND</b> , 95 % sand 5% silt, sand is medium to fine grain , well sorted, subrounded quartz, wet.		29.7 Top of seal.
7	SS	33.5	35.0	2-3-4	1.2		35		SW	<b>DARK YELLOW ORANGE 10YR 6/6 SAND</b> Well graded, 95% sand, 5% fine sand, sand is medium to coarse, well rounded, quartz, wet, stringers of coal at bottom of spoon 33.5', no contamination.		33.5 Top of sand. Rods wet 34.5.
8	SS	38.5	40.0	3-4-4	1.5		40		SM	<b>SM/SW MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND. TO WELL GRADED SAND</b> 100% sand, fine to coarse, w/minor gravel, sand is subrounded quartz, wet, no contamination.		Adding water to augers 125 gallons. 37.7 Top of screen.
9	SS	43.5	45.0	3-4-7	1.4		45		SP	<b>MODERATE YELLOW BROWN 10YR 5/4 SAND</b> 100% sand, medium grain, well sorted quartz, subrounded to rounded, wet, no contamination, minor clay at bottom 1/2".		
11	SS	45.0	46.5	4-4-6	1.5		45			<b>MODERATE YELLOW BROWN SAND</b> Poorly		Sample 10 grain size

Continued Next Page

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **005** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/1/97** BORING FINISH **7/1/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	48.5	50.0	4-4-6	1.5		50			graded, 100% sand, medium grain quartz, including gravel layers, wet, no contamination. <b>MODERATE YELLOW BROWN 10YR 5/4 SAND</b> Medium grain, quartz, well rounded to subrounded, wet, no visible contamination.		analysis from 45.5-47.0  47.7 Bottom of screen.  48.8 Bottom of sand.



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,255.7 E 1,735,680.0**  
 GROUND ELEVATION **601.3** SYSTEM State Plane using NAD27

BORING NO. **006** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **7/1/97** BORING FINISH **7/8/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **0.26** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **81.1** BOTTOM **91.1**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>50.3</b>	▽ <b>61.0</b>	▽ <b>70.0</b>
TIME			
DATE	<b>7-29-97</b>	<b>7-7-97</b>	<b>7-8-97</b>

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b>ASPHALT, BOTTOM ASH, GRAVEL ROAD BED</b>		
1	SS	6.0	7.5	18-22-24	1.5		5		SW	<b>LIGHT BROWN 5YR 5/6 SILTY SAND</b> Well graded, fill, 90% sand, 10% silt, fine sand, sand is medium to coarse, with gravel, quartz, subrounded, no contamination, dry.		
2	SS	7.5	9.0	9-15-13	1.5							
3	SS	9.0	10.5	9-13-15	1.5		10					
4	SS	10.5	12.0	7-9-9	1.5					<b>LIGHT BROWN 5YR 5/6 SAND</b> Well graded, fill, 95% sand, 5% silt, sand is medium to coarse with gravel, quartz, dry no contamination.		
5	SS	12.0	13.5	7-9-11	1.4				SM	<b>DARK YELLOW BROWN 10YR 4/2 SILTY SAND</b> 95% sand, 5% silty, minor gravel, sand is quartz dry, no contamination, fill ?.		
6	SS	13.5	15.0	9-10-12	1.4					<b>LIGHT BROWN 5YR 5/6 SILTY SAND/GRAVEL</b> 90% sand, 10% silt, sand medium grain.		
7	SS	15.0	16.5	7-9-13	1.5		15			<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY TO CLAYEY SILT</b> 10% clay, 90% silt, fine grain, minor sand, dry, no contamination.		
8	SS	16.5	18.0	7-9-10	1.8							
9	SS	18.0	19.5	5-5-11	1.5							
10	SS	19.5	21.0	6-9-9	1.5							

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **006** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/1/97** BORING FINISH **7/8/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	SS	21.0	22.5	4-6-7	1.3		25					
12	SS	22.5	24.0	5-7-11	1.5							
13	SS	24.0	25.5	9-10-9	1.5							
14	SS	25.5	27.0	7-7-8	1.4		30					
15	SS	27.0	28.5	5-8-9	1.3							
16	SS	28.5	30.0	5-5-6	1.5							
17	SS	30.0	31.5	6-7-8	1.5		35					
18	SS	31.5	33.0	4-6-9	1.5							
19	SS	33.0	34.5	5-5-8	1.3							
20	SS	34.5	36.0	3-6-9	1.5							
21	SS	36.0	37.5	3-3-6	1.5		40					
22	SS	37.5	39.0	3-3-5	1.5							
23	SS	39.0	40.5	3-4-6	1.5							
24	SS	40.5	42.0	4-4-6	1.5		45					
25	SS	42.0	43.5	2-4-4	1.5							
26	SS	43.5	45.0	3-3-3	1.5							
27	SS	45.0	46.5	1-2-2	1.4							

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **006** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/1/97** BORING FINISH **7/8/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
28	SS	46.5	48.0	2-3-4	1.5		50					
29	SS	48.0	49.5	3-3-4	1.5							
30	SS	49.5	51.0	1-2-3	1.5							
31	SS	51.0	52.5	3-4-4	1.5		55					
32	SS	52.5	54.0	1-1-2	1.5							52.5 Wet.
33	SS	54.0	55.5	2-3-4	1.5							53.2 Wet zone.
34	SS	55.5	57.0	2-3-3	1.5		60					
35	SS	57.0	58.5	1-3-3	1.5							
36	SS	58.5	60.0	3-3-4	1.56							
37	SS	60.0	61.5	3-4-4	1.5		65					
38	SS	61.5	63.0	1-2-4	1.5							62.2 Wet at 62.2-63.0
39	SS	63.0	64.5	3-4-5	1.5							
40	SS	64.5	66.0	3-3-3	1.5		70					
41	SS	66.0	67.5	3-3-4	1.5							66 Wet .2" zone.
42	SS	67.5	69.0	3-4-4	1.5							
43	SS	69.0	70.5	3-4-4	1.5							
44	SS	70.5	72.0	1-4-4	1.5							

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **006** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/1/97** BORING FINISH **7/8/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
45	SS	72.0	73.5	1-3-4	1.5							
46	SS	73.5	75.0	4-4-5	1.5		75					73.6 Top of seal.
47	SS	75.0	76.5	4-4-5	1.5							
48	SS	76.5	78.0	4-4-5	1.5							77.0 Top of sand.
49	SS	78.0	79.5	2-3-3	1.5							78.5 Wet sand.
50	SS	79.5	81.0	2-5-9	1.5		80					79.5 Water in sand base (80.8-81.0) water added to augers.
51	SS	81.0	82.5	11-11-11	1.5							81.1 Top of screen.
52	SS	82.5	84.0	9-11-11	.9							
53	SS	84.0	85.5	12-12-12	1.5		85					
54	SS	85.5	87.0	8-10-15	1.2							
55	SS	87.0	88.5	7-14-7	1.2							
56	SS	88.5	90.0	7-7-10	1.2		90					Total of 250 gallon of water added to bore hole.
57	SS	90.0	91.5	12-21-17	1.5							91.1 Bottom of screen.
58	SS	91.5	93.0	7-14-14	1.2							
59	SS	93.0	94.5	16-29-50/.2	1.1		95					93.7 Bottom of sand.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,915.8 E 1,736,153.5**  
 GROUND ELEVATION \_\_\_\_\_ SYSTEM **State Plane using NAD27**

BORING NO. **008** DATE **7/23/15** SHEET **1** OF **2**  
 BORING START **7/14/97** BORING FINISH **7/22/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.10** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **23.8** BOTTOM **33.8**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>13.8</b>	▼	▼
TIME			
DATE	<b>7-21-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.9	3.4	4-3-2	.7		5		CL	<b>ORGANIC MATERIAL, GRASS, WEEDS, ROOT ZONE IN SILTY CLAY AND CLAYEY SILT</b>		
									CL	<b>MODERATE BROWN 5YR 4/4 SILTY CLAY</b> 90% clay, 10% silt, dry, some organics, roots zone, no contamination.		
2	SS	6.9	8.4	4-2-3	1.5		10		CL	<b>MODERATE BROWN 5YR 4/4 TO YELLOW ORANGE 10YR 6/6 SILTY CLAY</b> 90% clay, 10% silt, grading to no silt and yellow color at base, mica, dry to top moist at bottom, purged water, no visible contamination.		
									CL	<b>MODERATE BROWN-DARK YELLOW ORANGE 5YR 4/4 TO 10YR 6/6 SILTY CLAY</b> From above grading into SM at 12.6.		
3	SS	11.9	13.4	4-3-2	1.4		15		SM	<b>MODERATE BROWN 5YR 3/4 CLAYEY SAND</b> 70% sand, 30% clay, sand is v-fine grain quartz, moist no contamination.		16.0 Top of seal.
									CL	<b>MODERATE YELLOW BROWN 10YR 5/4 CLAYEY/SILT SAND</b> 80% sand, 20% clay, moist, sand is v-fine grain, quartz, mica flakes, no visible contamination.		

TYPE OF CASING USED	
	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **008** DATE **7/23/15** SHEET **2** OF **2**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/14/97** BORING FINISH **7/22/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.9	23.4	1-1-1	1.5		25			<p><b><u>MODERATE YELLOW BROWN 10YR 5/4 CLAYEY/SILTY SAND</u></b> 80% sand, 20% clay, sand is v-fine grain, quartz with some silty and clay, sand is wet and contains mica, no visible contamination.</p>		<p>21.4 Top of sand.</p> <p>23.8 Top of screen.</p>
6	SS	26.9	28.4	1-1-2	1.5		30			<p><b><u>MODERATE YELLOW BROWN 10YR 5/4 SILTY/CLAYEY SAND</u></b> 80% sand, 20% clay/silt grading to 90% sand, 10% silt at base, fine sand at bottom of spoon, quartz, mica(minor) no visible contamination.</p>		<p>Wet.</p>
7	SS	31.9	33.4	3-1-2	1.3					<p><b><u>MODERATE BROWN 5YR 4/4 SILTY SAND</u></b> 95% sand, 5% silt, sand is fine grading to medium at 32.3', quartz, f's par, mica flakes, wet, no visible contamination.</p>		<p>31.9 Grain sized analysis.</p>
8	SS	33.4	34.9	2-2-4	1.1					<p><b><u>MODERATE BROWN 5YR 4/4 SILTY SAND</u></b> 95% sand, 5% silt, sand is fine to medium grain, quartz, subrounded, wet, no contamination, then fine sand and clay at base.</p>		<p>33.8 Bottom of screen.</p> <p>34.9 Bottom of sand.</p>
												<p>39.9 Added water to augers.</p>

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,328.2 E 1,736,320.9**  
 GROUND ELEVATION **575.0** SYSTEM **State Plane using NAD27**

BORING NO. **009** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **7/15/97** BORING FINISH **7/15/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **1.57** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **42.3** BOTTOM **52.3**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB-JCM** RIG **BK-81**

Water Level, ft	▽ <b>25.6</b>	▼	▼
TIME			
DATE	<b>7-17-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.9	3.4	4-4-4	1.5		5	[Symbol]		<b>ASH</b>	[Symbol]	
										<b>FLY ASH</b> With coal stringers, some clay, interbedded, dry, compact.		
2	SS	6.9	8.4	8-7-5	1.5		10	[Symbol]	CL	<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND</b> 95% sand, 5% silt, sand medium grain with quartz grading into CL SILTY CLAY DARK GRAY N3, v-fine grain, stiff, 90% , clay, 10% silt moist, no combinations.	[Symbol]	
										<b>MODERATE YELLOW 10YR 5/4 BROWN SILTY SAND</b> 95% sand, 5% silt, sand is medium to fine grades into CL SILTY CLAY DARK GRAY N3, v-fine grain with some silty, 90% clay, 10% silt, moist, moderately stiff, no contamination.		
3	SS	11.9	13.4	2-2-3	1.4		15	[Symbol]		<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY</b> 90% clay, 10% silt, very stiff, wet, no visible contamination, trace of black organics.	[Symbol]	
4	SS	16.9	18.4	2-2-2	1.5						[Symbol]	

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>			
	NQ-2 ROCK CORE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC			
	6" x 3.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON			
	9" x 6.25 HSA			RECORDER <b>T ROGERS</b>			
	HW CASING ADVANCER 4"						
	NW CASING 3"						
	SW CASING 6"						
	AIR HAMMER 8"						

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **009** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/15/97** BORING FINISH **7/15/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.9	23.4	2-2-1	1.5		25			<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY</b> 70% clay, 30% silty/sand, fine to medium grain at bottom, wet, no contamination, clay is little stiff.		22.4 Sandy zone.
6	SS	26.9	28.4	1-2-2	1.5		30			<b>DARK GRAY N3 SILTY CLAY</b> 90% clay, 10% silt, very stiff, moist.		
7	SS	31.9	33.4	1-2-1	1.5		35			<b>DARK GRAY N3 SILTY CLAY</b> 70% clay 30% silt, fine sand, wet throughout, sand v-fine grain with interbedded in section, no visible contamination.		
8	SS	36.9	38.4	1-1-1	1.5		40			<b>DARK GRAY N3 SILTY CLAY</b> 90% clay, 10% silt, moist, clay is v-stiff, trace of black organic material.		34.8 Top of seal. 38.5 Top of sand.
9	SS	42.9	44.4	8-17-27	1.5		45		GM	<b>MEDIUM DARK GRAY N4 SILTY GRAVEL</b> 60% gravel, 40% sand/silty, gravel subrounded, quartz, quartzite wet, no contamination.		41.9-43.9 Shelby tube 800 PSi, 20 sec., 42.3 Top of screen.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **009** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/15/97** BORING FINISH **7/15/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	46.9	48.4	15-15-10	1.5		50			<b>MEDIUM DARK GRAY N4</b> 60% gravel, 40% sand/silt, gravel is quartz, subrounded, sand is fine to coarse, wet, quartzite, wet, no contamination.		46.9-48.4 Grain size analysis.
11	SS	51.9	53.4	10-15-20	1.5					<b>MEDIUM DARK GRAY N4 SILTY SANDY GRAVEL</b> 60% gravel, 40% sand/silt, gravel is subrounded, quartzite, quartzite, other rock, sand medium to coarse, with silt, quartz subrounded, wet, no contamination.		52.3 Bottom of screen.  54.5 Bottom of sand.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 717,666.4 E 1,736,450.7**  
 GROUND ELEVATION \_\_\_\_\_ SYSTEM State Plane using NAD27

BORING NO. **011** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **7/22/97** BORING FINISH **7/23/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.39** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **36.3** BOTTOM **46.3**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>32.0</b>	▼	▼
TIME			
DATE	<b>7-24-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.5	3.0	6-8-8	.8				ML	<b>GRASS. OM. ML. SILT. GRAYISH ORANGE. 10YR 7/4</b> Dry.		
2	SS	6.5	8.0	7-7-10	1.3		5			<b>MEDIUM DARK GRAY N4 ASH</b> V-fine grain, dry, no contamination, ash is very dusty, coarse, bottom ash 1.8-2.4		
3	SS	11.5	13.0	5-3-5	1.4		10			<b>MEDIUM DARK GRAY N4 ASH</b> V-fine-fine sandy texture, dry at top moist at base.		
4	SS	16.5	18.0	4-5-10	1.5		15		CL	<b>DARK GRAY N4 ASH/BOTTOM ASH</b> V-fine sand texture, dry throughout with thin coal layers, no contamination.		
										<b>SAME AS ABOVE 16.5-17.0</b> <b>MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY</b> Clay is moderately stiff with silt and fine sand, interbedded, moist, no contaminate.		

TYPE OF CASING USED	
	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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  
 RECORDER **T ROGER**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **011** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/22/97** BORING FINISH **7/23/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.5	23.0	5-5-5	1.5		25			<b>BROWNISH GRAY 5YR 4/1 BOTTOM ASH</b> Fine sand texture, moist, includes coal, no contamination.		
6	SS	26.5	28.0	3-2-5	1.5		30			<b>MEDIUM DARK GRAY N4 BOTTOM ASH</b> V-fine to fine sand texture, some cinders, wet, no visible contamination.		28.2 Top of seal.
7	SS	31.5	33.0	3-2-2	1.5		35		GM	<b>MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND</b> 90% sand, 10% silty, and clay, wet, sand fine grain, quartz, no contamination.		34.0 Top of sand.
8	SS	36.5	38.0	4-2-2	1.2		40			<b>SAME AS ABOVE</b>		36.3 Top of screen.
9	SS	41.5	43.0	4-2-2	1.3		45			<b>MODERATE YELLOW BROWN 10YR 5/4 CLAYEY SAND</b> 70% sand, 30% clay, sand fine to medium grain, quartz, subrounded, wet, no visible contamination.		41.5-43.0 Grain size analysis.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **011** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/22/97** BORING FINISH **7/23/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	46.5	48.0	8-11-12	1.5					<p><b>CL DARK YELLOW ORANGE 10YR 6/6 SILTY CLAY</b> 90% clay, 10% silt, wet.</p> <p><b>MODERATE BROWN 5YR 4/4 SILTY SAND</b> 80% sand, 20% silt/clay, sand medium to coarse grain with some gravel, subrounded, wet.</p>		46.3 Bottom of screen.
11	SS	51.5	53.0	12-14-14	1.5		50		GM	<p><b>YELLOW BROWN 10YR 5/4 SILTY SAND</b> 90% sand, 10% silt, sand medium grain, quartz, wet grading into GM.</p> <p><b>MODERATE YELLOW BROWN SANDY GRAVEL</b> 70% gravel, 30% sand/silt, gravel subrounded, granite, quartzite, sand medium to fine grain, wet, no contamination.</p>		50.0 Bottom of sand.
12	SS	56.5	58.0	9-7-6	1.2		55			<p><b>MODERATE YELLOW BROWN 10YR 5/4 SANDY/SILTY GRAVEL</b> 80% gravel, 20% sand /silt, minor clay, gravel is subrounded, quartz, granite, quartzite, sand medium to fine quartz, wet, no contamination.</p>		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,753.1 E 1,737,045.5**  
 GROUND ELEVATION **580.0** SYSTEM State Plane using NAD27

BORING NO. **012** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **7/23/97** BORING FINISH **7/29/97**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.02** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **62.3** BOTTOM **72.3**  
 WELL DEVELOPMENT **YES** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>38.8</b>	▼	▼
TIME			
DATE	<b>7-30-97</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	3.0	4.5	3-2-2	1.5		5			<b>MEDIUM DARK GRAY TO GRAY N3-N4</b> <b>BOTTOM ASH</b> Ash dust, some interbedde, dry, top of spoon. <b>MODERATE YELLOW BROWN</b>		
2	SS	8.0	9.5	3-3-4	1.5		10					
3	SS	13.0	14.5	1-2-2	1.5		15					
4	SS	18.0	19.5	2-3-3	1.5							

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **T ROGERS**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **012** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/23/97** BORING FINISH **7/29/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	23.0	24.5	2-3-3	1.5		25					
6	SS	28.0	29.5	3-3-4	1.5		30					
7	SS	33.0	34.5	2-2-3	1.5		35					
8	SS	38.0	39.5	2-2-2	1.5		40					Spoon wet.
9	SS	43.0	44.5	2-2-2	1.5		45					45.5 Water on rods.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **012** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/23/97** BORING FINISH **7/29/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	48.0	49.5	2-3-3	1.5		50					
11	SS	53.0	54.5	22-24-29	1.3		55					
12	SS	58.0	59.5	17-15-19	1.1		60					57.4 Top of seal.
13	SS	63.0	64.5	10-16-22	1.1		65					61.4 Top of sand. 62.3 Top of screen.
14	SS	68.0	69.5	3-3-5	1.5		70					68.0-69.5 Grain size analysis.

*Continued Next Page*

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING




JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **012** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/23/97** BORING FINISH **7/29/97**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
15	SS	73.0	74.5	50/3	.3		75					72.3 Bottom of screen.  73.9 Bottom of sand.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,504.2 E 1,736,239.5**  
 GROUND ELEVATION **599.9** SYSTEM State Plane using NAD27

BORING NO. **MW-015** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **12/6/01** BORING FINISH **12/11/01**  
 PIEZOMETER TYPE **SS** WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **1.73** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **78.2** BOTTOM **87.2**  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽ <b>22.6</b>	▼	▼
TIME			
DATE	<b>12/10/01</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	1.9	3.4	6-7-8	1.5		5			<b>BOTTOM ASH</b> Dry		Grounding procedures not in use on this boring. This boring used to collect soil samples to determine where to set well. Potable water for drilling from old C E Lab site. Flushed lines for approx. 1 hr before using.
2	SS	6.9	8.4	2-3-3	1.5		10			<b>LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH</b> Dry; 0.2' moist area @ 18.0'		
3	SS	11.9	13.4	2-2-2	1.5		15					
4	SS	16.9	18.4	2-2-2	1.5							

**TYPE OF CASING USED**

<input type="checkbox"/>	NQ-2 ROCK CORE	
<input checked="" type="checkbox"/>	6" x 3.25 HSA	
<input type="checkbox"/>	9" x 6.25 HSA	
<input type="checkbox"/>	HW CASING ADVANCER	4"
<input type="checkbox"/>	NW CASING	3"
<input type="checkbox"/>	SW CASING	6"
<input type="checkbox"/>	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **MCR**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-015** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **12/6/01** BORING FINISH **12/11/01**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	21.9	23.4	2-3-3	1.5		25			<b>LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH</b> Moist throughout, some areas larger grain size than others	▽  SWL @ 22.6' on 12/10/01. This is about 80 hrs since bore hole was disturbed; HSA's to 51.9'. Water coming from saturated fly ash from 6.0' to 43.4'	
6	SS	26.9	28.4	1-1-2	1.5		30		<b>LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH</b> Wet			
7	SS	31.9	33.4	2-2-3	1.5		35		<b>LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH</b> Moist in some areas, wet in others			
8	SS	36.9	38.4	1-1-1	1.5		40		<b>LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH</b> Wet			
9	SS	41.9	43.4	0-0-0	1.5		45		<b>VERY LOOSE 5B 5/1 MEDIUM BLUISH GRAY FLY ASH</b> Saturated, very fine	Weight of hammer pushed spoon.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-015** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **12/6/01** BORING FINISH **12/11/01**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	46.9	48.4	3-4-6	1.5		50			<b>STIFF 10YR 5/4 MODERATE YELLOWISH BROWN CLAYEY SILT</b> 1.5 tsf, moist		Started adding drill mud to inside of HSA's to prevent heaving sand @ 51.9'
11	SS	51.9	53.4	3-4-5	1.4		55			<b>MEDIUM STIFF 10YR 5/4 MODERATE YELLOWISH BROWN CLAYEY SILT</b> 1.0 tsf, moist		
12	SS	56.9	58.4	2-3-3	1.5		60			<b>MEDIUM STIFF N5 MEDIUM GRAY CLAYEY SILT</b> 1.0 tsf, moist		
13	SS	61.9	63.4	2-2-2	1.5		65			<b>MEDIUM STIFF N5 MEDIUM GRAY CLAYEY SILT</b> 1.0 tsf, moist		
14	SS	66.9	68.4	2-2-2	1.5		70			<b>MEDIUM STIFF N5 MEDIUM GRAY CLAYEY SILT</b> 1.0 tsf, moist		

Continued Next Page

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-015** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **12/6/01** BORING FINISH **12/11/01**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
15	SS	71.9	73.4	2-3-3	1.5		75			<b>LOOSE BROWN &amp; GRAY FINE GRAIN SAND</b> Wet		Gravelly area @ 77.0'-88.4' (set well)
16	SS	76.9	78.3	19-39-50/4	1.3		80			<b>VERY DENSE 10YR 5/4 MODERATE YELLOWISH BROWN MEDIUM to COARSE GRAIN SAND</b> With little gravel		
17	SS	81.9	83.4	30-37-21	1.5		85			<b>VERY DENSE 10YR 6/6 DARK YELLOWISH ORANGE MEDIUM to COARSE GRAIN SAND</b> With little gravel		
18	SS	86.9	88.4	11-12-12	1.5		90			<b>MEDIUM DENSE N5 MEDIUM GRAY MEDIUM to COARSE GRAIN SAND</b> With trace gravel, wet		
19	SS	91.9	93.4	15-16-17	1.5					<b>DENSE N5 MEDIUM GRAY MEDIUM to COARSE GRAIN SAND</b> Wet		
20	SS	94.3	94.5	50/2	0.2					<b>N7 LIGHT GRAY SANDSTONE</b>		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 721,431.5 E 1,732,814.2**  
 GROUND ELEVATION **586.8** SYSTEM **State Plane using NAD27**

BORING NO. **MW-16** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **6/17/08** BORING FINISH **6/18/08**  
 PIEZOMETER TYPE **N/A** WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **1.787** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **67.5** BOTTOM **77.5**  
 WELL DEVELOPMENT **Yes/Reclaimer** BACKFILL **Quick Grout**  
 FIELD PARTY **MCR / ZLR** RIG **D-120**

Water Level, ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
												GROUNDING PROCEDURES IN USE ON THIS BORING; DIGGING PERMIT IN HAND; NO SPT TAKEN @ 1.7' BECAUSE OF POSSIBLE UNDERGROUNDS - CUTTINGS SHOW MOIST SILTY CLAY
1	SPT	6.7	8.2	3-3-6	1.5		5			<b>STIFF 10YR 6/6 DARK YELLOWISH ORANGE SILTY CLAY</b> tsf 2.75, moist		
2	SPT	11.7	13.2	1-1-3	1.5		10			<b>SOFT 5YR 5/6 LIGHT BROWN CLAYEY SILT</b> tsf 0.5, very moist		
3	SPT	16.7	18.2	10-13-15	1.2		15			<b>5YR 5/6 LIGHT BROWN FINE to MEDIUM SAND</b> w/trace of fine gravel, moist		

**TYPE OF CASING USED**

	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER \_\_\_\_\_

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-16** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/17/08** BORING FINISH **6/18/08**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
4	SPT	21.7	23.2	8-10-13	1.1		25					
5	SPT	26.7	28.2	5-8-13	1.2		30			<b>MEDIUM DENSE 10YR 5/4 MODERATE YELLOWISH BROWN COARSE SAND</b> w/trace of fine gravel, moist		
6	SPT	31.7	33.2	6-8-12	.8		35			<b>MEDIUM DENSE 5YR 6/4 LIGHT BROWN COARSE SAND</b> w/some coarse gravel, moist		
7	SPT	36.7	38.2	1-3-6	1.2		40			<b>LOOSE 10YR 4/2 DARK YELLOWISH BROWN SAND</b> medium moist to wet		SWL = 36.4' 06/18/08 w/ HSA'S @ 36.7' 14 hr READING WATER ON SPOON @ 37.5'; STARTED INDUCING WEAK DRILLING MUD TO INSIDE OF AUGERS TO PREVENT HEAVING SANDS
8	SPT	41.7	43.2	3-4-5	1.2		45			<b>LOOSE 5 YR 4/4 MODERATE BROWN MEDIUM SAND</b> w/trace of coarse gravel, wet		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-16** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/17/08** BORING FINISH **6/18/08**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
9	SPT	46.7	48.2	3-3-3	1.5		50			<b>LOOSE 5YR 4/4 MODERATE BROWN MEDIUM GRAIN SAND</b> w/trace of fine gravel, wet		
10	SPT	51.7	53.2	2-3-5	1.4		55			<b>LOOSE 5YR 4/4 MODERATE BROWN MEDIUM GRAIN SAND</b> w/trace of fine gravel, wet		
11	SPT	56.7	58.2	6-10-15	1.5		60			<b>MEDIUM DENSE 5YR 3/4 MODERATE BROWN COARSE GRAIN SAND</b> wet		
12	SPT	61.7	63.2	4-7-12	1.5		65			<b>MEDIUM DENSE 10YR 5/4 MODERATE YELLOWISH BROWN MEDIUM GRAIN SAND</b> wet		
13	SPT	66.7	68.2	6-12-15	1.5		70			<b>MEDIUM DENSE 5YR 5/2 PALE BROWN MEDIUM to COARSE GRAIN SAND</b> wet		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **MW-16** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/17/08** BORING FINISH **6/18/08**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
14	SPT	71.7	73.2	10-15-17	1.0		75			<b>MEDIUM DENSE 10YR 6/2 PALE YELLOWISH BROWN FINE SAND and FINE GRAVEL</b> wet		
15	SPT	76.7	78.2	15-18-25	1.3		80			<b>DENSE N5 MEDIUM GRAY COARSE SAND</b> w/some coarse gravel, wet		
16	SPT	81.7	82.0	50/3	.2					<b>N6 MEDIUM LIGHT GRAY WEATHERED COARSE GRAIN SANDSTONE</b>		STOPPED BORING @ 82.0'; INSTALLED 2" MONITORING WELL

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 717,700.5 E 1,735,921.2**  
 GROUND ELEVATION **592.7** SYSTEM **STATE PLANE**

BORING NO. **96-01** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/14/96** BORING FINISH **6/20/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>27.9</b>	▼	▼
TIME			
DATE	<b>6-20-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		0.0	1.5							<b>ROAD BASE</b>		
2	SS	3.0	4.5	11-10-7	1.5							
3	SS	5.0	6.5	8-9-11	1.3		5	SW		<b>BLACK BOTTOM ASH</b> Moist.  <b>YELLOWISH ORANGE GRAVELLY SAND</b> Dry to moist, 3/4" max size.		
4	SS	8.5	10.0	10-25-30	1.2		10			<b>BLACK BOTTOM ASH</b> Moist.		
5	SS	11.7	13.2	11-12-16	1.5		15			<b>DARK BROWN SANDY SILT</b> Moist, v-fine grain sand.		
6	SS	16.7	18.2	7-7-11	1.5					<b>BLACK BOTTOM ASH</b> Dry.		

**TYPE OF CASING USED**

<input type="checkbox"/>	NQ-2 ROCK CORE	
<input checked="" type="checkbox"/>	6" x 3.25 HSA	
<input type="checkbox"/>	9" x 6.25 HSA	
<input type="checkbox"/>	HW CASING ADVANCER	4"
<input type="checkbox"/>	NW CASING	3"
<input type="checkbox"/>	SW CASING	6"
<input type="checkbox"/>	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **WEB**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-01** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/14/96** BORING FINISH **6/20/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.7	23.2	7-3-2	1.5		25			<b><u>Moist this area</u></b>		
8	SS	26.7	28.2	1-1-1	1.5		30			<b><u>Saturated this area</u></b>	▽	
9	SS	31.7	33.2	1-2-2	1.5		35		CL	<b><u>GREENISH BROWN SANDY CLAY</u></b> Saturated, low plasticity.		
10	SS	36.7	38.2	3-2-2	1.2		40		CL	<b><u>MULTI-COLORED BROWN SANDY CLAY</u></b> Wet to saturated, low plasticity, v-fine sand.		
11	ST	41.7	43.7		0		45					Belive material to soft to pickup in tube.
12	ST	43.7	45.7		0							

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-01** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/14/96** BORING FINISH **6/20/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							50					
13	SS	51.7	53.2	1-1-2	1.0				CL	<b>DARK GRAY SANDY CLAY</b> Saturated, v-fine sand.		
												Stopped boring at 53.2' grouted from 53.2 to grade with approximately 60 gallons of quick grout.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 718,158.5 E 1,736,270.7**

GROUND ELEVATION **594.6** SYSTEM **STATE PLANE**

BORING NO. **96-02** DATE **7/23/15** SHEET **1** OF **3**

BORING START **6/13/96** BORING FINISH **6/13/96**

PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_

HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_

DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_

WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**

FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	0.0	1.5	10-12-13	1.2					<b>GRAY BOTTOM ASH</b> Dry, with 2 to 3" of sandy clay.		
2	SS	3.0	4.5	10-13-13	1.5					<b>GRAY BOTTOM ASH</b> Dry.		
3	SS	5.0	6.5	9-8-7	1.3		5		CL	<b>LIGHT BROWN CLAY</b> Dry, medium to high plasticity.		
4	SS	8.5	10.0	16-16-12	1.1		10		GP	<b>DARK BROWN SAND AND GRAVEL</b> Dry, 3/4" max size, rounded with some fines.		
5	SS	11.9	13.4	8-10-8	1.4		15					
6	SS	16.9	18.4	6-11-9	1.3					<b>DARK BROWN SAND AND GRAVEL</b> Moist, quartz, 1/2" max size, rounded with some fines.		

**TYPE OF CASING USED**

*Continued Next Page*

<input type="checkbox"/>	NQ-2 ROCK CORE	
<input checked="" type="checkbox"/>	6" x 3.25 HSA	
<input type="checkbox"/>	9" x 6.25 HSA	
<input type="checkbox"/>	HW CASING ADVANCER	4"
<input type="checkbox"/>	NW CASING	3"
<input type="checkbox"/>	SW CASING	6"
<input type="checkbox"/>	AIR HAMMER	8"

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

RECORDER **WEB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-02** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/13/96** BORING FINISH **6/13/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.9	23.4	7-7-7	1.3		25			<b><u>DARK BROWN SAND AND GRAVEL</u></b> Saturated, rounded, 1" max size, quartz with some fines.		
8	SS	26.9	28.4	1-1-2	1.5		30			<b><u>DARK GRAY FLY ASH</u></b> Saturated.		
9	SS	31.9	33.4	1-1-1	1.5		35					
10	SS	36.9	38.4	1-1-1	1.5		40					
11	SS	41.9	43.4	4-4-6	1.3		45		CL	<b><u>DARK GRAY CLAY</u></b> Wet, medium to high plasticity, trace of organic material.		
12	ST	43.9	45.9		1.0							

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-02** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/13/96** BORING FINISH **6/13/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
13	ST	46.9	48.9		2.0		50					
14	SS	51.9	53.4	3-3-4	1.5		55					
15	SS	56.9	58.4	1-3-4	1.5							Grouted hole from 58.4' to grade with approximately 75 gallons of quick grout.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,215.9 E 1,736,382.8**  
 GROUND ELEVATION **566.9** SYSTEM **STATE PLANE**

BORING NO. **96-03** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/17/96** BORING FINISH **6/18/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>22.2</b>	▼	▼
TIME			
DATE	<b>6-18-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	0.0	1.5	1-2-4	1.3					<b>GRAY FLY ASH</b> Moist.		Boring was grouted from grade to 60' w/ 60 gallons of quick grout
2	SS	3.0	4.5	6-5-4	1.5					<b>GRAY BOTTOM ASH</b> Moist.		
3	SS	5.0	6.5	3-2-2	1.5		5					
4	SS	8.5	10.0	4-6-6	1.5					<b>BLACK COAL</b>		
							10		SC	<b>LIGHT BROWN SANDY CLAY</b> Dry to moist, v-fine grain sand.		
5	SS	11.7	13.2	4-3-3	1.5							
										CL	<b>DARK GRAY CLAY</b> Wet, medium to high plasticity, trace of organic material.	
6	SS	16.7	18.2	7-1-1	1.5		15					

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>			
				PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC			
<b>X</b>				WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON			
				RECORDER <b>WEB</b>			

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-03** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/17/96** BORING FINISH **6/18/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	ST	21.7	23.7		2.0		25				▽	
8	SS	26.7	28.2	1-1-1	1.5		30					
9	ST	31.7	33.7		2.0		35					
10	SS	36.7	38.2	1-2-2	1.5		40	SP	<b>DARK GRAY AND BROWN SILTY SAND</b> Wet to saturated, quartz, fine grain.			
11	SS	41.7	43.2	7-14-19	.6		45	GW	<b>GRAY SAND AND GRAVEL</b> Saturated, quartz, 1/2" max size, rounded.			

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-03** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/17/96** BORING FINISH **6/18/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
12	SS	46.7	47.6	37-50/4	.9		50			<b>Brown</b>		
13	SS	51.7	53.2	18-19-20	1.5		55			<b>Same with 3/4" max size.</b>		
14	SS	56.7	57.0	50/3	.3					<b>Brown</b>		
15	SS	59.8	60.0	50/2	.2		60			<b>LIGHT GRAY SANDSTONE</b> Fine grain.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 717,954.5 E 1,735,752.5**  
 GROUND ELEVATION **593.5** SYSTEM **STATE PLANE**

BORING NO. **96-04** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **6/18/96** BORING FINISH **6/19/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽	▼	▼
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		0.0								<b>ROAD BASE</b>		Grouted boring from 88' to grade w/ 80 gallons of quick grout and placed concrete plug in road bed.
2	SS	3.0	4.5	11-12-13	1.3			SC	<b>DARK BROWN CLAYEY SAND</b> Moist, trace of small gravel.			
3	SS	5.0	6.5	11-19-16	1.5	5		SP	<b>DARK BROWN GRAVELLY SAND</b> Moist, 1/2" max size, rounded with fines.			
4	SS	8.5	10.0	9-12-10	1.5	10						
5	SS	11.6	13.1	16-22-17	1.5	15			<b>BLACK BOTTOM ASH</b> Moist with 1" layer of silty clay with slight plasticity.			
6	SS	16.6	18.1	9-9-7	.4				<b>DARK BROWN, BLACK CLAYEY SAND</b> Moist, some organic, may be older road base.			

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
<b>X</b>	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **WEB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-04** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/18/96** BORING FINISH **6/19/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.6	23.1	5-5-6	1.5					<b>BLACK BOTTOM ASH</b> Saturated.		
							25			<b>BLACK FLY ASH</b> Saturated.		
8	SS	26.6	28.1	1-2-2	1.2							
							30					
9	SS	31.6	33.1	1-1-1	1.5							
							35					
10	SS	36.6	38.1	.2-3-3	1.5			CL		<b>ORANGE AND LIGHT BROWN MOTTLED SILTY CLAY</b> Wet to saturated, medium to low plasticity.		
							40					
11	SS	41.6	43.1	3-3-3	1.5					<b>Same as sample with trace of organic material.</b>		
							45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



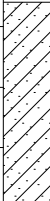
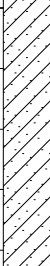



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-04** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/18/96** BORING FINISH **6/19/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
12	ST	46.6	48.6		2.0							
13	SS	51.6	53.1	1-1-1	1.5		50		SC	<b>GRAY AND BROWN CLAYEY SAND</b> Wet to saturated, v-fine grain sand, slight to non plasticity.		
14	SS	59.3	60.8	3-3-3	.8		55		SP	<b>DARK BROWN SAND</b> Saturated, fine grain, with some fines, quartz.		
15	SS	64.3	65.8	15-16-2	1.5		60			<b>DARK BROWN SAND</b> Saturated, v-fine grain with some fines, quartz.		
16	SS	69.3	70.8	8-9-11	1.5		65		SW	<b>DARK BROWN SAND</b> Saturated, quartz.		
							70					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-04** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/18/96** BORING FINISH **6/19/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
17	SS	74.3	75.8	14-14-19	1.5		75					
18	SS	79.3	80.8	8-10-8	1.5		80		SP	<b>DARK BROWN AND GRAY SAND</b> Saturated, quartz, fine grain.		
19	SS	84.3	85.1	8-50/.3	.8		85		GW	<b>BROWN SAND AND GRAVEL</b> Saturated, quartz, 1/2" max size, rounded.		
20	SS	87.7	87.9	50/.2	.2					<b>GRAY CLAY SHALE</b> Dry.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,463.6 E 1,736,113.5**  
 GROUND ELEVATION **597.4** SYSTEM **STATE PLANE**

BORING NO. **96-05** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/12/96** BORING FINISH **6/12/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>48.8</b>	▼	▼
TIME			
DATE	<b>6-12-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	0.0	1.5	14-22-35	1.0					<b>GRAY BOTTOM ASH</b>		Boring grouted from grade to 58.2.
2	SS	3.0	4.5	11-12-15	1.2			SP	<b>DARK BROWN GRAVELLY SAND</b> Moist, 1/2" max size, some fines. <b>BROWN CLAYEY SILT</b> Moist, slight to non plasticity.			
3	SS	5.0	6.5	10-10-15	1.3		5	SM	<b>LIGHT BROWN SILTY SAND</b> Dry, v-fine grain.			
5	SS	8.5	10.0	8-13-15	1.5		10	SC	<b>LIGHT AND DARK BROWN CLAYEY SAND</b> Moist, trace of small gravel.			
6	SS	11.7	13.2	11-11-13	1.2		15	GP	<b>DARK BROWN CLAYEY SAND AND GRAVEL</b> Moist, quartz, 3/4" max size, rounded.			
7	SS	16.7	18.2	3-2-4	1.5			SM	<b>LIGHT BROWN SILTY SAND</b> Moist, v-fine grain sand.			
								CL	<b>DARK GRAY SILTY CLAY</b> Wet, medium to low plasticity, trace of organic material.			

TYPE OF CASING USED	
	NQ-2 ROCK CORE
<b>X</b>	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **WEB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-05** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/12/96** BORING FINISH **6/12/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
8	SS	21.7	23.2	3-4-6	1.5		25		CL	<b>LIGHT BROWN CLAYEY SILTY</b> Moist to wet, slight plasticity.		
9	SS	26.7	28.2	2-2-1	1.1		30			<b>GRAY BOTTOM ASH</b> Saturated.		
10	SS	31.7	33.2	1-2-2	1.3		35		CL	<b>DARK GRAY CLAY</b> Wet to saturated, medium to low plasticity, trace of organic.		
11	SS	36.7	38.2	1-1-1	1.5		40			<b>GRAY FLY ASH</b> Saturated.		
12	SS	41.7	43.2	1-1-1	1.5		45		CL	<b>DARK GRAY SILTY CLAY</b> Moist, low to medium plasticity, trace of organic material.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-05** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/12/96** BORING FINISH **6/12/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
13	SS	46.7	48.2	1-1-2	1.5					▽		
14	ST	51.7	53.7		2.0							
15	SS	56.7	58.2	2-2-3	1.5							

**BROWN CLAY** Wet to saturated, medium to low plasticity.

**DARK GRAY SILTY CLAY** Wet to saturated, low to medium plasticity, trace of v-fine grain sand lens.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 718,519.1 E 1,736,243.1**

GROUND ELEVATION **566.1** SYSTEM STATE PLANE

BORING NO. **96-06** DATE **7/23/15** SHEET **1** OF **2**

BORING START **6/18/96** BORING FINISH **6/18/96**

PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_

HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_

DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_

WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**

FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽ <b>23.6</b>	▼	▼
TIME			
DATE	<b>6-18-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	0.0	1.5	1-1-4	1.5					<b>GRAY FLY ASH</b> Moist.		
2	SS	3.0	4.5	5-6-4	1.5							
3	SS	5.0	6.5	3-3-2	1.5		5			<b>GRAY BOTTOM ASH</b> Saturated.		
4	SS	8.5	10.0	5-5-6	1.5		10		CL	<b>BROWN SILTY CLAY</b> Moist, low to medium plasticity (DIKE MATERIAL).		
5	SS	11.5	13.0	3-4-2	1.5		15			<b>DARK BROWN SILTY CLAY</b> Saturated, medium to low plasticity, (DIKE MATERIAL).		
6	SS	16.5	18.0	4-4-3	1.5				SM	<b>GRAY SILTY SAND</b> Saturated, v-fine grain, quartz.		

