



ASH POND SYSTEM-CCR GROUNDWATER MONITORING WELL NETWORK EVALUATION

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

October 27, 2016

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ACRONYMS AND ABBREVIATIONS

AEP American Electric Power Service Corporation

amsl above mean sea level

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 the adequacy of the groundwater monitoring well network included in the Coal Combustion Residual (CCR) requirements, as specified in Code of Federal Regulations (CFR) 40 CFR 257.91, for the bottom ash ponds (BAPs) (CCR Unit) at the AEP Mountaineer 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. These 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. The objective of this report is to present an evaluation of the adequacy of the groundwater monitoring well network in the uppermost aquifer at the onsite BAPs (Site). The evaluation of the five location restriction criteria is not included in this report and will be completed under separate cover.

Two regulated CCR units associated with the Plant were identified for review, which include the onsite 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 also 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 and the current monitoring well network. The monitoring well network was determined to adequately cover the up and down gradient areas of the BAPs in the uppermost aquifer; therefore, the report objective has been met.

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 volumes of the west and east BAPs are 193 and 152 acre ft, respectively. The maximum design volumes 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 re-use 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 were 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.

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, performed stability calculations of mine pillars and ground movement from proposed future mining operations. GAI concluded that the Site is not expected to have adverse impacts from past or future mining of the Redstone Coal.

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 the 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 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 logs 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. GROUNDWATER MONITORING WELL NETWORK EVALUATION

An initial evaluation of the monitoring well network present at the Site was performed in late 2015 into February 2016 to determine if any of the existing wells were viable for continued use as part of the groundwater quality monitoring well network or also be retained as part of a larger groundwater hydraulic monitoring well network. As part of this review, hydrogeologic conditions were evaluated to determine if the uppermost aquifer unit had an adequate monitoring well network. The evaluation was completed in accordance with 40 CFR 257.91 to have an established monitoring well network that effectively monitors the uppermost aquifer up gradient and down gradient of the Site. An additional 12 monitor wells were installed in April through June 2016. Monitoring wells included in the monitoring network are designated as up or down gradient. Up gradient monitoring wells represent background groundwater quality and the down gradient monitoring wells were placed down gradient of the CCR unit boundary to monitor water quality.

3.1 Hydrostratigraphic Units

3.1.1 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.

3.1.2 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). Details of the modeling are provided in **Appendix C**. 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 6.0×10^{-4} ft/ft (MW-1605S/MW-1605D) to 9.9×10^{-3} ft/ft (MW-1604S/MW-1604D). A downward vertical gradient of 1.8×10^{-3} ft/ft was measured at the MW-1606S/MW-1606D well pair.

3.1.3 Soil Property Testing

During unconsolidated monitoring well installation, selected split-spoon soil samples were retained for particle-size analysis by sieving and hydrometer in accordance with American Society for Testing and Materials (ASTM) D421, D422, and D4718 and moisture content in accordance with ASTM D2216. Split spoon samples selected for particle-size analysis corresponded to the final well screen interval at each boring. For each new monitoring well location, one composite soil sample was compiled from the selected split spoon samples, which was then transported to the AEP Dolan Civil Engineering Laboratory in Groveport, Ohio for particle-size analysis. The particle-size analysis results were used to assist with monitoring well design. The results of this analysis are summarized in **Table 3**, and complete laboratory reports are provided in **Appendix D**. Grain size analysis of samples collected within the final screen intervals indicated sediments were generally poorly-graded sand. Secondary proportions of silt or gravel were found at some boreholes within the final screen intervals.

3.1.4 Hydraulic Conductivity

Hydraulic testing was completed at wells MW-001, MW-002, MW-004, and MW-005 prior to this evaluation in the uppermost unconsolidated aquifer. Estimated hydraulic conductivity based on these slug tests was reported to range from 51 ft per day in sandy sediments to 772 ft per day in gravelly sediments with an overall geometric mean of 237 ft per day, based on site slug testing (EPRI, 1999).

Additional slug tests were performed at newly-installed monitoring wells on June 20-21, 2016. Pneumatic and bail down slug tests were performed on a total of 3 up gradient wells (MW-1601A, MW-1603, and MW-1608) and 4 down gradient wells (well pairs MW-1605S/MW-1605D, MW-1607S/MW-1607D) to provide a more spatial understanding of the hydraulic conductivity distribution within the alluvial sands (i.e. uppermost aquifer). Well construction details for these monitoring wells and all other wells are presented in **Table 2**.