**TYPE OF CASING USED**

<input type="checkbox"/>	NQ-2 ROCK CORE	
<input checked="" type="checkbox"/>	6" x 3.25 HSA	
<input type="checkbox"/>	9" x 6.25 HSA	
<input type="checkbox"/>	HW CASING ADVANCER	4"
<input type="checkbox"/>	NW CASING	3"
<input type="checkbox"/>	SW CASING	6"
<input type="checkbox"/>	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **WEB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-06** DATE **7/23/15** SHEET **2** OF **2**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/18/96** BORING FINISH **6/18/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.5	23.0	1-1-2	1.3		25				▽	
8	SS	26.5	28.0	1-1-1	1.5				CL	<b>DARK GRAY CLAY</b> Saturated, medium to low plasticity with v-fine grain sand lens.		
9	SS	31.5	33.0	2-3-3	1.5		30					

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,983.0 E 1,734,516.1**  
 GROUND ELEVATION **619.0** SYSTEM **STATE PLANE**

BORING NO. **96-101** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/5/96** BORING FINISH **6/5/96**  
 PIEZOMETER TYPE **SS** WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN **24.4** BOTTOM **33.4**  
 WELL DEVELOPMENT **NO** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽	▽	▽
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1		0.0			0					<b>No sample taken boring in road way</b>		
2	SS	3.0	4.5	12-13-16	1.1				SM	<b>BROWN SILTY GRAVELLY SAND</b> Dry to moist, 1/2" max size, rounded, quartz.		
3	SS	5.0	6.5	7-9-9	1.2		5					
3	SS	8.5	10.0	3-4-5	1.2		10		SC	<b>BROWN CLAYEY SAND</b> Moist, fine grain with trace of gravel.		
4	SS	11.5	13.0	17-27-38	1.2				SM	<b>BROWN SILTY GRAVELLY SAND</b> Moist, fine grain, trace of gravel, quartz.		
5	SS	16.5	18.0	12-19-26	1.1		15					

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
				PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
<b>X</b>				WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
				RECORDER <b>REB</b>								

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-101** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/5/96** BORING FINISH **6/5/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
												20.0 Top of seal.
6	SS	21.5	23.0	16-21-27	1.1				SW	<b>BROWN GRAVELLY SAND</b> Moist, trace of small gravel, quartz, rounded.		22.0 Top of sand.
							25					24.4 Top of screen.
7	SS	26.5	28.0	12-20-23	1.2				GP	<b>BROWN SAND AND GRAVEL</b> Moist to wet, quartz, rounded, 3/4" max size, some fines.		
							30					
8	SS	31.5	33.0	4-5-7	1.1				SM	<b>BROWN SILTY SAND</b> Moist, 100% fine grain.		
9	ST	33.5	35.5		1.6				CL	<b>Push 2.0</b> <b>Time 5 sec.</b> <b>PSI 800</b> <b>Top of sample. BROWN SILTY SAND</b> <b>Bottom of sample. LIGHT GRAY CLAY</b> Moist, low to medium plasticity.		34.0 Bottom of pipe. 34.4 Bottom of screen.
							35					35.0 Bottom of sand.
10	SS	36.5	38.0	4-6-8	1.1							
							40					
11	SS	41.5	43.0	4-5-6	1.1				SM	<b>DARK GRAY SILTY SAND</b> Wet, non to slight plasticity, with reddish brown quartz sand lens.		
12	ST	43.5	45.5		1.5				ML	<b>PUSH 2.0</b> <b>TIME 5 SEC</b> <b>PSI 800</b> <b>Bottom of sample. Drillers identification fly ash</b> <b>believe it is a light gray clay</b>		
							45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page





AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,707.5 E 1,734,001.7**  
 GROUND ELEVATION **619.6** SYSTEM **STATE PLANE**

BORING NO. **96-102** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/5/96** BORING FINISH **6/5/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1		0.0			0					<b><u>NO SAMPLE TAKEN BORING IN ROAD AUGER CUTTINGS INDICATE BROWN SAND AND GRAVEL</u></b>		Boring was grouted from grade to 48.2' with quick grout.
2	SS	3.0	4.5	12-16-19	1.1			SP	<b><u>BROWN GRAVELLY SAND</u></b> Moist, 1/2" max size, rounder, quartz with fines.			
3	SS	5.0	6.5	17-21-26	1.2	5						
4	SS	8.5	10.0	13-16-19	1.2	10						
5	SS	11.7	13.2	15-28-32	1.2	15						
6	SS	16.7	18.2	17-21-26	1.2							

**TYPE OF CASING USED**

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-102** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/5/96** BORING FINISH **6/5/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.7	23.2	19-21-24	1.1		25			<u>Sample moist to wet.</u>		
8	SS	26.7	28.2	9-9-11	1.1		30		SM	<u>DARK BROWN SANDY SILT</u> Moist, non-plastic.		
9	SS	31.7	33.2	3-4-5	1.1		35		SC	<u>BROWN SANDY CLAY</u> Moist, low plasticity, with v-fine sand lens.		
10	ST	33.7	35.7		?					<u>Time 5 sec.</u> <u>Push 2.0</u> <u>PSI 1000</u>		
11	SS	36.7	38.2	4-4-5	1.1		40		SM	<u>BROWN SILTY SAND</u> Moist, with very fine sand lens.		
12	SS	41.7	43.2	3-5-8	1.1		45		SP	<u>BROWN GRAVELLY SAND</u> Moist, 3/4" max size, rounded, quartz.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-102** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/5/96** BORING FINISH **6/5/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
13	SS	46.7	48.2	13-15-21	1.2			-				

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,785.3 E 1,734,133.3**  
 GROUND ELEVATION **618.0** SYSTEM **STATE PLANE**

BORING NO. **96-103** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/4/96** BORING FINISH **6/4/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1		0.0			0					<b><u>NO SAMPLE TAKEN BORING LOCATED IN ROAD CUTTINGS INDICATE BROWN SAND AND GRAVEL.</u></b>		Boring grouted from grade to 48.1 w/ 60 gallons of quick grout.
2	SS	3.0	4.5	12-19-24	1.1			SP	<b><u>DARK BROWN GRAVELLY SAND</u></b> Moist, rounded, quartz, with fines, 3/4" max size.			
3	SS	5.0	6.5	14-17-19	1.2	5						
4	SS	8.5	10.0	17-21-25	1.1	10						
5	SS	11.6	13.1	19-25-28	1.1	15						
6	SS	16.6	18.1	12-19-25	1.2							

<b>TYPE OF CASING USED</b>		<i>Continued Next Page</i>	
<input checked="" type="checkbox"/>	NQ-2 ROCK CORE	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	
	6" x 3.25 HSA	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON	
	9" x 6.25 HSA	RECORDER <b>REB</b>	
	HW CASING ADVANCER 4"		
	NW CASING 3"		
	SW CASING 6"		
	AIR HAMMER 8"		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-103** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/4/96** BORING FINISH **6/4/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.6	23.1	5-14-21	1.1		25					
8	SS	26.6	28.1	11-17-28	1.2		30					
9	SS	31.6	33.1	8-9-10	1.1		35	CL	<b>BROWN SILTY CLAY</b> Moist, with fine grain sand lens, low plasticity.			
10	ST	36.6	38.6		1.6		40	SP	<b>time 5 sec.</b> <b>Push 2.0</b> <b>PSI 700</b> <b>LIGHT BROWN SAND</b> Fine grain.			
11	SS	41.6	43.1	4-5-6	1.1		45		<b>BROWN SAND</b> Moist, 100% fine grain, with fines.			

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-103** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/4/96** BORING FINISH **6/4/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
12	SS	46.6	48.1	6-6-5	?			[Dotted pattern]				

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,229.2 E 1,734,600.2**  
 GROUND ELEVATION **618.7** SYSTEM **STATE PLANE**

BORING NO. **96-104** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/4/96** BORING FINISH **6/4/96**  
 PIEZOMETER TYPE **SS** WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN **24.1** BOTTOM **33.1**  
 WELL DEVELOPMENT **NO** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽	▼	▼
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	0.0		2-4-8	1.1				CL	-		
2	SS	3.0	4.5	9-14-18	1.2				SP	<b>DARK BROWN CLAY</b> Moist, medium to high plasticity trace of sand.		
3	SS	5.0	6.5	73	1.1		5		GW	<b>BROWN GRAVELLY SAND</b> Dry, quartz, 1/2" max, rounded. <b>DARK BROWN SAND AND GRAVEL</b> Dry, quartz, 1/2" max, rounded.		
4	SS	8.5	10.0	9-18-25	1.2		10			<b>Same as above some fines, moist</b>		
5	SS	11.7	13.2	19-26-31	1.2		15		SP	<b>DARK BROWN GRAVELLY SAND</b> Dry, 3/4" max, rounded, quartz.		
6	SS	16.7	18.2	18-21-26	1.2				SC	<b>DARK BROWN CLAYEY SAND</b> Moist, trace of gravel.		

**TYPE OF CASING USED**

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-104** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/4/96** BORING FINISH **6/4/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.7	23.2	17-21-25	1.2		25		SP	<b>LIGHT BROWN GRAVELLY SAND</b> Dry, quartz, 3/4" max, rounded.		20.4 Top seal. 22.5 Top of sand.
8	SS	26.7	28.2	4-6-8	1.1		30		CL	<b>LIGHT BROWN SILTY CLAY</b> Moist, low to medium plasticity.		24.1 Top of screen. 33.1 Bottom of screen.
9	ST	31.7	33.7		1.6		35			<b>PUSH 2.0</b> <b>PSI 900</b> <b>TIME 6 SEC.</b> <b>BROWN CLAYEY SAND</b> Fine grain?		34.7 Bottom of sand.
10	SS	36.7	38.2	3-3-5	1.2		40			<b>LIGHT BROWN SILTY CLAY</b> Moist, low to medium plasticity.		
11	SS	41.7	43.2	4-4-7	1.1		45		SM	<b>LIGHT BROWN SILTY SAND</b> Moist. v-fine grain 100%.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-104** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/4/96** BORING FINISH **6/4/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
12	ST	46.7	48.7		1.5					<b>PUSH 2.0</b> <b>PSI 1200</b> <b>TIME 6 SEC.</b> <b>DARK BROWN SANDY CLAY</b> Fine grain.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,782.8 E 1,735,084.7**  
 GROUND ELEVATION **619.3** SYSTEM **STATE PLANE**

BORING NO. **96-105** DATE **7/23/15** SHEET **1** OF **3**  
 BORING START **6/3/96** BORING FINISH **6/3/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b>No sample taken. Boring located in road bed. Auger cuttings sand and gravel.</b>		Boring grouted from grade to 48.5' with 75 gallons of quick grout
1	SS	3.0	4.5	7-10-11	1.1				SW	<b>BROWN SAND</b> Dry, quartz, rounded with trace of gravel.		
2	SS	5.0	6.5	12-16-21	1.2		5			<b>BROWN GRAVELLY SAND</b> Dry quartz, rounded, 1/2" max size.		
3	SS	8.5	10.0	9-15-17	1.2		10			<b>3/4" max size trace of fines.</b>		
4	SS	11.5	13.0	9-16-19	1.1		15					
5	SS	16.5	18.0	9-14-17	1.2					<b>Moist</b>		

**TYPE OF CASING USED**

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-105** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/3/96** BORING FINISH **6/3/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	21.5	23.0	7-9-14	1.1		25		SM	<b>DARK BROWN SILTY SAND</b> Moist, with trace of small gravel.		
7	SS	26.5	28.0	5-6-7	1.2		30		CL	<b>BROWN SILTY CLAY</b> Moist, low to medium plasticity.		
8	ST	31.5	33.5		1.7		35			<b>PUSH 2.0 PSI 700 TIME 8 SEC.</b>		
9	SS	36.5	38.0	3-3-5	1.1		40					
10	SS	41.5	43.0	4-4-5	1.2		45		SP SC	<b>LIGHT BROWN CLAYEY SAND</b> Moist, 100% v-fine grain.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-105** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/3/96** BORING FINISH **6/3/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	ST	46.5	48.0		1.8					<b>TIME 5 SEC</b> <b>PSI 800</b> <b>PUSH 2.0</b>		



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 719,271.8 E 1,735,858.4**

GROUND ELEVATION **618.9** SYSTEM **STATE PLANE**

BORING NO. **96-106** DATE **7/23/15** SHEET **1** OF **3**

BORING START **5/28/96** BORING FINISH **5/28/96**

PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_

HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_

DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_

WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**

FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽ <b>60.2</b>	▼	▼
TIME			
DATE	<b>5-28-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b><u>NO SAMPLE TAKEN BORING IN ROAD BED.</u></b>		
1	SS	3.0	4.5	15-17-21	1.1				GP	<b><u>DARK BROWN SAND AND GRAVEL</u></b> Moist, 1/2" max, rounded, quartz, some fines.		
2	SS	5.0	6.5	17-24-30	1.1		5			<b><u>1" max size</u></b>		
3	SS	8.5	10.0	13-17-20	1.2					<b><u>1/2" max size</u></b>		
4	SS	11.5	13.0	11-11-14	1.2		10					
5	SS	16.5	18.0	13-15-17	1.1		15			<b><u>1/2" max size</u></b>		

**TYPE OF CASING USED**

*Continued Next Page*

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

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

RECORDER **REB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-106** DATE **7/23/15** SHEET **2** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/28/96** BORING FINISH **5/28/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	21.5	23.0	6-8-10	1.2				SC	<b>BROWN SANDY CLAY</b> Dry, slight to low plasticity.		
7	SS	26.5	28.0	4-6-6	1.2		25			<b>GRAY FLY ASH</b> Dry.		
8	SS	31.5	33.0	1-1-1	1.2		30			<b>Saturated</b>		
9	SS	36.5	38.0	1-1-1	1.2		35					
10	SS	41.5	43.0	1-1-1	1.2		40					
							45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-106** DATE **7/23/15** SHEET **3** OF **3**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/28/96** BORING FINISH **5/28/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	SS	46.5	48.0	3-2-2	1.1		50					
12	SS	51.5	53.0	2-2-2	1.2		55					
13	SS	56.5	58.0	3-4-4	1.2		60		CL	<b>DARK GRAY SILTY CLAY</b> Wet, low to medium plasticity, trace of organic material.		
14	ST	61.5	63.5		1.6		65			<b>Time 7 sec.</b> <b>Push 2.0</b> <b>PSI 600</b> <b>BROWN SILTY CLAY</b> Trace of fine sand.	▽	
15	SS	66.5	68.0	3-4-5	1.2					<b>BROWN CLAY</b> Wet, medium to high plasticity.		
												Boring grouted from 68.0' to grade with 125 gallons quick grout.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,691.4 E 1,736,040.0**  
 GROUND ELEVATION **618.8** SYSTEM **STATE PLANE**

BORING NO. **96-107** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **5/29/96** BORING FINISH **5/29/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽ <b>39.1</b>	▼	▼
TIME			
DATE	<b>5-29-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b><u>NO SAMPLE TAKEN BORING IN ROAD BED. AUGER CUTTINGS INDICATE BROWN SAND AND GRAVEL.</u></b>		Boring was grouted from 73.1 to grade w/approximately 100 gallons of quick grout.
1	SS	3.0	4.5	14-17-21	1.1			GP	<b><u>BROWN SAND AND GRAVEL</u></b> Moist, quartz, rounded, some fine 3/4" max size.			
2	SS	5.0	6.5	17-21-28	1.2	5						
3	SS	8.5	10.0	14-18-24	1.1	10			<b><u>1/2" max size</u></b>			
4	SS	11.6	13.1	13-16-21	1.2	15						
5	SS	16.6	18.1	5-8-10	1.1			ML	<b><u>BROWN SILT</u></b> Moist, non to v-slight plasticity.			

TYPE OF CASING USED	
<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-107** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/29/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	21.6	23.1	8-8-11	1.2		25		SM	<b>Attempted shelly tube lifted rig</b> <b>BROWN SILT SAND</b> Moist, 100% v-fine grain.		
7	SS	26.6	28.1	4-5-9	1.2		30			<b>GRAY FLY ASH</b> Moist.		
8	SS	31.6	33.1	5-8-11	1.2		35			<b>Saturated</b>		
9	SS	36.6	38.1	1-1-1	1.1		40					
10	SS	41.6	43.1	1-1-1	1.2		45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-107** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/29/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	SS	46.6	48.1	1-1-1	1.2		50					
12	SS	51.6	53.1	2-1-1	1.2		55					
13	SS	56.6	58.1	0	1.3		60					
14	SS	61.6	63.1	4-7-10	1.2		65		CL	<b>DARK BROWN CLAY</b> Moist. medium to high plasticity.		
15	ST	66.6	68.6		1.5		70			<b>Push 2.0</b> <b>Time 5 sec.</b> <b>PSI 600</b> <b>BROWN CLAY</b>		
16	SS	71.6	73.1	4-6-7	1.2							

Weight of 140# hammer.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-107** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/29/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,761.8 E 1,736,125.4**  
 GROUND ELEVATION **603.4** SYSTEM **STATE PLANE**

BORING NO. **96-108** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **6/11/96** BORING FINISH **6/11/96**  
 PIEZOMETER TYPE **SS** WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN **63.3** BOTTOM **72.3**  
 WELL DEVELOPMENT **NO** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-WEB** RIG **BK-81**

Water Level, ft	▽	▼	▼
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b>No sample road base</b>		
1	SS	3.0	4.5	11-15-16	1.2					<b>BLACK SAND AND BOTTOM ASH</b> Moist.		
3	SS	5.0	6.5	12-17-21	1.5		5					
4	SS	8.5	10.0	12-16-29	.9		10	SC		<b>DARK BROWN CLAYEY SAND</b> Moist, with fine sand lens.		
5	SS	11.6	13.1	9-18-22	1.2		15	SP		<b>DARK BROWN GRAVELLY SAND</b> Moist, quartz, some fine, 1/2" max size.		
6	SS	16.6	18.1	18-24-21	.8			SC		<b>DARK BROWN CLAYEY SAND</b> Moist, trace of small gravel and ash.		

**TYPE OF CASING USED**

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-108** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/11/96** BORING FINISH **6/11/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.6	23.1	6-6-8	1.5		25		CL	<b>LIGHT BROWN SILTY CLAY</b> Moist, low plasticity.		
8	SS	26.6	28.1	4-4-4	1.0		30			<b>BLACK BOTTOM ASH</b> Saturated.		
9	SS	31.6	33.1	2-1-2	1.1		35			<b>GRAY FLY ASH</b> Saturated.		
10	SS	36.6	38.1	2-1-1	1.5		40					
11	SS	41.6	43.1	3-5-7	.8		45		CL	<b>LIGHT GRAY CLAY</b> Moist to wet, medium to high plasticity.		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-108** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/11/96** BORING FINISH **6/11/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
12	ST	46.6	48.6		2.0		50			<b><u>PUSH 2.0</u></b> <b><u>TIME 7 SEC.</u></b> <b><u>PSI 1000</u></b>		
13	SS	51.6	53.1	2-2-3	?		55		CL	<b><u>DARK GRAY SILTY CLAY</u></b> Wet, low plasticity, trace of organic and sand.		
14	SS	56.6	58.1	2-2-3	1.5		60					57.0 Top of seal.
15	SS	61.6	63.1	3-4-5	1.5		65					60.6 Top of sand.
16	SS	66.6	68.1	4-4-5	1.5		70					63.3 Top screen.
17	SS	71.6	73.1	4-5-6	1.5							

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING




JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-108** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/11/96** BORING FINISH **6/11/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
												72.3 Bottom of screen.  74.0 Bottom of sand.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,227.5 E 1,735,579.0**  
 GROUND ELEVATION **619.6** SYSTEM **STATE PLANE**

BORING NO. **96-109** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **5/29/96** BORING FINISH **5/30/96**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN \_\_\_\_\_ BOTTOM \_\_\_\_\_  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽ <b>20.5</b>	▼	▼
TIME			
DATE	<b>5-30-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b>NO SAMPLE TAKEN BORING LOCATED IN ROAD BASE. AUGER CUTTINGS INDICATE BROWN SAND AND GRAVEL.</b>		Boring grouted from 73.2 to grade with 150 gallons quick grout.
1	SS	3.0	4.5	13-19-24	1.2			GP	<b>DARK BROWN SAND AND GRAVEL</b> Moist, 1/2" max size, quartz, rounded, some fines.			
2	SS	5.0	6.5	15-18-21	1.1	5						
3	SS	8.5	10.0	15-18-21	1.2	10						
4	SS	11.7	13.2	12-13-14	1.0	15		SP	<b>DARK BROWN SAND</b> Moist, fine grain.			
5	SS	16.7	18.2	4-5-6	1.1			ML	<b>BROWN SANDY SILT</b> Moist, non plasticity.			

**TYPE OF CASING USED**

<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-109** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/30/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	21.7	23.2	4-6-8	1.2		25				▽	
7	ST	26.7	28.7		1.5		30			Time 10 sec PSI 1200 Push 2.0 By watching rig psi possible .4 to .5 of fly ash in bottom of tube. GRAY FLY ASH Moist.		
8	ST	31.7	33.2	4-7-10	1.1		35					
9	SS	36.7	38.2	1-1-1	1.2		40			Saturated		
10	SS	41.7	43.2	1-1-1	1.2		45					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-109** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/30/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
11	SS	46.7	48.2	1-1-3	?		50					
12	SS	51.7	66.7	1-1-2	1.2		55					
13	SS	56.7	58.2	1-1-4	1.2		60					
14	SS	61.7	63.2	4-6-8	?		65		CL	<b>DARK BROWN CLAY</b> Moist, medium to high plasticity.		
15	ST	66.7	68.7		1.7		70			<b>Time 8 sec.</b> <b>Push 2.0</b> <b>PSI 1000</b> <b>Material same as sample no. 14</b>		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

Continued Next Page



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-109** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **5/29/96** BORING FINISH **5/30/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
16	SS	71.7	73.2	3-4-5	1.2							

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,277.1 E 1,735,665.6**  
 GROUND ELEVATION **602.3** SYSTEM **STATE PLANE**

BORING NO. **96-110** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **6/6/96** BORING FINISH **6/10/96**  
 PIEZOMETER TYPE **SS** WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND \_\_\_\_\_ DIA \_\_\_\_\_  
 DEPTH TO TOP OF WELL SCREEN **43.7** BOTTOM **52.7**  
 WELL DEVELOPMENT **NO** BACKFILL **QUICK GROUT**  
 FIELD PARTY **MCR-REB** RIG **BK-81**

Water Level, ft	▽ <b>DRY</b>	▼	▼
TIME			
DATE	<b>6-10-96</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
										<b>No sample taken, boring in road.</b>		Grouted grade to 73.1' with approximately 80 gallons.
1	SS	3.0	4.5	13-18-24	1.1					<b>DARK GRAY BOTTOM ASH</b> Dry.		
2	SS	5.0	6.5	10-11-14	1.2		5					
3	SS	8.5	10.0	5-7-9	1.1				GP	<b>DARK BROWN SAND AND GRAVEL</b> Dry, quartz, rounded, 3/4" max.		
4	SS	11.6	13.1	6-7-10	1.1		10					
5	SS	16.6	18.1	8-10-10	1.2				CL	<b>BROWN CLAY</b> Dry, low to medium plasticity with trace of v-fine sand.		
6	SS	18.6	20.1	9-11-12	1.2		15		SC	<b>Attempted to push tube lifted drill, destroyed end of tube.</b> <b>BROWN SANDY CLAY</b> Moist, low to medium		

TYPE OF CASING USED	
<b>X</b>	NQ-2 ROCK CORE
	6" x 3.25 HSA
	9" x 6.25 HSA
	HW CASING ADVANCER 4"
	NW CASING 3"
	SW CASING 6"
	AIR HAMMER 8"

*Continued Next Page*

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

RECORDER **REB**

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-110** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/6/96** BORING FINISH **6/10/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.6	23.1	5-7-11	1.2		25			plasticity with v-fine grain sand lens.  <b><u>Grading to more sand</u></b>  <b><u>Attempted to push tube, top hole broken in tube, pushed approximately 1' lifted rig.</u></b>		
9	SS	26.6	28.1	5-7-11	1.2		30			<b><u>GRAYISH BROWN SILTY CLAY</u></b> Moist, low to medium plasticity.  <b><u>Could not move or knock tube off to the side of lead auger, pulled augers grouted hole moved approximately three feet down stream to start new hole. No spt taken on new hole until this point. SWL dry augers to 26.6'. Auger set all weekend at this point.</u></b> <b><u>REDDISH BROWN CLAY</u></b> Dry to moist, medium to high plasticity.		
10	SS	31.6	33.1	7-10-9	1.3		35		CL			
11	SS	36.6	38.1		1.5		40		CL	<b><u>MEDIUM GRAY CLAY</u></b> Moist to dry, medium to high plasticity, with odor of organic.  <b><u>PUSH 2.0</u></b> <b><u>PSI 1200</u></b> <b><u>TIME 6 SEC.</u></b> <b><u>Top DARK BROWNISH GRAY SANDY CLAY</u></b> <b><u>Bottom BROWN SANDY CLAY</u></b>		
12	ST	38.6	40.6		2.0		40					39.1 Top of seal.
13	SS	41.6	43.1	3-5-7	1.5		45			<b><u>DARK GRAY CLAY</u></b> Moist to wet, medium to high plasticity, strong odor of organic.		41.7 Top of sand.  43.7 Top of screen.

Continued Next Page

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING






JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-110** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/6/96** BORING FINISH **6/10/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
14	SS	46.6	48.1	3-4-4	1.5		50			<b>GRAY BROWN CLAY</b> Moist to wet, medium to high plasticity, odor of organic with v-fine grain sand lens, water on out side of spoon.		52.7 Bottom of screen. 53.3 Bottom of sand.
15	SS	51.6	53.1	3-3-5	1.5		55					
16	SS	56.6	58.1	3-4-4	1.5					<b>PUSH 2.0</b> <b>TIME 7 SEC.</b> <b>PSI 770</b> <b>DARK GRAY SILTY CLAY</b>		
17	ST	58.6	60.6		2.0		60					
18	SS	61.6	63.1		?					<b>DARK GRAY CLAY</b> Moist to wet, medium to high plasticity, strong odor of organic material.		
19	SS	66.6	68.1	3-4-5	1.5		65					
20	SS	71.6	73.1	4-7-11	1.4		70					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **96-110** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **6/6/96** BORING FINISH **6/10/96**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 723,463.5 E 1,734,069.7**  
 GROUND ELEVATION **582.2** SYSTEM State Plane using NAD27

BORING NO. **JTMN-1** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **7/19/90** BORING FINISH **7/19/90**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND **1.5** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **56.7** BOTTOM **75.7**  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **Benseal**  
 FIELD PARTY **MCR / JD** RIG **B-61**

Water Level, ft	▽ <b>38.0</b>	▼	▼
TIME			
DATE	<b>7/19/90</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	2.7	4.2	4-8-7	1.4		5			<b>BROWN SANDY SILT</b> Moist, w/some quartz sand (fill)		20' North of well hub.
2	SS	7.7	9.2	3-3-3	0.9		10					
3	SS	12.7	14.2	4-7-9	1.3		15			<b>MULTI-COLORED BROWN CLAY</b> Moist, med to low plasticity		
4	SS	17.7	19.2	4-7-9	1.3					w/ trace of very fine sand		

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>			
		NQ-2 ROCK CORE 6" x 3.25 HSA 9" x 6.25 HSA HW CASING ADVANCER 4" NW CASING 3" SW CASING 6" AIR HAMMER 8"		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 RECORDER <b>JCM</b>			

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ\_AEP.GDT 7/23/15

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-1** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/19/90** BORING FINISH **7/19/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	22.7	24.2	4-7-9	1.4		25			<b>BROWN SILTY CLAY</b> w/ trace of very fine sand, low to medium plasticity		
6	SS	27.7	29.2	3-4-6	1.4		30			<b>BROWN SAND</b> Moist to wet, 100% fine grain		
7	SS	32.7	34.2	3-4-4	1.3		35					
8	SS	37.7	39.2	6-6-10	1.3		40			<b>BROWN CLAYEY SAND &amp; GRAVEL</b> Saturated, quartz - 3/4" max size, rounded	▽	
9	SS	42.7	44.2	6-8-10	1.1		45			<b>BROWN SAND &amp; GRAVEL</b> Saturated, quartz - 3/4" max size, rounded, w/ trace of fines		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

*Continued Next Page*



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-1** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/19/90** BORING FINISH **7/19/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	47.7	49.2	12-16-25	0.4		50			1" max size		
11	SS	52.7	54.2	10-12-16	0.9		55			<b>BROWN SAND</b> Saturated, 70% fine grain, w/ some fines		
12	SS	57.7	59.2	10-12-17	1.3		60			<b>BROWN SAND</b> Saturated, 90% medium to fine grain		
13	SS	62.7	64.2	12-17-15	0.9		65			<b>BROWN SAND</b> Saturated, 80% medium to fine grain quartz, trace of fines		
14	SS	67.7	69.2	17-16-16	1.0		70			<b>BROWN SILTY SAND</b> Saturated, quartz, w/ trace of small gravel		

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING




JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-1** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/19/90** BORING FINISH **7/19/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
15	SS	72.7	74.2	9-18-19	0.4		75			<b>BROWN SAND</b> Saturated, quartz, w/ trace of fines		Auger refusal @ 76.6'. Installed 2" observation well.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 723,392.8 E 1,734,106.4**  
 GROUND ELEVATION **582.2** SYSTEM **State Plane using NAD27**

BORING NO. **JTMN-2** DATE **7/23/15** SHEET **1** OF **4**  
 BORING START **7/17/90** BORING FINISH **7/18/90**  
 PIEZOMETER TYPE \_\_\_\_\_ WELL TYPE \_\_\_\_\_  
 HGT. RISER ABOVE GROUND **1.9** DIA **2**  
 DEPTH TO TOP OF WELL SCREEN **57.9** BOTTOM **76.9**  
 WELL DEVELOPMENT \_\_\_\_\_ BACKFILL **Benseal**  
 FIELD PARTY **MCR / JD** RIG **B-61**

Water Level, ft	▽ <b>40.2</b>	▼	▼
TIME			
DATE	<b>7/18/90</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	SS	2.7	4.2	5-2-12	0		5			NO RECOVERY - DROVE SPOON ON COBBLES		100' North of potable well hub.
2	SS	7.7	9.2	2-2-8	0		10			CONCRETE FRAGMENTS & SAND ON SPOON		
3	SS	12.7	14.2	4-5-8	0.9		15			BROWN CLAY Moist, medium to low plasticity		
4	SS	17.7	19.2	3-5-8	1.0							

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
	6" x 3.25 HSA	
<b>X</b>	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **JCM**

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-2** DATE **7/23/15** SHEET **2** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/17/90** BORING FINISH **7/18/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	SS	22.7	24.2	3-4-7	0		25					
6	SS	27.7	29.2	3-5-4	0.4		30			<b>BROWN SILTY SAND</b> Moist, 100% fine grain		
7	SS	32.7	34.2	4-5-5	1.3		35			<b>BROWN CLAY</b> Moist, medium to low plasticity <b>BROWN SAND</b> Quartz, 95% fine grain, trace of fines		
8	SS	37.7	39.2	3-5-7	1.3		40			<b>BROWN CLAYEY SAND</b> Wet to saturated.	▽	
9	SS	42.7	44.2	10-11-8	1.0		45			<b>BROWN SAND &amp; GRAVEL</b> Quartz, rounded, 3/4" max size, w/ fines		Started washing out augers.

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-2** DATE **7/23/15** SHEET **3** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/17/90** BORING FINISH **7/18/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
10	SS	47.7	49.2	8-11-11	0.3		50					
11	SS	52.7	54.2	9-14-10	0.5		55					
12	SS	57.7	59.2	7-7-7	0.9		60		<b>BROWN SAND</b> Quartz, saturated, trace of gravel			
13	SS	62.7	64.2	8-14-12	1.1		65		<b>BROWN SAND</b> Quartz, saturated, trace of gravel, trace of fines			
14	SS	67.7	69.2	7-13-14	1.2		70					

AEP\_EPRI\_SPORN\_MOUNTAINEER.GPJ AEP.GDT 7/23/15

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING





JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

BORING NO. **JTMN-2** DATE **7/23/15** SHEET **4** OF **4**

PROJECT **EPRI GROUND WATER STUDY**

BORING START **7/17/90** BORING FINISH **7/18/90**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
15	SS	72.7	74.2	8-13-16	1.2		75			<b>BROWN SAND</b> Saturated		
16	SS	77.7	77.8	50/0.1	0.1					<b>LIGHT BROWN SANDSTONE</b>		Auger refusal @ 77.8' Installed 2" observation well.

**AEP 1990, 1996, 1997, 2001,  
2008**

**Monitoring Well Construction  
Diagrams**

**MW-001 to MW-16, 96-101, 96-  
104, 96-108, 96-110, JTMN-1,  
JTMN-2**









AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

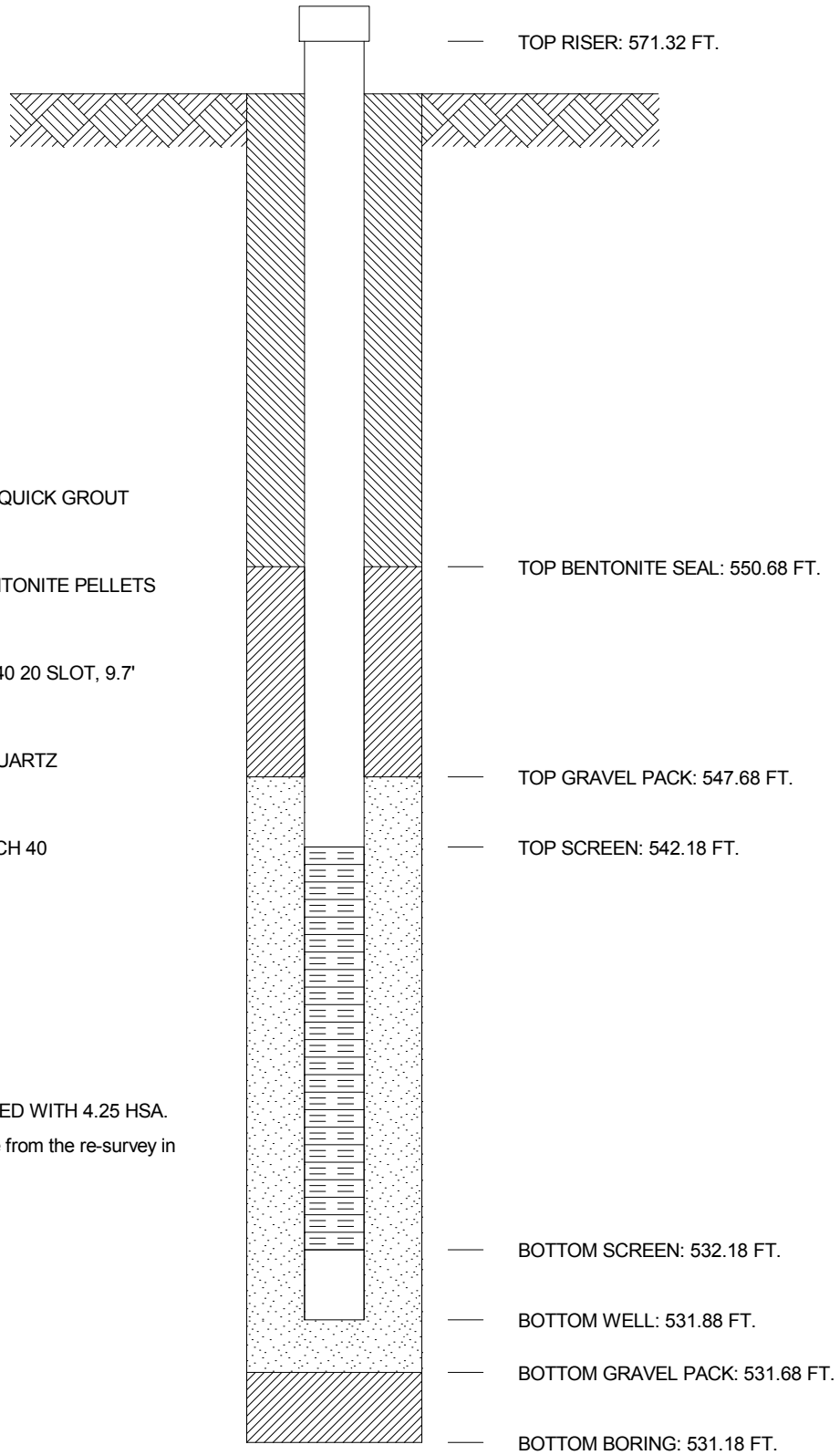


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,498.7 E 1,733,165.9**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-001** BORING No. **001** INSTALLED **6/18/97**

GROUND ELEVATION 569.18 FT.

-  GROUT SEAL: 50 GALLONS QUICK GROUT
-  BENTONITE SEAL: 125 #BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 95 #7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN. DRILLED WITH 4.25 HSA.  
 Coordinates and elevations are from the re-survey in June 2008.







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 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

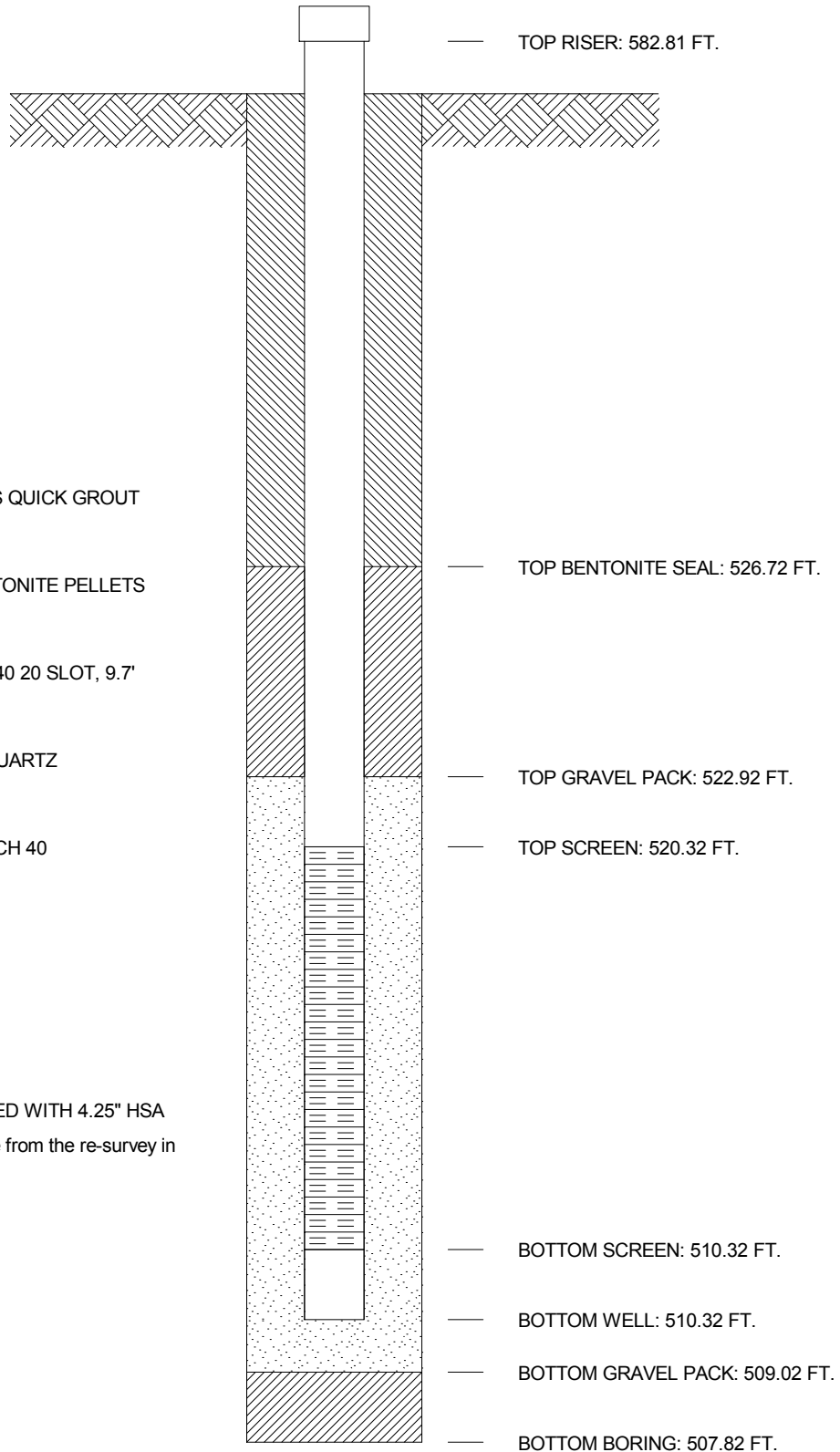


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,857.8 E 1,733,650.5**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-002** BORING No. **002** INSTALLED **6/24/97**

GROUND ELEVATION 580.82 FT.

-  GROUT SEAL: 100 GALLONS QUICK GROUT
-  BENTONITE SEAL: 25# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 97# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN DRILLED WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

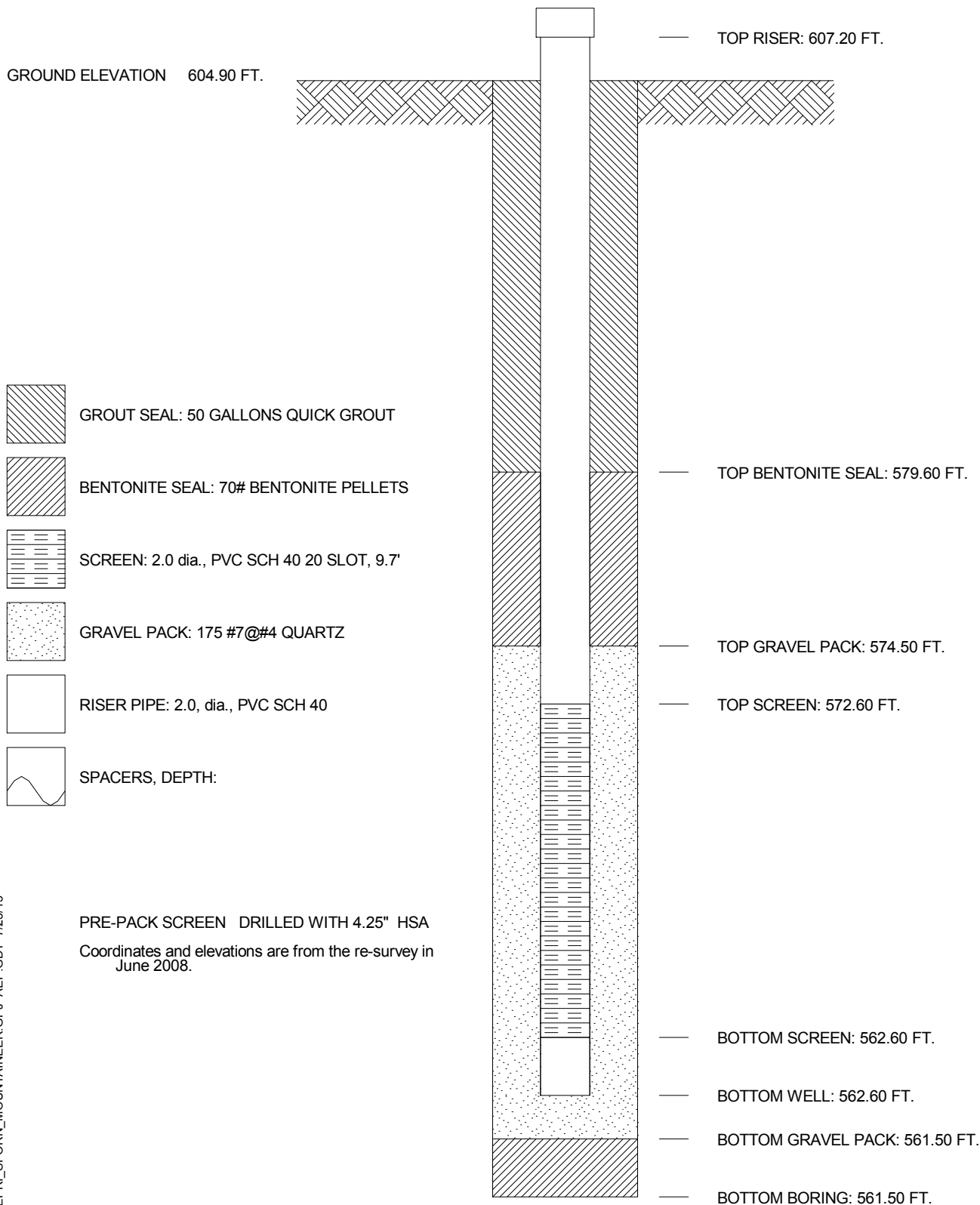
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,877.2 E 1,733,713.7**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-003** BORING No. **003** INSTALLED **6/25/97**

GROUND ELEVATION 604.90 FT.



PRE-PACK SCREEN DRILLED WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.







AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

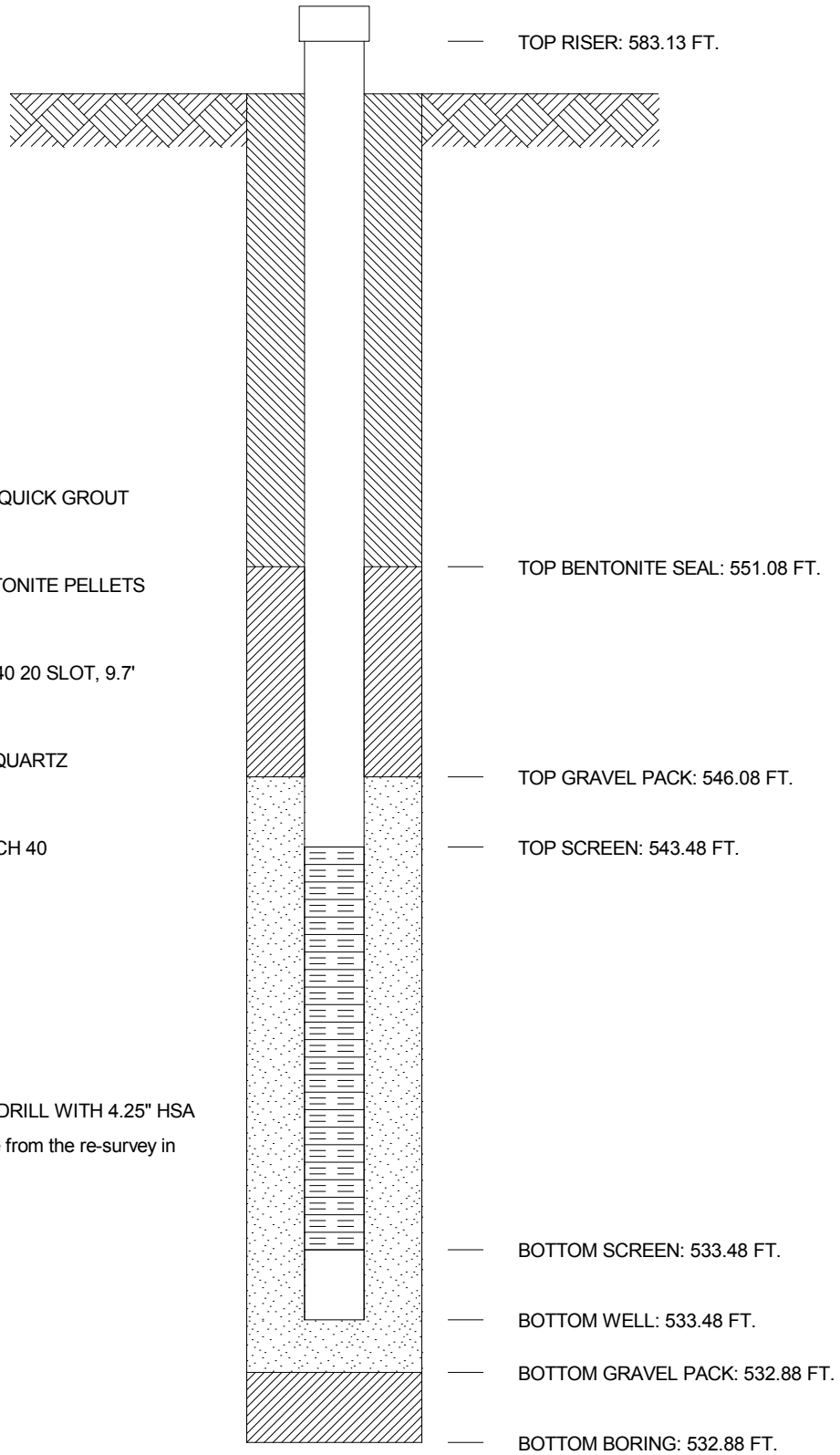


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 724,865.9 E 1,733,643.4**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-004** BORING No. **004** INSTALLED **6/30/97**

GROUND ELEVATION 581.08 FT.

-  GROUT SEAL: 50 GALLONS QUICK GROUT
-  BENTONITE SEAL: 50# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 375 #7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.







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 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

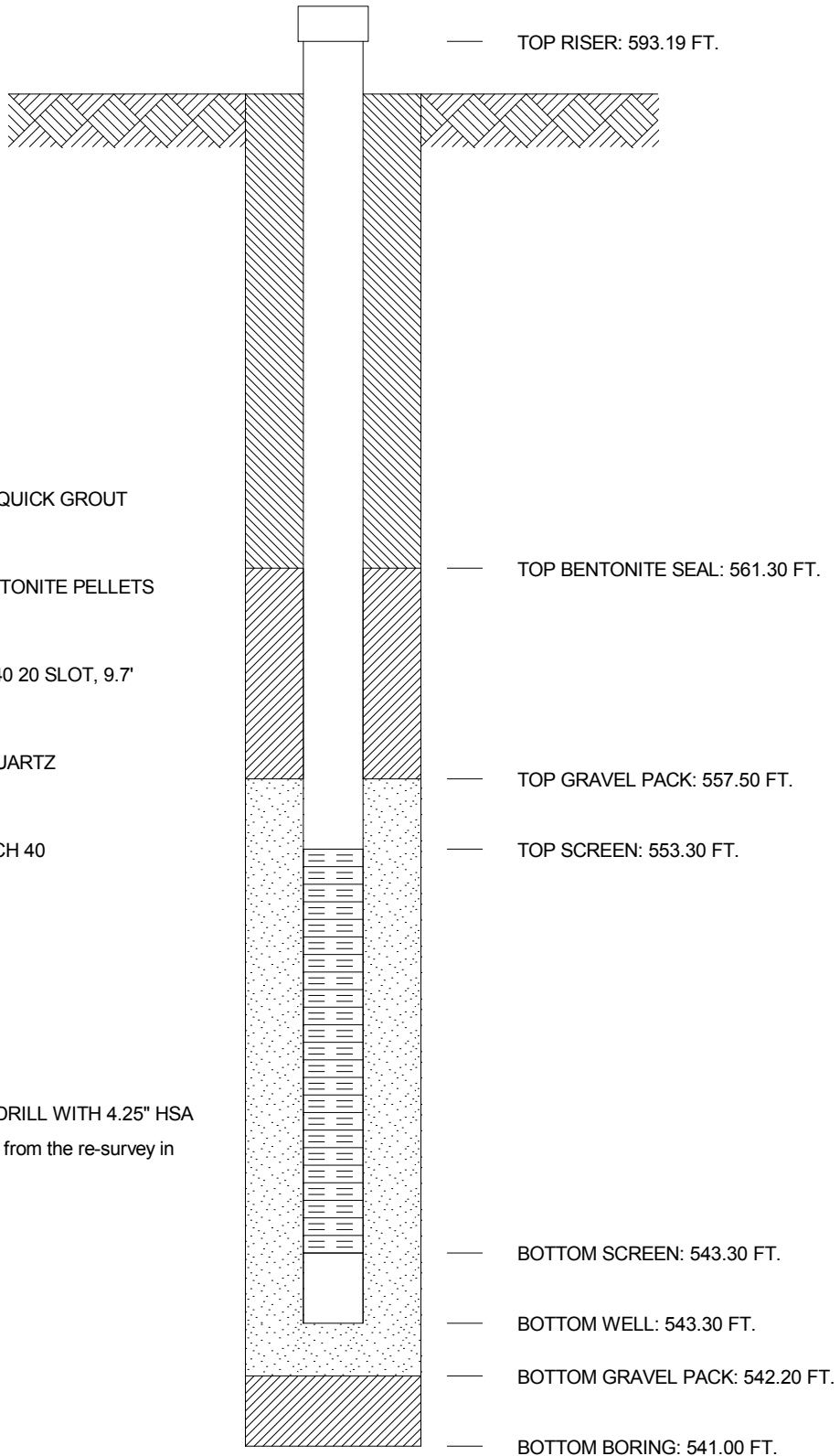


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,152.8 E 1,734,428.9**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-005** BORING No. **005** INSTALLED **7/1/97**

GROUND ELEVATION 591.00 FT.

-  GROUT SEAL: 80 GALLONS QUICK GROUT
-  BENTONITE SEAL: 150# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 75# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

WELL No. **MW-006** BORING No. **006** INSTALLED **7/8/97**

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 720,255.7 E 1,735,680.0**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION 601.31 FT.



GROUT SEAL: GALLONS QUICK GROUT



BENTONITE SEAL: 80# BENTONITE PELLETS



SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'



GRAVEL PACK: 185# 7@#4 QUARTZ

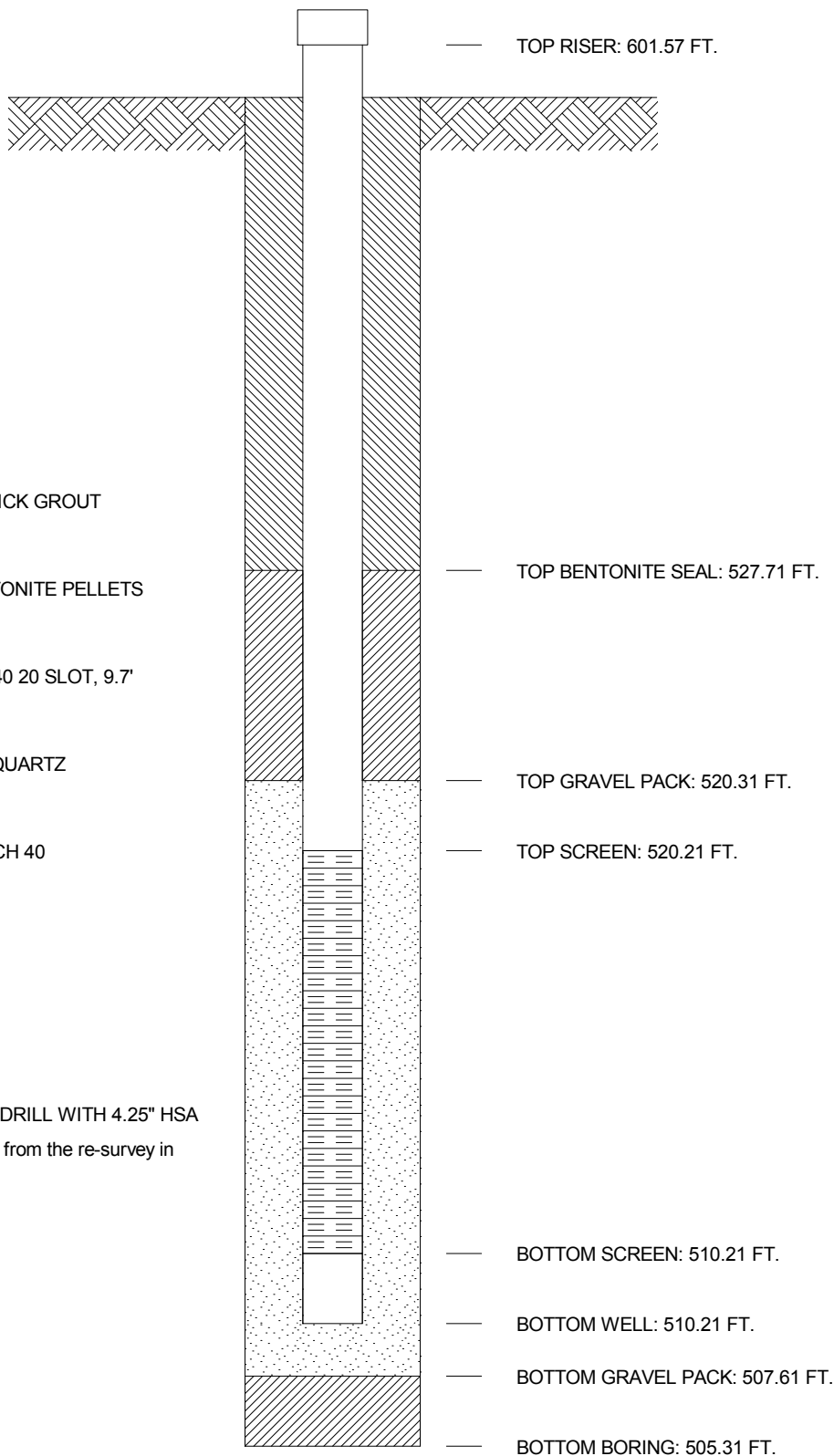


RISER PIPE: 2.0, dia., PVC SCH 40



SPACERS, DEPTH:

PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.









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 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

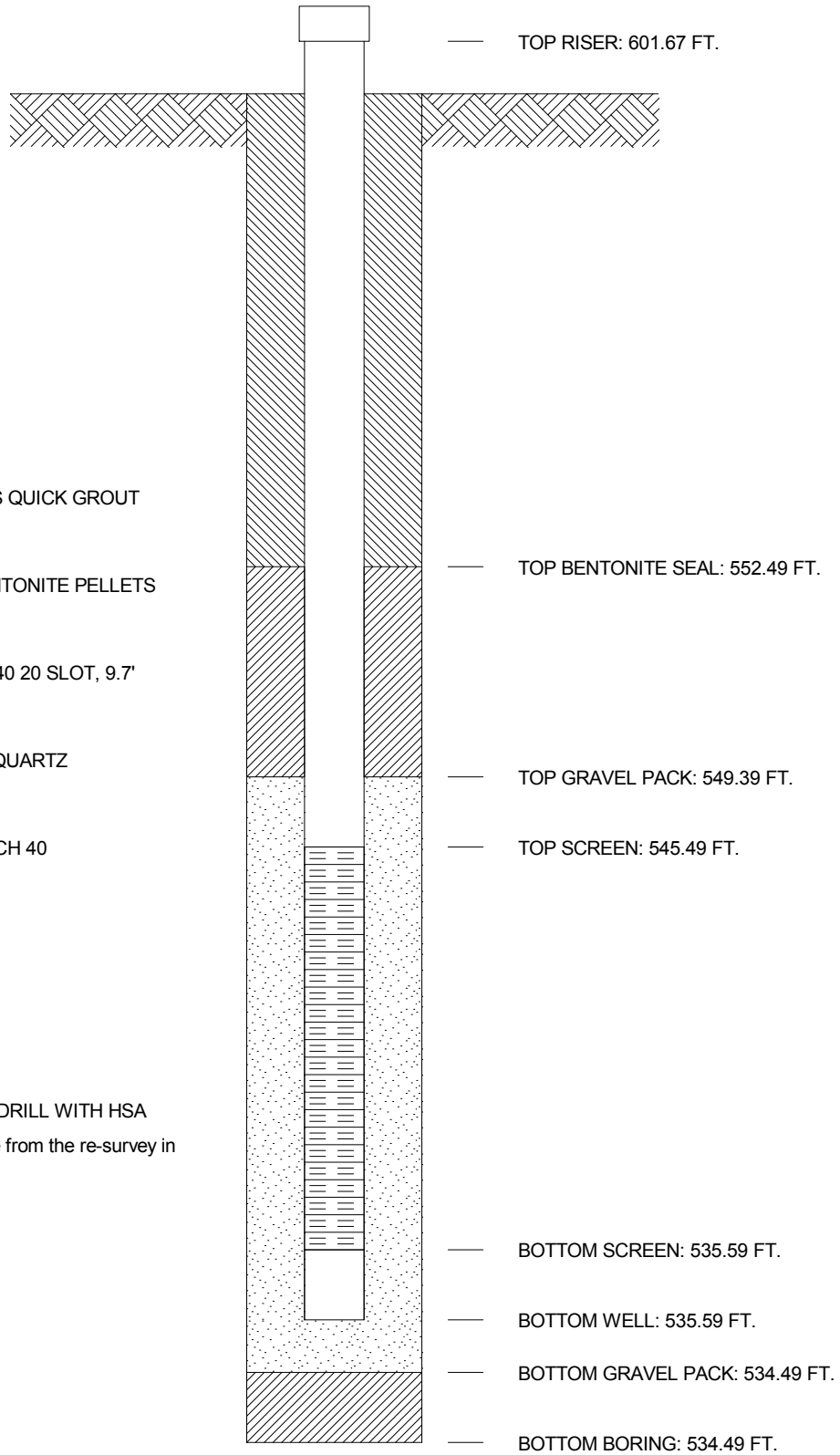


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,265.1 E 1,735,674.4**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-007** BORING No. **007** INSTALLED **7/10/97**

GROUND ELEVATION 601.49 FT.

-  GROUT SEAL: 100 GALLONS QUICK GROUT
-  BENTONITE SEAL: 100# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 525# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILL WITH HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

WELL No. **MW-008** BORING No. **008**

INSTALLED **7/22/97**

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 718,915.8 E 1,736,153.5**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION FT.



GROUT SEAL: GALLONS QUICK GROUT



BENTONITE SEAL: 70# BENTONITE PELLETS



SCREEN: 2.0 dia., PVC SCH 40 08 SLOT, 9.7'



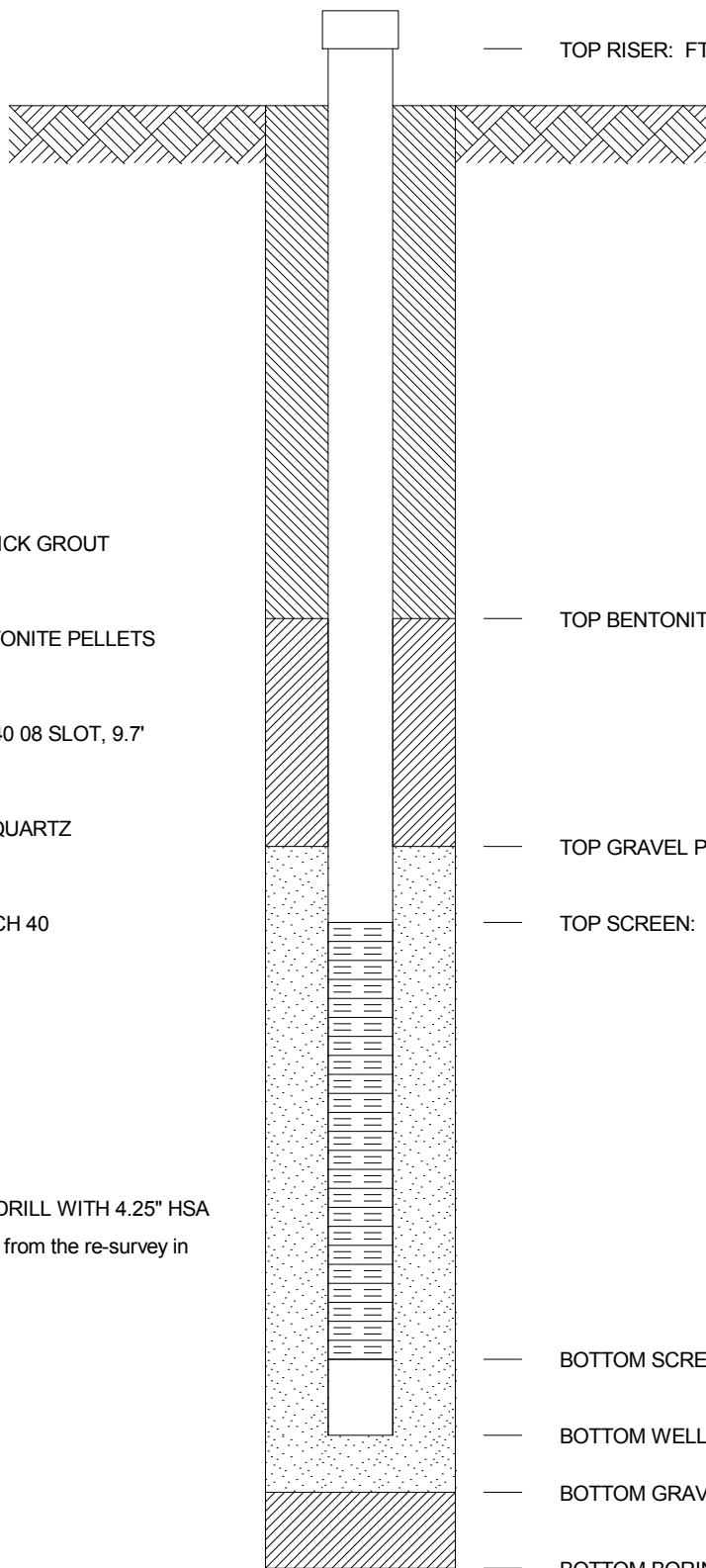
GRAVEL PACK: 360# 7@#4 QUARTZ



RISER PIPE: 2.0, dia., PVC SCH 40



SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.









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 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

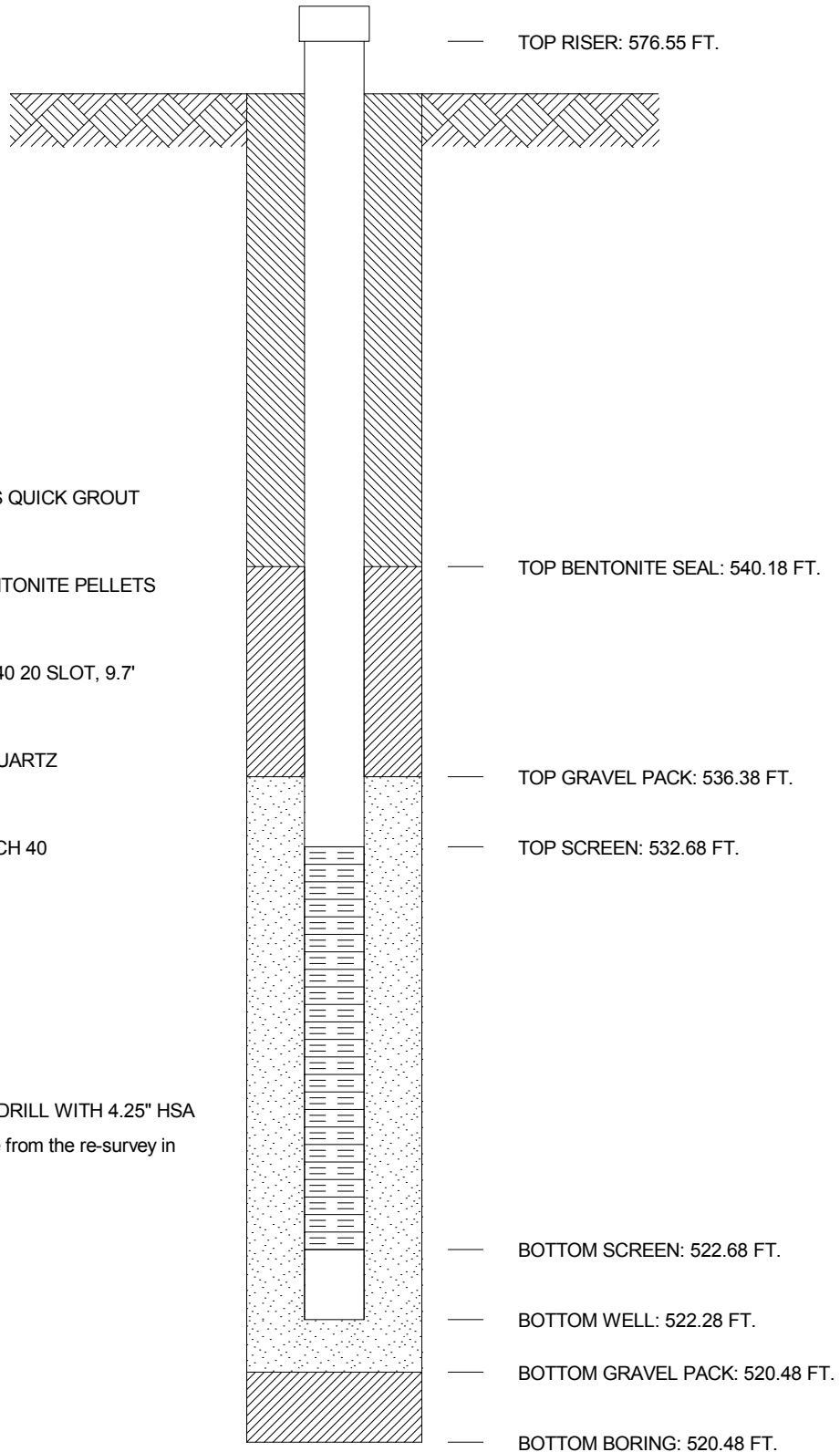


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,328.2 E 1,736,320.9**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-009** BORING No. **009** INSTALLED **7/15/97**

GROUND ELEVATION 574.98 FT.

-  GROUT SEAL: 180 GALLONS QUICK GROUT
-  BENTONITE SEAL: 100# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 65# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

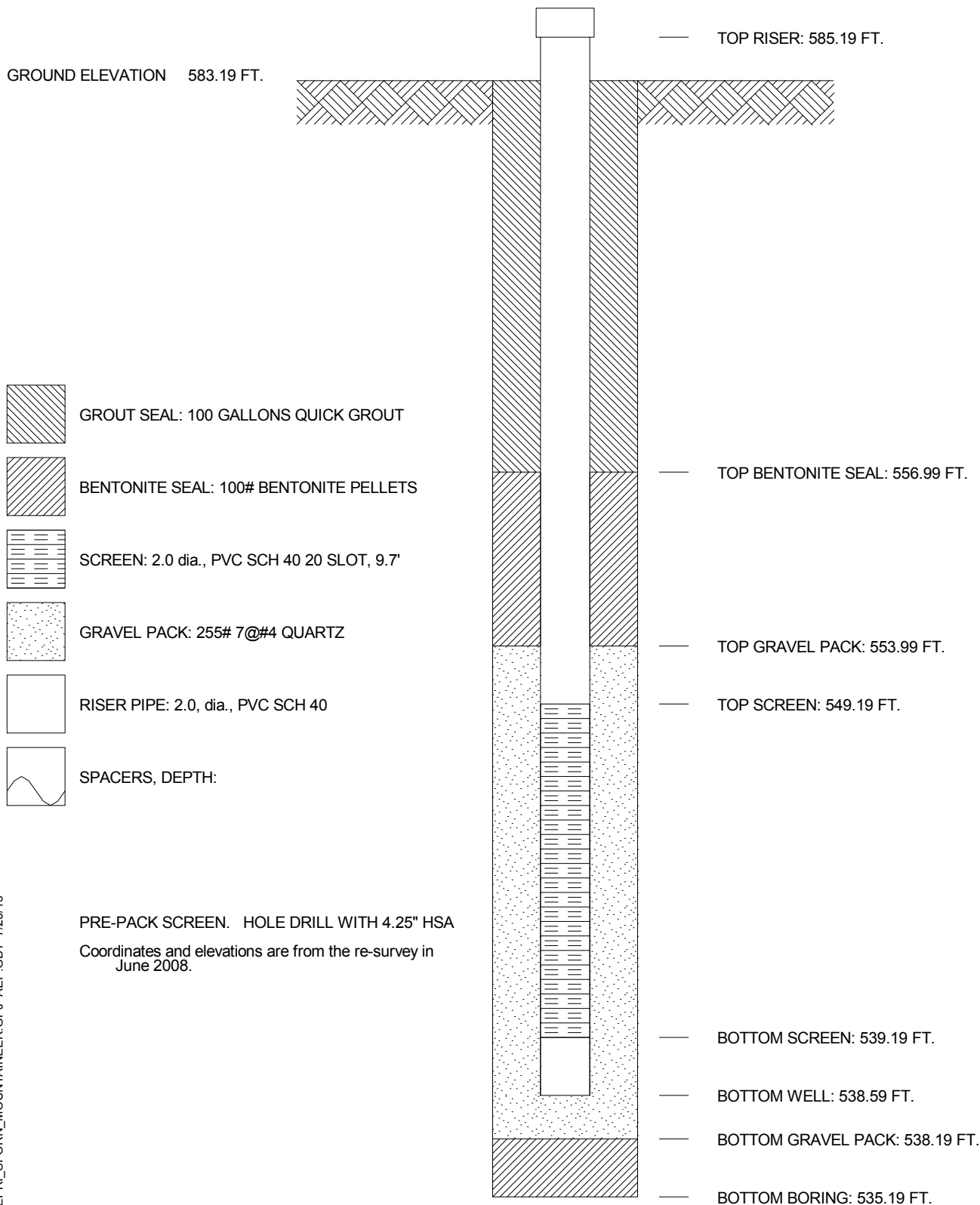
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 716,771.2 E 1,738,107.3**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-010** BORING No. **010** INSTALLED **7/17/97**

GROUND ELEVATION 583.19 FT.



PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

WELL No. **MW-011** BORING No. **011**







INSTALLED **7/23/97**

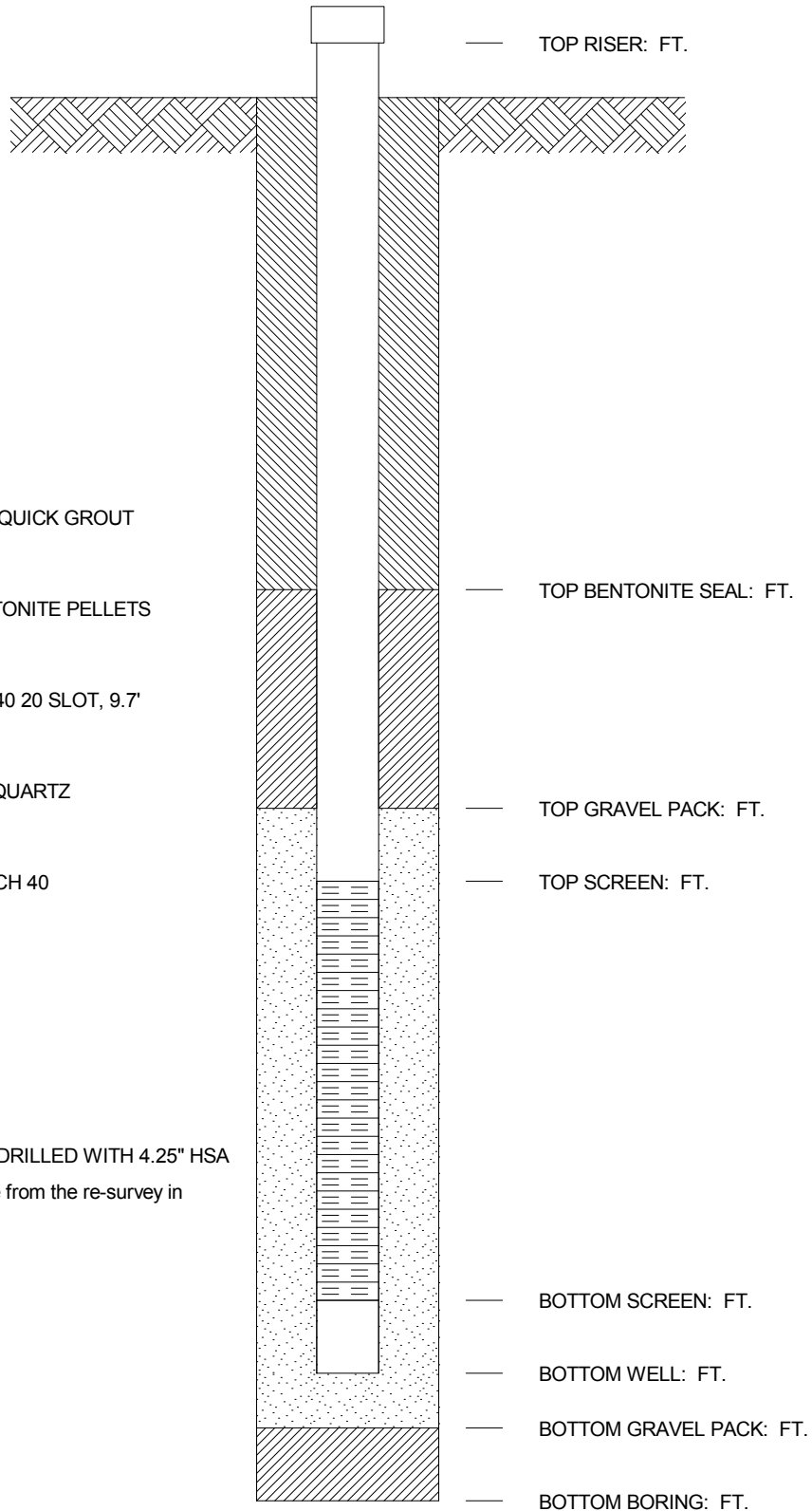
PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 717,666.4 E 1,736,450.7**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION FT.

-  GROUT SEAL: 75 GALLONS QUICK GROUT
-  BENTONITE SEAL: 30# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 330# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

WELL No. **MW-012** BORING No. **012**







INSTALLED **7/29/97**

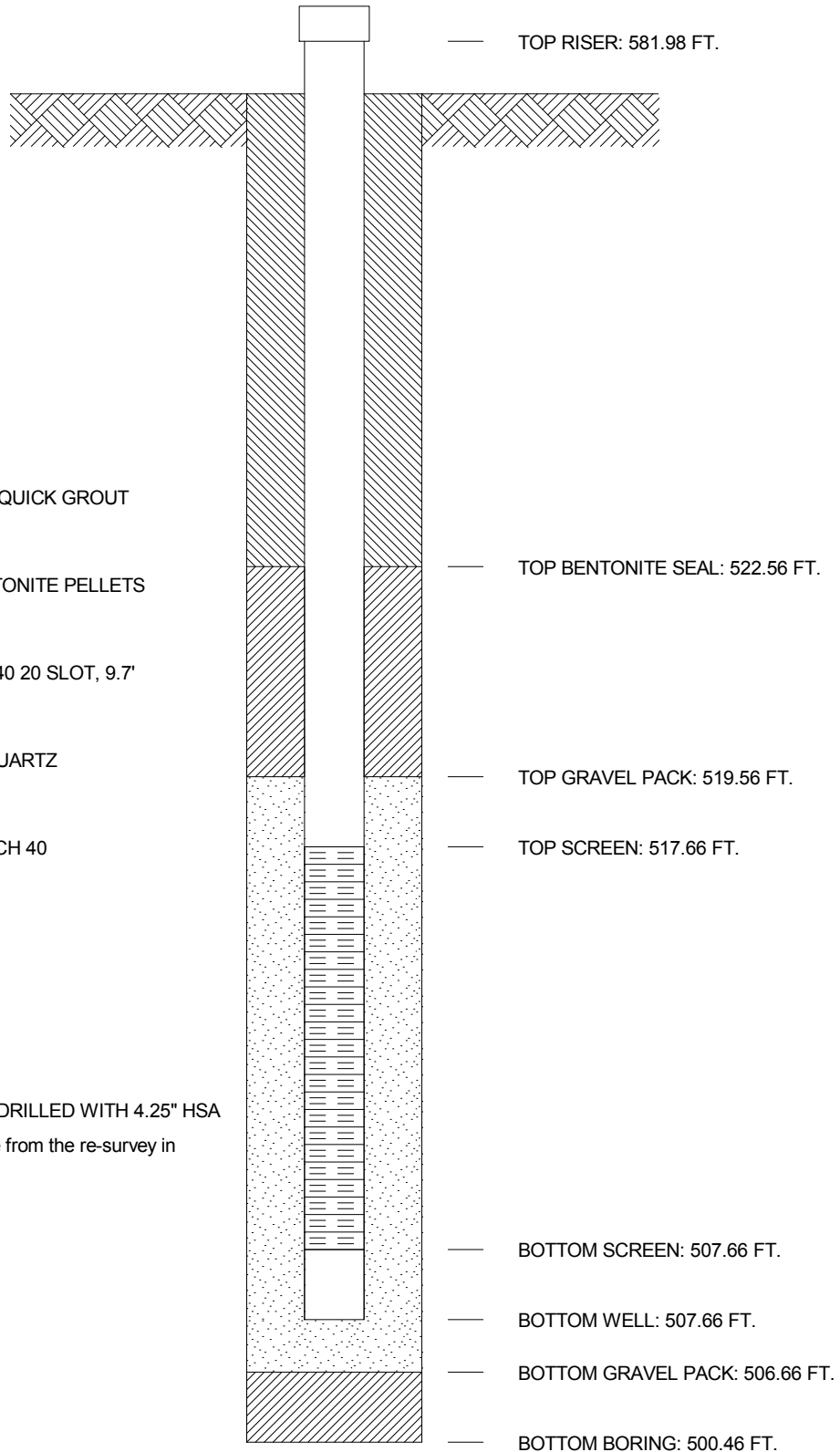
PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 718,753.1 E 1,737,045.5**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION 579.96 FT.

-  GROUT SEAL: 75 GALLONS QUICK GROUT
-  BENTONITE SEAL: 40# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 40# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA  
 Coordinates and elevations are from the re-survey in  
 June 2008.

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_

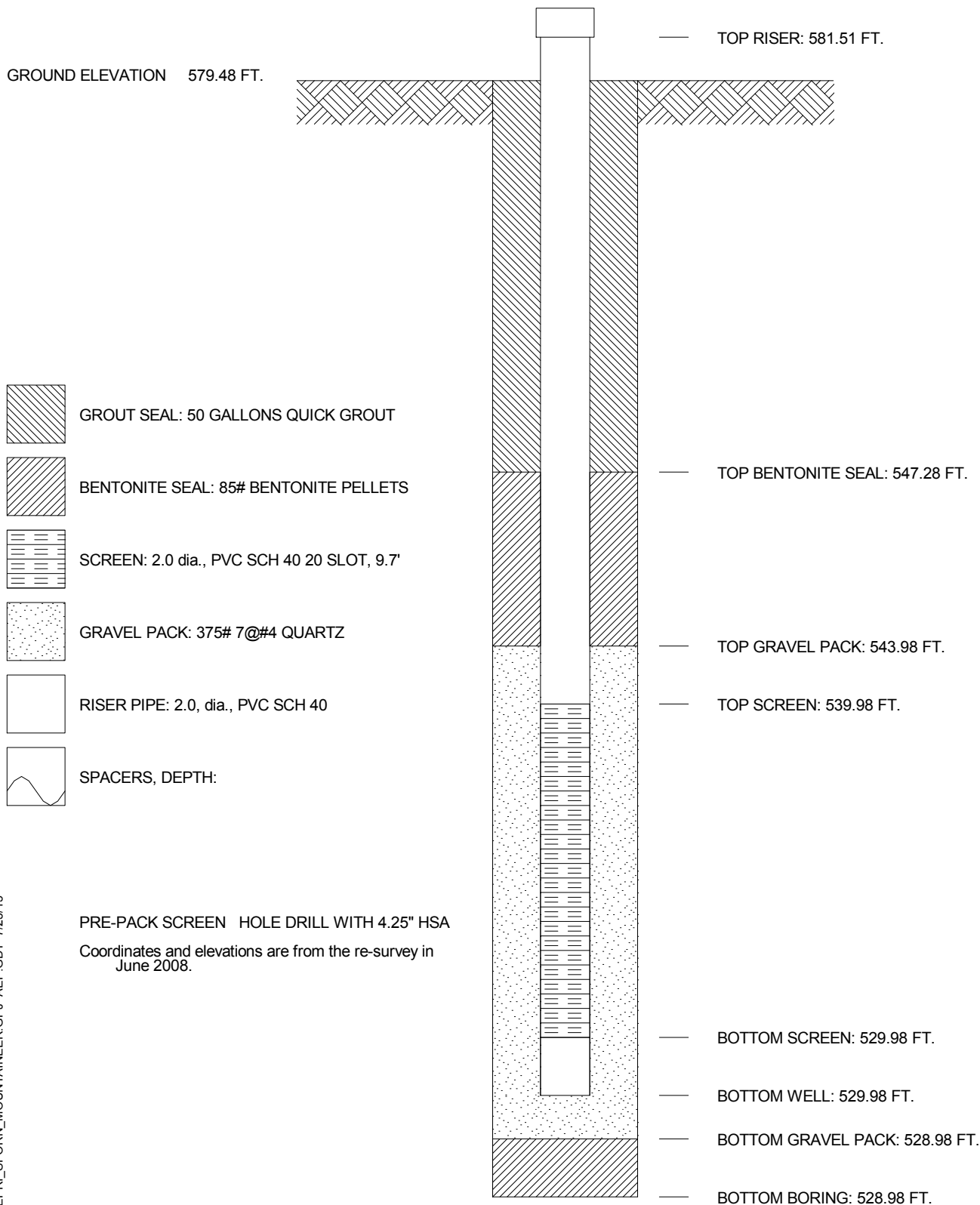
WELL No. **MW-013** BORING No. **013** INSTALLED **7/30/97**

PROJECT **EPRI GROUND WATER STUDY**

COORDINATES **N 718,758.6 E 1,737,044.4**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION 579.48 FT.









AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

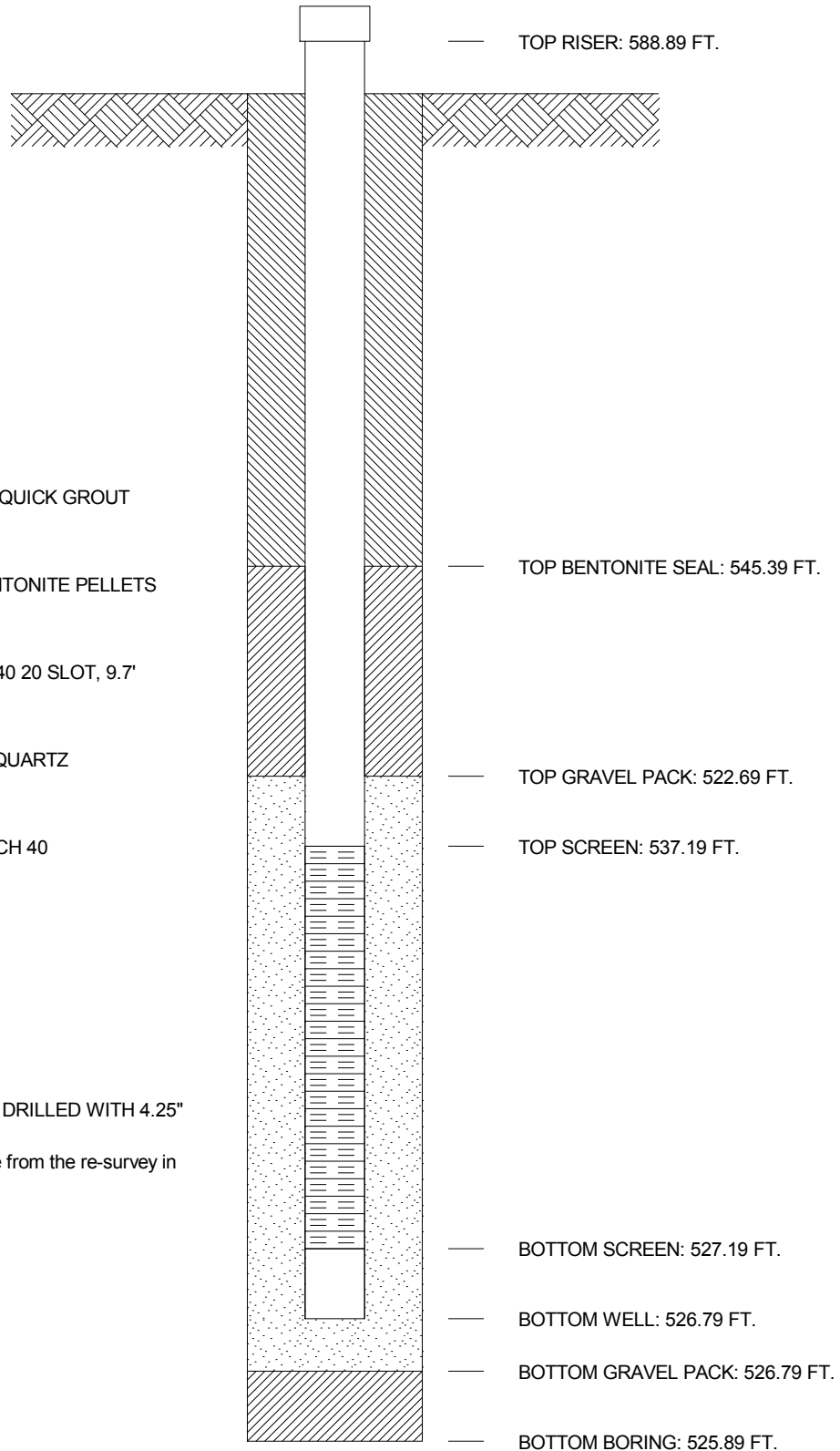


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 718,892.4 E 1,736,827.8**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-014** BORING No. **014** INSTALLED **7/30/97**

GROUND ELEVATION 586.89 FT.

-  GROUT SEAL: 75 GALLONS QUICK GROUT
-  BENTONITE SEAL: 100# BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'
-  GRAVEL PACK: 375# 7@#4 QUARTZ
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



PRE-PACK SCREEN. HOLE DRILLED WITH 4.25" HSA

Coordinates and elevations are from the re-survey in June 2008.







AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

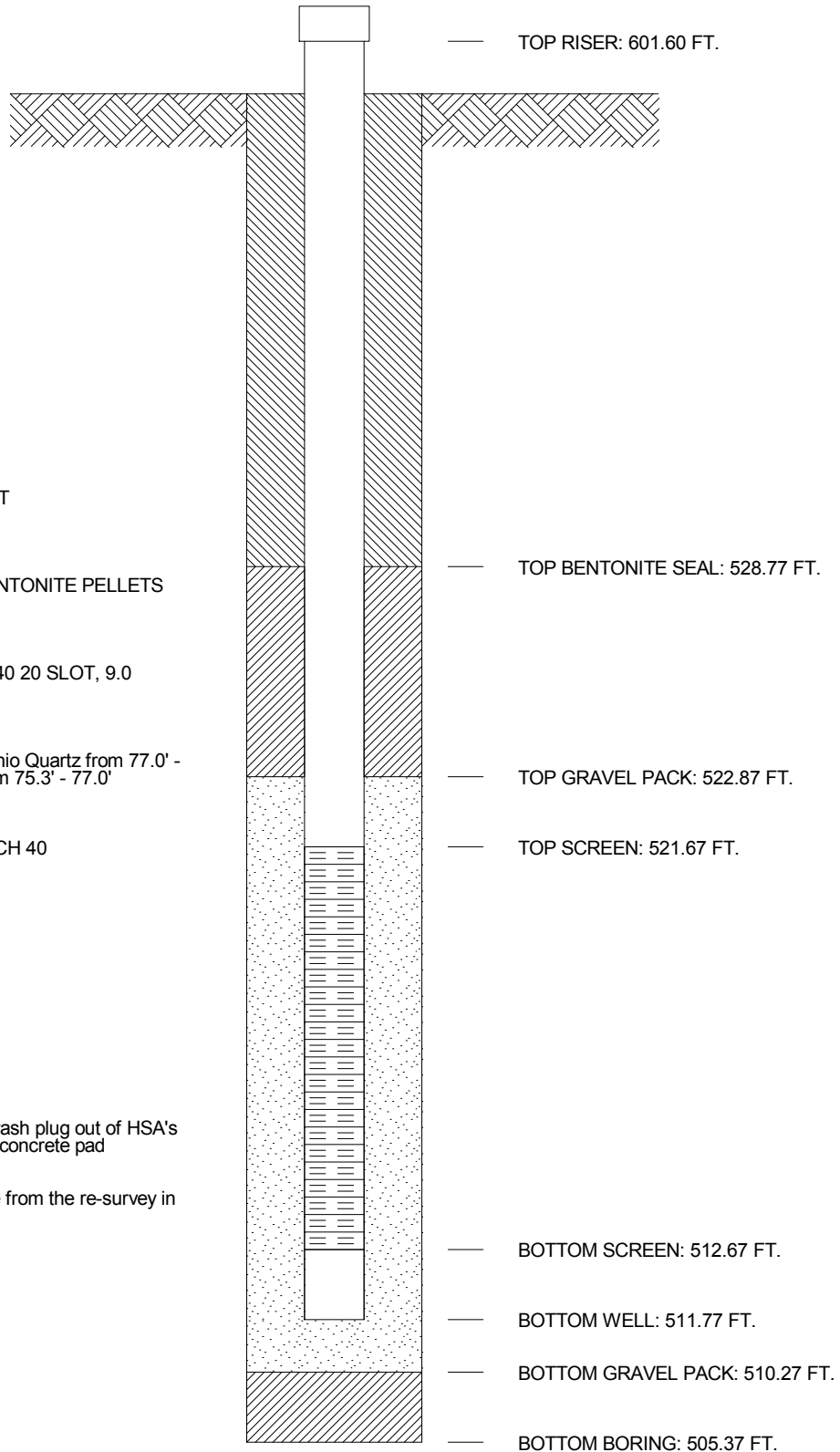


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,504.2 E 1,736,239.5**  
 SYSTEM **State Plane using NAD27**

WELL No. **MW-015** BORING No. **MW-015** INSTALLED **12/11/01**

GROUND ELEVATION 599.87 FT.

-  GROUT SEAL: QUICK GROUT
-  BENTONITE SEAL: 50 lbs BENTONITE PELLETS
-  SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.0
-  GRAVEL PACK: 200 lbs #4 Ohio Quartz from 77.0' - 89.6'; 75 lbs #7 Sand from 75.3' - 77.0'
-  RISER PIPE: 2.0, dia., PVC SCH 40
-  SPACERS, DEPTH:



Installed with 4.25" HSA's  
 Used 300 gallons of water to wash plug out of HSA's  
 Set steel protector and poured concrete pad  
 Grouted from 71.1' to grade

Coordinates and elevations are from the re-survey in June 2008.







AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

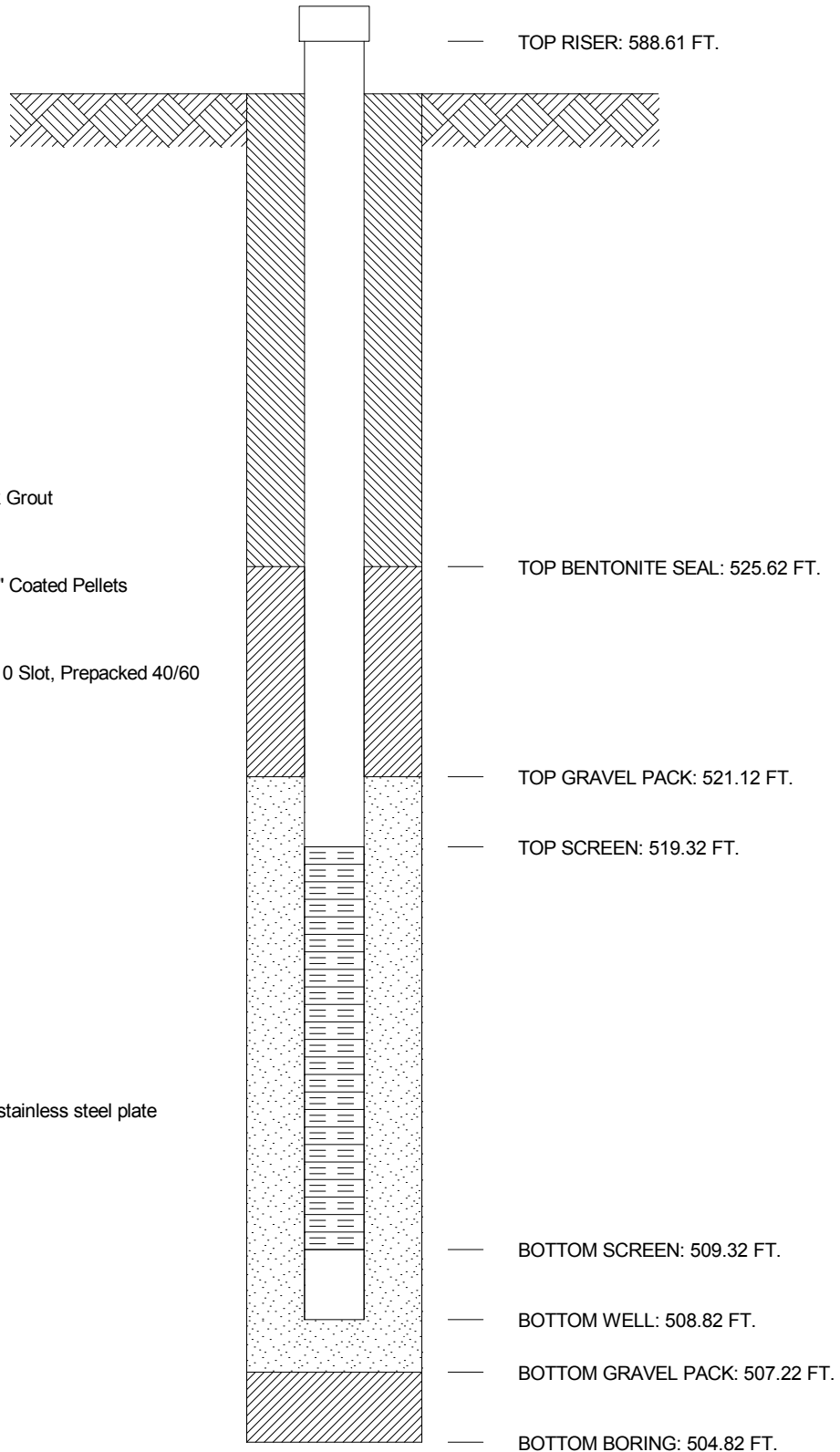


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 721,431.5 E 1,732,814.2**  
 SYSTEM **State Plane using NAD27**

WELL No. **M-16** BORING No. **MW-16** INSTALLED **6/18/08**

GROUND ELEVATION 586.82 FT.

-  GROUT SEAL: 300 gals Quick Grout
-  BENTONITE SEAL: 80 lbs 3/8" Coated Pellets
-  SCREEN: 2" dia., Sch 40, 0.010 Slot, Prepacked 40/60 Pack, 10'
-  GRAVEL PACK: 40/60 Pack
-  RISER PIPE: 2", dia., Sch 40
-  SPACERS, DEPTH: N/A



Installed with 6.25' HSA's and stainless steel plate  
 SWL @ install = 36.7'



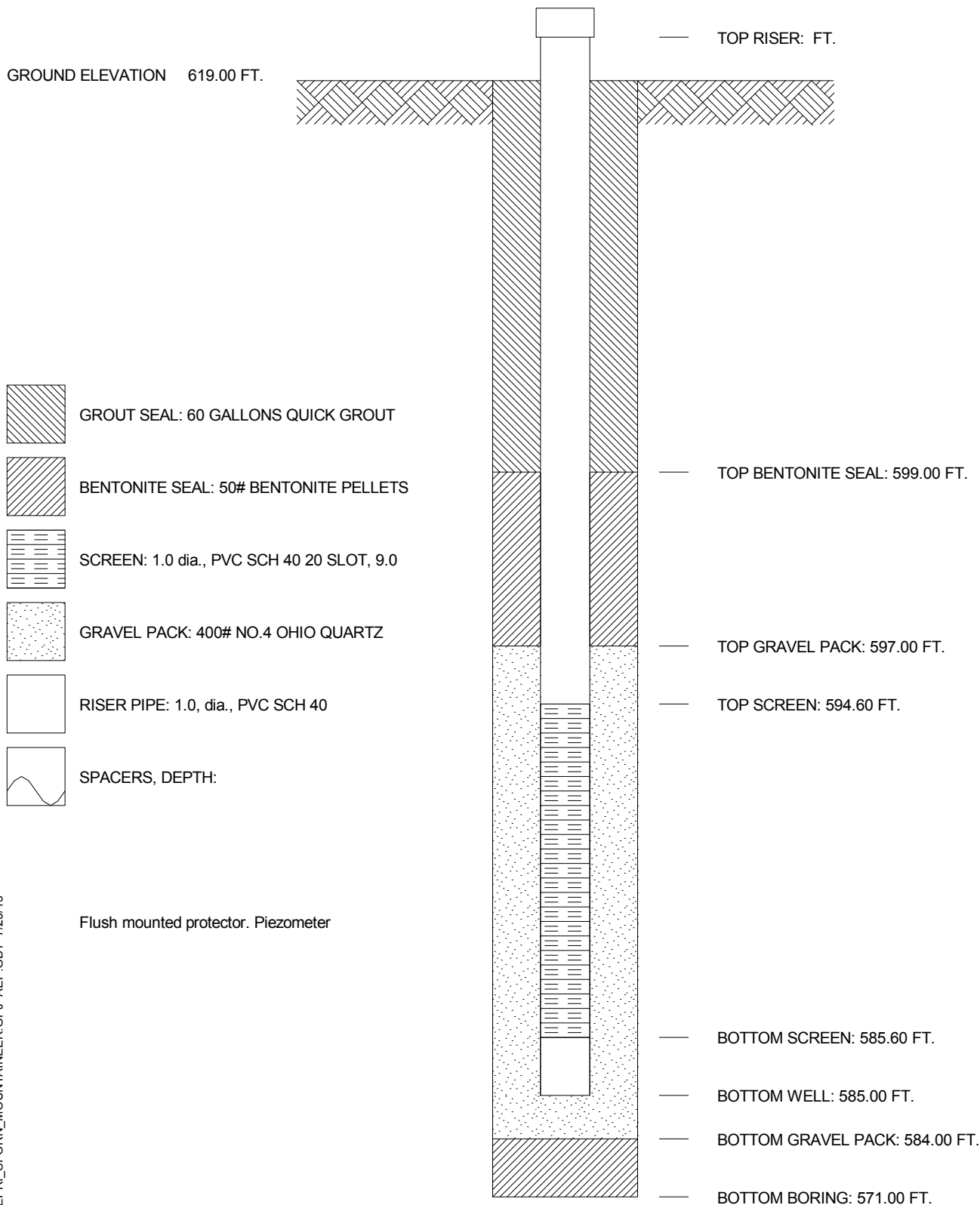
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,983.0 E 1,734,516.1**  
 SYSTEM **STATE PLANE**

WELL No. **96-101** BORING No. **96-101** INSTALLED **6/5/96**

GROUND ELEVATION 619.00 FT.



GROUT SEAL: 60 GALLONS QUICK GROUT



BENTONITE SEAL: 50# BENTONITE PELLETS



SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0



GRAVEL PACK: 400# NO.4 OHIO QUARTZ



RISER PIPE: 1.0, dia., PVC SCH 40



SPACERS, DEPTH:

Flush mounted protector. Piezometer

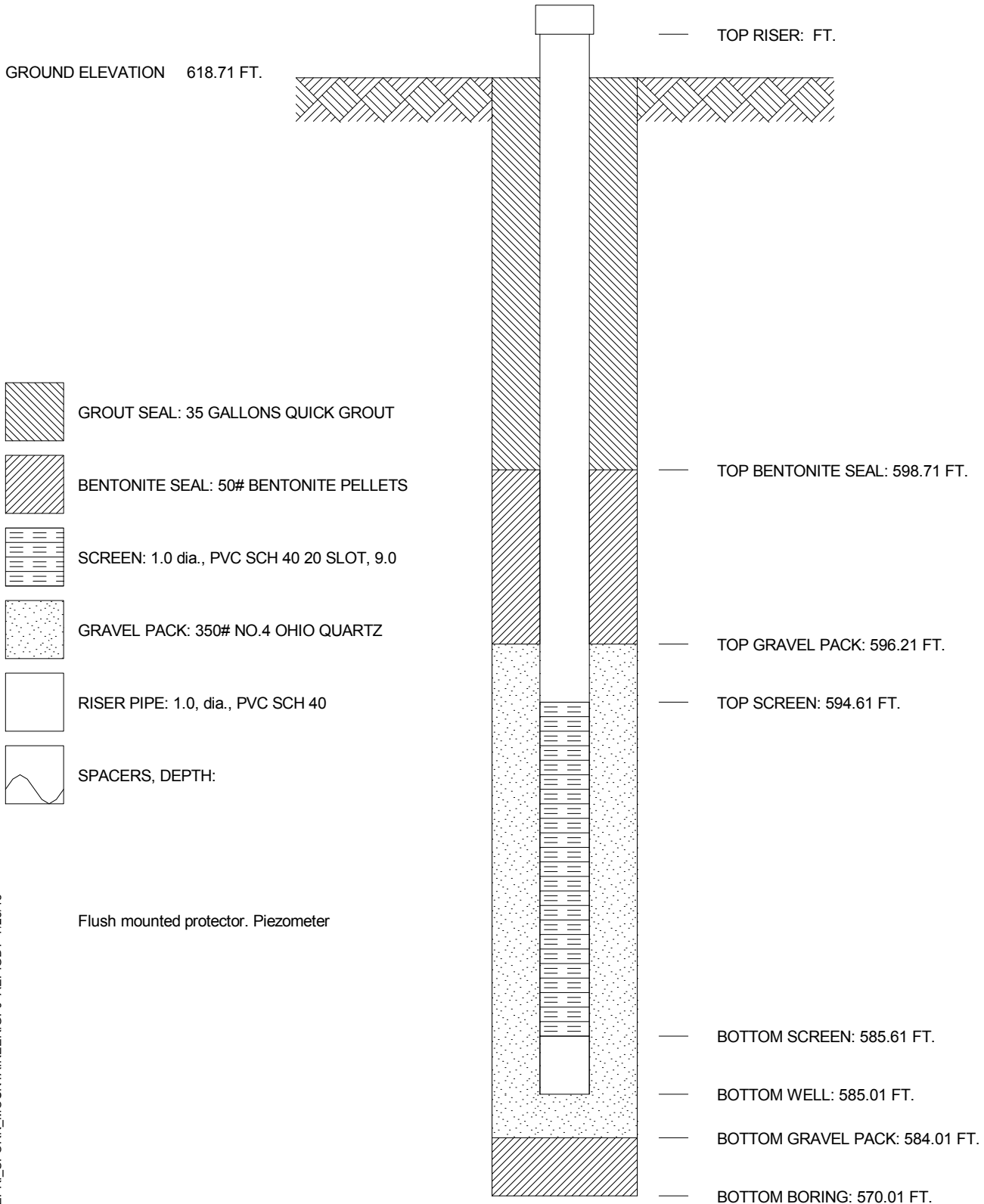
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION









JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,229.2 E 1,734,600.2**  
 SYSTEM **STATE PLANE**

WELL No. **96-104** BORING No. **96-104** INSTALLED **6/4/96**

GROUND ELEVATION 618.71 FT.



-  GROUT SEAL: 35 GALLONS QUICK GROUT
-  BENTONITE SEAL: 50# BENTONITE PELLETS
-  SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0
-  GRAVEL PACK: 350# NO.4 OHIO QUARTZ
-  RISER PIPE: 1.0, dia., PVC SCH 40
-  SPACERS, DEPTH:

Flush mounted protector. Piezometer

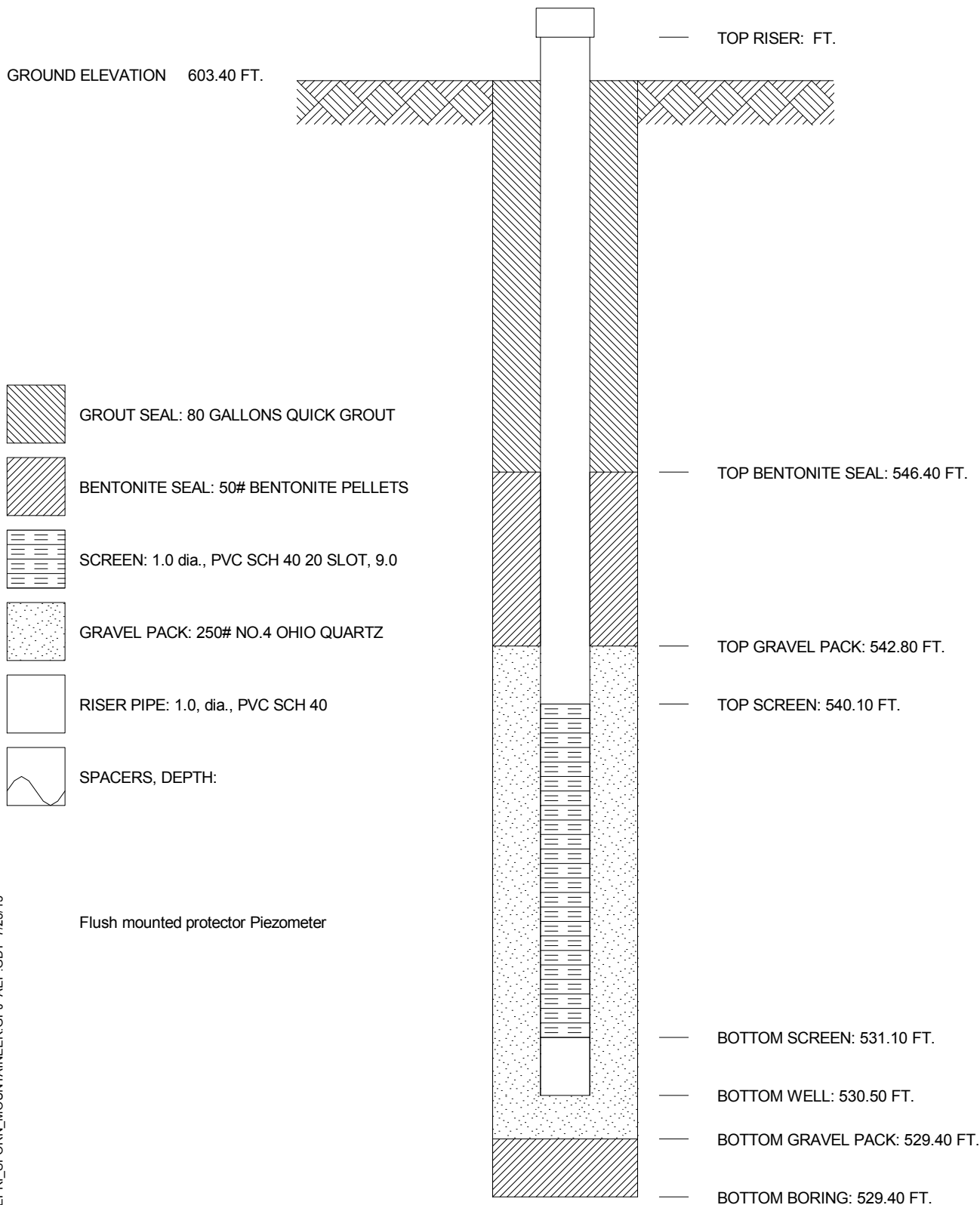
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION









JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 719,761.8 E 1,736,125.4**  
 SYSTEM **STATE PLANE**

WELL No. **96-108** BORING No. **96-108** INSTALLED **6/11/96**

GROUND ELEVATION 603.40 FT.



-  GROUT SEAL: 80 GALLONS QUICK GROUT
-  BENTONITE SEAL: 50# BENTONITE PELLETS
-  SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0
-  GRAVEL PACK: 250# NO.4 OHIO QUARTZ
-  RISER PIPE: 1.0, dia., PVC SCH 40
-  SPACERS, DEPTH:

Flush mounted protector Piezometer







AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



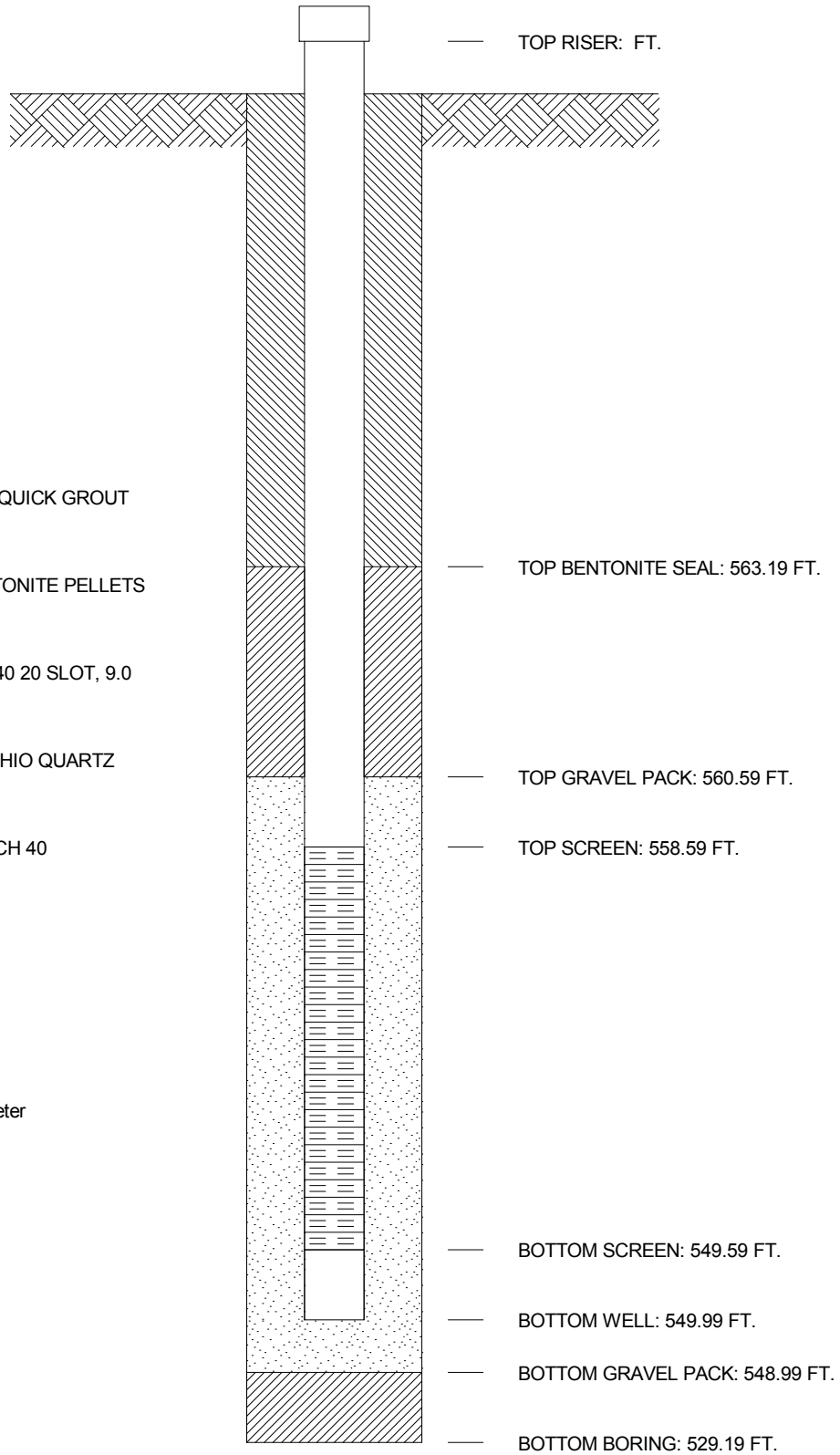
JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 720,277.1 E 1,735,665.6**  
 SYSTEM **STATE PLANE**

WELL No. **96-110** BORING No. **96-110** INSTALLED **6/10/96**

GROUND ELEVATION 602.29 FT.

-  GROUT SEAL: 60 GALLONS QUICK GROUT
-  BENTONITE SEAL: 50# BENTONITE PELLETS
-  SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0
-  GRAVEL PACK: 300# NO.4 OHIO QUARTZ
-  RISER PIPE: 1.0, dia., PVC SCH 40
-  SPACERS, DEPTH:

Flush mount protector Piezometer



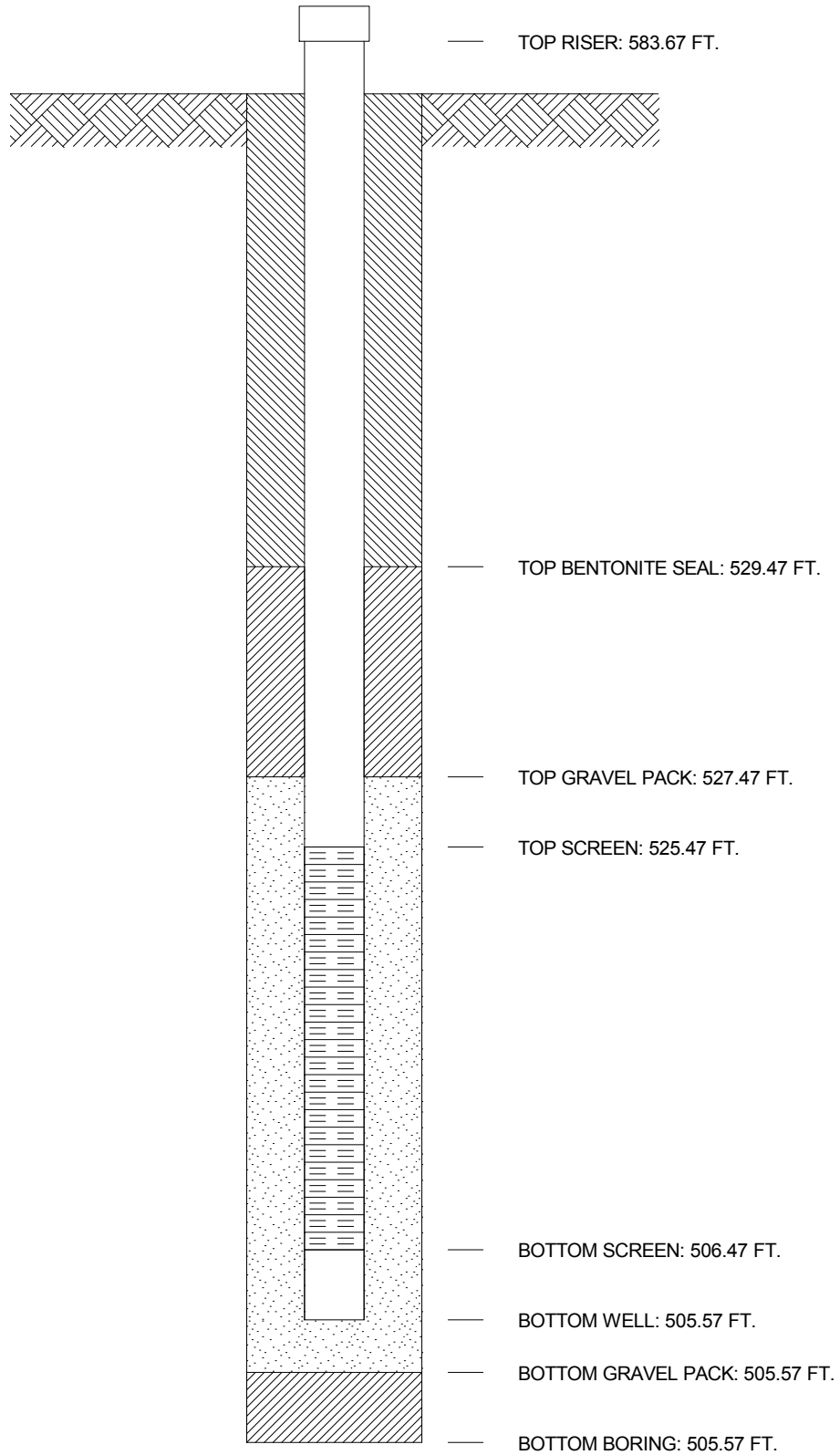
AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION



JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 723,463.5 E 1,734,069.7**  
 SYSTEM **State Plane using NAD27**

WELL No. **JTMN-1** BORING No. **JTMN-1** INSTALLED **7/19/90**

GROUND ELEVATION 582.17 FT.









AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 MONITORING WELL CONSTRUCTION

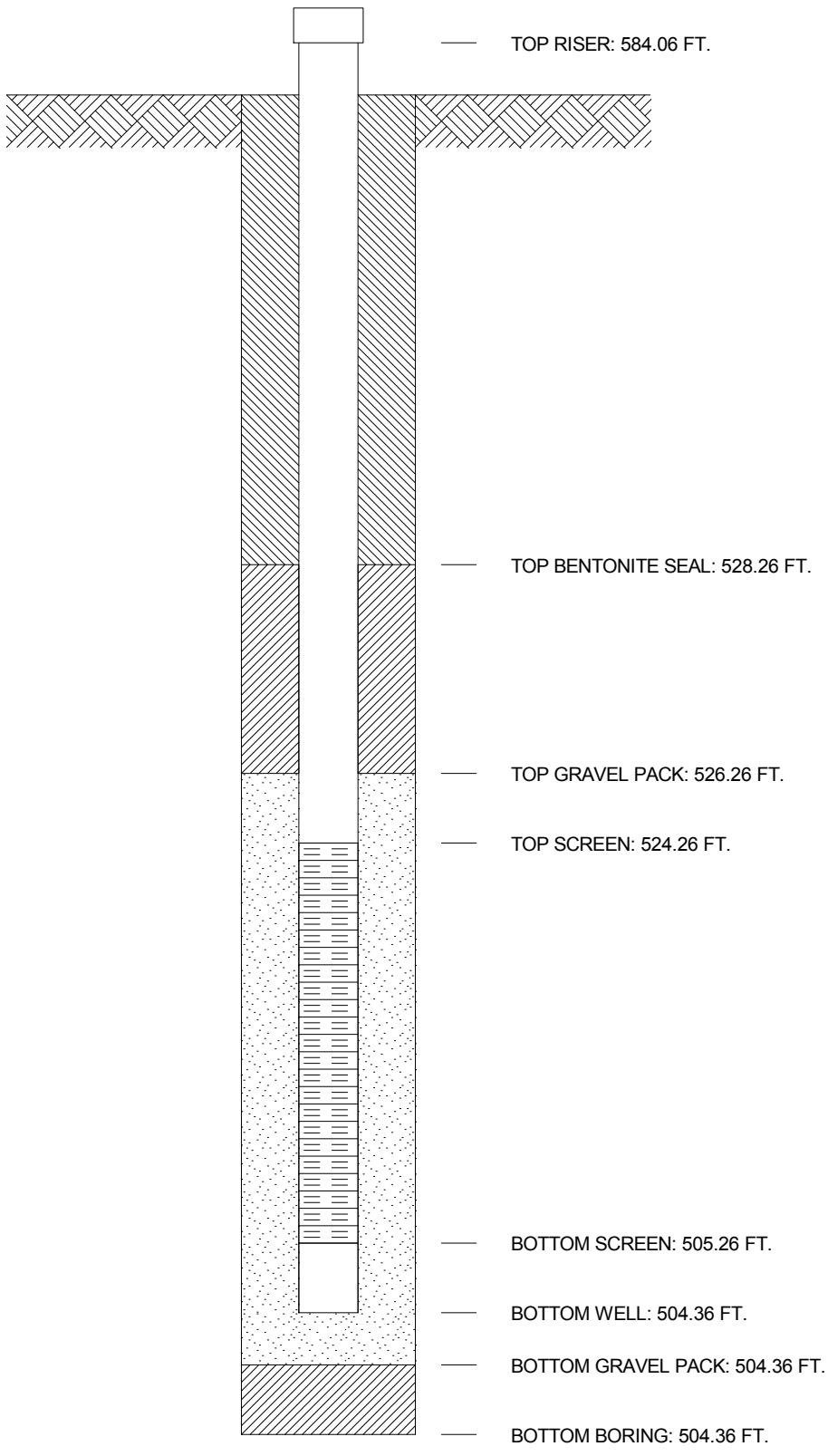


JOB NUMBER \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 PROJECT **EPRI GROUND WATER STUDY**  
 COORDINATES **N 723,392.8 E 1,734,106.4**  
 SYSTEM **State Plane using NAD27**

WELL No. **JTMN-2** BORING No. **JTMN-2** INSTALLED **7/18/90**

GROUND ELEVATION 582.16 FT.

-  GROUT SEAL: Benseal
-  BENTONITE SEAL:
-  SCREEN: 2.0 dia., 20 slot, 19'
-  GRAVEL PACK:
-  RISER PIPE: 2.0, dia.,
-  SPACERS, DEPTH:





**AEP 2008, 2010**

**Production Well Information**

**East 1, West 1, Well 4 to Well 6**

MOUNTAINEER SUPPLY WELLS					
DATUM: NAD27 / NGVD29 WV S				Surveyed: 2/24/2010	
WELL	NORTH	EAST	ELEV.	DESC.	NOTE
EAST 1	722087.67	1734564.25	588.47	WELL PUMP	Top of PVC @ Inspection Hole
			585.91	GROUND	
WEST 1	721864.73	1734247.03	587.32	FGD	Top of Inspection Hole
			585.64	GROUND	
WELL 4	721739.55	1734875.42	583.43	WASTEWATER WELL	Top of Inspection Hole
			581.95	GROUND	
WELL 5	721130.76	1733439.50	589.09	WAREHOUSE	Top of Inspection Hole
			586.64	GROUND	
WELL 6	722576.53	1732461.99	588.45	OLD LAB	Top of Inspection Hole
			587.45	GROUND	



**AEP-DOLAN CIVIL LAB**  
**MT PLANT - WELL CONVERSIONS**

25 February 2010

**INPUT**  
State Plane, NAD27  
4702 - West Virginia South, U.S. Feet

**OUTPUT**  
Geographic, NAD27

---

**EAST 1**

1/5

**Northing/Y:** 722087.67  
**Easting/X:** 1734564.25

**Latitude:** 38 58 45.45449  
**Longitude:** 81 56 01.14811

**Convergence:** -0 34 37.84628  
**Scale Factor:** 1.000021856

---

**WEST 1**

2/5

**Northing/Y:** 721864.73  
**Easting/X:** 1734247.03

**Latitude:** 38 58 43.21944  
**Longitude:** 81 56 05.13625

**Convergence:** -0 34 40.31173  
**Scale Factor:** 1.000021706

---

**WELL 4**

3/5

**Northing/Y:** 721739.55  
**Easting/X:** 1734875.42

**Latitude:** 38 58 42.04479  
**Longitude:** 81 55 57.16376

**Convergence:** -0 34 35.38317  
**Scale Factor:** 1.000021627

---

**WELL 5**

4/5

**Northing/Y:** 721130.76  
**Easting/X:** 1733439.50

**Latitude:** 38 58 35.88458  
**Longitude:** 81 56 15.26701

**Convergence:** -0 34 46.57452  
**Scale Factor:** 1.000021213

---

**Remark:**

**AEP-DOLAN CIVIL LAB**  
**MT PLANT - WELL CONVERSIONS**

25 February 2010

**INPUT**

State Plane, NAD27  
4702 - West Virginia South, U.S. Feet

**OUTPUT**

Geographic, NAD27

---

**WELL 6**

5/5

**Northing/Y:** 722576.53

**Latitude:** 38 58 50.07601

**Easting/X:** 1732461.99

**Longitude:** 81 56 27.82955

**Convergence:** -0 34 54.34062

**Scale Factor:** 1.000022168

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**Remark:**



Reynolds, Inc.

6451 Germantown Road \* Middletown, Ohio 45042 \* Phone: (513) 424-7287

Date: 12/12/2008

Job No.: 68658

Page 1 of 3

# PRODUCTION TEST

## FGD West Well

Owner: AEP - Mountaineer Plant City: New Haven State: WV

Well No.: FGD West Location: in gravel area

Measured from Top Casing: X Total Depth 77' Inside Diam. 16" Static Level / Standing Water Level 44.70'

Type Well: Gravel Wall X Tubular Rock New X

Old Cleaned Gravel Wall Diam. 30"

Screen: Length 15' Diam. 16" Slot Size 60

Type Stainless Steel-Pipe Size Depth to top 62'

Driven By: Electric Engine Pump Bowl Stages

Length Suction Pipe None X Well Top to Bottom of Suction

Orifice Size 6 By 5 Water discharged 200' from well into pit in building

Well Top to Bottom of Air Line N/A Gauge Reads: Feet Pounds

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
8:27 AM					44.70			SWL
9:10 AM	6.0	305						Pump on
9:12 AM					47.50	2.80		
9:14 AM					47.60			
9:17 AM					47.70	3.00		
9:21 AM					47.70			
9:30 AM					47.75			
9:34 AM	6.5	317			47.78	3.08		
9:38 AM					47.81			
9:45 AM					47.83			
9:50 AM					47.86	3.16	100.0	
9:55 AM					47.89			
								Step 2
9:57 AM					49.40			

Tested and Witnessed By Terry Breckenridge - Witnessed By For Purchaser TC during test - 32" above gr.

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
9:59 AM	13.5	457			49.35			
10:01 AM					49.36	4.66	98.0	
10:07 AM					49.40			
10:12 AM					49.43			
10:16 AM					49.50			
10:21 AM					49.50	4.80	95.0	
10:28 AM					49.55			
10:32 AM					49.56			
10:35 AM					49.57	4.87	94.0	
10:40 AM								Step 3
10:40 AM	23.5	603						
10:41 AM	24.5	616			51.00	6.30	98.0	
10:43 AM					51.05			
10:45 AM					51.06			
10:52 AM					51.12			
10:55 AM					51.13	6.43	96.0	
11:02 AM					51.18	6.48		
11:08 AM					51.21			
11:09 AM					39.50			FGD East
11:11 AM					51.23			
11:14 AM					51.24	6.54	94.0	
11:20 AM					51.26	6.56		
11:25 AM					51.28			
11:30 AM								Step 4
11:32 AM	30.0	682			51.85	7.15		
11:35 AM					51.98	7.28	94.0	
11:40 AM					52.00	7.30		
11:46 AM					39.70			FGD East
11:50 AM					52.01	7.31		
11:55 AM					52.05	7.35		





Reynolds, Inc.

6451 Germantown Road \* Middletown, Ohio 45042 \* Phone: (513) 424-7287

Date: 12/17/2008

Job No.:

Page 1 of 4

# PRODUCTION TEST

## FGD East Well

Owner: AEP - Mountaineer Plant City: New Haven State: WV

Well No.: FGD East Location: along railroad tracks

Measured from Ground Level: Total Depth 78' Inside Diam. 16" Static Level / Standing Water Level 45.38'

Type Well: Gravel Wall X Tubular Rock New X

Old Cleaned Gravel Wall Diam. 30"

Screen: Length 15' Diam. 16" Slot Size 60

Type Stainless Steel - Pipe Size Depth to top 63'

Driven By: Electric Engine Pump Bowl Stages

Length Suction Pipe None: X Well Top to Bottom of Suction

Orifice Size By Water Discharged 600' +/- from well into pit in building

Well Top to Bottom of Air Line N/A Gauge Reads: Feet Pounds

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
10:30 AM								Stop surging east well
10:52 AM					45.45	+ 0.07		
11:00 AM					45.45	+ 0.07		
11:15 AM					45.40	+ 0.02		
11:25 AM					44.59			FGD West
11:27 AM					45.38	0		SWL
11:30 AM								Pump on
11:31 AM					48.27	2.89		Rate 1
11:32 AM					48.30	2.92		
11:33 AM					48.33	2.95		
11:35 AM					48.35	2.97		
11:40 AM	6.0	305			48.85	3.47		
11:44 AM					48.90	3.52	95	
11:50 AM					49.00	3.62		

Tested and Witnessed By Terry Breckenridge Witnessed By For Purchaser

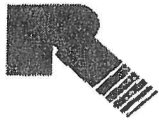
TC 2.7' above ground.  
450' +/- north of Ohio Drilling well (original FGD well)

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
11:55 AM	5.0	278			49.15	3.77	74	
12:00 PM					49.14	3.76		
12:04 PM					44.60			FGD West
12:10 PM					49.19	3.81		
12:14 PM					49.20	3.82		
12:15 PM								Rate 2
12:19 PM					50.91	5.53		
12:20 PM					50.94	5.56		
12:23 PM	10.5	403			50.97	5.59	72	
12:25 PM					50.97	5.59		
12:29 PM					44.62			FGD West
12:34 PM					51.02	5.64		
12:38 PM					51.04	5.66	71	
12:43 PM					51.05	5.67		
12:50 PM					51.08	5.7		
12:51 PM					44.67			FGD West
12:55 PM					51.10	5.73		
1:00 PM								Rate 3
1:07 PM	23.5	603			54.20	8.82		
1:08 PM					54.20	8.82		
1:10 PM					54.21	8.83		
1:11 PM					47.67			FGD West
1:13 PM					54.22	8.84		
1:18 PM					54.23	8.85		
1:27 PM					54.28	8.9		
1:35 PM					54.30	8.92		
1:40 PM					54.32	8.94		
1:45 PM								Rate 4
1:47 PM	41.5	802			56.88	11.5	70	
1:50 PM					57.92	12.24		
1:52 PM					57.60	12.22		
1:54 PM					57.65	12.27		

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
1:57 PM					57.6	12.28		
1:58 PM					44.71			FGD West
2:00 PM					57.69	12.31		
2:04 PM					57.70	12.32	65	
2:06 PM					57.70	12.32		
2:07 PM					57.72	12.34		
2:08 PM	41.5	802			57.71	12.33		
2:10 PM					57.75	12.37		
2:13 PM					57.76	12.38		
2:15 PM								Rate 5
2:19 PM	52.5	902			58.85	13.47	67	
2:22 PM					59.59	14.21		
2:24 PM					59.60	14.22		
2:25 PM					59.60	14.22		
2:27 PM					59.63	14.25		
2:30 PM					59.64	14.26		
2:31 PM					44.73			FGD West
2:40 PM					59.73	14.35		
2:43 PM					59.75	14.37		
2:45 PM								Rate 6
2:47 PM	64.5	1000			60.55	15.17		
2:48 PM					61.20	15.82		
2:50 PM					61.25	15.87		
2:51 PM					44.72			FGD West
2:52 PM					61.28	15.9		
2:54 PM					61.30	15.92		
2:58 PM					61.34	15.96		
3:01 PM					61.35	15.97		
3:05 PM					61.39	16.01		
3:08 PM					61.40	16.02		
3:12 PM					61.41	16.03		
3:14 PM					61.44	16.06	62.5	







Reynolds, Inc.

6451 Germantown Road \* Middletown, Ohio 45042 \* Phone: (513) 424-7287

Date: 7/8/2008

Job No.: 68570

### PRODUCTION TEST

Page 1 of 1

Owner: AEP-Mountaineer Plant City: New Haven State: WV

Well No.: Fire Well #1 Location: 50' +/- from old Fire Well #1 (Abandoned)

Measured from Ground Level: Total Depth Inside Diam. 10 Static Level / Standing Water Level 40.52

Type Well: Gravel Wall 16 Tubular Rock New X

Old Cleaned Gravel Wall Diam. 16"

Screen: Length 15' Diam. 10" PS Slot Size 80

Type Johnson Depth to top 63 (Bel. Gr.)