Data-logging pressure transducers were used during these tests in 2016 to monitor water level displacement every 0.5 seconds and in real time. Three pneumatic slug tests were performed at each well except MW-1603, at which a bail down slug test was performed due to equipment issues. Two tests were performed using an identical initial pressure and one test was performed using approximately twice the pressure applied in the other two tests. This protocol was implemented to verify the initial head displacement and to evaluate the reproducibility of the results. Equilibration was achieved prior to and after each pneumatic slug test in order to minimize any potential interference between tests.

At MW-1603, three bail-down slug tests were completed. Two tests were performed by submerging and removing half the bailer (24-inches) and one test was performed by submerging and removing the entire bailer (48-inches). This protocol was implemented to verify the initial head displacement and to evaluate the reproducibility of the results.

For each well, one representative test was selected for analysis and analyzed using AQTESOLV® for Windows® Version 4.50 (Duffield, 2007). The hydraulic conductivity values were determined using applicable analytical solutions for a single (partially-penetrating) well under unconfined conditions, as appropriate based on the response. Results of the slug test analyses, including hydraulic conductivity estimates, are summarized in **Table 4** and solution reports with individual curve matches are provided in **Appendix E.**

The hydraulic conductivity estimates from the seven monitoring wells tested had a tight range from 147 ft per day (MW-1605S) to 213 ft per day (MW-1601A). The overall mean hydraulic conductivity estimate was 187 ft per day, while the overall geometric mean was 186 ft per day. Estimated hydraulic conductivity values for all the wells were consistent for a sand and gravel alluvium system and correlate to the geometric mean hydraulic conductivity estimates of the historical hydraulic testing.

3.2 Uppermost Aquifer

3.2.1 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.

3.2.1.1 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.

3.2.2 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.

3.3 Review of Existing Monitoring Well Network

3.3.1 Overview

The Site was visited by Arcadis and AEP personnel on August 12, 2015 to review existing well network conditions and locations. The well network that existed at the time of that site visit was deficient, lacking the distribution to accurately represent background water quality and the quality of groundwater passing the waste boundary of the CCR Unit, per 40 CFR 257.91. A well construction table that summarizes the location, ground surface elevation, borehole depth, installation date, and associated well construction details of the existing monitoring well network is included as **Table 2**.

The groundwater quality monitoring well network monitors the alluvial aquifer consisting of unconfined sand and gravel defined as the uppermost aquifer. It includes 12 wells installed from April to June 2016. An additional 8 Mountaineer Plant wells, and 3 piezometers, which were present prior to Arcadis initial evaluation, are utilized for the purpose of hydraulic monitoring (**Table 2**). Four well pairs (MW-1604S/MW-1604D, MW-1605S/MW-1606D, MW-1606S/MW-1606D, MW-1607S/MW-1607D) measure vertical flow.

Spatially, the network extends as far up gradient to the south as MW-1601A, and to the north as MW-1608. Down gradient, the network extends immediately down gradient of the BAPs (MW-1604S/MW-1604D through MW-1607S/MW-1607D). Eight existing wells and 3 existing piezometers have been retained in the network for hydraulic monitoring (**Table 2**). The current monitoring well network distribution is presented on **Figure 7**.

3.3.2 Gaps in Monitoring Network

As discussed in Section 3.3.1 of this report, gaps in the monitoring network were identified upon initial Arcadis review in late 2015 and in early 2016. Following monitoring well installation described in **Appendix F** of this report, there are no gaps in the monitoring network. Up gradient background water quality is not current and will need to be re-evaluated with analysis results from the new recommended monitoring well network. The recommended monitoring well network is described in Section 4.

4. RECOMMENDED MONITORING WELL NETWORK

The groundwater monitoring well network is intended to meet specifications stated in 40 CFR 257.91. The network is discussed with respect to location to the BAPs (up gradient or down gradient), well depth, and well construction. The recommended monitor well network described below will provide an adequate understanding of seasonal and temporal fluctuations in groundwater quality, hydraulics, and groundwater flow in the uppermost aquifer.