Driven By: Electric X Engine Pump Bowl Test Pump Stages

Length Suction Pipe None Well Top to Bottom of Suction NA

Orifice Size 6 By 5 Water Discharged 300 from Well into Cooling Tower

Well Top to Bottom of Air Line N/A Gauge Reads: Feet Pounds

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL	DRAW DOWN	SPECIFIC CAPACITY	COMMENTS
11:00 AM	6	305			45.22	4.70		
11:10 AM					45.45	4.93		
11:20 AM					45.47	4.95	61.2	
11:30 AM	14	466			49.61	9.09		
11:40 AM					49.59	9.07		
11:50 AM					49.54	9.02	51.8	
12:00 PM	22	584			52.00	11.48		
12:30 PM					52.25	11.73		
1:00 PM					52.30	11.78		
1:30 PM					52.25	11.73	49.8	
								Water clear
								at end of test

Tested and Witnessed By

Steve Back

Witnessed By For Purchaser

Rev 3/08 OWNER/CO USE ONLY DATE RECEIVED  MM DD YY	DATE THE WELL WAS COMPLETED MM DD YY 07 08 08	STATE OF WEST VIRGINIA WATER WELL COMPLETION REPORT	FORM SW-258 THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL IS COMPLETED
	PERMIT NO. DW-_____		FILL IN THIS FORM COMPLETELY PLEASE PRINT OR TYPE

LOCATION OF WELL  
Well Owner: ~~XXXXXXXXXX~~ AEP ~~XXXXXXXXXX~~ Mountaineer Power Plant  
Street/Road Route 62 County Mason Zip Code 25265-0419

Latitude: 38 Deg 58.603 Min Longitude: 81 Deg 56.240 Min Acquired By: <input checked="" type="checkbox"/> GPS <input type="checkbox"/> Topo <input type="checkbox"/> Other	AREA NAME/LOCATION: Fire Well #1 Replacement Well	TYPE OF WELL: <input type="checkbox"/> Potable <input type="checkbox"/> Public Water Supply <input type="checkbox"/> Geothermal <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Dewatering <input type="checkbox"/> Irrigation <input type="checkbox"/> Test/Exploratory <input type="checkbox"/> Other
--	---	--

WELL LOG		DRILLING METHOD <input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary <input type="checkbox"/> Rotary Hammer <input type="checkbox"/> Other	GROUTING RECORD Grouting Material: <input checked="" type="checkbox"/> Cement <input type="checkbox"/> Bentonite Clay Other: _____ No. of Bags: Bulk _____ Installation Method: Tremic
Depth	State the kind of formation penetrated, their color, caves, and if water bearing with estimate flow (GPM).	Hole Diameter 16 (in) Total depth 78 (ft) CASINGS RECORD MAIN CASING TYPE <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other _____ Casing Diameter 10 (in) Wall Thickness 0.365 (in) Casing Length 63 (ft) Other Casing or Liner Used Type <input type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other _____ Casing/Liner Diameter _____ (in) Length _____ (ft) from _____ (ft) to _____ (ft)	PUMP INSTALLED By Driller <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ESTIMATED WELL YIELD Estimated at 500 G.P.M Static Water Level 40.5 (ft) *Pumping level below land surface 52 (ft) after 2.5 hrs. at 580 G.P.M. (Estimated) *Note: For Public Water Supply wells please submit required yield and drawdown tests.
From (ft.)	To (ft.)	SCREEN RECORD - SS <input type="checkbox"/> Not Installed <input checked="" type="checkbox"/> Installed Material: <input type="checkbox"/> Bronze <input type="checkbox"/> Plastic Diameter of screen 10 PS (in) Slot size 70 Length 15 (ft) from _____ (ft) to _____ (ft)	WELL HEAD COMPLETION Casing height above grade 2 (ft) Type Of Well Cap Baker Installed: Pitless adaptor
0	3	Top Soil	VARIANCE ISSUED <input type="checkbox"/> Yes <input type="checkbox"/> No Request Number _____
3	15	Br. sandy clay	COMMENTS BY INSTALLER:  New Fire Well #1 - 50' +/- from old Well #1  Old Fire Well #1 abandoned/sealed
	30	Br. sand and gravel	
30	35	Same	
35	40	Same	
40	45	Br. medium sand little gravel	
45	60	Br. medium sand	
60	78	Br. medium sand little gravel	
GRAVEL PACK RECORD Gravel Pack: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No From 63 (ft) to 78 (ft)		If additional space is needed, use additional sheets and attach w/permit # at top.	

I hereby certify that this well has been constructed in accordance with state rules and in conformance with all conditions stated in the above captioned permit, and that the information presented herein is accurate and complete to the best of my knowledge.

Company Name Reynolds, Inc. WV Contractor No. WV000825  
Business Registration No. \_\_\_\_\_ Master Well Driller Certification No. \_\_\_\_\_  
Master Well Driller (print) John Workman  
Master Well Driller Signature \_\_\_\_\_

THE SUPERVISOR (SIGNATURE OF DRILLER OR JOURNEYMAN RESPONSIBLE FOR NETWORK IF DIFFERENT FROM MASTER DRILLER.)  
Journeyman Well Driller Certification No. \_\_\_\_\_  
Journeyman Well Driller (please print) \_\_\_\_\_  
Apprentice and Name (s) \_\_\_\_\_

Rev 3/08	DATE THE WELL WAS COMPLETED MM DD YY <u>12 10 08</u>	<b>STATE OF WEST VIRGINIA WATER WELL COMPLETION REPORT</b>	<b>FORM SW-258</b> THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL IS COMPLETED
ST/CO USE ONLY DATE RECEIVED  MM DD YY	PERMIT NO.  DW-_____		FILL IN THIS FORM COMPLETELY PLEASE PRINT OR TYPE

**LOCATION OF WELL**  
 Well Owner: Last Name American Electric Power ~~XXXXXXXX~~ Mountaineer Plant  
 Street/Road Route 62, New Haven County Mason Zip Code 26265-0419

Latitude: _____ Deg _____ Min _____ Sec Longitude: _____ Deg _____ Min _____ Sec Acquired By: <input checked="" type="checkbox"/> GPS <input type="checkbox"/> Topo <input type="checkbox"/> Other	<b>AREA NAME/LOCATION:</b>  <u>FGD West Well</u>	<b>TYPE OF WELL:</b> <input type="checkbox"/> Potable <input type="checkbox"/> Public Water Supply <input type="checkbox"/> Geothermal <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Dewatering <input type="checkbox"/> Irrigation <input type="checkbox"/> Test/Exploratory <input type="checkbox"/> Other _____
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<b>WELL LOG</b>	<b>DRILLING METHOD</b>	<b>GROUTING RECORD</b>				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:10%;">Depth</th> <th style="width:10%;">State the kind of formation penetrated, their color, caves, and if water bearing with estimate flow (GPM).</th> </tr> <tr> <td style="text-align:center;">From (ft.)</td> <td style="text-align:center;">To (ft.)</td> </tr> </table>	Depth	State the kind of formation penetrated, their color, caves, and if water bearing with estimate flow (GPM).	From (ft.)	To (ft.)	<input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary <input type="checkbox"/> Rotary Hammer <input type="checkbox"/> Other  Hole Diameter <u>30</u> (in) Total depth <u>78</u> (ft)	<b>GRROUTING RECORD</b> Grouting Material: <input checked="" type="checkbox"/> Cement <input type="checkbox"/> Bentonite Clay Other _____ No. of Bags: <u>Bulk</u> Installation Method: _____
Depth	State the kind of formation penetrated, their color, caves, and if water bearing with estimate flow (GPM).					
From (ft.)	To (ft.)					

0	13	Fill (fly ash)	<b>CASINGS RECORD</b> <b>MAIN CASING TYPE</b> <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other _____ Casing Diameter <u>16</u> (in) Wall Thickness <u>0.375</u> (in) Casing Length <u>63</u> (ft)	<b>PUMP INSTALLED</b> By Driller <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
52	78	Med- Coarse sand and gravel	<b>Other Casing or Liner Used</b> Type <input type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other _____ Casing/Liner Diameter _____ (in) Length _____ (ft) from _____ (ft) to _____ (ft)	<b>ESTIMATED WELL YIELD</b> Estimated at <u>850</u> G.P.M Static Water Level <u>44.70</u> (ft) *Pumping level below land surface <u>52.24</u> (ft) after <u>4</u> hrs. at <u>682</u> G.P.M. (Estimated) *Note: For Public Water Supply wells please submit required yield and drawdown tests.
78		Clay	<b>SCREEN RECORD</b> <input type="checkbox"/> Not Installed <input checked="" type="checkbox"/> Installed Material: <input type="checkbox"/> Bronze <input checked="" type="checkbox"/> Plastic Diameter of screen <u>16</u> (in) Slot size <u>0.06</u> Length <u>15</u> (ft) from <u>63</u> (ft) to <u>78</u> (ft)	<b>WELL HEAD COMPLETION</b> Casing height above grade <u>2</u> (ft) Type Of Well Cap _____ Installed: <u>Baker Pitless</u>
If additional space is needed, use additional sheets and attach w/permit # at top.			<b>GRAVEL PACK RECORD</b> Gravel Pack: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No From <u>25</u> (ft) to <u>78</u> (ft)	<b>VARIANCE ISSUED</b> <input type="checkbox"/> Yes <input type="checkbox"/> No Request Number _____

I hereby certify that this well has been constructed in accordance with state rules and in conformance with all conditions stated in the above captioned permit, and that the information presented herein is accurate and complete to the best of my knowledge.

Company Name Reynolds, Inc. WV Contractor No. WV 000825  
 Business Registration No. \_\_\_\_\_ Master Well Driller Certification No. \_\_\_\_\_  
 Master Well Driller (print) John Workman  
 Master Well Driller Signature \_\_\_\_\_

**SITE SUPERVISOR (SIGNATURE OF DRILLER OR JOURNEYMAN RESPONSIBLE FOR SITEWORK IF DIFFERENT FROM MASTER DRILLER.)**

Journeyman Well Driller Certification No. \_\_\_\_\_  
 Journeyman Well Driller (please print) \_\_\_\_\_  
 Apprentice and Name (s) \_\_\_\_\_

317 gpm  
 457 gpm  
 616 gpm  
 682 gpm

Rev 3/08  ST/CO USE ONLY DATE RECEIVED  MM DD YY _____	DATE THE WELL WAS COMPLETED MM DD YY <u>12 12 08</u>  PERMIT NO. DW-_____	<b>STATE OF WEST VIRGINIA WATER WELL COMPLETION REPORT</b>	<b>FORM SW-258</b> THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL IS COMPLETED  FILL IN THIS FORM COMPLETELY PLEASE PRINT OR TYPE
--	---	--	---

**LOCATION OF WELL**  
 Well Owner: Last Name American Electric Power ~~First Name~~ Mountaineer Plant  
 Street/Road Route 62, New Haven County Mason Zip Code 26265-0419

Latitude: _____ Deg _____ Min _____ Sec Longitude: _____ Deg _____ Min _____ Sec Acquired By: <input checked="" type="checkbox"/> GPS <input type="checkbox"/> Topo <input type="checkbox"/> Other	<b>AREA NAME/LOCATION:</b> <u>FGD East Well</u>	<b>TYPE OF WELL:</b> <input type="checkbox"/> Potable <input type="checkbox"/> Public Water Supply <input type="checkbox"/> Geothermal <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Dewatering <input type="checkbox"/> Irrigation <input type="checkbox"/> Test/Exploratory <input type="checkbox"/> Other
--	--	---

WELL LOG		DRILLING METHOD	GROUTING RECORD
	Depth	<input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary <input type="checkbox"/> Rotary Hammer <input type="checkbox"/> Other  Hole Diameter <u>30</u> (in) Total depth <u>78</u> (ft)	Grouting Material: <input checked="" type="checkbox"/> Cement <input type="checkbox"/> Bentonite Clay Other _____ No. of Bags: <u>Bulk</u> Installation Method: _____
		<b>CASINGS RECORD</b> <b>MAIN CASING TYPE</b> <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other Casing Diameter <u>16</u> (in) Wall Thickness <u>0.375</u> (in) Casing Length <u>63</u> (ft) <b>Other Casing or Liner Used</b> Type <input type="checkbox"/> Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other Casing/Liner Diameter _____ (in) Length _____ (ft) from _____ (ft) to _____ (ft)	<b>PUMP INSTALLED</b> By Driller <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <b>ESTIMATED WELL YIELD</b> Estimated at <u>900</u> G.P.M Static Water Level <u>45.38</u> (ft) *Pumping level below land surface <u>61.44</u> (ft) after <u>4</u> hrs. at <u>1000</u> G.P.M. (Estimated) *Note: For Public Water Supply wells please submit required yield and drawdown tests.
		<b>SCREEN RECORD</b> <input type="checkbox"/> Not Installed <input checked="" type="checkbox"/> Installed Material: <input type="checkbox"/> Bronze <input checked="" type="checkbox"/> SS Diameter of screen <u>16"</u> Slot size <u>0.06"</u> Length <u>15</u> (ft) from <u>63</u> (ft) to <u>78</u> (ft)	<b>WELL HEAD COMPLETION</b> Casing height above grade <u>2</u> (ft) Type Of Well Cap Installed: <u>Baker Pitless</u>
		<b>GRAVEL PACK RECORD</b> Gravel Pack: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No From <u>25</u> (ft) to <u>78</u> (ft)	<b>VARIANCE ISSUED</b> <input type="checkbox"/> Yes <input type="checkbox"/> No Request Number _____  <b>COMMENTS BY INSTALLER:</b>  Pump Test noted above was Step Test at:  <div style="text-align: right;">             278 gpm              403 gpm              603 gpm              802 gpm              902 gpm              1000 gpm           </div>

I hereby certify that this well has been constructed in accordance with state rules and in conformance with all conditions stated in the above captioned permit, and that the information presented herein is accurate and complete to the best of my knowledge.

Company Name Reynolds, Inc. WV Contractor No. WV 000825  
 Business Registration No. \_\_\_\_\_ Master Well Driller Certification No. \_\_\_\_\_  
 Well Driller (print) John Workman  
 Master Well Driller Signature \_\_\_\_\_

**SITE SUPERVISOR (SIGNATURE OF DRILLER OR JOURNEYMAN RESPONSIBLE FOR SITEWORK IF DIFFERENT FROM MASTER DRILLER.)**  
  
 Journeyman Well Driller Certification No. \_\_\_\_\_  
 Journeyman Well Driller (please print) \_\_\_\_\_  
 Apprentice and Name (s) \_\_\_\_\_



**H.C. Nutting Company 2009**

**Piezometer Construction  
Diagrams**

**PZ-09-03 to PZ-09-05**

PROJECT MOUNTAINEER BOTTOM ASH POND COMPLEX

SUMMARY ELEVATIONS  
(FT. NGVD)

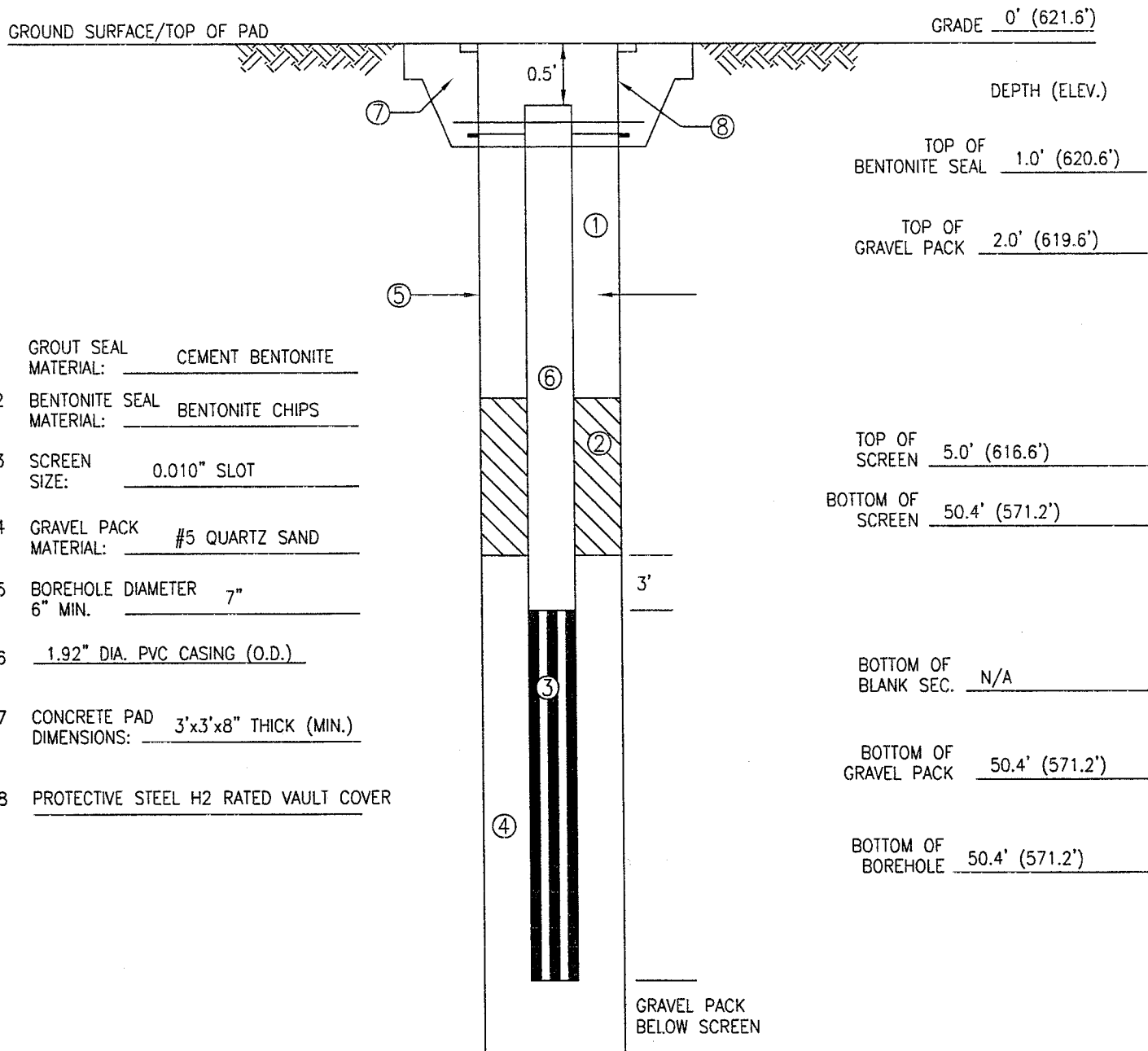
COORDINATES 71944.21 N/1733850.23 E (NAD 27)(NGVD29 WV S)

DATE INSTALLED 02/17/09

PIEZOMETER NO. PZ-09-03

REF. DATUM PT.:  
TOP OF PROTECTIVE  
VAULT/GROUND SURFACE

REF. DATUM PT. \_\_\_\_\_



- 1 GROUT SEAL MATERIAL: CEMENT BENTONITE
- 2 BENTONITE SEAL MATERIAL: BENTONITE CHIPS
- 3 SCREEN SIZE: 0.010" SLOT
- 4 GRAVEL PACK MATERIAL: #5 QUARTZ SAND
- 5 BOREHOLE DIAMETER 7"  
6" MIN.
- 6 1.92" DIA. PVC CASING (O.D.)
- 7 CONCRETE PAD DIMENSIONS: 3'x3'x8" THICK (MIN.)
- 8 PROTECTIVE STEEL H2 RATED VAULT COVER

GRADE 0' (621.6')

DEPTH (ELEV.)

TOP OF BENTONITE SEAL 1.0' (620.6')

TOP OF GRAVEL PACK 2.0' (619.6')

TOP OF SCREEN 5.0' (616.6')

BOTTOM OF SCREEN 50.4' (571.2')

BOTTOM OF BLANK SEC. N/A

BOTTOM OF GRAVEL PACK 50.4' (571.2')

BOTTOM OF BOREHOLE 50.4' (571.2')

NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VAULT/GROUND SURFACE

SCALE: NTS

GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD		REVISION 0		OBSERVATION WELL	
APP'D.	DR.	C.K.	DATE		
AMERICAN ELECTRIC POWER SERVICE CORP.				CDS-04A	SH.

AMERICAN ELECTRIC POWER  
MOUNTAINEER BOTTOM ASH POND COMPLEX

GEOLOGIST/ENGINEER:  
TODD GRIFFITH H.C. NUTTING CO.

PROJECT MOUNTAINEER BOTTOM ASH POND COMPLEX

SUMMARY ELEVATIONS  
(FT. NGVD)

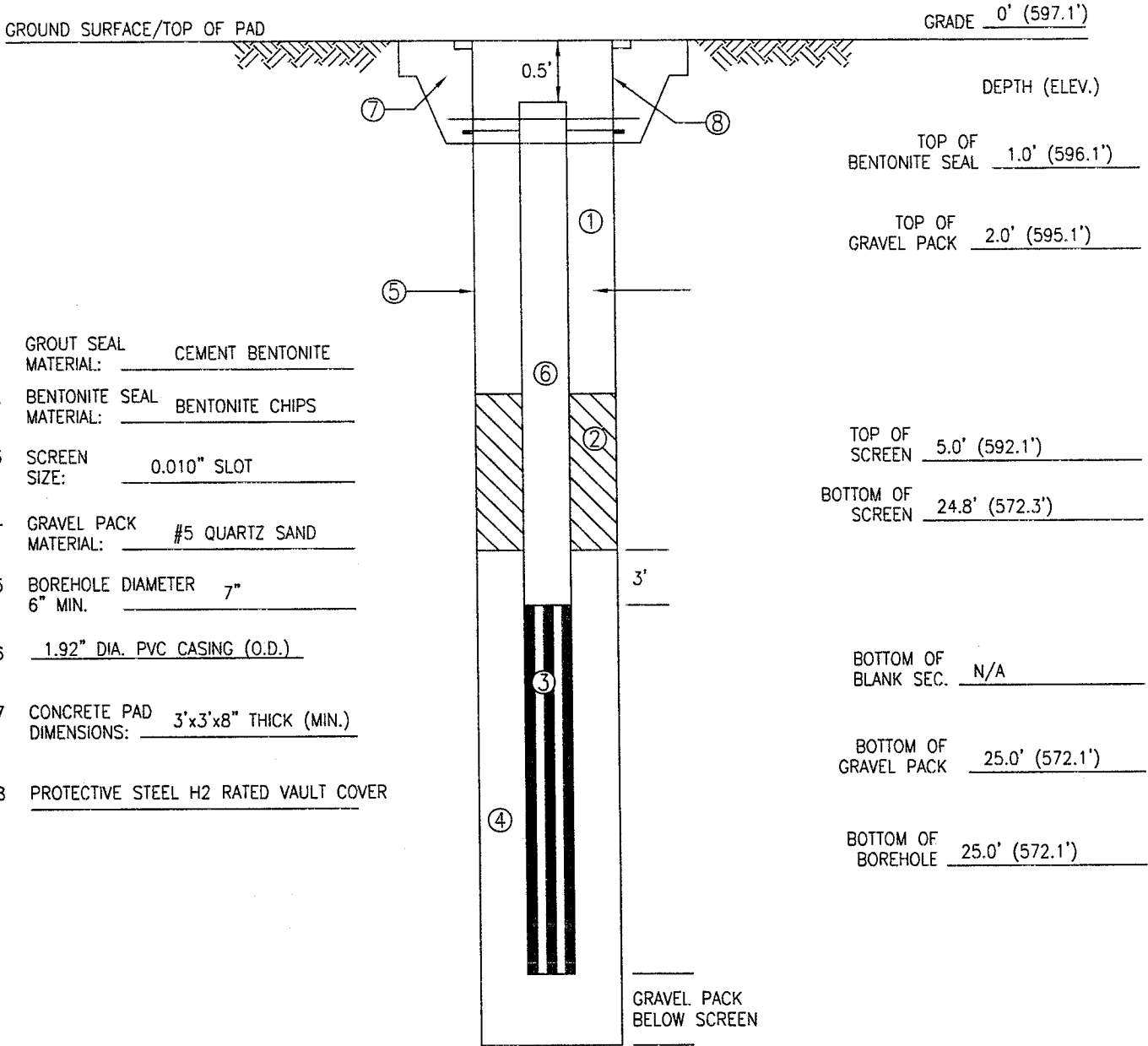
COORDINATES 719507.75 N/1733919.28 E (NAD 27)(NGVD29 WV S)

DATE INSTALLED 02/19/09

PIEZOMETER NO. PZ-09-04

REF. DATUM PT.:  
TOP OF PROTECTIVE  
VAULT/GROUND SURFACE

REF. DATUM PT. \_\_\_\_\_



- 1 GROUT SEAL MATERIAL: CEMENT BENTONITE
- 2 BENTONITE SEAL MATERIAL: BENTONITE CHIPS
- 3 SCREEN SIZE: 0.010" SLOT
- 4 GRAVEL PACK MATERIAL: #5 QUARTZ SAND
- 5 BOREHOLE DIAMETER 7"  
6" MIN.
- 6 1.92" DIA. PVC CASING (O.D.)
- 7 CONCRETE PAD DIMENSIONS: 3'x3'x8" THICK (MIN.)
- 8 PROTECTIVE STEEL H2 RATED VAULT COVER

DEPTH (ELEV.)

GRADE 0' (597.1')

TOP OF BENTONITE SEAL 1.0' (596.1')

TOP OF GRAVEL PACK 2.0' (595.1')

TOP OF SCREEN 5.0' (592.1')

BOTTOM OF SCREEN 24.8' (572.3')

BOTTOM OF BLANK SEC. N/A

BOTTOM OF GRAVEL PACK 25.0' (572.1')

BOTTOM OF BOREHOLE 25.0' (572.1')

NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VAULT/GROUND SURFACE

SCALE: NTS

GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD		REVISION 0		OBSERVATION WELL	
APP'D.	DR.	C.K.	DATE		
AMERICAN ELECTRIC POWER SERVICE CORP.				CDS-04A	SH.

AMERICAN ELECTRIC POWER  
MOUNTAINEER BOTTOM ASH POND COMPLEX

GEOLOGIST/ENGINEER:  
TODD GRIFFITH H.C. NUTTING CO.



TERRACON PROJECT NO. N2095020

PROJECT MOUNTAINEER BOTTOM ASH POND COMPLEX

SUMMARY ELEVATIONS  
(FT. NGVD)

COORDINATES 718480.58 N/1734992.79 E (NAD 27)(NGVD29 WV S)

DATE INSTALLED 02/18/09

PIEZOMETER NO. PZ-09-05

REF. DATUM PT.:  
TOP OF PROTECTIVE  
VAULT/GROUND SURFACE

REF. DATUM PT. \_\_\_\_\_

GROUND SURFACE/TOP OF PAD

GRADE 0' (611.7')

DEPTH (ELEV.)

TOP OF BENTONITE SEAL 1.0' (610.7')

TOP OF GRAVEL PACK 2.0' (609.7')

TOP OF SCREEN 5.0' (606.7')

BOTTOM OF SCREEN 50.2' (561.5')

BOTTOM OF BLANK SEC. N/A

BOTTOM OF GRAVEL PACK 50.2' (561.5')

BOTTOM OF BOREHOLE 50.2' (561.5')

1 GROUT SEAL  
MATERIAL: CEMENT BENTONITE

2 BENTONITE SEAL  
MATERIAL: BENTONITE CHIPS

3 SCREEN  
SIZE: 0.010" SLOT

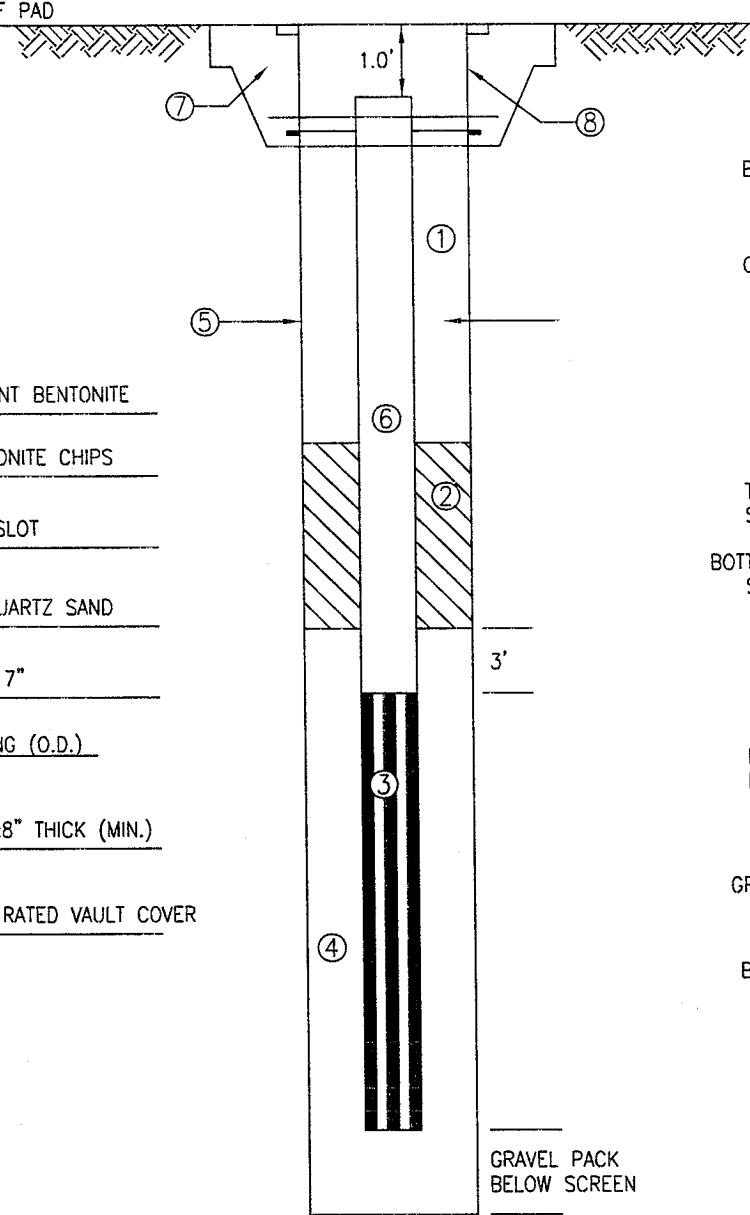
4 GRAVEL PACK  
MATERIAL: #5 QUARTZ SAND

5 BOREHOLE DIAMETER  
6" MIN. 7"

6 1.92" DIA. PVC CASING (O.D.)

7 CONCRETE PAD  
DIMENSIONS: 3'x3'x8" THICK (MIN.)

8 PROTECTIVE STEEL H2 RATED VAULT COVER



NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VAULT/GROUND SURFACE

SCALE: NTS

GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD		REVISION 0		OBSERVATION WELL	
APP'D.	DR.	C.K.	DATE		
AMERICAN ELECTRIC POWER SERVICE CORP.				CDS-04A	SH.

AMERICAN ELECTRIC POWER  
MOUNTAINEER BOTTOM ASH POND COMPLEX

GEOLOGIST/ENGINEER:  
TODD GRIFFITH H.C. NUTTING CO.



**H.C. Nutting Company 2009**

**Soil Boring Logs**

**B-09-01, B-09-02, PZ-09-03 to  
PZ-09-05, B-09-06**

# LOG OF BORING NO. B-09-01

CLIENT <b>American Electric Power</b>										
SITE <b>New Haven, West Virginia</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>								
GRAPHIC LOG	Boring Location: 719673.518, 1733588.509		SAMPLES				TESTS			
	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	Approx. Surface Elev.: 621.5 ft									
	1	<b>FILL</b> , gravel base for roadway	620.5	GP	1	SS	18	27		
		<b>FILL</b> , poorly graded sand, some gravel and silt, fine grained, brown, medium dense to dense, moist								
			5							
			10							
	12.5	<b>FILL</b> , silty sand, grayish brown to brown, very dense to dense, moist to wet	609							
			15							
			20							
	22.5	<b>FILL</b> , poorly graded sand, some gravel and silt, fine grained, brown to light brown, dense, saturated	599							
			25							
	27.5	<b>SILTY SAND</b> , very fine to fine grained, some thin sandy silt seams, brown to light brown, medium dense to loose, wet to moist	594							
			30							

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	∇ 22.5	WD	∇ AB
WL	∇ 22.0	24 hour	∇
WL			



BORING STARTED		2-16-09	
BORING COMPLETED		2-16-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS: MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

# LOG OF BORING NO. B-09-01

CLIENT <b>American Electric Power</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>									
SITE <b>New Haven, West Virginia</b>											
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	SAMPLES				TESTS				
			USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	<p><b>SILTY SAND</b>, very fine to fine grained, some thin sandy silt seams, brown to light brown, medium dense to loose, wet to moist</p>	35	SM	14	SS	18	9				
		35	SM	15	SS	18	9				
		35	SM	16	SS	18	11	14			
		40	SM	17	SS	18	8				
		40	SM	18	SS	18	10				
	45	45	SP SM	19	SS	18	25				
		45	SP SM	20	SS	18	27	8			
	51.5	50	SP SM	21	SS	18	54				
	51.5	570	BORING COMPLETED								

REVISED BORING LOGS: MOUNTAINEER PLANT BOTTOM ASH GPJ TERRACON.GDT 3/9/09

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 22.5	WD	▽ AB
WL	▽ 22.0	24 hour	▽
WL			



BORING STARTED		2-16-09	
BORING COMPLETED		2-16-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

# LOG OF BORING NO. B-09-02

CLIENT  
**American Electric Power**

SITE  
**New Haven, West Virginia**

PROJECT  
**Mountaineer Bottom Ash Pond Complex**

Boring Location: 719744.754, 1733658.992

DESCRIPTION

Approx. Surface Elev.: 594.5 ft

DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
		NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS /ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
2	CL	1	SS	18	4	19			
5	ML	2	SS	18	9	19			
5	ML	3	SS	18	7				
10	ML	4	SS	18	5				
10	ML	5	SS	18	6				
15	ML	6	SS	14	6				
16	SP SM	7	SS	18	9				
16	SP SM	8	SS	18	22	6			
20	SP SM	9	SS	18	14				
25	SP SM	10	SS	15	19				
25	SP SM	11	SS	18	30				

**TOPSOIL**, lean clay, high organic content, dark brown, very soft, saturated (possible seepage from dike)

**SANDY SILT**, fine grained, brown, loose, wet to moist

**POORLY GRADED SAND with SILT and GRAVEL**, light to dark brown, medium dense to dense, moist

BORING COMPLETED

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 0	WD	▽ 26.0 AB
WL	▽	WD	▽
WL			



BORING STARTED		2-18-09	
BORING COMPLETED		2-18-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS: MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

# LOG OF BORING NO. PZ-09-03

CLIENT <b>American Electric Power</b>										
SITE <b>New Haven, West Virginia</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>								
GRAPHIC LOG	Boring Location: 719441.213, 1733850.227		DEPTH, ft.		SAMPLES			TESTS		
	DESCRIPTION		USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 621.5 ft									
	1	620.5	SP SM	1	SS	18	26			
	FILL, gravel base for roadway  FILL, poorly graded sand with silt, some gravel, brown, medium dense to dense, moist		SP SM	2	SS	18	31	6		
			5	SP SM	3	SS	18	28		
			SP SM	4	SS	18	39			
			10	SP SM	5	SS	18	42		
			SP SM	6	SS	18	49	10		
	15	SP SM	7	SS	18	39				
17.5	604	SP	8	SS	18	38				
FILL, poorly graded sand, some gravel and silt, fine grained, brown, dense, saturated  CLAYEY GRAVEL with SAND, fine sand with rounded gravel, dark gray, medium dense, moist to wet		SP	9	SS	18	42				
		20	SP	10	SS	18	11			
22.5	599	SC	10	SS	18	11				
24	597.5	CL	11	SS	18	12	19		4500* LL = 29 PI = 10	
LEAN CLAY with SAND, brown to light brown, stiff, moist		CL	12	SS	18	13			3500*	
		25	CL	13	SS	18	11	20		4500* LL = 25 PI = 5
30	591.5	CL ML	13	SS	18	11	20		4500* LL = 25 PI = 5	
SILTY CLAY with sand, brown to light brown, stiff, moist		CL	1	ST	22				LL = 25	

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer  
\*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 17.5	WD	▽ 20.2
WL	▽ 15.8	2/25	▽
WL			



BORING STARTED		2-16-09	
BORING COMPLETED		2-17-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS: MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

# LOG OF BORING NO. PZ-09-03

CLIENT <b>American Electric Power</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>								
SITE <b>New Haven, West Virginia</b>										
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
34		587.5	ML						Pl = 7	
	<b>SILTY SAND</b> , very fine grained, trace gravel, many thin sandy silt seams, brown to light brown, loose to medium dense, moist	35	SM	14	SS	14	10			
		35	SM	15	SS	18	11			
		35	SM	16	SS	18	8	13		
		40	SM	17	SS	18	7			
		40	SM	18	SS	18	8			
		45	SM	19	SS	18	10			
48.5		573	SM	20	SS	18	12			
	<b>POORLY GRADED GRAVEL with SAND and SILT</b> , subrounded to rounded gravel, brown, loose to medium dense, wet	50	GP	21	SS	18	8	8		
51.5		570								
	BORING COMPLETED									

REVISED BORING LOGS: MOUNTAINEER PLANT BOTTOM ASH GP.J TERRACON.GDT 3/9/09

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer  
\*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 17.5	WD	▽ 20.2      72
WL	▽ 15.8	2/25	▽
WL			



BORING STARTED		2-16-09	
BORING COMPLETED		2-17-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

# LOG OF BORING NO. PZ-09-04

CLIENT <b>American Electric Power</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>								
SITE <b>New Haven, West Virginia</b>		Boring Location: 719506.02, 1733919.514								
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	SAMPLES				TESTS			
	Approx. Surface Elev.: 597 ft		USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	<b>TOPSOIL</b> , saturated		CL	1	SS	11	9			
	2									
	<b>SANDY SILT</b> , trace clay, fine to very fine grained, brown, loose, layered, wet		ML	2	SS	18	9	21		
	5									
			ML	1	ST	24				
			ML	3	SS	18	10			
			ML	4	SS	18	5			
			ML	5	SS	18	6	23		
			ML	6	SS	18	5			
	ML	7	SS	18	7					
	ML	8	SS	18	13					
21.4										
<b>POORLY GRADED GRAVEL with SILT and SAND</b> , subrounded gravel, brown with gray, medium dense to dense, very moist	GP GM	9	SS	12	19	6				
26.5										
<b>BORING COMPLETE</b>	GP GM	10	SS	18	43					

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ N/E	WD	▽ N/E	AB
WL	▽ N/E	48	▽ 25.5	2/25
WL				



BORING STARTED		2-19-09	
BORING COMPLETED		2-19-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS: MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09



# LOG OF BORING NO. PZ-09-05

CLIENT  
**American Electric Power**

SITE  
**New Haven, West Virginia**

PROJECT  
**Mountaineer Bottom Ash Pond Complex**

Boring Location: 718483.249, 1734990.193

GRAPHIC LOG

DESCRIPTION

Approx. Surface Elev.: 611.5 ft

DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
		NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
0.3	SP	1	SS	18	20				
	SP	2	SS	18	30	4			
5	SP	3	SS	18	10				
	SP	4	SS	18	5				
10	SP	5	SS	18	5				
	SP	6	SS	18	4	7			
15	SP	7	SS	18	3				
	SP	8	SS	13	4				
20	SP	9	SS	18	5				
	SP	10	SS	18	3	6			
25	SP	11	SS	18	6				
	SP	12	SS	18	5				
30	GP	13	SS	18	10				

**TOPSOIL** 611

**FILL**, poorly graded sand, some silt and trace fine gravel, fine to medium grained sand, brown, dense, moist

5 606.5

**POORLY GRADED SAND** trace silt, fine grained, brown, loose to very loose, moist

20 591.5

**POORLY GRADED SAND**, trace silt, fine grained, brown, very loose to loose, moist

29 582.5

**POORLY GRADED GRAVEL with SAND**, subrounded gravel with fine to coarse sand, brown to dark brown, loose to medium dense, moist

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ N/E	WD	▽ N/E AB
WL	▽ N/E	72	▽ N/E 2/25
WL			



BORING STARTED		2-18-09	
BORING COMPLETED		2-18-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS - MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

LOG OF BORING NO. PZ-09-05

CLIENT <b>American Electric Power</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>									
SITE <b>New Haven, West Virginia</b>											
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS				
				NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
				35	GP 14	SS	18	19			
				576.5	SP 15	SS	18	10			
					SP 16	SS	18	13			
				40	SP 17	SS	18	30	3		
				571.5	SP 18	SS	18	20			
					SP 19	SS	18	21			
				45	SP 20	SS	18	14	7		
				564	SP 21	SS	18	13			
50											
47.5											
51.5											
560											
BORING COMPLETED											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ N/E	WD	▽ N/E	AB
WL	▽ N/E	72	▽ N/E	2/25
WL				



BORING STARTED		2-18-09	
BORING COMPLETED		2-18-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020

REVISED BORING LOGS: MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

# LOG OF BORING NO. B-09-06

CLIENT <b>American Electric Power</b>		PROJECT <b>Mountaineer Bottom Ash Pond Complex</b>											
SITE <b>New Haven, West Virginia</b>													
Boring Location: 718535.672, 1735062.716		DESCRIPTION		SAMPLES				TESTS					
GRAPHIC LOG	Approx. Surface Elev.: 594.5 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf		
	0.3	594		SC	1	SS	14	11					
	<b>TOPSOIL</b>												
	<b>FILL</b> , clayey sand, fine to medium grained, organics such as roots fragments throughout, brown, medium dense to loose, moist to wet		591		SC	2	SS	18	5			2000*	
	3.5												
	<b>SILTY CLAY with SAND</b> , fine sand, light brown, medium stiff, moist			5	CL ML	1	ST	24					
					CL ML	3	SS	18	7	23		2000*	LL = 25 PI = 6
					CL ML	4	SS	18	7	23		2500*	LL = 26 PI = 6
	10.5	584		10	SP	5	SS	18	13				
	<b>POORLY GRADED SAND with GRAVEL</b> , fine to coarse sand, some silt, rounded to subrounded gravel, brown, medium dense to loose, moist				SP	6	SS	14	8				
				15	SP	7	SS	14	6				
					SP	8	SS	14	5				
			20	SP	9	SS	14	11					
22.5	572			SP SM	10	SS	18	19	4				
<b>POORLY GRADED SAND with SILT</b> , brown, medium dense, moist				SP SM	11	SS	18	14					
26.5	568		25										
BORING COMPLETED													

REVISED BORING LOGS MTNEER PLANT BOTTOM ASH.GPJ TERRACON.GDT 3/9/09

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

\*\*CME 140H SPT automatic hammer  
\*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	∇ N/E	WD	∇ AB
WL	∇	24 hour	∇
WL			



BORING STARTED		2-18-09	
BORING COMPLETED		2-18-09	
RIG	Track	FOREMAN	JW
LOGGED	TAG	JOB #	N2095020



**Arcadis 2016**

**Boring Logs**

**SB-1601, MW-1601A to MW-1608**

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

COORDINATES Not Surveyed

GROUND ELEVATION NA SYSTEM NA

BORING NO. SB-1601 DATE 10/05/16 SHEET 1 OF 4

BORING START 05/05/16 BORING FINISH 05/06/16

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 Grout

FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	▽ <b>57.0</b>	▼	▼
TIME			
DATE	<b>5/6/2016</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	8.0							No recovery, boring was pre-drilled for utility clearance; no samples were taken.		
1	SH	8.0	10.0	0-3-3-1	12		5			Sand, fine to coarse; some silt; little fine gravel, angular to subrounded; trace medium subangular gravel; wet; dark yellowish brown (10YR 4/2).		
2	SS	10.0	12.0	1-1-1-1	12		10			Silt with clay with fine sand; moist; soft; non-plastic; very dark gray (N 3/).		
3	SS	12.0	14.0	0-0-1-1	18					Silt, some clay, some fine sand, trace coal fragments; moist; soft.		
4	SS	14.0	16.0	1-1-2-2	18							
5	SS	16.0	18.0	2-1-1-2	18		15					

**TYPE OF CASING USED**

NA	NQ-2 ROCK CORE	
NA	6" x 3.25 HSA	
NA	9" x 6.25 HSA	
NA	HW CASING ADVANCER	4"
NA	NW CASING	3"
NA	SW CASING	6"
NA	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER J. Wanner

AEP - AEP.GDT - 10/05/16 15:21 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE\AEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPJ

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**








COMPANY **American Electric Power**

BORING NO. **SB-1601** DATE **10/05/16** SHEET **2** OF **4**

PROJECT **Mountaineer Plant**

BORING START **05/05/16** BORING FINISH **05/06/16**

AEP - AEP.GDT - 10/05/16 15:21 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS SERVER\USE FOR REFERENCE\AEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPJ

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	18.0	20.0	1-1-1-1	19		20					
7	SS	20.0	22.0	1-1-2-1	48							
8	SS	22.0	24.0	0-1-3-7	21							
9	SS	24.0	26.0	4-5-4-5	21		25		SM	Silty sand, fine to coarse; moist; loose; yellowish brown (10YR 5/4).		
10	SS	26.0	28.0	1-1-3-3	18				ML	Silt, some very fine sand; dry; rapid dilatancy; stratified; gray (5Y 6/1) with 30% iron staining as dark as dusky red (7.5R 3/3).		
11	SS	28.0	30.0	1-1-2-2	22				ML	Silt, trace clay; wet; soft; rapid dilatancy; stratified.		Note: Very finely stratified from 27.8 to 28 feet.  Note: Color grades to yellowish brown (10YR 5/6) from 29 to 31 feet.
12	SS	30.0	32.0	1-1-3-9	19		30		SP	Note: Color change to gray (N 5/) abrupt upper and lower boundaries from 31 to 31.1 feet.		
13	SS	32.0	34.0	2-2-3-4	17				SP	Sand with silt, some clay; moist; loose; brown (7.5YR 4.3); sand is fine to coarse.		
14	SS	34.0	36.0	2-4-7-7	12					Sand, little to some silt; moist; yellowish brown (10YR 5/4); loose; sand is fine to coarse.		Note: Dry from 34 to 36 feet.
15	SS	36.0	38.0	5-7-8-7	12		35					Note: Dry grades to moist from 36 to 38 feet.
16	SS	38.0	40.0	2-4-5-6	19							Note: Moist from 38 to 44 feet.
17	SS	40.0	42.0	5-5-6-5	19		40					

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. SB-1601 DATE 10/05/16 SHEET 3 OF 4

PROJECT Mountaineer Plant

BORING START 05/05/16 BORING FINISH 05/06/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
18	SS	42.0	44.0	1-4-5-5	17							
19	SS	44.0	46.0	2-4-6-7	13		45			Note: Slight increase in silt content from 43 to 44 feet.		
20	SS	46.0	48.0	5-5-7-7	17							
21	SS	48.0	50.0	8-10-10-10	18					Note: Weakly stratified from 48.5 to 50 feet.		
22	SS	50.0	52.0	6-6-7-8	16		50					
23	SS	52.0	54.0	2-3-8-8	18							
24	SS	54.0	56.0	4-4-5-6	13		55					
25	SS	56.0	58.0	4-4-6-8	19					Note: Trace subrounded medium to coarse gravel, sedimentary very thinly bedded, pitted along bedding at 55.5 feet.	▽	
26	SS	58.0	60.0	2-4-6-4	13					Note: Trace subrounded coal (250 mm diameter, readily disaggregate; broken apart; internal coal appearance is well preserved) at 56.1 feet.		
27	SS	60.0	62.0	2-4-4-6	14		60			Note: Includes little amount of fine subangular gravel from 57.5 to 58 feet. Note: Weakly stratified from 59 to 59.5 feet.		
28	SS	62.0	64.0	4-4-4-5	18							
29	SS	64.0	66.0	5-6-9-10	17				SP	Sand, fine to medium, little to some silt; moist; loose; yellowish brown (10YR 5/4).		

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. SB-1601 DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 05/05/16 BORING FINISH 05/06/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
30	SS	66.0	68.0	5-6-7-8	17		65			Note: Thin layer of coal fragments up to 10 mm in size. Note: Includes a little amount of fine subrounded gravel from 67 to 68 feet.		
31	SS	68.0	70.0	6-6-5-7	16							
32	SS	70.0	71.3	12-15-50/4	16		70		GP SP ML	Gravel, some sand; moist; loose; gravel is fine to medium, rounded and subrounded. Sand, some silt, little fine to medium gravel; dry; loose; yellowish brown (10YR 5.4); sand is fine to coarse. Silt, little very fine sand; dry; hard; very dark brown (7.5YR 2.5/2). Bedrock, weak, thin plates; looks like shale, but fine party crystals (like mica) are abduct; olive gray (5Y 5/2). Bedrock, weak, thin plates; looks like shale, but fine party crystals (like mica) are abduct; olive gray (5Y 5/2). End of boring at 71.3 feet.		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

JOB NUMBER OH015976.0009  
 COMPANY American Electric Power  
 PROJECT Mountaineer Plant  
 COORDINATES N 717,305.0 E 1,734,094.2  
 GROUND ELEVATION 607.5 SYSTEM NAD 1927

BORING NO. MW-1601A DATE 10/05/16 SHEET 1 OF 4  
 BORING START 06/08/16 BORING FINISH 06/08/16  
 PIEZOMETER TYPE NA WELL TYPE OW  
 HGT. RISER ABOVE GROUND 3.19 DIA 2"  
 DEPTH TO TOP OF WELL SCREEN 67.0 BOTTOM 77.0  
 WELL DEVELOPMENT NA BACKFILL Grout  
 FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	▽ <u>63.0</u>	▼	▼
TIME			
DATE	<u>6/8/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	10.0		0					Straight drill to 10 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1	SS	10.0	12.0	1-2-4-5	13		10		ML	Silt, some clay, little sand; dry; firm; massive; 10YR 4/4 to 4/3.		
2	SS	12.0	14.0	3-4-5-5	16							
3	SS	14.0	16.0	4-5-4-7	13		15		CL ML SM	Silt with clay and sand; moist; soft. Interbedded sand and clay; dry; loose and soft; sands are fine to coarse; 10YR 4/4; silt/clay layers are silt with clay, some fine sand, dry, soft, black (10YR 2/1).		
4	SS	16.0	18.0	3-4-6-5	14				SW	Sand, fine to coarse, little silt, trace fine gravel; moist; loose; 10YR 5/4 to 4/4; in stratified.		
5	SS	18.0	20.0	2-2-2-3	16				SP	Note: Dry from 18 to 19 feet. Note: Abrupt boundary at 19 feet.		

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>			
NA	NQ-2 ROCK CORE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC			
NA	6" x 3.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON			
NA	9" x 6.25 HSA			RECORDER <u>J. Wanner</u>			
NA	HW CASING ADVANCER	4"					
NA	NW CASING	3"					
NA	SW CASING	6"					
NA	AIR HAMMER	8"					

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1601A** DATE **10/05/16** SHEET **2** OF **4**

PROJECT **Mountaineer Plant**

BORING START **06/08/16** BORING FINISH **06/08/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
6	SS	20.0	22.0	2-2-2-4	17				SW SW	Fine sand, some silt, dry; loose; 10YR 5/4. Silty sand; moist; soft; 10YR 4/4.		
7	SS	22.0	24.0	1-3-3-3	13					Sand, fine to coarse, little to some silt, trace fine to medium gravel; dry; loose; 10YR 5/4 to 10YR 4/4. Note: Gravel fraction is subrounded sedimentary and chert, both fine in size from 22 to 26 feet.		
8	SS	24.0	26.0	3-6-8-7	16		25					
9	SS	26.0	28.0	3-5-4-5	14					Note: Some gravel at 26 feet. Note: No gravel at 26.7 to 28 feet.		
10	SS	28.0	30.0	5-6-7-5	18							
11	SS	30.0	32.0	4-4-5-6	14		30					
12	SS	32.0	34.0	1-4-7-6	13							
13	SS	34.0	36.0	3-8-5-8	14					Note: Moist at 34.5 feet.		
14	SS	36.0	38.0	3-8-12-12	17					Note: No gravel from 36 to 37 feet. Note: Gravel fraction is fine to medium, subangular to subrounded, from 37 to 38 feet.		
15	SS	38.0	40.0	6-8-6-8	18					Note: Moist from 38 to 38.5 feet.		
16	SS	40.0	42.0	8-12-17-20	17		40		SW SW	Sand, fine, with silt; dry; loose; brown. Sand, fine to coarse, little to some fine gravel, little to some silt; dry; loose; brown; gravel is subangular to subrounded.		
17	SS	42.0	44.0	10-12-8-12	16					Note: No gravel from 42.5 to 43.5 feet.		
18	SS	44.0	46.0	9-10-12-6	13							
							45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1601A DATE 10/05/16 SHEET 3 OF 4

PROJECT Mountaineer Plant

BORING START 06/08/16 BORING FINISH 06/08/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
19	SS	46.0	48.0	12-12-15-20	17					Note: Igneous and sedimentary rock types from 46 to 52 feet.		
20	SS	48.0	50.0	12-12-10-12	17					Note: Moist from 48 to 50 feet.		
21	SS	50.0	52.0	9-10-14-16	16		50					
22	SS	52.0	54.0	6-10-13-14	13				SW	Sand with fine gravel, little silt, little amount of medium size gravel; dry; loose; sand is fine to coarse; gravel is subround dominant.		
23	SS	54.0	56.0	14-20-22-11	14					Note: Includes trace coarse gravel (subangular igneous, and subrounded sedimentary. from 54 to 56 feet.		
24	SS	56.0	58.0	9-12-14-24	17					Note: Includes trace coarse subrounded gravel from 56 to 60 feet.		
25	SS	58.0	60.0	14-15-20-15	17							
26	SS	60.0	62.0	20-20-14-14	18		60		SW	Sand with silt, little fine gravel; dry; loose; brown; sand is fine to coarse.		
27	SS	62.0	64.0	8-8-8-6	12					Note: Moist from 62 to 62.5 feet.		
28	SS	64.0	66.0	7-9-7-8	14				SW	Sand some silt, little fine to medium gravel; loose; weakly stratified. Note: Wet at 63 feet.	▽	
29	SS	66.0	68.0	5-4-3-12	16				SW	Sand, some gravel, fine to medium, little silt, trace coarse rounded gravel; wet; loose; unstratified; brown.		
30	SS	68.0	70.0	1-4-6-9	14					Note: Wet at 68 feet.		
31	SS	70.0	72.0	5-15-15-18	0.9		70		SW	Sand, little to some silt, trace fine gravel; wet; loose; unstratified; sand is very fine to medium dominant.		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING


JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1601A DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 06/08/16 BORING FINISH 06/08/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
32	SS	72.0	74.0	NM-NM-NM-NM	0					No sample attempted; heaving sands from 72 to 76 feet.		
33	SS	74.0	76.0	9-12-13-12	0		75					
34	SS	76.0	78.0	3-9-13-13	0.9				SW	Sand with silt, trace fine gravel; wet; loose; brown; sand is fine to medium.		
35	SS	78.0	80.0	9-13-22-23	0.6		80					
										End of boring at 80 feet.  See well construction log for development information.		

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**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

COORDINATES N 717,671.9 E 1,733,519.1

GROUND ELEVATION 602.4 SYSTEM NAD 1927

BORING NO. MW-1602 DATE 10/05/16 SHEET 1 OF 3

BORING START 05/09/16 BORING FINISH 05/10/16

PIEZOMETER TYPE NA WELL TYPE OW

HGT. RISER ABOVE GROUND 2.75 DIA 2"

DEPTH TO TOP OF WELL SCREEN 61.0 BOTTOM 71.0

WELL DEVELOPMENT NA BACKFILL Grout

FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	$\nabla$ <u>57.0</u>	$\blacktriangledown$	$\nabla$
TIME			
DATE	<u>5/9/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	10.0		0							Straight drill to 10 feet, boring was pre-drilled for utility clearance; no samples were taken.
1	SS	10.0	12.0	1-0-0-1	18		5		ML	Silt, trace clay; wet; soft; rapid dilatancy; dark yellowish brown (10YR 4/4).		
2	SS	12.0	14.0	0-3-5-2	18					Note: From 12 to 13 feet wet.		
3	SS	14.0	16.0	0-3-3-4	18					Note: From 13 to 15 feet coarsely interbedded with sand, little silt, loose.		
4	SS	16.0	18.0	2-2-3-3	18		15		SP	Sand, little to some silt; loose; dry; yellowish brown (10YR 5/4).		
5	SS	18.0	20.0	3-2-3-3	17					Note: From 16 to 26.5 feet dry.		
6	SS	20.0	22.0	3-3-5-6	17		20			Note: At 21 feet trace fine gravel.		

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
NA	NQ-2 ROCK CORE	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC										
NA	6" x 3.25 HSA	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON										
NA	9" x 6.25 HSA	RECORDER <u>J. Wanner</u>										
NA	HW CASING ADVANCER 4"											
NA	NW CASING 3"											
NA	SW CASING 6"											
NA	AIR HAMMER 8"											

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1602 DATE 10/05/16 SHEET 2 OF 3

PROJECT Mountaineer Plant

BORING START 05/09/16 BORING FINISH 05/10/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	SS	22.0	24.0	1-2-3-5	17				Note: At 22 feet little amount of fine gravel.			
8	SS	24.0	26.0	3-7-10-14	17					Note: At 24 feet trace medium subrounded gravel.		
9	SS	26.0	28.0	7-10-10-13	17					Note: From 25.8 to 26 feet little coarse sand.		
10	SS	28.0	30.0	2-3-7-10	17				SP	Sand, little to some silt, little gravel; dry; loose; gravel is fine to medium, angular to subrounded; sand is fine to coarse.		
11	SS	30.0	32.0	2-5-5-8	14				SP	Sand, little to some silt; dry; loose; sand is fine to medium.		
12	SS	32.0	34.0	4-7-7-10	13				SP	Sand, fine to coarse, little to some silt, little fine gravel, trace medium gravel; dry; loose. Note: From 32 to 34 feet trace coarse rounded gravel, igneous.		
13	SS	34.0	36.0	7-11-11-11	18							
14	SS	36.0	38.0	7-10-13-16	17							
15	SS	38.0	40.0	7-10-13-17	17							
16	SS	40.0	42.0	10-11-13-13	13						Note: At 39 feet, trace coarse rounded gravel, igneous.	
17	SS	42.0	44.0	6-10-11-14	19						Note: At 41 feet, trace coarse rounded gravel, igneous.	
18	SS	44.0	46.0	8-10-12-15	14							
19	SS	46.0	48.0	6-9-11-14	16							
20	SS	48.0	50.0	6-10-13-16	18							
21	SS	50.0	52.0	9-11-21-27	18							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1602 DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 05/09/16 BORING FINISH 05/10/16

AEP - AEP.GDT - 10/05/16 15:36 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS SERVER\USE FOR REFERENCE\AEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPJ

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
22	SS	52.0	54.0	10-14-16-17	17					Note: From 51 to 52 feet, includes some fine gravel, angular to subangular.  Note: From 52.5 to 53.5 feet includes trace medium subrounded gravel.		
23	SS	54.0	56.0	9-10-10-9	16							
24	SS	56.0	58.0	5-2-4-3	18		55		SP	Sand, little to some silt, little to some fine gravel, trace medium to coarse gravel; dry; loose; sand is fine to coarse.  Note: From 57 to 58 feet wet.	▽	
25	SS	58.0	60.0	5-6-6-10	18							
26	SS	60.0	62.0	6-7-7-10	0.8		60					
27	SS	62.0	64.0	8-7-9-11	0					No recovery; driller said drilling conditions have not changed.		
28	SS	64.0	66.0	7-9-13-18	0					Note: From 64 to 66 feet all baskets replaced.		
29	SS	66.0	68.0	8-8-10-12	12		65		SP	Sand, some silt, trace fine rounded gravel; wet; loose; sand is fine to coarse.		
30	SS	68.0	70.0	6-9-8-11								
31	SS	70.0	89.0	3-4-46-50			70			Note: At 69.5 feet, subrounded gravel composed of coal (17 mm in size).		
										Bedrock, competent. End of boring at 71.6 feet.  See well construction log for development information.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

JOB NUMBER OH015976.0009  
 COMPANY American Electric Power  
 PROJECT Mountaineer Plant  
 COORDINATES N 719,516.2 E 1,732,495.0  
 GROUND ELEVATION 602.9 SYSTEM NAD 1927

BORING NO. MW-1603 DATE 10/05/16 SHEET 1 OF 4  
 BORING START 05/03/16 BORING FINISH 05/04/16  
 PIEZOMETER TYPE NA WELL TYPE OW  
 HGT. RISER ABOVE GROUND 3.38 DIA 2"  
 DEPTH TO TOP OF WELL SCREEN 60.0 BOTTOM 75.0  
 WELL DEVELOPMENT NA BACKFILL Grout  
 FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	▽ <u>57.0</u>	▼	▼
TIME			
DATE	<u>5/3/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	9.0		0							
1	SS	9.0	11.0	1-2-3-3	21		5					
2	SS	11.0	13.0	2-2-3-4	20		10	ML CL ML	SP CL ML	Silt, trace clay; dry; rapid dilatancy; brown (7.5YR 4/4). Grades to silt with clay; dry; non-dilatant; non-plastic; brown (7.5YR 4/4). Sand, fine to medium, trace gravel, trace silt; moist; loose; dark yellowish brown (10YR 4/4). Silt with little to some clay; moist; non-dilatant; non-plastic; yellowish brown (10YR 5/4).		
3	SS	13.0	15.0	3-4-4-5	17		15		SP ML SP	Sand, fine to medium; dry; loose. Silt, some clay; dry; non-dilatant; non-plastic; yellowish brown (10YR 5/4).		
4	SS	15.0	17.0	2-2-2-6	18					Sand, fine to coarse, trace gravel, fine to medium, subangular to subrounded, little silt; dry; loose.		
5	SS	17.0	19.0	2-2-4-5	16							
6	SS	19.0	21.0	2-3-3-5	18							Note: From 19 to 21 feet no gravel present; moist.

<b>TYPE OF CASING USED</b>		<i>Continued Next Page</i>	
<b>NA</b>	NQ-2 ROCK CORE	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 RECORDER <u>J. Wanner</u>	
<b>NA</b>	6" x 3.25 HSA		
<b>NA</b>	9" x 6.25 HSA		
<b>NA</b>	HW CASING ADVANCER 4"		
<b>NA</b>	NW CASING 3"		
<b>NA</b>	SW CASING 6"		
<b>NA</b>	AIR HAMMER 8"		



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1603 DATE 10/05/16 SHEET 2 OF 4

PROJECT Mountaineer Plant

BORING START 05/03/16 BORING FINISH 05/04/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	21.0	23.0	3-2-4-4	18							
8	SS	23.0	25.0	2-5-8-8	17							
9	SS	25.0	27.0	4-4-5-6	20		25					Note: From 23.3 to 25 feet, includes trace gravel, fine to medium, subangular to subrounded.
10	SS	27.0	29.0	4-4-6-8	18							Note: From 25 to 27 feet no gravel; moist.
11	SS	29.0	31.0	2-6-7-7	20							Note: From 26 to 26.3 feet includes some gravel, fine to medium, subangular to subrounded.
12	SS	31.0	33.0	4-4-5-7	20							Note: From 27.5 to 28.5 feet weakly stratified.
13	SS	33.0	35.0	6-5-7-11	21		30					Note: At 28.5 feet trace very fine coal fragments.
14	SS	35.0	37.0	10-8-10-10	21				SW			Note: From 30 to 30.9 feet includes some fine gravel.
15	SS	37.0	39.0	13-8-10-9	18							Note: From 33 to 33.6 feet; moist.
16	SS	39.0	41.0	5-7-10-10	20		35		SP			Fine sand with silt; moist; loose; yellowish brown (10YR 5/4).
17	SS	41.0	43.0	6-9-10-12	17							Sand, little silt, little gravel; moist; loose; sand is fine to coarse; gravel is fine to medium.
18	SS	43.0	45.0	6-11-20-18	21				SP			Sandy silt, some fine gravel, trace clay; moist; very soft; sand is fine to coarse; dark yellowish brown (10YR 4/4).
19	SS	45.0	47.0	9-12-14-14	20		40					Gravelly sand; dry; loose; sand is fine to coarse, gravel is fine to medium, both fractions are angular to subrounded.
									SP			Sand, fine to medium, little silt; dry; loose; yellowish brown (10YR 5/4).
							45					Note: From 42.6 to 42.9 feet includes some fine to medium gravel; subrounded.
												Note: From 44 to 44.8 feet includes some fine to medium gravel; round to subrounded.

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1603** DATE **10/05/16** SHEET **3** OF **4**

PROJECT **Mountaineer Plant**

BORING START **05/03/16** BORING FINISH **05/04/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	47.0	49.0	10-13-16-18	22					Note: From 46 to 46.9 feet includes some fine to medium gravel, subangular to subrounded.		
21	SS	49.0	51.0	6-7-10-14	18		50			Note: At 48 feet includes fine to medium gravel.		
22	SS	51.0	53.0	13-16-22-25	20					Note: From 50.5 to 51 feet slight increase in silt content.		
23	SS	53.0	55.0	7-9-12-15	20					Note: At 52 feet trace coal fines.		
24	SS	55.0	57.0	10-14-17-23	20		55		SM SP	Note: At 53 feet moist.  Note: From 54.2 to 54.3 feet includes coal fines.		
25	SS	57.0	59.0	7-6-7-9	18					Sandy silt, some clay; moist; soft; dark yellowish brown (10YR 4/4). Sand, little silt; moist; loose; yellowish brown (10YR 5/4). Note: At 57 feet wet.	▽	
26	SS	59.0	61.0	4-5-7-9	19							
27	SS	61.0	63.0	9-13-15-19	0.9		60		SP	Gravelly sand; wet; loose; gravel is fine to medium, sand is fine to coarse; yellowish brown (10YR 5/4).		
28	SS	63.0	65.0	13-27-50/5	24					Sand, little silt; wet; loose; sand is fine to coarse.		
29	SS	65.0	67.0	10-6-6-9	12		65			Note: From 64 to 65 feet heaving sands.		
30	SS	67.0	69.0	6-6-8-9	0.9				GP SP	Gravel, some coarse sand; wet; loose; gravel is fine to medium, subangular to subrounded dominant; washed.		
31	SS	69.0	71.0	6-8-7-8	0.8				SP	Sand, fine to medium, little silt; wet; loose; yellowish brown (10YR 5/4). Sand with fine gravel, little silt; wet; loose; sand is fine to coarse.		
32	SS	71.0	73.0	4-5-4-5	0.9		70		SP	Sand with little fine gravel, little silt; wet; loose.		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING


JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1603 DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 05/03/16 BORING FINISH 05/04/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
33	SS	73.0	76.0	4-5-5-6	0.9		75					
										End of boring at 76 feet.  See well construction log for development information.		

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**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

PROJECT **Mountaineer Plant**

COORDINATES **N 720,194.0 E 1,733,082.0**

GROUND ELEVATION **595.6** SYSTEM **NAD 1927**

BORING NO. **MW-1604D** DATE **10/05/16** SHEET **1** OF **4**

BORING START **04/26/16** BORING FINISH **04/26/16**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.63** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **69.0** BOTTOM **79.0**

WELL DEVELOPMENT **NA** BACKFILL **Grout**

FIELD PARTY **NA** RIG **Hollow Stem Auger**

Water Level, ft	▽ <b>51.0</b>	▼	▼
TIME			
DATE	<b>4/26/2016</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	8.8		0					Straight drilled to 8.8 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1	SS	8.8	10.8	2-2-3-3	17		5		SM	Fine sand with silt, trace clay; dry; loose; yellowish brown (10YR 5/4).		
2	SS	10.0	12.0	3-2-3-4	19		10		ML	Silt, little clay, trace fine sand; moist; non-dilatant; non-plastic; yellowish brown (10YR 5/4).		
3	SS	12.0	14.0	3-1-5-10	18				SP	Sand, some gravel, little silt; dry; loose; gravel is fine to medium, subrounded to rounded, yellowish brown (10YR 5/4).		
4	SS	14.0	16.0	9-9-8-9	0.9		15					
5	SS	16.0	18.0	10-12-11-11	12							
6	SS	18.0	20.0	11-11-9-10	14							

**TYPE OF CASING USED**

<b>NA</b>	NQ-2 ROCK CORE	
<b>NA</b>	6" x 3.25 HSA	
<b>NA</b>	9" x 6.25 HSA	
<b>NA</b>	HW CASING ADVANCER	4"
<b>NA</b>	NW CASING	3"
<b>NA</b>	SW CASING	6"
<b>NA</b>	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **J. Wanner**

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1604D DATE 10/05/16 SHEET 2 OF 4

PROJECT Mountaineer Plant

BORING START 04/26/16 BORING FINISH 04/26/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	20.0	22.0	8-9-12-12	18							
8	SS	22.0	24.0	5-10-12-13	16							
9	SS	24.0	26.0	7-10-13-14	12		25			Note: At 24 feet wet.		
10	SS	26.0	28.0	8-10-18-22	16			SP		Sand, little fine gravel, little silt; moist; loose; sand is fine to coarse, subangular to rounded; yellowish brown (10YR 5/4).		
11	SS	28.0	30.0	3-10-16-22	18							
12	SS	30.0	32.0	11-11-16-22	16		30					
13	SS	32.0	34.0	10-12-19-17	14					Note: At 32 feet dry.		
14	SS	34.0	36.0	6-11-16-18	18							
15	SS	36.0	38.0	8-8-10-12	14		35					
16	SS	38.0	40.0	6-7-7-10	17							
17	SS	40.0	42.0	7-11-10-19	19		40					
18	SS	42.0	44.0	6-8-14-17	19							
19	SS	44.0	46.0	10-8-8-9	19		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1604D** DATE **10/05/16** SHEET **3** OF **4**

PROJECT **Mountaineer Plant**

BORING START **04/26/16** BORING FINISH **04/26/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	46.0	48.0	8-10-14-11	19					Note: From 46.3 to 46.45 feet black, fine, soft, organic layer, weak platy structure.		
21	SS	48.0	50.0	5-5-7-10	21				SP	Sand, little silt; moist; loose; sand is very fine to medium; yellowish brown (10YR 5/4).		
22	SS	50.0	52.0	5-8-8-10	21		50			Note: From 51 to 54 feet wet.	▽	
23	SS	52.0	54.0	8-8-10-12	19							
24	SS	54.0	56.0	6-5-6-8	21					Note: From 54 to 55.6 feet color changes to very dark grayish brown (10YR 3/2); wet.		
25	SS	56.0	58.0	4-8-30-42	18				SP	Note: From 55.6 to 55.9 feet stratified with little clay, black color. Sand, some silt, trace clay; wet; loose; yellowish brown (10YR 5/4).		
26	SS	58.0	60.0	5-5-10-11	16							
27	SS	60.0	62.0	7-10-12-18	21		60			Note: From 60.9 to 61 feet little fine rounded gravel. Note: From 61.4 to 61.6 feet is about 25-35% fine black material, possible coal.		
28	SS	62.0	64.0	9-10-15-16	18							
29	SS	64.0	66.0	9-12-15-15	16							
30	SS	66.0	68.0	3-8-10-15	20							
31	SS	68.0	70.0	3-8-16-24	20							
32	SS	70.0	72.0	6-20-32-30	20		70			Note: At 69.3 feet color is very dark gray (10YR 3/1). Note: At 69.4 feet color is dark yellowish brown (10YR 4/6). Note: From 70 to 71.7 feet color changes to grayish brown (10YR 5/2).		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1604D DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 04/26/16 BORING FINISH 04/26/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
33	SS	72.0	74.0	9-14-17-21	21				SM	Silty fine sand; wet; loose; rapid dilatant grades to medium dilatant, yellowish brown (10YR 5/4). Sand, some silt, trace clay; wet; loose; trace fine to medium gravel, subrounded, grayish brown (10YR 5/2).		
34	SS	74.0	76.0	9-14-14-19	17		75		SP			
35	SS	76.0	78.0	4-10-11-18	14							
36	SS	78.0	80.0	6-14-15-17	18							
							80			End of boring at 80 feet.  See well construction log for development information.		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

COORDINATES N 720,189.8 E 1,733,077.2

GROUND ELEVATION 595.5 SYSTEM NAD 1927

BORING NO. MW-1604S DATE 10/05/16 SHEET 1 OF 3

BORING START 04/28/16 BORING FINISH 04/28/16

PIEZOMETER TYPE NA WELL TYPE OW

HGT. RISER ABOVE GROUND 2.59 DIA 2"

DEPTH TO TOP OF WELL SCREEN 49.0 BOTTOM 59.0

WELL DEVELOPMENT NA BACKFILL Grout

FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	▽ 51.0	▼	▼
TIME			
DATE	4/28/2016		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	49.0		0					Straight drilled from 0 to 49 feet; geologic descriptions adapted from the adjacent boring MW-1604D.		
							5					
							10					
							15					

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
NA	6" x 3.25 HSA	
NA	9" x 6.25 HSA	
NA	HW CASING ADVANCER	4"
NA	NW CASING	3"
NA	SW CASING	6"
NA	AIR HAMMER	8"

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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

RECORDER J. Wanner

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1604S DATE 10/05/16 SHEET 2 OF 3

PROJECT Mountaineer Plant

BORING START 04/28/16 BORING FINISH 04/28/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							25					
							30					
							35					
							40					
							45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1604S DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 04/28/16 BORING FINISH 04/28/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
1	SS	49.0	51.0	4-7-10-13	17		50		SP	Sand some silt, trace clay; moist to wet; loose; yellowish brown (10YR 5/4). Note: From 50 to 50.2 feet includes black, fine material likely coal.  Note: At 53 feet wet.  Note: At 54 feet trace medium subrounded gravel.  Note: High blow count cause by heaving sand. Note: From 55 to 60 feet wet.	∇	
2	SS	51.0	53.0	6-6-11-10	20							
3	SS	53.0	55.0	3-10-25-50/3	24							
4	SS	55.0	57.0	3-5-9-15	24		55					
5	SS	57.0	60.0	12-15-20-28	24							
							60			End of boring at 60 feet.  See well construction log for development information.		

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER **OH015976.0009**  
 COMPANY **American Electric Power**  
 PROJECT **Mountaineer Plant**  
 COORDINATES **N 720,117.3 E 1,733,468.6**  
 GROUND ELEVATION **588.5** SYSTEM **NAD 1927**

BORING NO. **MW-1605D** DATE **10/05/16** SHEET **1** OF **4**  
 BORING START **05/09/16** BORING FINISH **05/10/16**  
 PIEZOMETER TYPE **NA** WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.50** DIA **2"**  
 DEPTH TO TOP OF WELL SCREEN **69.0** BOTTOM **79.0**  
 WELL DEVELOPMENT **NA** BACKFILL **Grout**  
 FIELD PARTY **NA** RIG **Hollow Stem Auger**

Water Level, ft	▽ <b>44.0</b>	▼	▼
TIME			
DATE	<b>5/9/2016</b>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	8.0		0					Straight Drilled to 8 feet, utility pre-clearance straight drilled; no samples taken.		
1	SS	8.0	10.0	3-3-5-6	24		5		CL CH	Clay with silt; medium to high plasticity; slow dilatancy; dry; soft; brown (10YR 5/3).		
2	SS	10.0	12.0	3-3-4-4	24		10		ML	Silt, little clay; low plasticity; little sand, very fine to fine; moist; soft; yellowish brown (10YR 5/4).		
3	SS	12.0	14.0	1-1-2-3	22				ML	Silt; non-plastic; rapid dilatancy; little sand, very fine; moist; soft; yellowish brown (10YR 5/4).		
4	SS	14.0	16.0	3-3-2-4	22		15					
5	SS	16.0	18.0	1-1-2-3	21				SM	Sand, very fine; and silt; trace gravel, small pebbles, subangular to subround, poorly sorted; wet; yellowish brown (10YR 5/4).		
6	SS	18.0	20.0	1-4-7-10	10				SM	Sand, fine to very coarse; little silt; little gravel, small pebbles, subangular to subround; poorly sorted; dry; brown (7.5Y 5/4).		

<b>TYPE OF CASING USED</b>			<i>Continued Next Page</i>		
<b>NA</b>	NQ-2 ROCK CORE		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		
<b>NA</b>	6" x 3.25 HSA				
<b>NA</b>	9" x 6.25 HSA				
<b>NA</b>	HW CASING ADVANCER	4"			
<b>NA</b>	NW CASING	3"			
<b>NA</b>	SW CASING	6"			
<b>NA</b>	AIR HAMMER	8"	RECORDER <b>T. Darmon</b>		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605D DATE 10/05/16 SHEET 2 OF 4

PROJECT Mountaineer Plant

BORING START 05/09/16 BORING FINISH 05/10/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	20.0	22.0	10-11-11-11	19							
8	SS	22.0	24.0	7-10-12-10	14			SM	Sand, fine to coarse; little silt; little gravel, small pebbles, subangular to subround; poorly sorted; dry; brown (7.5Y 5/4).			
9	SS	24.0	26.0	10-7-7-9	16		25	SP	Sand, fine to coarse; trace silt; trace gravel, small pebbles, subround; well sorted; dry; yellowish brown (10YR 5/4).			
10	SS	26.0	28.0	4-5-12-7	17			SW	Sand, coarse, some gravel; small to medium pebbles, subangular to subround; poorly sorted; dry; light yellowish brown (10YR 6/4).			
11	SS	28.0	30.0	4-5-6-5	3			SP	Sand, medium, subangular to subround; little silt; poorly graded; dark brown (10YR 8/2).			
							30	SP	Sand, coarse; some gravel; small pebbles, subround; well sorted; dry; light gray (7.5Y 7/3).			
12	SS	30.0	32.0	5-9-10-8	2			SP	Sand, medium to coarse, subangular to subround; poorly graded; dry; brown (10YR 5/3).			
13	SS	32.0	34.0	3-4-9-6	17			SP	Sand, fine to medium, subround; poorly graded; dry; yellowish brown (10YR 5/4).			
14	SS	34.0	36.0	2-6-7-6	18		35					
15	SS	36.0	38.0	6-6-6-8	19			SP	Sand, fine to coarse; little gravel; granules to small pebbles; subangular to subround; moderate to poorly graded; dry; yellowish brown (10YR 5/4).			
16	SS	38.0	40.0	5-7-8-9	24							
17	SS	40.0	42.0	5-6-7-8	17		40					
18	SS	42.0	44.0	5-6-7-7	16							
19	SS	44.0	46.0	4-5-6-5	23		45			Note: From 44 to 46 feet, moist.	▽	

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605D DATE 10/05/16 SHEET 3 OF 4

PROJECT Mountaineer Plant

BORING START 05/09/16 BORING FINISH 05/10/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	46.0	48.0	3-5-7-7	24				SP	Sand, fine to coarse; trace gravel, small pebbles, subround; little silt; poorly graded; wet; light yellowish brown (10YR 6/4).		
21	SS	48.0	50.0	NM	0					No Recovery, augers dropped to 49.5 feet overnight due to heaving sands. Sands heaved 10.5 feet into auger.		
22	SS	50.0	52.0	5-11-23-39	24		50		SP	Sand, medium to coarse, subangular to subround; little silt; moderate to poorly graded; wet; light yellowish brown (10YR 6/4).		
23	SS	52.0	54.0	4-7-9-9	5							
24	SS	54.0	56.0	3-3-7-7	14							
25	SS	56.0	58.0	7-10-10-9	12							
26	SS	58.0	60.0	9-15-10-11	20							
27	SS	60.0	62.0	9-10-13-13	24		60		SW	Sand, fine to coarse, angular to subround; little to some silt; well graded; wet; grayish brown (10YR 5/2).		
28	SS	62.0	64.0	9-13-17-6	24				SW	Sand, fine to coarse; trace coal fragments at 62 to 62.5 feet; subangular to subround; poorly sorted; wet; pale brown (10YR 6/3).		
29	SS	64.0	66.0	5-9-4-4	8				SW	Sand, fine to medium; trace to little silt; subround; poorly graded; wet; pale brown (10YR 6/3).		
30	SS	66.0	68.0	9-10-10-19	24				SP	Sand, medium to coarse; trace gravel, small pebbles, subangular to subround; well sorted; wet; light gray (10YR 7/2).		
31	SS	68.0	70.0	9-14-22-20	8				SW	Sand, coarse; small pebbles, subround; poorly sorted; wet; very pale brown (10YR 7/4).		
32	SS	70.0	72.0	9-8-8-7	12		70					

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605D DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 05/09/16 BORING FINISH 05/10/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
33	SS	72.0	74.0	7-8-14-11	14							
34	SS	74.0	76.0	9-21-8-10	20		75					
35	SS	76.0	78.0	10-13-21-10	13				SP	Sand, medium, subround; well sorted; wet; light gray (10YR 7/2).		
36	SS	78.0	80.0	13-14-29-14	16				SW	Sand, coarse; some gravel, small pebbles, subangular to subround; poorly sorted; wet; very pale brown (10YR 7/4).		
							80			End of boring at 80 feet.  See well construction log for development information.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

PROJECT **Mountaineer Plant**

COORDINATES **N 720,112.2 E 1,733,471.2**

GROUND ELEVATION **588.5** SYSTEM **NAD 1927**

BORING NO. **MW-1605S** DATE **10/05/16** SHEET **1** OF **3**

BORING START **05/11/16** BORING FINISH **05/12/16**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.35** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **49.0** BOTTOM **59.0**

WELL DEVELOPMENT **NA** BACKFILL **Grout**

FIELD PARTY **NA** RIG **Hollow Stem Auger**

Water Level, ft	▽ <b>44.0</b>	▼	▼
TIME			
DATE	<b>5/11/2016</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
0	NR	0.0	48.0							Straight drilled from 0 to 48 feet; geologic descriptions adapted from the adjacent boring MW-1605D.		
							5					
							10					
							15					

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
NA	6" x 3.25 HSA	
NA	9" x 6.25 HSA	
NA	HW CASING ADVANCER	4"
NA	NW CASING	3"
NA	SW CASING	6"
NA	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER **T, Darmon**

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605S DATE 10/05/16 SHEET 2 OF 3

PROJECT Mountaineer Plant

BORING START 05/11/16 BORING FINISH 05/12/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							25					
							30					
							35					
							40					
							45				▽	

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 AEP CIVIL ENGINEERING LABORATORY  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605S DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 05/11/16 BORING FINISH 05/12/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
1	SS	48.0	50.0	1-2-3-4	16							
2	SS	50.0	52.0	1-1-1-2	1		50		SP	Sand, medium to coarse; trace to little silt and gravel, small pebbles, subangular to subround; moderate to poorly graded; wet; light yellowish brown (10YR 6/4).		
3	SS	52.0	54.0	5-6-5-5	12							
4	SS	54.0	56.0	5-6-6-3	15				SP	Sand, medium to coarse; trace to little gravel, small pebbles, subangular to subround; little silt; moderate to poorly graded; wet; pale brown (10YR 6/3).		
5	SS	56.0	58.0	8-3-3-7	20		55					
6	SS	58.0	60.0	10-13-50/6	24							
												End of boring at 59.5 feet spoon refusal. Note: Heaving sand.  See well construction log for development information.

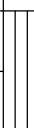


**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER OH015976.0009  
 COMPANY American Electric Power  
 PROJECT Mountaineer Plant  
 COORDINATES N 719,653.7 E 1,733,935.3  
 GROUND ELEVATION 587.3 SYSTEM NAD 1927

BORING NO. MW-1606D DATE 10/05/16 SHEET 1 OF 4  
 BORING START 05/12/16 BORING FINISH 05/13/16  
 PIEZOMETER TYPE NA WELL TYPE OW  
 HGT. RISER ABOVE GROUND 2.85 DIA 2"  
 DEPTH TO TOP OF WELL SCREEN 65.0 BOTTOM 75.0  
 WELL DEVELOPMENT NA BACKFILL Grout  
 FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	$\nabla$ <u>43.0</u>	$\blacktriangledown$	$\nabla$
TIME			
DATE	<u>5/12/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	8.0							Straight drilled to 8 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1	SS	8.0	10.0	3-3-4-5	25		5		ML	Silt and sand, very fine; non-plastic; non-plastic; no dilatancy; moist; soft; light yellowish brown (10YR 6/4).		
2	SS	10.0	12.0	1-3-5-4	22		10		SC SM	Sand, very fine; little silt; little clay; moist; light yellowish brown (10YR 6/4).		
3	SS	12.0	14.0	3-7-14-21	22							
4	SS	14.0	16.0	6-10-13-8	20							
5	SS	16.0	18.0	10-13-10-10	17		15		SW	Sand, fine to coarse; little gravel, small to medium pebbles; subround; trace to little silt; well graded; dry; yellowish brown (10YR 5/4).		
6	SS	18.0	20.0	6-6-7-10	17							

<b>TYPE OF CASING USED</b>			<i>Continued Next Page</i>		
<b>NA</b>	NQ-2 ROCK CORE		PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC		
<b>NA</b>	6" x 3.25 HSA		WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON		
<b>NA</b>	9" x 6.25 HSA		RECORDER <u>T. Darmon</u>		
<b>NA</b>	HW CASING ADVANCER	4"			
<b>NA</b>	NW CASING	3"			
<b>NA</b>	SW CASING	6"			
<b>NA</b>	AIR HAMMER	8"			

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1606D** DATE **10/05/16** SHEET **2** OF **4**

PROJECT **Mountaineer Plant**

BORING START **05/12/16** BORING FINISH **05/13/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	20.0	22.0	10-10-7-6	23							
8	SS	22.0	24.0	10-10-13-14	21				SP	Sand, medium to coarse; trace gravel, small pebbles, subround; dry; light yellowish brown (10YR 6/4).		
9	SS	24.0	26.0	6-8-9-8	24		25		SP	Sand, medium to coarse; trace gravel, small pebbles, subround; poorly graded; dry; brownish yellow (10YR 6/6).		
10	SS	26.0	28.0	5-4-3-4	18							
11	SS	28.0	30.0	4-5-4-4	22				SW SP	Sand, fine to coarse, subround; well graded; dry; light yellowish brown (10YR 6/4) with black staining coal (10YR 2/1).		
12	SS	30.0	32.0	4-4-5-6	17		30		SP	Sand, medium to coarse; trace to little gravel, small pebbles, subround; moderate to poorly graded; yellowish brown (10YR 5/4). Note: Stratified with a 1-inch layer of small pebbles.		
13	SS	32.0	34.0	2-2-5-5	24				SW	Sand, medium to coarse; trace gravel, small pebbles, subround; poorly graded; dry; yellowish brown (10YR 5/4).		
14	SS	34.0	36.0	6-6-6-6	22					Sand, medium to coarse; trace gravel, small pebbles, subangular to subround; some coal, highly weathered; stratified; well graded; dry; pale brown (10YR 6/3).		
15	SS	36.0	38.0	0-6-6-6	19		35		SP	Sand, fine to coarse, subround; trace to little silt; poorly graded; dry; yellowish brown (10YR 5/4).		
16	SS	38.0	40.0	2-3-3-2	20							
17	SS	40.0	42.0	2-2-3-5	22		40					
18	SS	42.0	44.0	1-3-5-6	24							Note: From 42 to 43 feet moist.  Note: At 43 feet wet.
19	SS	44.0	46.0	8-9-10-13	24		45		SP	Sand, medium to coarse, subround; trace to little silt; poorly graded; wet; yellowish brown (10YR 5/4). Note: Recovered sample was all heaved		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606D DATE 10/05/16 SHEET 3 OF 4

PROJECT Mountaineer Plant

BORING START 05/12/16 BORING FINISH 05/13/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	46.0	48.0	10-15-23-23	29				SP	sands. Sand, medium to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4). Note heaving sands.		
21	SS	48.0	50.0	4-4-2-3	13				SP	Sand, fine to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
22	SS	50.0	52.0	9-9-3-2	16		50		SP	Sand, medium to coarse; trace fine, subangular to subround; poorly graded; wet; yellowish brown (10YR 5/4).		
23	SS	52.0	54.0	3-2-9-9	19				SP	Sand, medium to coarse; trace silt and gravel, small pebbles, subangular to subround; poorly graded; wet; yellowish brown (10YR 5/4).		
24	SS	54.0	56.0	3-9-13-30	24		55		SP			
25	SS	56.0	58.0	9-13-13-3	21				SW	Sand, fine to coarse; little gravel, small to medium pebbles; trace silt, subround; moderate to well graded; wet; yellowish brown (10YR 5/4).		
26	SS	58.0	60.0	10-15-13-14	19				SP	Sand, fine to medium, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
27	SS	60.0	62.0	7-12-15-10	16		60		SP	Sand, medium to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
28	SS	62.0	64.0	7-10-10-11	24				SP	Sand, medium to coarse; trace gravel, small to medium pebbles, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
29	SS	64.0	66.0	9-12-18-19	19		65		SP			
30	SS	66.0	68.0	7-13-18-32	13				SW	Sand, fine to coarse, subangular to subround; moderate to well graded; wet; light brownish gray (10YR 6/2).		
31	SS	68.0	70.0	8-8-24-7	13				SM	Note: At 60 feet 40% granules to small pebbles.		
32	SS	70.0	72.0	8-23-7-11	19		70		SP	Sand, fine to coarse; some silt; trace clay; well graded; wet; yellowish brown (10YR 5/4).		
									SW	Sand, medium to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING


JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606D DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 05/12/16 BORING FINISH 05/13/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
33	SS	72.0	74.0	13-20-22-23	15		75		SP	Sand and gravel, medium to coarse, small to medium pebbles; subround to round; well graded; wet; yellowish brown (10YR 5/4).		
34	SS	74.0	76.0	14-13-10-10	15							Sand, medium to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).
										End of boring at 76 feet.		See well construction log for development information.