4.1 Monitoring Well Network Distribution

A total of 12 monitoring wells were installed to establish an adequate network. Specifics on field methodology and other documentation on installation of the additional wells in 2016 is provided in **Appendix F**. Monitoring well construction was targeted to monitor the unconfined saturated alluvial sand and gravel, which is identified as the uppermost aquifer. The total groundwater quality monitoring network includes 4 up gradient wells and 8 down gradient wells (**Table 2** and **Figure 7**). The monitoring well distribution adequately covers down gradient and up gradient areas as detailed in the following sections. In addition to the 12 groundwater quality wells, 8 wells and 3 piezometers are used to refine the understanding of groundwater flow and hydraulic gradients in the vicinity of the BAPs and down gradient at the Plant (**Table 2** and **Figure 7**).

4.1.1 Down Gradient Locations

Down gradient monitoring wells are located to the north, northeast, and east of the BAPs. These wells include newly-installed wells MW-1604S, MW-1604D, MW-1605S, MW-1605D, and MW-1606S, MW-1606D, MW-1607S, and MW-1607D (**Table 2**). These wells monitor groundwater as it flows north and northeast past the CCR unit boundary. Down gradient wells were installed as shallow and deep well pairs within the uppermost aguifer in order to monitor the entire saturated thickness of the aguifer.

4.1.2 Up Gradient Locations

Up gradient monitoring wells are located southeast, south, and northwest of the BAPs. These wells include newly-installed wells MW-1601A, MW-1602, MW-1603, and MW-1608 (**Table 2**). These wells establish background groundwater quality up gradient of the CCR unit boundary, with the exception of MW-1608. MW-1608 establishes background groundwater quality of groundwater flowing from the bedrock ridge into the Ohio River valley.

4.2 Well Construction

Groundwater quality monitoring wells in the network are constructed of 2-inch Schedule 40 PVC risers with 10 to 15 ft slotted PVC screens. All monitoring wells were installed in general accordance with West Virginia Department of Environmental Protection Title 47 Series 60 Monitoring Well Design Standards dated June 21, 2011 by a state-licensed driller. Installation details and field methods are provided in

Appendix F. Well construction data for the monitoring well network is summarized on Table 2. Boring logs and the monitoring well completion diagrams are provided in Appendix A.

5. PROFESSIONAL ENGINEER'S CERTIFICATION

I, John W. Holm, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the site, the proposed groundwater monitoring system will be adequate to meet the requirements of 40 CFR Part 257.91.

Printed Name of Registrati Wroto Stall Engineer

Signature

Registration No.

Registration State

Date

6. REFERENCES

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TABLES

FIGURES

APPENDIX A

Boring/Well Construction Logs

APPENDIX B Banks Well Inventory Report

APPENDIX C Groundwater Modeling Supporting Information

APPENDIX D

Soil Property Testing

APPENDIX E

Slug Testing Results

APPENDIX F

Field Methodology



Arcadis U.S., Inc.

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www.arcadis.com

TABLES

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



	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
Well ID	GW Elev.	GW Elev. a	GW Elev. a	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.
	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl	ft. amsl
Gravel Zone Wells																						
Downgradient																						
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
Sand Zone Wells																						
Upgradient																						
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
Downgradient																						
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
<u>Piezometers</u>																						
Downgradient																						
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
Sporn Wells 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 NA	540.14	541.70	NA NA	NA 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
11111 0 17	197	U-10.17	0-1.70	1 4/ 1	14/1	1771	14/1	1 17 1		072.70	070.11	0-10.07	0-0.70	0-10.00	070.12	072.00	0-70.00		071.70	0-71.11	0-70.00	0-0.00

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

Table 2
Well Construction Details
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia



		Location			Ground	Top of Casing	Borehole			Well	Top of Screen		Botton	n of Screen
Well ID	Hydraulic Monitoring Only	Description to CCR Unit	Northing ^a	Easting ^a	Surface Elevation	Elevation ft amsl	Depth ft. bls	Date Installed	Screen Material	Diameter inches	Depth ft. bls	Elevation ft. amsl	Depth ft. bls	Elevation ft. amsl
Gravel Zone Wells														
Downgradient	,													
MW-001 ^b	X	North	724542.7	1701713.0	569.18	571.32	38.0	6/18/1997	Sch. 40 PVC	2	27.0	542.18	37.0	532.18
Sand Zone Wells														
Upgradient				.====				0/0/00/0		_				
MW-1601A °		Southeast	717349.0	1702641.3	607.47	610.66	80.0	6/9/2016	Sch. 40 PVC	2	67.0	540.47	77.0	530.47
MW-1602 °		South	717716.0	1702066.2	602.37	605.12	71.6	5/10/2016	Sch. 40 PVC	2	61.0	541.37	71.0	531.37
MW-1603 ^c		Northwest	719560.2	1701042.0	602.92	606.30	76.0	5/4/2016	Sch. 40 PVC	2	60.0	542.92	75.0	527.92
MW-1608 °		Northwest	723686.8	1699158.3	587.26	590.65	70.0	6/10/2016	Sch. 40 PVC	2	46.0	541.26	56.0	531.26
Downgradient MW-002 ^b		NI d	704004.0	4700407.0	500.00	500.04	70.0	0/04/4007	0 1 40 D)/O		00.5	500.00	70.5	540.00
	X	North	724901.8	1702197.6	580.82	582.81	73.0	6/24/1997	Sch. 40 PVC	2	60.5	520.32	70.5	510.32
MW-003 b	X	Northeast	719921.2	1702260.8	604.90	607.20	43.4	6/25/1997	Sch. 40 PVC	2	32.3	572.60	42.3	562.60
MW-004 b	X	North	724909.9	1702190.5	581.08	583.13	48.2	6/30/1997	Sch. 40 PVC	2	37.6	543.48	47.6	533.48
MW-005 ^b	X	East	719196.9	1702976.0	591.00	593.19	50.0	7/1/1997	Sch. 40 PVC	2	37.7	553.30	47.7	543.30
MW-016 ^d	X	North	721475.5	1701361.3	586.82	588.61	82.0	6/17/2008	Sch. 40 PVC	2	67.5	519.32	77.5	509.32
JTMN-1 ^d	X	North	723507.5	1702616.8	582.17	583.67	76.6	7/19/1990	Sch. 40 PVC	2	56.7	525.47	75.7	506.47
JTMN-2 ^d	X	North	723436.8	1702653.5	582.16	584.06	77.8	7/18/1990	Sch. 40 PVC	2	57.9	524.26	76.9	505.26
MW-1604S ^c		North	720233.9	1701624.2	595.48	598.07	60.0	5/2/2016	Sch. 40 PVC	2	49.0	546.48	59.0	536.48
MW-1604D ^c		North	720238.0	1701629.1	595.59	598.22	80.0	4/27/2016	Sch. 40 PVC	2	69.0	526.59	79.0	516.59
MW-1605S ^c		Northeast	720156.3	1702018.3	588.51	590.86	59.5	5/12/2016	Sch. 40 PVC	2	49.0	539.51	59.0	529.51
MW-1605D ^c		Northeast	720161.4	1702015.6	588.51	591.01	80.0	5/11/2016	Sch. 40 PVC	2	69.0	519.51	79.0	509.51
MW-1606S ^c		Northeast	719693.3	1702486.4	587.28	590.15	56.0	5/18/2016	Sch. 40 PVC	2	45.0	542.28	55.0	532.28
MW-1606D ^c		Northeast	719697.7	1702482.4	587.25	590.10	76.0	5/16/2016	Sch. 40 PVC	2	65.0	522.25	75.0	512.25
MW-1607S ^c		East	719276.0	1702912.2	590.79	593.99	60.0	5/26/2016	Sch. 40 PVC	2	50.0	540.79	60.0	530.79
MW-1607D ^c		East	719279.7	1702908.9	590.75	593.93	80.0	5/19/2016	Sch. 40 PVC	2	70.0	520.75	80.0	510.75
<u>Piezometers</u>														
Downgradient PZ-09-03 ^e		NI d	740405.0	4700007.0	004.00	004.47	50.4	0/47/0000	0 1 40 D)/O	4.5	5.0	040.00	50.4	574.00
PZ-09-03 PZ-09-04 ^e	X X	Northeast Northeast	719485.3 719550.1	1702397.3 1702466.6	621.60 597.10	621.17 596.64	50.4 25.0	2/17/2009 2/19/2009	Sch. 40 PVC Sch. 40 PVC	1.5 1.5	5.0 5.0	616.60 592.10	50.4 24.8	571.20 572.30
PZ-09-04 PZ-09-05 ^e	X	Southeast	718527.3	1702400.0	611.70	610.74	50.2	2/19/2009	Sch. 40 PVC	1.5	5.0	606.70	50.2	561.50
Sporn Wells f	Λ	Journeast	7 10327.3	1703337.3	011.70	010.74	30.2	2/10/2009	3011. 401 VO	1.5	3.0	000.70	30.2	301.30
MW-006 b		East	720299.8	1704227.1	601.31	601.57	96.0	7/8/1997	Sch. 40 PVC	2	81.1	520.21	91.1	510.21
MW-008 b		East	718959.9	1704700.6	NA	NA	34.9	7/22/1997	Sch. 40 PVC	2	23.8	NA	33.8	NA
MW-009 b		Southeast	718372.3	1704868.0	574.98	576.55	54.5	7/15/1997	Sch. 40 PVC	2	42.3	532.68	52.3	522.68
MW-011 ^b		Southeast	717710.5	1704997.8	NA	NA	50.0	7/23/1997	Sch. 40 PVC	2	36.3	NA	46.3	NA
MW-013 ^b		East	718802.7	1705591.5	579.48	581.51	50.5	7/30/1997	Sch. 40 PVC	2	39.5	539.98	49.5	529.98
MW-014 ^b		East	718936.5	1705374.9	586.89	588.89	61.0	7/30/1997	Sch. 40 PVC	2	49.7	537.19	59.7	527.19