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**  
 COMPANY **American Electric Power**  
 PROJECT **Mountaineer Plant**  
 COORDINATES **N 719,649.2 E 1,733,939.3**  
 GROUND ELEVATION **587.3** SYSTEM **NDA 1927**

BORING NO. **MW-1606S** DATE **10/05/16** SHEET **1** OF **3**  
 BORING START **05/17/16** BORING FINISH **05/17/16**  
 PIEZOMETER TYPE **NA** WELL TYPE **OW**  
 HGT. RISER ABOVE GROUND **2.87** DIA **2"**  
 DEPTH TO TOP OF WELL SCREEN **49.0** BOTTOM **59.0**  
 WELL DEVELOPMENT **NA** BACKFILL **Grout**  
 FIELD PARTY **NA** RIG **Hollow Stem Auger**

Water Level, ft	▽ <b>43.0</b>	▼	▼
TIME			
DATE	<b>5/17/2016</b>		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	44.0							Straight drilled from 0 to 44 feet; geologic descriptions adapted from the adjacent boring MW-1606D.		
							5					
							10					
							15					

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
<b>NA</b>	NQ-2 ROCK CORE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
<b>NA</b>	6" x 3.25 HSA											
<b>NA</b>	9" x 6.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
<b>NA</b>	HW CASING ADVANCER											
<b>NA</b>	NW CASING			4"	RECORDER <b>T. Darmon</b>							
<b>NA</b>	SW CASING			3"								
<b>NA</b>	AIR HAMMER			6"								
<b>NA</b>				8"								

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING


JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606S DATE 10/05/16 SHEET 2 OF 3

PROJECT Mountaineer Plant

BORING START 05/17/16 BORING FINISH 05/17/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							25					
							30					
							35					
							40					
1	SS	44.0	46.0	5-7-15-15	24		45		SP	Sand, fine to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).	▽	

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606S DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 05/17/16 BORING FINISH 05/17/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
2	SS	46.0	48.0	2-2-5-5	13							
3	SS	48.0	50.0	3-7-11-11	24				SP	Sand, medium to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
4	SS	50.0	52.0	5-7-7-8	24		50		SP	Sand, fine to coarse, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
5	SS	52.0	54.0	5-5-4-4	18				SP	Sand, fine to coarse; trace silt; trace gravel, small pebbles, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
6	SS	54.0	56.0	10-22-15-22	24		55			Note: From 55 to 56 feet increase small to medium pebbles.		
										End of boring at 56 feet.		
										See well construction log for development information.		



**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER OH015976.0009  
 COMPANY American Electric Power  
 PROJECT Mountaineer Plant  
 COORDINATES N 719,235.7 E 1,734,361.8  
 GROUND ELEVATION 590.8 SYSTEM NAD 1927

BORING NO. MW-1607D DATE 10/05/16 SHEET 1 OF 4  
 BORING START 05/18/16 BORING FINISH 05/18/16  
 PIEZOMETER TYPE NA WELL TYPE OW  
 HGT. RISER ABOVE GROUND 3.18 DIA 2"  
 DEPTH TO TOP OF WELL SCREEN 70.0 BOTTOM 80.0  
 WELL DEVELOPMENT NA BACKFILL Grout  
 FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	$\nabla$ <u>46.0</u>	$\blacktriangledown$	$\blacktriangledown$
TIME			
DATE	<u>5/18/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	8.0		0					Straight drill boring to 8 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1	SS	8.0	10.0	1-2-3-4	24		5		ML	Silt, trace to little clay, non-plastic, none to slow dilatancy; trace sand, very fine; moist; soft; very pale brown (10YR 7/4).		
2	SS	10.0	12.0	1-3-4-4	22		10		SC SM	Sand, very fine to fine; silt; trace to little clay; well graded; moist; light yellowish brown (10YR 6/4).		
3	SS	12.0	14.0	2-4-5-5	20				CL	Clay; little silt; medium to high plasticity; trace to little very fine to fine sand; moist; medium stiff; yellowish brown (10YR 5/4).		
4	SS	14.0	16.0	4-6-8-10	22		15		SM	Sand and silt; fine; medium to well graded; dry; yellowish brown (10YR 5/4).		
5	SS	16.0	18.0	6-9-10-8	18				SW	Sand, medium to coarse; some gravel, small to medium pebbles, little fine, subangular to subround; well graded; dry; yellowish brown (10YR 5/4).		
6	SS	18.0	20.0	6-9-8-11	14							

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
NA	6" x 3.25 HSA			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
NA	9" x 6.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
NA	HW CASING ADVANCER	4"		RECORDER <u>T. Darmon</u>								
NA	NW CASING	3"										
NA	SW CASING	6"										
NA	AIR HAMMER	8"										

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1607D DATE 10/05/16 SHEET 2 OF 4

PROJECT Mountaineer Plant

BORING START 05/18/16 BORING FINISH 05/18/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	20.0	22.0	9-13-13-6	24				SM	Sand and silt; fine to coarse; little to some gravel, small to medium pebbles, subangular to subround; trace clay; well graded; moist; yellowish brown (10YR 5/4).		
8	SS	22.0	24.0	5-5-9-10	19				SP	Sand, medium to coarse; trace silt; subround; poorly graded; dry; yellowish brown (10YR 5/4).		
9	SS	24.0	26.0	8-8-9-6	20		25		SW	Sand, fine to coarse; trace to little silt; subround; well graded; dry; yellowish brown (10YR 5/4).		
10	SS	26.0	28.0	6-5-6-5	24				SW	Sand, fine to coarse; some gravel, angular to subround; trace silt; well graded; dry; yellowish brown (10YR 5/4).		
11	SS	28.0	30.0	5-6-6-5	22				SW	Sand, fine to coarse; some gravel, angular to subround; trace silt; well graded; dry; yellowish brown (10YR 5/4).		
12	SS	30.0	32.0	4-4-4-6	22		30		SP	Sand, fine to medium, subround; trace silt; poorly graded; dry; brown (10YR 5/3).		
13	SS	32.0	34.0	4-9-9-9	24				SW	Sand, fine to medium; trace coarse gravel; small to medium gravel; pebbles; subangular to subround; dry; brown (10YR 5/3).		
14	SS	34.0	36.0	5-7-9-4	24				SW	Sand, fine to medium; trace coarse gravel; small to medium gravel; pebbles; subangular to subround; dry; brown (10YR 5/3).		
15	SS	36.0	38.0	5-6-6-9	21		35		SW	Note: From 35.8 to 36 feet includes coal. Sand, fine to coarse; trace gravel; small pebbles, subangular to subround; well graded; satinfin <1" thick, pale brown (10YR 6/3).		
16	SS	38.0	40.0	4-6-8-8	18				SW	Note: From 26 to 39 feet includes trace to little amount of coal fragments.		
17	SS	40.0	42.0	4-4-6-8	22		40		SP	Sand, fine to medium, subround; trace to little silt; poorly graded; dry; yellowish brown (10YR 5/4).		
18	SS	42.0	44.0	3-6-8-8	20				SP	Sand, fine to medium, subround; trace to little silt; poorly graded; dry; yellowish brown (10YR 5/4).		
19	SS	44.0	46.0	4-6-7-8	24		45		SP	Note: At 46 feet, saturated.		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1607D** DATE **10/05/16** SHEET **3** OF **4**

PROJECT **Mountaineer Plant**

BORING START **05/18/16** BORING FINISH **05/18/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	46.0	48.0	1-2-2-8	24				SW	Sand, fine to coarse, subround; well graded; wet; yellowish brown (10YR 5/4).		
21	SS	48.0	50.0	NM	0					No recovery; heaving sands.		
22	SS	50.0	52.0	1-3-7-9	28		50		SP	Sand, medium to coarse; trace to little silt; subround; poorly graded; wet; yellowish brown (10YR 5/4).		
23	SS	52.0	54.0	5-6-9-15	28					Note: At 53.5 feet coal present.		
24	SS	54.0	56.0	7-9-14-15	15				SW	Sand, fine to coarse; little gravel, small pebbles; subround; medium to well graded, dark brown (10YR 7/4).		
25	SS	56.0	58.0	7-10-10-13	13				SW	Sand, fine to coarse; trace to little small pebbles, subround; well graded; wet; pale brown (10YR 7/4).		
26	SS	58.0	60.0	5-6-10-11	14							
27	SS	60.0	62.0	6-10-11-13	11		60		SP	Sand, medium to coarse; trace small pebbles, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
28	SS	62.0	64.0	8-10-13-11	0					No recovery.		
29	SS	64.0	66.0	5-10-13-5	15							
30	SS	66.0	68.0	10-15-20-22	18				SP	Sand, medium to coarse, subround; medium to poorly graded; wet; yellowish brown (10YR 5/4).		
31	SS	68.0	70.0	11-15-15-7	20				SW	Sand, fine to very coarse, subround; little to some silt; medium to well graded; wet; light brownish gray (10YR 6/2).		
32	SS	70.0	72.0	2-6-14-14	15		70		SW	Sand, fine to very coarse, subround; little to some silt; medium to well graded; wet; light brownish gray (10YR 6/2).		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1607D DATE 10/05/16 SHEET 4 OF 4

PROJECT Mountaineer Plant

BORING START 05/18/16 BORING FINISH 05/18/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
33	SS	72.0	74.0	10-15-18-18	12							
34	SS	74.0	76.0	9-12-12-7	11		75					
35	SS	76.0	78.0	6-6-8-8	24				SP	Sand, medium to coarse, subround; poorly graded; wet; pale brown (10YR 6/3).		
36	SS	78.0	80.0	20-30-22-11	24		80					
										End of boring at 80 feet.  See well construction log for development information.		

AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

COORDINATES N 719,232.0 E 1,734,365.1

GROUND ELEVATION 590.8 SYSTEM NAD 1927

BORING NO. MW-1607S DATE 10/05/16 SHEET 1 OF 3

BORING START 05/26/16 BORING FINISH 05/26/16

PIEZOMETER TYPE NA WELL TYPE OW

HGT. RISER ABOVE GROUND 3.20 DIA 2"

DEPTH TO TOP OF WELL SCREEN 50 BOTTOM 60

WELL DEVELOPMENT NA BACKFILL Grout

FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	▽ 46.0	▼	▼
TIME			
DATE	5/26/2016		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	50.0		0							
							5					
							10					
							15					

Straight drill boring to 50 feet, boring was pre-drilled for utility clearance; no samples were taken.

**TYPE OF CASING USED**

	NQ-2 ROCK CORE	
NA	6" x 3.25 HSA	
NA	9" x 6.25 HSA	
NA	HW CASING ADVANCER	4"
NA	NW CASING	3"
NA	SW CASING	6"
NA	AIR HAMMER	8"

*Continued Next Page*

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

RECORDER T. Darmon

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1607S DATE 10/05/16 SHEET 2 OF 3

PROJECT Mountaineer Plant

BORING START 05/26/16 BORING FINISH 05/26/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
							25					
							30					
							35					
							40					
							45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

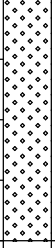
JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1607S DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 05/26/16 BORING FINISH 05/26/16

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
1	SS	50.0	52.0	NA	0		50			Augers dropped 4 foot into hole due to heaving sands, no samples collected.		
2	SS	52.0	54.0	NA	0							
3	SS	54.0	56.0	WOH-WOH-2-2	0		55			No sample collected, no recovery, attempted resample but auger dropped additional 2 feet due to heaving sands.		
4	SS	56.0	58.0	4-5-6-10	15				SW	Sand; fine to coarse; trace to little gravel; small pebbles; subround; moderate to well graded; wet; pale brown (10YR 7/4).		
5	SS	58.0	60.0	5-5	20		60			End of boring at 60 feet.  See well construction log for development information.		

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**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING**

JOB NUMBER OH015976.0009  
 COMPANY American Electric Power  
 PROJECT Mountaineer Plant  
 COORDINATES N 723,642.8 E 1,730,611.2  
 GROUND ELEVATION 587.3 SYSTEM NAD 1927

BORING NO. MW-1608 DATE 10/05/16 SHEET 1 OF 3  
 BORING START 06/02/16 BORING FINISH 06/07/16  
 PIEZOMETER TYPE NA WELL TYPE OW  
 HGT. RISER ABOVE GROUND 3.39 DIA 2"  
 DEPTH TO TOP OF WELL SCREEN 46.0 BOTTOM 56.0  
 WELL DEVELOPMENT NA BACKFILL Grout  
 FIELD PARTY NA RIG Hollow Stem Auger

Water Level, ft	$\nabla$ <u>48.0</u>	$\blacktriangledown$	$\nabla$
TIME			
DATE	<u>6/2/2016</u>		

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	NR	0.0	12.0		0							Straighted drilled to 12 feet, boring was pre-drilled for utility clearance; no samples were taken.
							5					
							10					
1	SS	12.0	14.0	5-4-5-5	24			ML	Silt; little clay; trace fine sand; dry; slow dilatancy; (10YR 4/5).			
4	SS	14.0	16.0	3-1-1-2	21			SW	Sand, fine to very fine; loose; dry.			
							15					
5	SS	16.0	18.0	1-1-1-3	21							
6	SS	18.0	20.0	1-2-4-3	21							

<b>TYPE OF CASING USED</b>				<i>Continued Next Page</i>								
NA	NQ-2 ROCK CORE			PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
NA	6" x 3.25 HSA											
NA	9" x 6.25 HSA			WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
NA	HW CASING ADVANCER											
NA	4"			RECORDER <u>J. Wanner</u>								
NA	3"											
NA	NW CASING											
NA	6"											
NA	SW CASING											
NA	8"											



AMERICAN ELECTRIC POWER SERVICE CORPORATION  
**AEP CIVIL ENGINEERING LABORATORY**  
 LOG OF BORING

JOB NUMBER **OH015976.0009**

COMPANY **American Electric Power**

BORING NO. **MW-1608** DATE **10/05/16** SHEET **2** OF **3**

PROJECT **Mountaineer Plant**

BORING START **06/02/16** BORING FINISH **06/07/16**

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
7	SS	20.0	22.0	14	14							
8	SS	22.0	24.0	7-13-15-14	13				SW	Sand; some gravel; fine to medium; angular; dry; loose; unstratified; gravel is igneous dominant; (10YR 4/3).		
9	SS	24.0	26.0	10-16-14-11	13		25			Note: At 25 feet trace coal and gravel (metamorphic; rounded); foliated.		
10	SS	26.0	28.0	8-12-12-14	17				SW	Sand; some gravel, fine to medium; angular; dominant; little silt; dry; loose; unstratified; gravel is igneous dominant; (10YR 4/3).		
11	SS	28.0	30.0	9-15-12-14	14							
12	SS	30.0	32.0	6-8-9-17	18		30					
13	SS	32.0	34.0	11-10-9-9	20				SW	Sand, fine to coarse; little to some silt; trace gravel, fine to medium, angular to rounded; dry; loose; unstratified; (10YR 4/3).		
14	SS	34.0	36.0	7-10-12-9	24				SW	Sand, fine to coarse; little to some silt; little to some gravel, fine to medium dominant; igneous, sedimentary and metamorphic; rounded dominant; dry; loose; unstratified; (10YR 4/3).		
15	SS	36.0	38.0	10-8-5-6	16							
16	SS	38.0	40.0	9-8-11-10	17				SW	Sand; some silt; trace gravel, coarse, round, limestone; dry; loose; unstratified; (10YR 4/3).		
17	SS	40.0	42.0	5-5-8-8	19		40		SW	Note: At 39.5 feet very thin coal fragment layer. Sand; little to some silt; little to some gravel, fine, subrounded; dry; loose; unstratified; (10YR 4/3).		
18	SS	42.0	44.0	7-5-6-5	18				SW	Note: At 42.5 feet, coarse, rounded, igneous gravel. Silty sand; moist; loose; unstratified; (10YR 4/3).		
19	SS	44.0	46.0	2-3-5-3	19					Note: From 44 to 46 feet wet; trace coarse gravel, rounded, igneous.		
							45			Note: Heaving sands.		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION  
AEP CIVIL ENGINEERING LABORATORY  
LOG OF BORING

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1608 DATE 10/05/16 SHEET 3 OF 3

PROJECT Mountaineer Plant

BORING START 06/02/16 BORING FINISH 06/07/16

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
20	SS	46.0	48.0	4-4-5-4	17				SW	<p>Sand; little to some silt; some gravel; wet; loose; unstratified; gravel is fine to coarse; fine fraction is fine to rounded; sand is subrounded to round; gravel is igneous to sedimentary; gravel colors range from red and green and brown; (looks like outwash); includes trace coal fragments, up to 2cm in size. Note: From 48 to 49.5 feet wet.</p> <p>Silty sand; wet; loose; unstratified; sand is fine to medium; brown. Note: From 50 to 52 feet wet; include 20% coal material, fragments up to 3cm in size.</p> <p>Sand with silt; wet; loose; unstratified; sand is fine to coarse grades to fine to medium. Note: At 53.5 feet coal fragments up to 2 cm in size. Note: From 54 to 56 feet wet; no coal fragments.</p> <p>Silt and sand; wet; loose; sand is fine to medium; brown.</p> <p>Sand with silt; trace gravel; wet; loose; unstratified; sand is fine to coarse; gravel is medium to coarse, subrounded; brown.</p> <p>Silty sand; trace fine gravel; wet; loose; unstratified; sand is fine to coarse; (10YR 4/3).</p> <p>Recovery was all heaved sand.</p> <p>Fine sand with silt; wet; loose; sand is very fine to fine dominant; bottom of recovery includes coarse gravel (chert), subangular; (10YR 5/2).</p> <p>Note: At 68 feet coursing with depth.</p> <p>Sand and gravel; trace silt; clean-washed interval; wet; loose. Sand with silt; little fine; gravel; wet; loose.</p>	▽	
21	SS	48.0	50.0		17			SW				
22	SS	50.0	52.0	6-8-11-9	16		50	SW				
23	SS	52.0	54.0	5-7-7-10	13			SW				
24	SS	54.0	56.0	8-11-15-17	13		55	SW				
25	SS	56.0	58.0	11-15-16-13	14			SM				
26	SS	58.0	60.0	8-15-18-13	16		60	SW				
27	SS	60.0	62.0	9-14-16-20	14			SW				
28	SS	62.0	64.0	2-12-40-50/2	19			SW				
29	SS	64.0	66.0	20-50/4	24		65	SW				
30	SS	66.0	68.0	12-20-25-30	0.9			SP				
31	SS	68.0	70.0	12-15-20-20	17			SW				
							70	SP SP				
									End of boring at 70 feet.  See well construction for development information.			

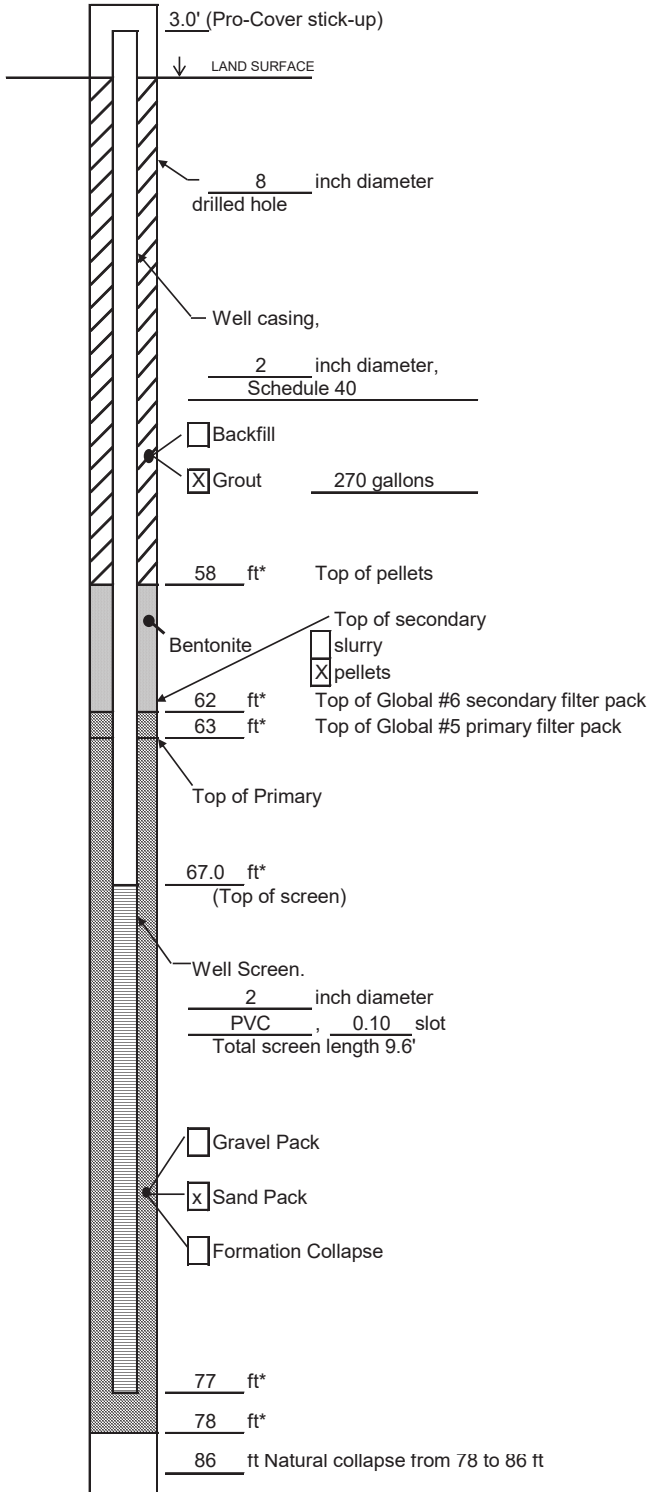


**Arcadis 2016**

**Well Construction Diagrams**

**MW-1601A to MW-1608**

**WELL CONSTRUCTION LOG**  
(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project AEP - Mountaineer Well MW-1601A

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 607.47; TOC: 610.66 feet  Surveyed

Estimated

Installation Date(s) 6/9/2016

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid None

Development Technique(s) and Date(s)  
Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 30 gallons

Static Depth to Water 65.81 feet below M.P.

Pumping Depth to Water 80 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/15/2016

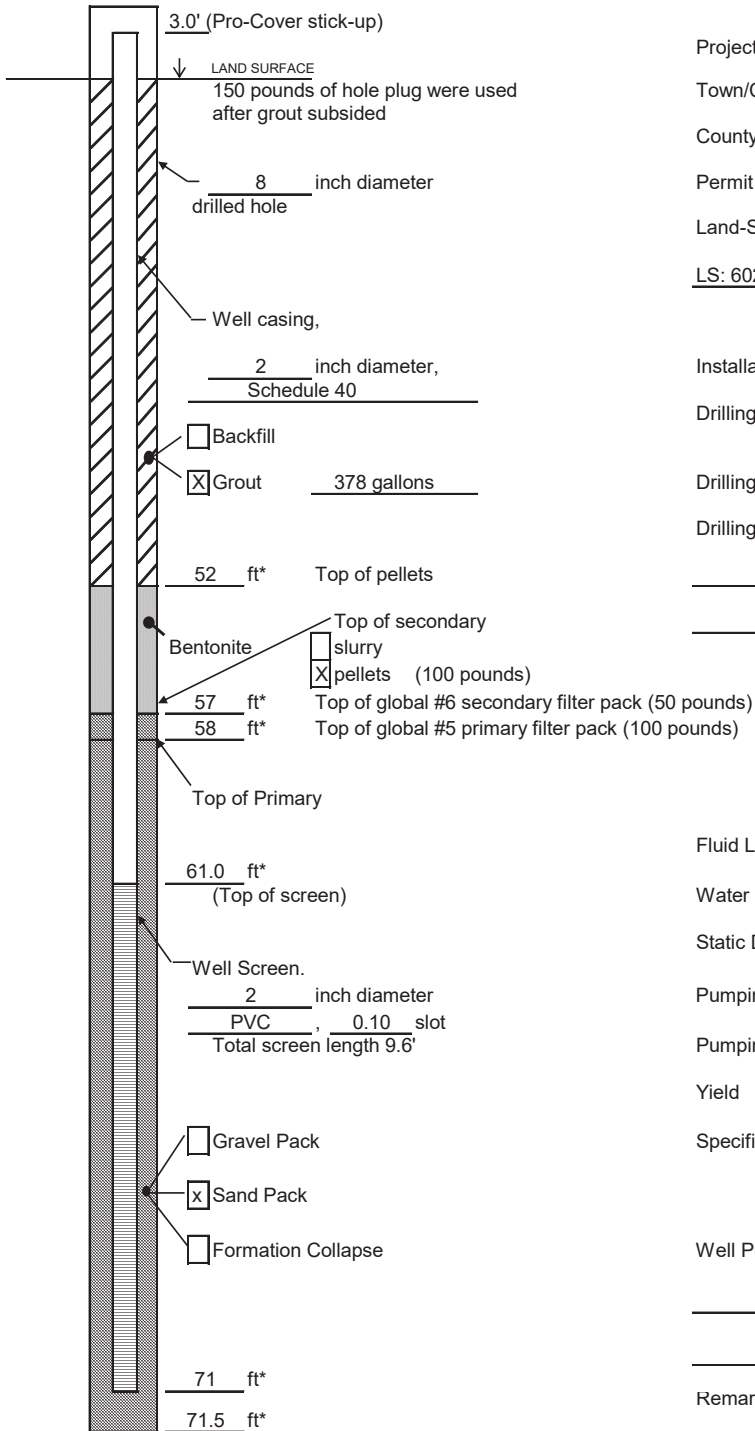
Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

Remarks Well Installed in the alternate #1 boring at  
this location.

Prepared by Judd Wanner

**WELL CONSTRUCTION LOG**  
(Unconsolidated)



Project AEP - Mountaineer Well MW-1602  
 Town/City New Haven  
 County Mason County State WV  
 Permit No. N/A

Land-Surface (LS) Elevation and Datum:  
 LS: 602.37; TOC: 605.12 feet  Surveyed  
 Estimated

Installation Date(s) 5/10/2016  
 Drilling Method Hollow Stem Auger  
 Drilling Contractor DLZ Ohio, Inc.  
 Drilling Fluid None

Development Technique(s) and Date(s)  
Wattera (6/7/16)  
Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling N/A gallons  
 Water Removed During Development 37.9 gallons  
 Static Depth to Water 59.82 feet below M.P.  
 Pumping Depth to Water 70 feet below M.P.  
 Pumping Duration NM hours  
 Yield N/A gpm Date 6/15/2016  
 Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

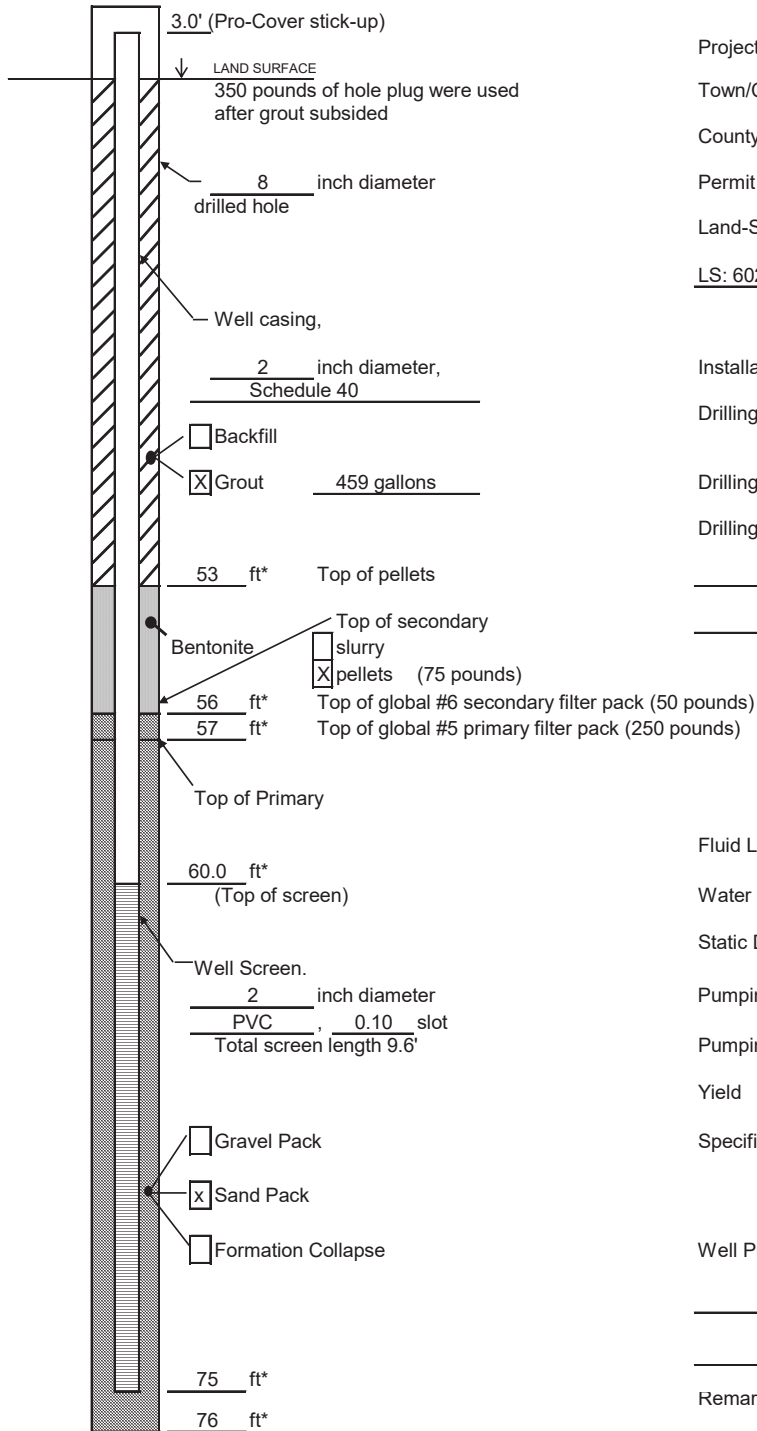
Remarks

Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

Prepared by Judd Wanner

# WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1603

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 602.92; TOC: 606.30 feet  Surveyed  Estimated

Installation Date(s) 5/4/2016

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid None

Development Technique(s) and Date(s)

Waterra (6/10/16)

Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 47.5 gallons

Static Depth to Water 61.35 feet below M.P.

Pumping Depth to Water 79 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/15/2016

Specific Capacity N/A gpm/ft

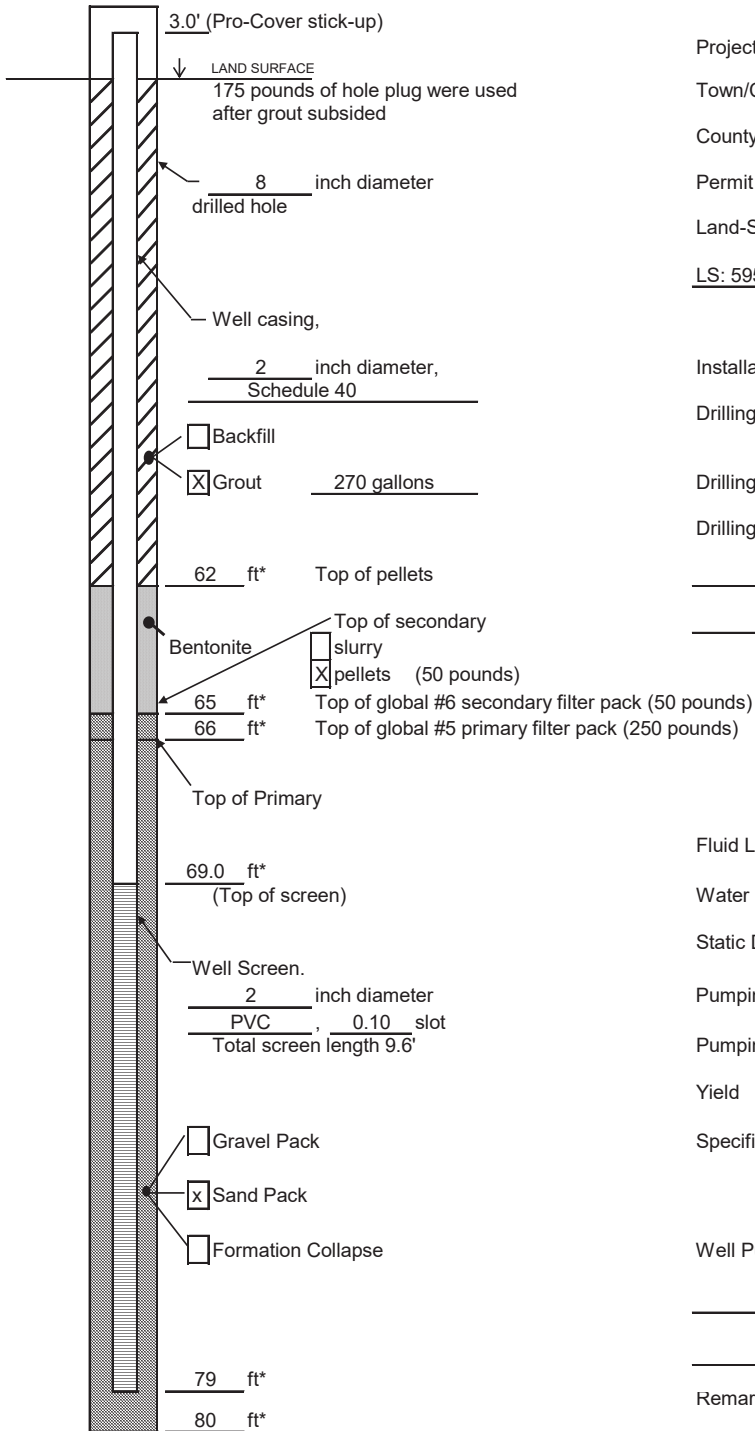
Well Purpose Monitoring well

Remarks

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Judd Wanner

**WELL CONSTRUCTION LOG**  
(Unconsolidated)



Project AEP - Mountaineer Well MW-1604D

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 595.59; TOC: 598.22 feet  Surveyed  Estimated

Installation Date(s) 5/4/2016

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid None

Development Technique(s) and Date(s)  
Waterra and Submersible Pump (6/9/16)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 45.1 gallons

Static Depth to Water 54.56 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration NM hours

Yield NM gpm Date 6/9/2016

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

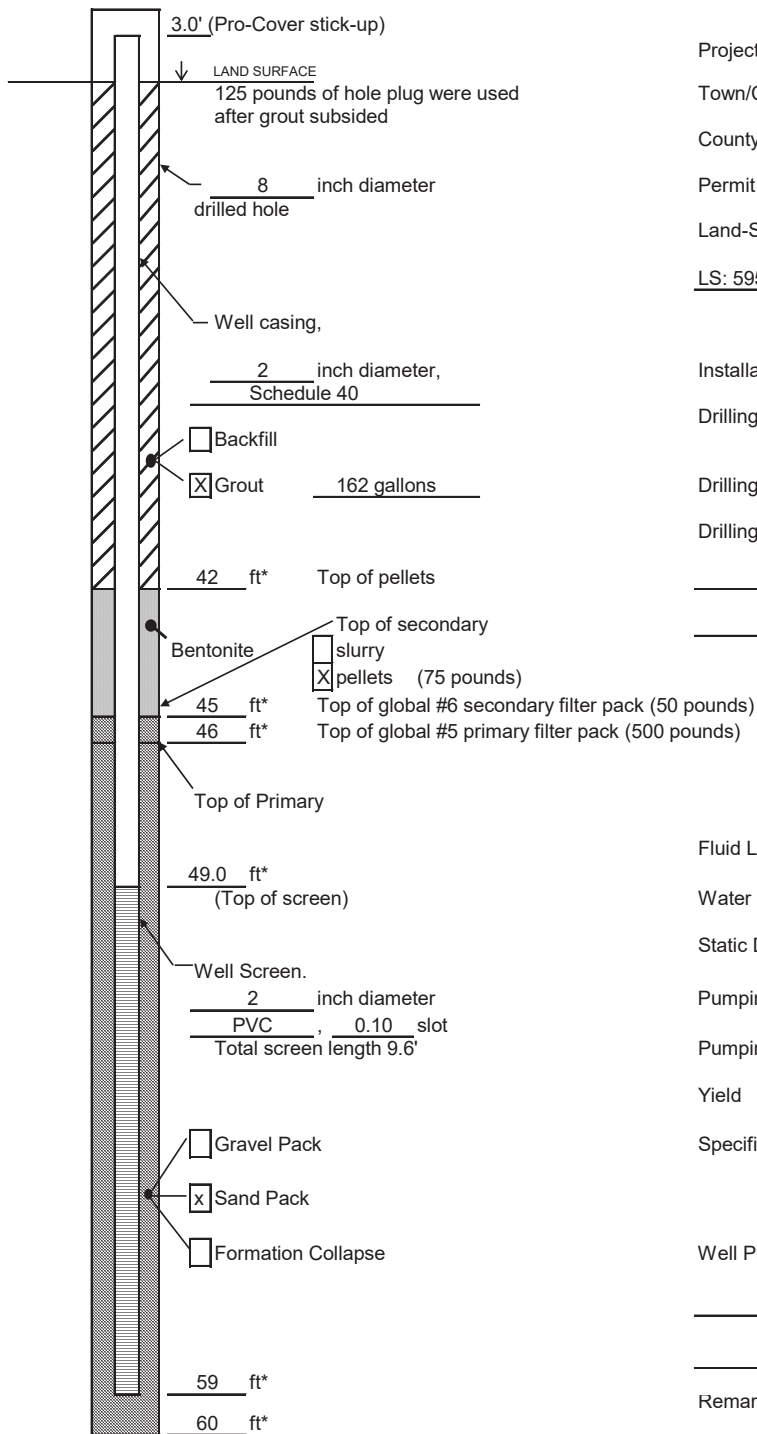
Remarks Primary filter pack is #5 global sand; secondary filter pack is global #6 sand.

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Judd Wanner

## WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1604S

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 595.48; TOC: 598.07 feet  Surveyed  Estimated

Installation Date(s) 5/2/2016

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid None

Development Technique(s) and Date(s)

Wattera (6/9/16)

Submersible Impeller Pump (6/16/16)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 30.8 gallons

Static Depth to Water 54.49 feet below M.P.