- a. 1983 West Virginia State Planar Coordinates
- b. Source: EPRI. June 1999. Groundwater Quality at the Philip Sporn and Mountaineer Power Plants, Mason County, West Virginia
- c. Source: AEP survey, September 2016
- d. Source: AEP-provided boring logs
- e. Source: H.C. Nutting. March 2009. Geotechnical Engineering Report. AEP Mountaineer Bottom Ash Pond Complex. Appendix A
- f. Sporn wells used for the simulated groundwater flow model only. Sporn wells are not used for the CCR well network.

amsl - above mean sea level

bls - below land surface

ft - feet

NA - not available

Table 3
Grain Size Analysis Summary
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia



			Grain Size	e Analysi	s		
Sample ID	Depth feet	% Gravel	% Sand	% Silt	% Clay	USCS Classification	Moisture Content %
Sand Zone V	<u>Vells</u>					<u> </u>	
Upgradient					l		I
MW-1601A	66-76	8.9	89.2	1.3	0.5	(SP) POORLY-GRADED SAND	4.8
MW-1602	61-71	4.4	92.2	2.1	1.3	(SP) POORLY-GRADED SAND	17.9
MW-1603	60-75	24.1	71.2	3.8	0.8	(SP) POORLY-GRADED SAND with GRAVEL	15.7
MW-1608	46-56	10.5	84.5	2.2	2.8	(SP) POORLY-GRADED SAND	13.6
Downgradie	nt						
MW-1604S	49-59	4.2	91.1	2.4	2.3	(SP) POORLY-GRADED SAND	17.4
MW-1604D	69-79	8.4	86.0	3.5	2.0	(SP-SM) POORLY-GRADED SAND with SILT	15.2
MW-1605S	49-59	8.6	85.7	4.4	1.3	(SP-SM) POORLY-GRADED SAND with SILT	18.1
MW-1605D	69-79	9.1	85.2	5.6	0.1	(SP-SM) POORLY-GRADED SAND with SILT	16.1
MW-1606S	45-55	7.9	88.5	1.9	1.6	(SP) POORLY-GRADED SAND	22.5
MW-1606D	65-75	14.0	82.9	1.7	1.4	(SP) POORLY-GRADED SAND	15.4
MW-1607S	56-60	23.2	76.2	0.1	0.5	(SP) POORLY-GRADED SAND with GRAVEL	17.6
MW-1607D	70-80	21.5	77.4	0.7	0.4	(SP) POORLY-GRADED SAND with GRAVEL	27.9

Samples were collected from April to June 2016 and submitted to AEP Dolan Civil Engineeering Laboratory USCS - Unified Soil Classification System