Pumping Depth to Water 62 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/16/2016

Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

Remarks

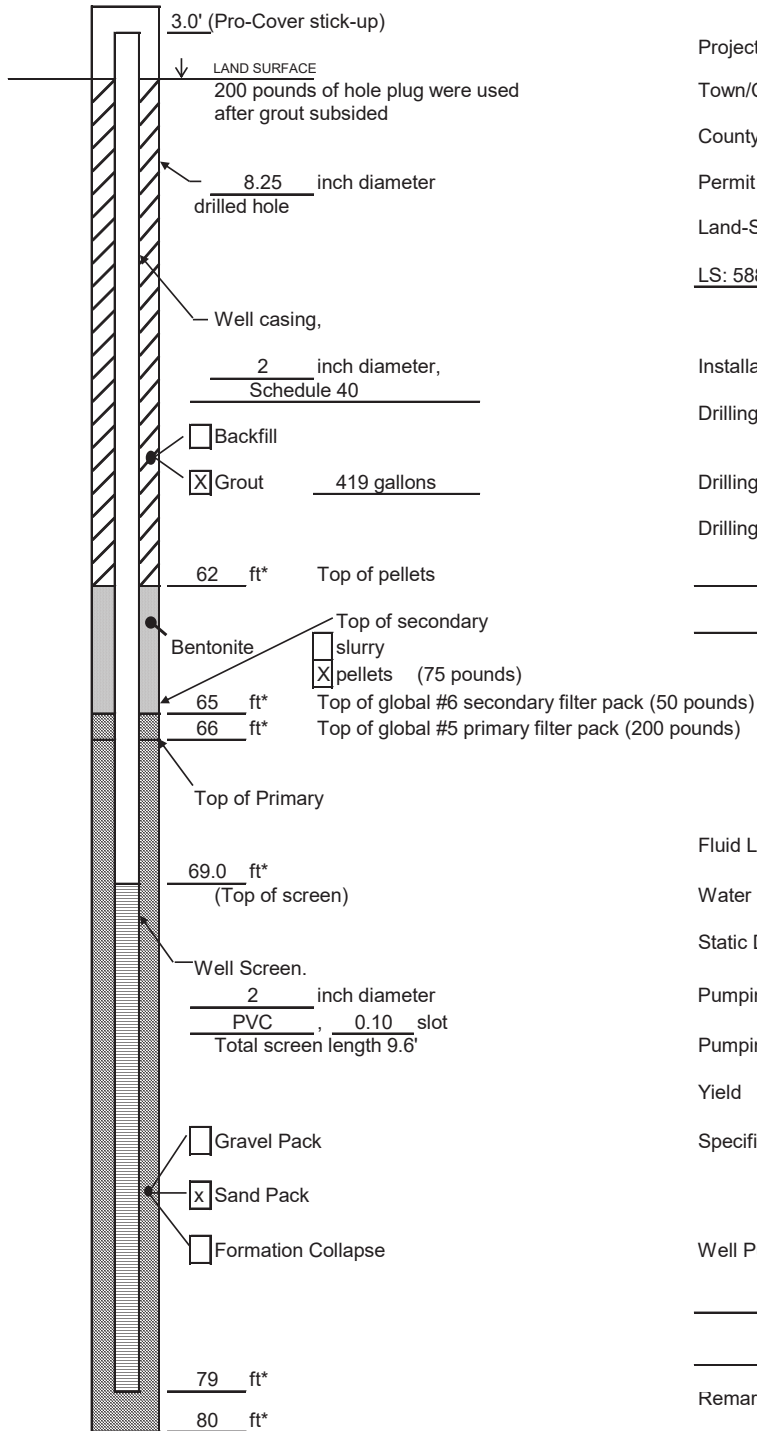
Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Judd Wanner



# WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1605D

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 588.51; TOC: 591.01 feet  Surveyed  Estimated

Installation Date(s) 5-9-16 to 5-11-16

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid Potable water

Development Technique(s) and Date(s)  
Waterra and Submersible Pump (6/8/16)

Fluid Loss During Drilling 400 gallons

Water Removed During Development 65 gallons

Static Depth to Water 47.51 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/8/2016

Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

Remarks \_\_\_\_\_

\_\_\_\_\_

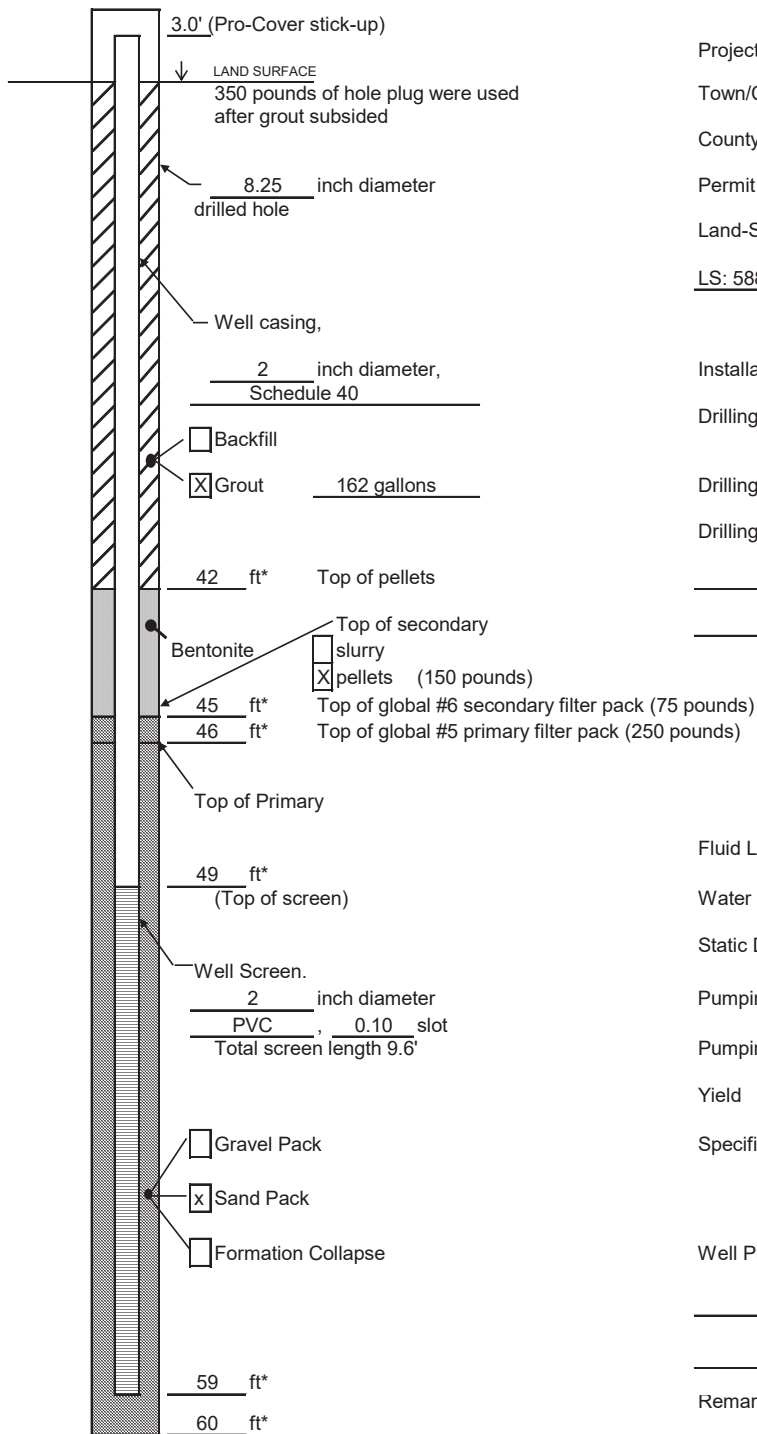
\_\_\_\_\_

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Tom Darmon

## WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1605S  
 Town/City New Haven  
 County Mason County State WV  
 Permit No. N/A  
 Land-Surface (LS) Elevation and Datum:  
 LS: 588.51; TOC: 590.86 feet  Surveyed  
 Estimated  
 Installation Date(s) 5/12/2016  
 Drilling Method Hollow Stem Auger  
 Drilling Contractor DLZ Ohio, Inc.  
 Drilling Fluid Potable water

Development Technique(s) and Date(s)  
Waterra (6/8/16)  
Submersible Impeller Pump (6/16/16)

Fluid Loss During Drilling 200 gallons  
 Water Removed During Development 36.1 gallons  
 Static Depth to Water 47.36 feet below M.P.  
 Pumping Depth to Water 61.5 feet below M.P.  
 Pumping Duration NM hours  
 Yield N/A gpm Date 6/16/2016  
 Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

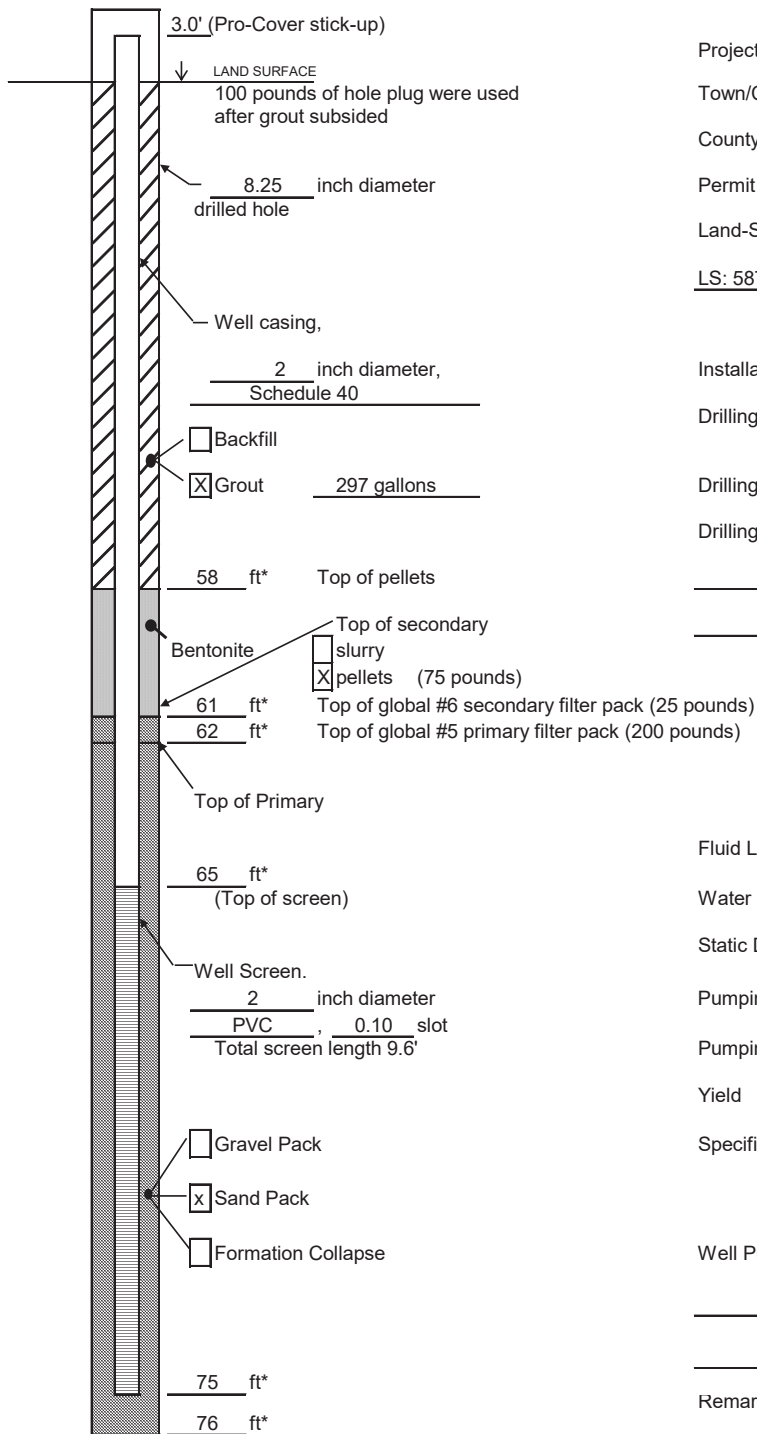
Remarks Fluid loss due to heaving sand estimated.  
Removed water could not be quantified to clean  
out augers.

Prepared by Tom Darmon

Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

## WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1606D

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 587.25; TOC: 590.10 feet  Surveyed  Estimated

Installation Date(s) 5-16-16 to 5-17-16

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid Potable water

Development Technique(s) and Date(s)

Wattera and Submersible Pump (6/9/16)

Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling 250 gallons

Water Removed During Development 67 gallons

Static Depth to Water 46.03 feet below M.P.

Pumping Depth to Water 77.5 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/15/2016

Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

Remarks \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

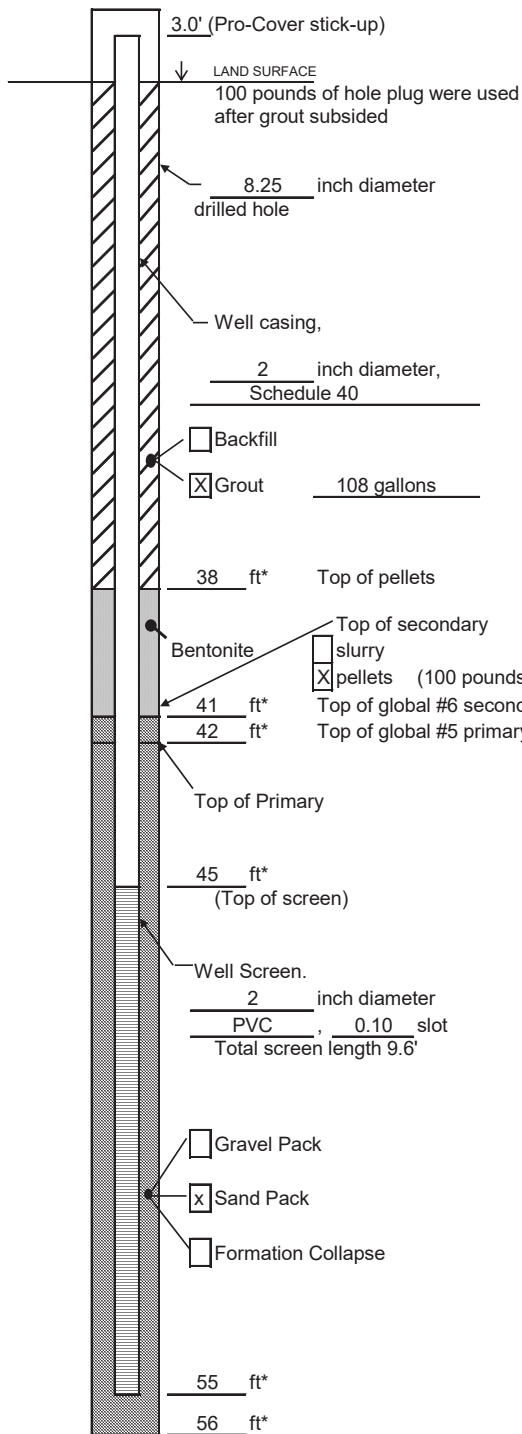
\_\_\_\_\_

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Tom Darmon

## WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1606S

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 587.28; TOC: 590.15 feet  Surveyed  Estimated

Installation Date(s) 5/17/16 - 5/18/16

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid None

Development Technique(s) and Date(s)

Wattera (6/8/16)

Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling 0 gallons

Water Removed During Development 29.5 gallons

Static Depth to Water 46.02 feet below M.P.

Pumping Depth to Water 57 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/15/2016

Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

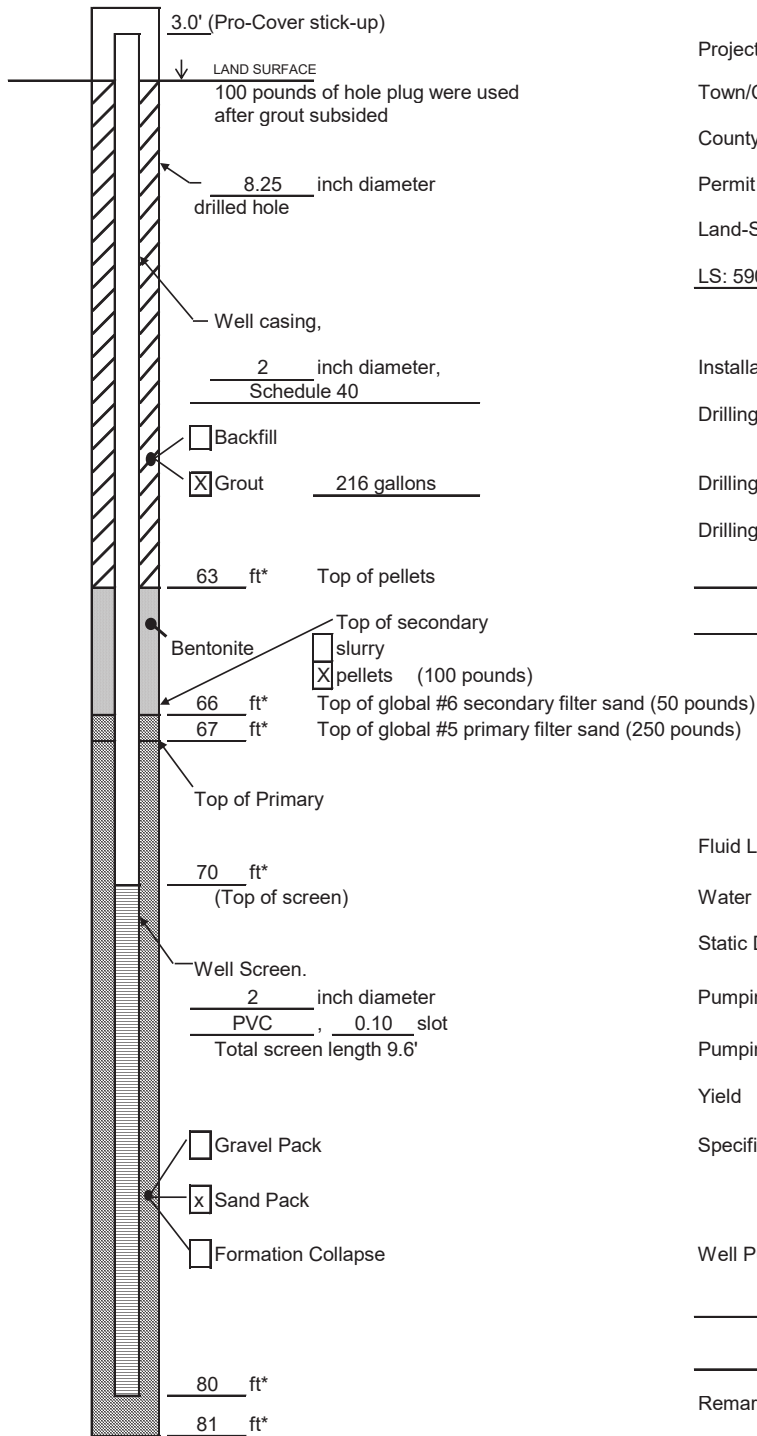
Remarks

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Prepared by Tom Darmon

## WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1607D

Town/City New Haven

County Mason County State WV

Permit No. N/A

Land-Surface (LS) Elevation and Datum:

LS: 590.75; TOC: 593.93 feet  Surveyed

Estimated

Installation Date(s) 5/19/2016

Drilling Method Hollow Stem Auger

Drilling Contractor DLZ Ohio, Inc.

Drilling Fluid Portable water

Development Technique(s) and Date(s)

Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling 300 gallons

Water Removed During Development 8.5 gallons

Static Depth to Water 46.72 feet below M.P.

Pumping Depth to Water 80 feet below M.P.

Pumping Duration NM hours

Yield N/A gpm Date 6/15/2016

Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

Remarks Fluid loss due to heaving sand estimated.

Removed water could not be quantified to clean

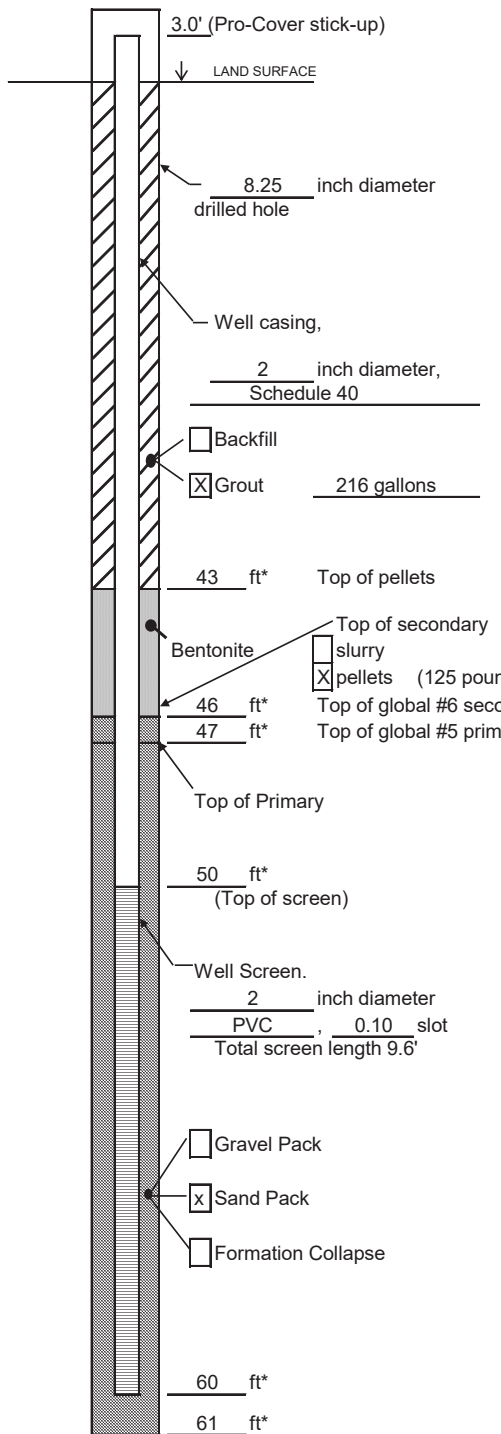
out augers.

Prepared by Tom Darmon

Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

# WELL CONSTRUCTION LOG

(Unconsolidated)



Project AEP - Mountaineer Well MW-1607S  
 Town/City New Haven  
 County Mason County State WV  
 Permit No. N/A

Land-Surface (LS) Elevation and Datum:  
 LS: 590.79; TOC: 593.99 feet  Surveyed  
 Estimated

Installation Date(s) 5/26/16 - 5/27/16  
 Drilling Method Hollow Stem Auger  
 Drilling Contractor DLZ Ohio, Inc.  
 Drilling Fluid Portable water

Development Technique(s) and Date(s)  
Submersible Impeller Pump (6/15/16)

Fluid Loss During Drilling 400 gallons  
 Water Removed During Development 8.5 gallons  
 Static Depth to Water 46.56 feet below M.P.  
 Pumping Depth to Water 60 feet below M.P.  
 Pumping Duration NM hours  
 Yield N/A gpm Date 6/15/2016  
 Specific Capacity N/A gpm/ft

Well Purpose Monitoring well

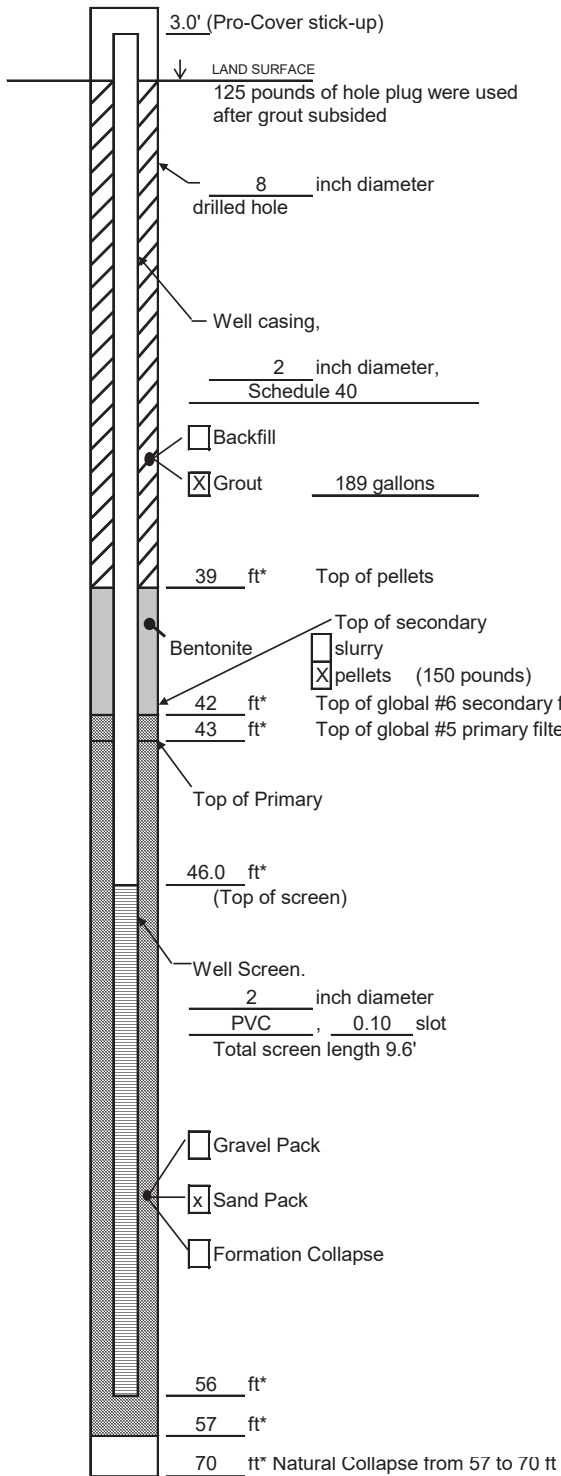
Remarks Fluid loss due to heaving sand estimated.  
Removed water could not be quantified to clean  
out augers.

Prepared by Tom Darmon

Measuring Point is  
 Top of Well Casing  
 Unless Otherwise Noted.  
 \* Depth Below Land Surface

# WELL CONSTRUCTION LOG

(Unconsolidated)



Measuring Point is  
Top of Well Casing  
Unless Otherwise Noted.  
\* Depth Below Land Surface

Project AEP - Mountaineer Well MW-1608  
 Town/City New Haven  
 County Mason County State WV  
 Permit No. N/A  
 Land-Surface (LS) Elevation and Datum:  
 LS: 587.26; TOC: 590.65 feet  Surveyed  
 Estimated  
 Installation Date(s) 6/9/16 - 6/10/16  
 Drilling Method Hollow Stem Auger  
 Drilling Contractor DLZ Ohio, Inc.  
 Drilling Fluid None

Development Technique(s) and Date(s)  
Submersible Impeller Pump (6/17/16)

Fluid Loss During Drilling N/A gallons  
 Water Removed During Development 33 gallons  
 Static Depth to Water 47.66 feet below M.P.  
 Pumping Depth to Water 60 feet below M.P.  
 Pumping Duration NM hours  
 Yield N/A gpm Date 6/17/2016  
 Specific Capacity N/A gpm/ft

Well Purpose Monitoring well  
 Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Prepared by Judd Wanner

# APPENDIX B

## Banks Well Inventory Report





**Prepared for:**

ARCADIS U.S., INC.-Columbus  
630 Plaza Drive, Suite 600  
Highlands Ranch, CO 80129



# Water Well Report

AEP Water Well Inventory  
MOUNTAINEER PLANT  
1347 GRAHAM STATION ROAD  
NEW HAVEN, WV  
MASON County  
PO #: OH015976.0004  
ES-112028  
Monday, September 08, 2014

**Table of Contents** *AEP Water Well Inventory*



<b>Geographic Summary</b>	<b>3</b>
<b>Maps</b>	
<b>Summary Map - 0.5 Mile Buffer</b>	<b>4</b>
<b>Topographic Overlay Map - 0.5 Mile Buffer</b>	<b>5</b>
<b>Current Imagery Overlay Map - 0.5 Mile Buffer</b>	<b>6</b>
<b>Water Well Details</b>	<b>7</b>
<b>Database Definitions and Sources</b>	<b>8</b>
<b>Disclaimer</b>	<b>9</b>

**Geographic Summary** *AEP Water Well Inventory*



Location	
MASON County, WV	
Target location is 0.131 square miles and has a 1.5 mile perimeter	

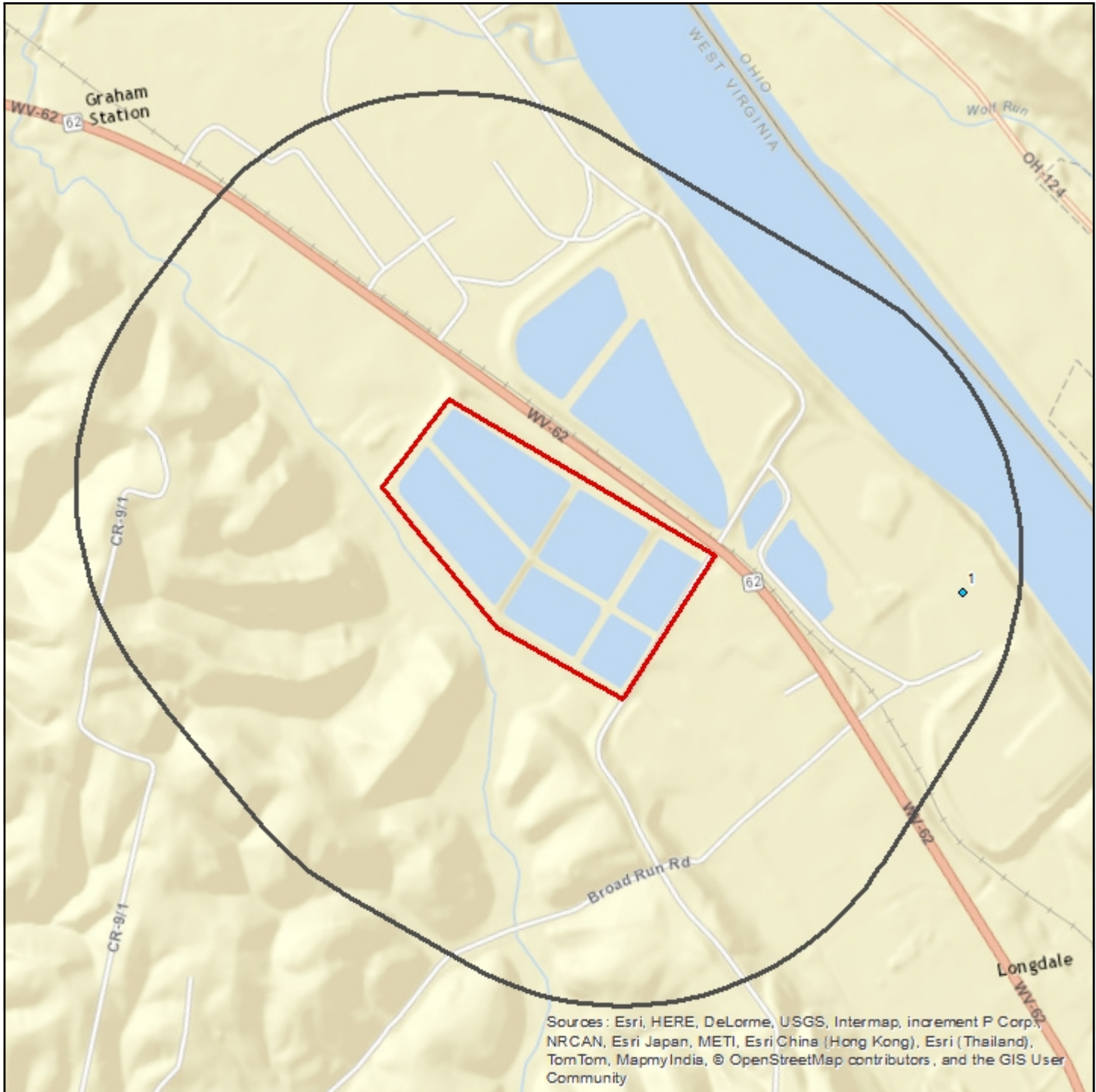
Coordinates	
Longitude & Latitude in Degrees Minutes Seconds	NA
Longitude & Latitude in Decimal Degrees	NA
X and Y in UTM	NA

Elevation	
NA	

Zip Codes Searched	
Search Distance	Zip Codes (historical zip codes included)
Target Property	25253, 25247, 25264, 25265
0.5 miles	25253, 25247, 25264, 25265

Topos Searched	
Search Distance	Topo Name
Target Property	New Haven (1977)
0.5 miles	New Haven (1977)

# Summary Map - 0.5 Mile Buffer



## AEP Water Well Inventory

- Well
- Well Cluster
- Target Property
- Search Buffer

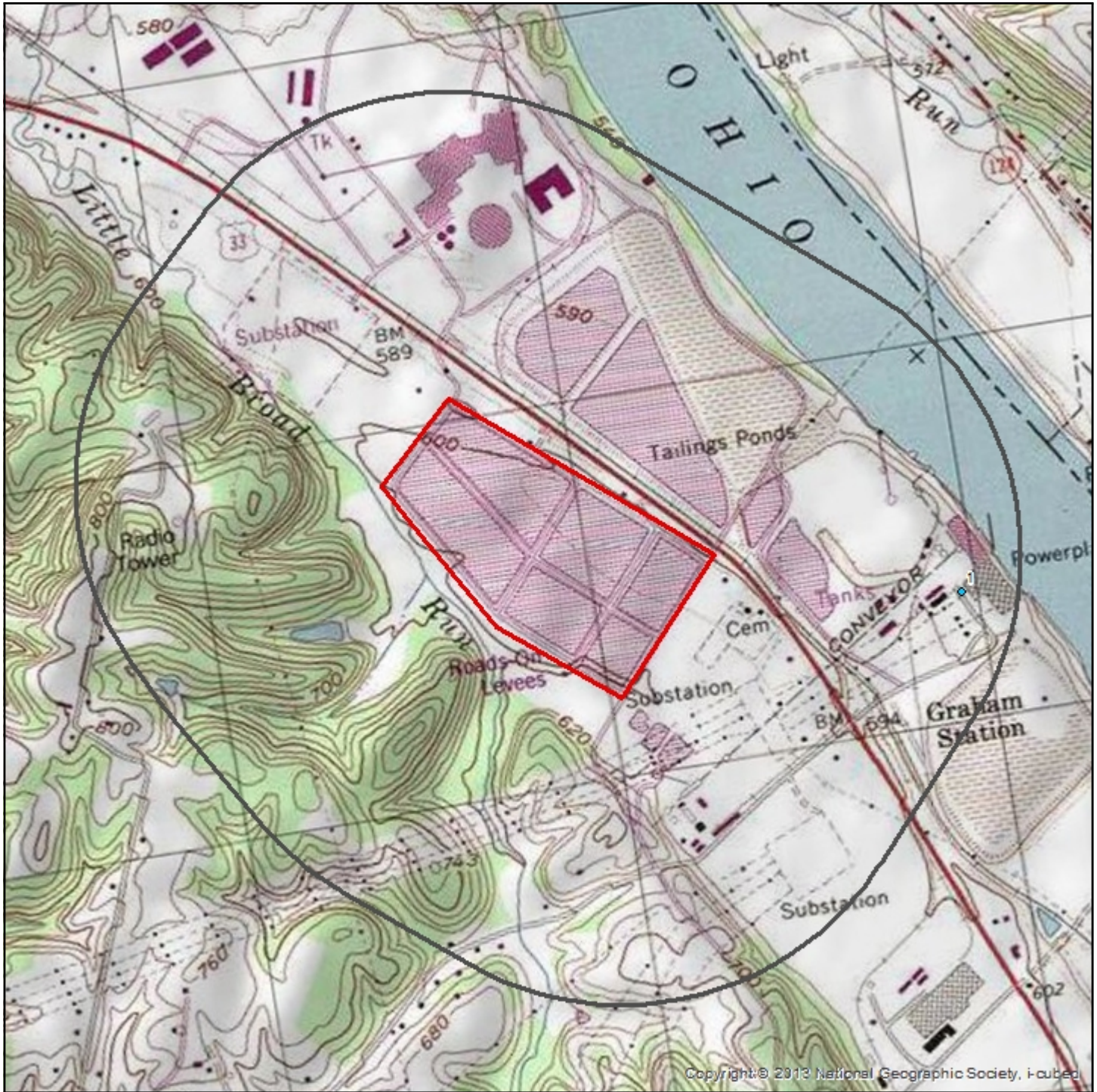
1 : 15,000  
 1 inch = 0.237 miles  
 1 inch = 1250 feet  
 1 centimeter = 0.150 kilometers  
 1 centimeter = 150 meters



Lambert Conformal Conic Projection  
 1983 North American Datum  
 First Standard Parallel: 33° 00' North  
 Second Standard Parallel: 45° 00' North  
 Central Meridian: 96° 00' West  
 Latitude of Origin: 39° 00' North



# Topographic Overlay Map - 0.5 Mile Buffer



Copyright © 2013 National Geographic Society, i-cubed

## AEP Water Well Inventory

- Well
- Well Cluster

- Target Property
- Search Buffer

Target Property Quad Name(s)  
New Haven (1977)

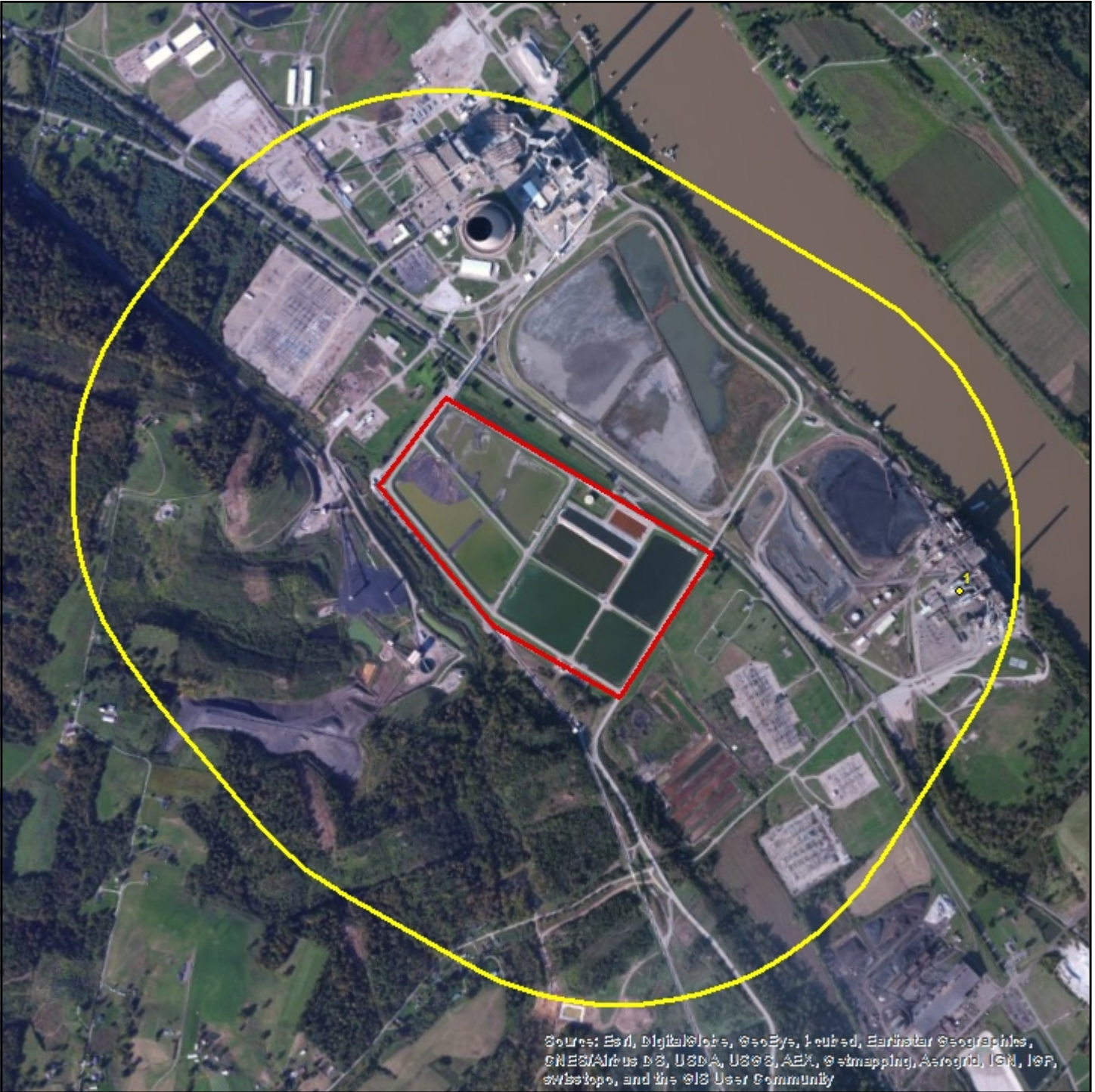
1 : 15,000  
1 inch = 0.237 miles  
1 inch = 1250 feet

Lambert Conformal Conic Projection  
1983 North American Datum  
First Standard Parallel: 33° 00' North  
Second Standard Parallel: 45° 00' North  
Central Meridian: 96° 00' West  
Latitude of Origin: 39° 00' North





# Current Imagery Overlay Map - 0.5 Mile Buffer



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

## AEP Water Well Inventory

-  Well
-  Well Cluster
-  Target Property
-  Search Buffer

1 : 15,000  
 1 inch = 0.237 miles  
 1 inch = 1250 feet  
 1 centimeter = 0.150 kilometers  
 1 centimeter = 150 meters



Lambert Conformal Conic Projection  
 1983 North American Datum  
 First Standard Parallel: 33° 00' 00" North  
 Second Standard Parallel: 45° 00' 00" North  
 Central Meridian: 96° 00' 00" West  
 Latitude of Origin: 39° 00' 00" North

**Water Well Details** *AEP Water Well Inventory*



Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
1	USGS-385802081552602	WW USGS	USGS	Not Reported	80	01/01/1950	-81.923748	38.967302	585 ft	N/A

**Well Summary**

Water Well Dataset	# of Wells
WW USGS	1
<b>Total Count</b>	<b>1</b>

## Dataset Descriptions and Sources *AEP Water Well Inventory*



Dataset	Source	Dataset Description	Update Schedule	Data Requested	Data Obtained	Data Updated	Source Updated
WV WW - West Virginia Water Wells	West Virginia Department of Health and Human Resources	This dataset contains groundwater well information provided by West Virginia Department of Health and Human Resources.	As requested	N/A	N/A	N/A	N/A
OH WW - Ohio Water Wells	Ohio Department of Natural Resources	This dataset contains all historical water well records searched from Ohio Department of Natural Resources Division of Water	As requested	N/A	N/A	N/A	N/A
WW USGS - USGS Water Wells	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Quarterly	06/30/2014	06/30/2014	07/13/2014	06/30/2014



**Disclaimer** *AEP Water Well Inventory*



The Banks Environmental Data Water Well Report was prepared from existing state water well databases and/or additional file data/records research conducted at the state agency and the U.S. Geological Survey. Banks Environmental Data has performed a thorough and diligent search of all groundwater well information provided and recorded. All mapped locations are based on information obtained from the source. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the records and mapped well locations could possibly be traced to the appropriate regulatory authority or the actual driller. It may be possible that some water well schedules and logs have never been submitted to the regulatory authority by the water driller and, thus, may explain the possible unaccountability of privately drilled wells. It is uncertain if the above listing provides 100% of the existing wells within the area of review. Therefore, Banks Environmental Data cannot fully guarantee the accuracy of the data or well location(s) of those maps and records maintained by the regulatory authorities.

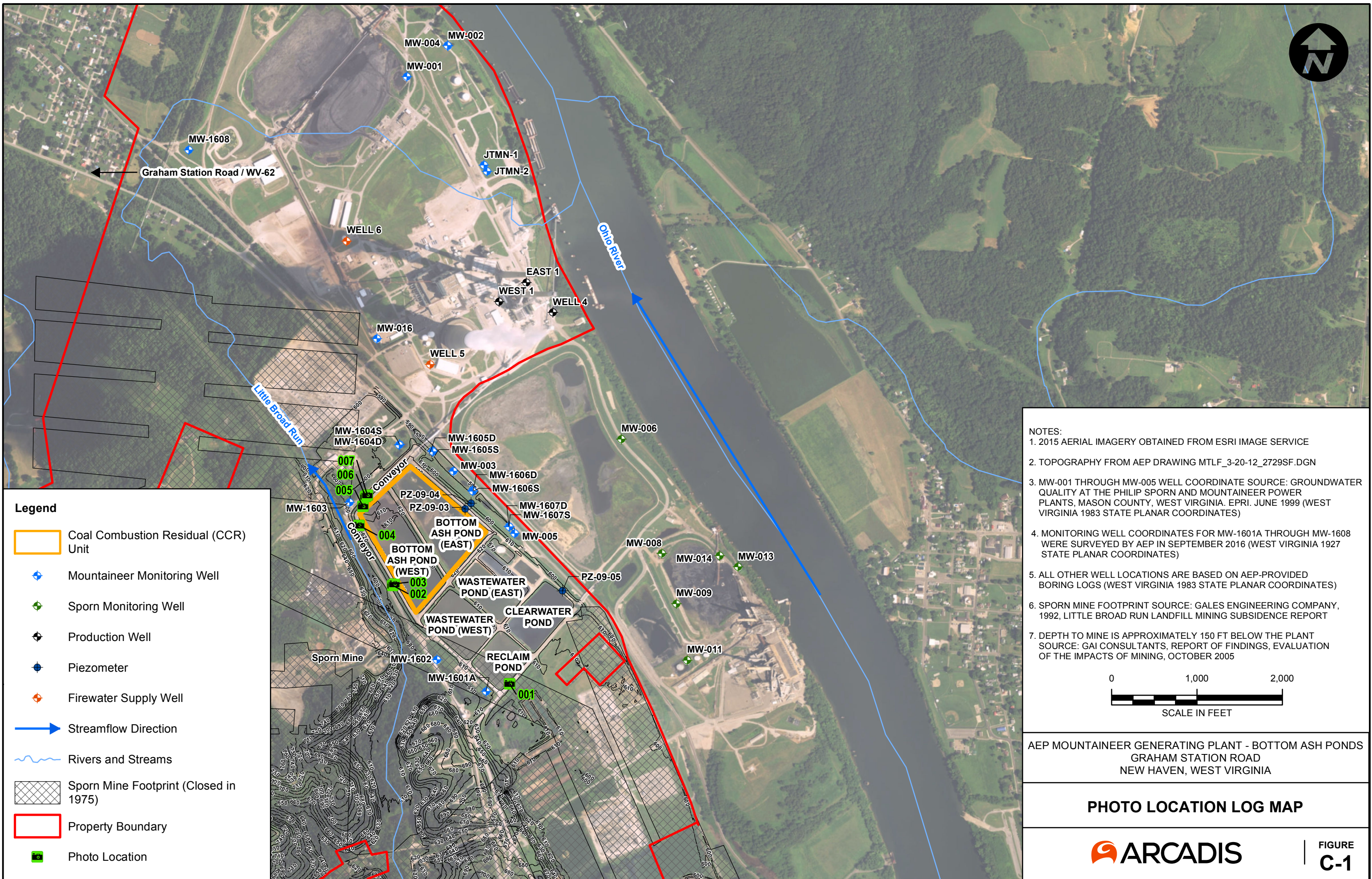
# APPENDIX C

Photographic Log





City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb  
 OH:015976.0009.00001 (Mountaineer Ash Pond)  
 Z:\GIS\PROJECTS\_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\C1\_Mtr.Ash Pond Photo Location Map.mxd 10/6/2016 8:54:34 AM



**Legend**

- Coal Combustion Residual (CCR) Unit
- Mountaineer Monitoring Well
- Sporn Monitoring Well
- Production Well
- Piezometer
- Firewater Supply Well
- Streamflow Direction
- Rivers and Streams
- Sporn Mine Footprint (Closed in 1975)
- Property Boundary
- Photo Location

**NOTES:**

1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
2. TOPOGRAPHY FROM AEP DRAWING MTLF\_3-20-12\_2729SF.DGN
3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
6. SPORN MINE FOOTPRINT SOURCE: GALES ENGINEERING COMPANY, 1992, LITTLE BROAD RUN LANDFILL MINING SUBSIDENCE REPORT
7. DEPTH TO MINE IS APPROXIMATELY 150 FT BELOW THE PLANT SOURCE: GAI CONSULTANTS, REPORT OF FINDINGS, EVALUATION OF THE IMPACTS OF MINING, OCTOBER 2005

SCALE IN FEET

AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS  
 GRAHAM STATION ROAD  
 NEW HAVEN, WEST VIRGINIA

**PHOTO LOCATION LOG MAP**



<b>Photo No.</b> 001	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  Southeast		
<b>Description:</b>  South of Reclaim Pond.		

<b>Photo No.</b> 002	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  North		
<b>Description:</b>  West side of Bottom Ash Pond-West.		




<b>Photo No.</b> 003	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  South		
<b>Description:</b>  West side of Bottom Ash Pond-West.		

<b>Photo No.</b> 004	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  West		
<b>Description:</b>  Potential wetland downslope from Bottom Ash Pond-West.		



<b>Photo No.</b> 005	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  South		
<b>Description:</b>  North side of Bottom Ash Pond-West.		

<b>Photo No.</b> 006	<b>Date:</b> 8/12/2015	
<b>Direction Photo Taken:</b>  Northwest		
<b>Description:</b>  Upland area north of Bottom Ash Pond west.		

<b>Photo No.</b> 007	<b>Date:</b> 8/12/2015	 <p>2015.08.12.16.41</p>
<b>Direction Photo Taken:</b>  Northeast		
<b>Description:</b>  Upland area north of Bottom Ash Pond-West.		