Well ID Screen Interval ft bgs		Screened Interval USCS Classification	Slug Test Type	Hydraulic Conductivity ft/day	Hydraulic Conductivity cm/sec
Sand Zone We	ells				
Upgradient					
MW-1601A	67-77	(SP) POORLY-GRADED SAND	Pneumatic - Rising Head	213	7.5E-02
MW-1603	60-75	(SP) POORLY-GRADED SAND with GRAVEL	Bail down - Rising head	201	7.1E-02
MW-1608	46-56	(SP) POORLY-GRADED SAND	Pneumatic - Rising Head	204	7.2E-02
Downgradient	•				
MW-1605S	49-59	(SP-SM) POORLY-GRADED SAND with SILT	Pneumatic - Rising Head	147	5.2E-02
MW-1605D	69-79	(SP-SM) POORLY-GRADED SAND with SILT	Pneumatic - Rising Head	190	6.7E-02
MW-1607S	50-60	(SP) POORLY-GRADED SAND with GRAVEL	Pneumatic - Rising Head	187	6.6E-02
MW-1607D	70-80	(SP) POORLY-GRADED SAND with GRAVEL	Pneumatic - Rising Head	167	5.9E-02
			Slug Test Overall Mean Test Overall Geometric Mean	187	6.6E-02
	186	6.6E-02			
			Slug Test Minimum	147	5.2E-02
			Slug Test Maximum	213	7.5E-02

All slug tests completed on June 20-21, 2016

Slug test analyses performed using Springer-Gelhar (1991) analytical solution for underdamped responses Reference: Springer, R.K. and L.W. Gelhar, 1991. Characterization of large-scale aquifer heterogeneity in glacial outwash by analysis of slug tests with oscillatory response, Cape Cod, Massachusetts, U.S. Geol. Surv. Water Res. Invest. Rep. 91-4034, pp. 36-40

bgs - below ground surface

cm/sec - centimeters per second

ft - feet

USCS - Unified Soil Classification System

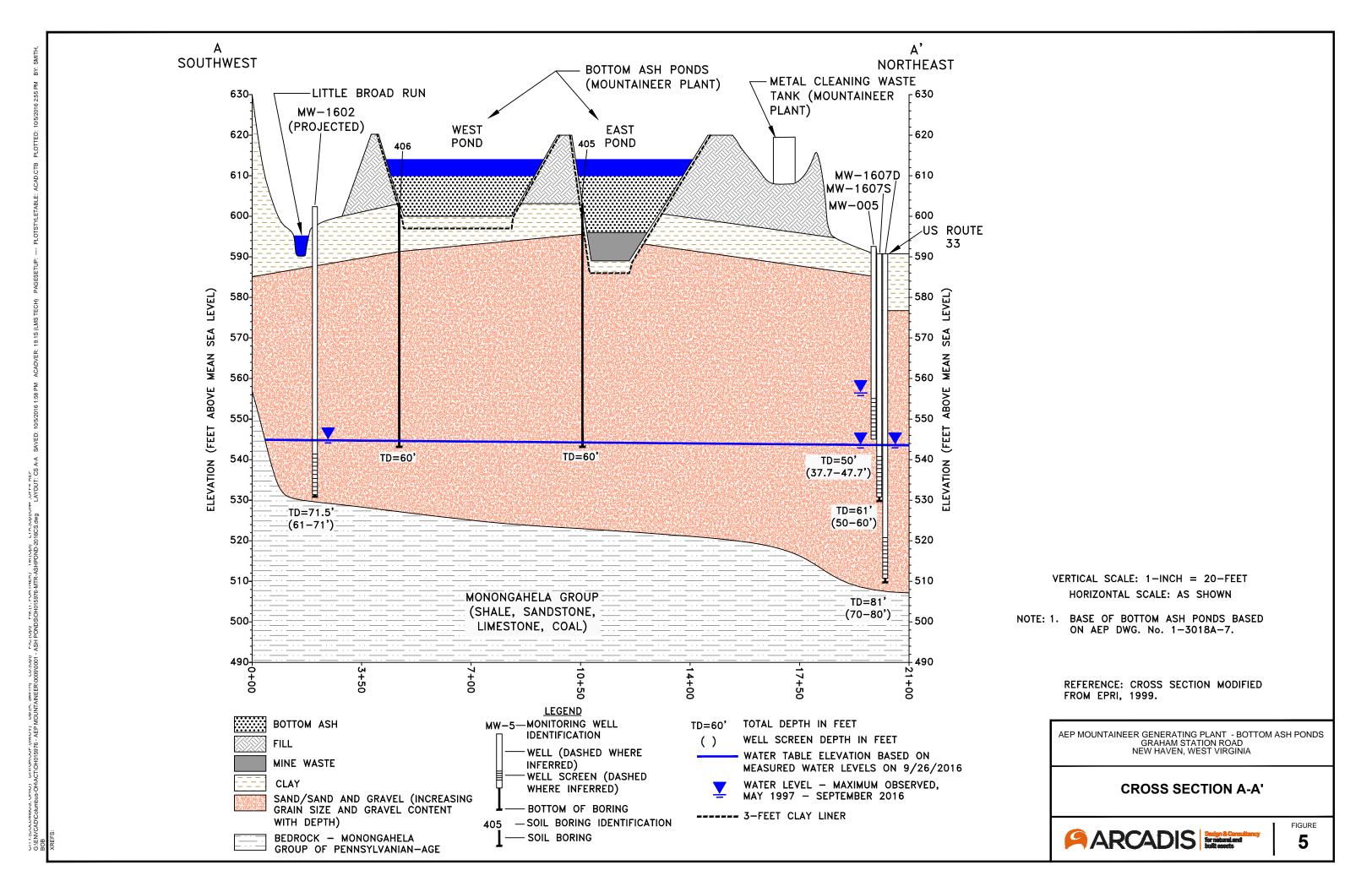
FIGURES

Document Path: Z:\G|SPROJECTS_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\F1_Site Map.mxd

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OH015976.0009.00001 (Mountaineer Ash Pond)

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OH015976.0009.00001 (Mountaineer Ash Pond)

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City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OH015976, 0009, 00001 (Mountaineer Ash Pond)

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OHO19976 0009 00001 (Mountaineer Ash Pond)

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

AMERICAN ELECTRIC POTER SERVICE CORTORATION

Job No. Compan	v App	alachian	Power (Compan	ıy		Boring No. 401 Date 1-21-77 Sheet 1 of 3 Type of Boring Auger Rig B-50
Project		ject 1301	L - Ash	Ponds		· · · · · · · · · · · · · · · · · · ·	Type of Boring Auger Rig B-50 Casing used Size Drilling mud used
Locat	ion of Bo	oring:					Casing used Size Drilling mud used Boring begun 1-21-77 Boring completed 1-24-77 Ground Elevation 596.14' referred to
Water	Level	47'					Ground Elevation 596.14 referred to Datu
Time		1-24-7	77				Field Party: King and Smithson
Date	<u></u>	1 1 27					
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 - 3 - 3		
			5/	4.	4		
	1	3.5-5	640	14"	5 -		Medium brown clayey silty sand.
				ļ	6		
		ŀ			<u> </u>		
-					<u> </u>	-]	
					8 -		
	2	8.5-10	5/ ₅	6"	上 上/0-		Same as sample number 1.
					F /1		
	 				下"-]	
			-	 -	/2 -	-	
- A - 1				ļ	_E /3 _		
					F ,, -	1//	
	 		57		E /4 -	3//	hut more sandy
	3	13.5-15	6/6	6"	/5 <i>*</i>	#	Same as sample number 1 but more sandy.
			•		F ,.	-	
-	-		1		- 		
			1:		17-		
					/ ₈ _	1	
					= /],	
	<u> </u>		16/][/	1
	4	18.5-20	17/18	3 4"	= 20.	31/2	Sand and gravel.
-	1				Ex	4	Large gravel in end of spoon.
	<u> </u>		-		1 -	-	
1	1	İ		1			Engineer

ob No.	-,						101 77 0 3
Compan	У					····	Boring No. 401 Date 1-24-77 Sheet 2 of 3
roject					-		Boring No. 401 Date 1-24-77 Sheet 2 of 3 Type of Boring Rig Casing used Size Drilling mud used
	ion of Bo	oring:					Casing used Size Driffing mudused
Water	Lovel	T					Boring begun Boring completed Ground Elevation referred to
Water Time	Levei	<u> </u>					Ground Elevation referred to Datum
Date				· · · · · · · · · · · · · · · · · · ·			Field Party: King and Smithson
Date						1	
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	OIL GRAPH	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
ది రి	Sa	San	P. S. F.	Tof		S	fluctuations in water level, notes on drilling ease, etc.
				:	<u>-</u> 20 -	1	
					21 -		
					$\mathbb{E}^{\nu'}$]	
					1-22-	#	
					F -	11	
		<u> </u>			- 23 -	11	
					F -	1//	
		 	19/		F-24-	1//	
	5	23.5-25	19/ 25/ 24	10"	25 -	1//	Medium brown coarse sand and gravel.
		+======================================	27		- 15 -	111	
					E 26 =]	
					$E^{\prime\prime}$ 3]	
					1-27-		
					L =		
					L 28 -	-	
					F -	11//	
			151	ļ	<u>-</u> 29 -	3//	
	6	28.5-29.5	45/	6 ⁿ	F =	#	Dense sand and gravel.
		20.3 23.	1	 	- 30 -	#	
					F ,, -	1	1
					E 31 -]	
		·			32-]	
					F -	41	
			<u> </u>	ļ <u>.</u>	<u> </u>	71	
					E -	1/	
 	 		14/	 	34 -	11/	
	7	33.5-35	17/21	10"		11/	More sand.
 	 			1	35 ←	-	
					F 36 -]	
					Ł´ :		
			ļ	<u> </u>	37 -		
					F -	1	
		<u> </u>		 -]	
					-	17	
	ļ	 	13/	 	39 -	11/	
	8	38.5-40	16/ 16/ 17	12"	F //-	11/	Same as sample number 7.
 	 		1		FO =][
				<u></u>		31	
		1	<u> </u>		<u> </u>	Ш_	Engineer

FORM CE-5 , REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job N	lo	·				LUG	OI BONING
Comp	any						Boring No. <u>401</u> Date <u>1-24-77</u> Sheet <u>3</u> of <u>3</u>
Proje	ct						Rig
Loc	ation of	Boring:					Casing used Size Drilling mud used
Wate	r Level	T					Boring begun Boring completed Ground Elevation referred to
Time							Dat
Date		<u> </u>					Field Party: King and Smithson
	, o z	T #	_ 5 % 5	Tot, length of recov. sample	DEPTH	АРН	DESCRIPTION
Depth of Casing, ft,	Z	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	ng th sam	IN	GRA	Soil type, color, texture, consistency, sampler driving notes,
Dep	Sample	froi froi	Stan enet esis	t. ie	FEET	9	blows per foot on casing, depths wash water lost, observed
	N.	S		ြို့ မို		18	fluctuations in water level, notes on drilling ease, etc.
	ļ				F40 -		
					E / =]	
			1		 	<u> </u>	
					E 1/2 =]] [
	1				E' -	11	
	 		 	1	- 43 -		
			1		EUE	1//	
Ì	9	43.5-45	15/ 19/ 25		F =	1//	
		43.3-43	1 25	14"	¥5 <u> </u>	11/4	Wet medium brown sand and gravel.
<u> </u>					E46 =		
			8		E' Ξ		
	ļ.,	<u> </u>	 	<u> </u>	47 -	╟╼╁	Water
					- /0 -		
					F /8 =		
	<u> </u>		15/		<u> </u>	1	
	10	48.5-50	15/ 20/ 21	16"	E 50 =		More sandy.
					E" =		
		<u> </u>		ļ	-51-		
					F / =	-	
					- 52 -		Washed out 3' plug in augers.
					£ 53 =	-	
					54	1//	
		50 5 55	16/ 23 ₂₉	ou.	E"∃		
	11	53.5-55	29	8''	<u>_</u> 55 <u>_</u>	14	Same as sample number 10.
		N			- - 56 -	1 -	
					E»∃		
		 			57	-	Woohod nut 21 nlus
					E , =	-	Washed out 2' plug in augers.
					<u> </u>		
			32/		59	///-	
	12	58.5-60	32/ 16/ ₂₃	10"	F , \exists		Medium brown sand and gravel w/gendates for
					-60-	11	Medium brown sand and gravel w/sandstone fragments Stopped home at 60.0 1-24-77
					_ ,]		
							Engineer
		L				 	Mary 111001

FORM CE-5'

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Project 1301 - Proposed Ash Pond Area Location of Boring: Water Level 45.51 Time Date Type of Boring Auger Rig B-61 Casing used Size Drilling mud used Boring begun 10-28-76 Boring completed 10-2 Ground Elevation 597.40' referred to Field Party: Roush and Reitmire Date DESCRIPTION Soil type, color, texture, consistency, sampler driving n blows per foot on casing, depths wash water lost, obser fluctuations in water level, notes on drilling ease, etc. 1 3-4.5 4/4/6 17" 4 Medium brown clayey silt. 2 8-9.5 3/4/5 13" 9 Same as sample number 1. Same as sample number 1.	Job No.							
Location of Boring: Water Level 45.5' Time Date Solid Segun 10-28-76 Soring completed 10-2 Ground Elevation 597.40' referred to	Compan						<u>.</u>	Boring No. 402 Date 10-28-76 Sheet 1 of 3
Baring begun 10-28-76 Boring completed 10-2 Ground Elevation 597.40' referred to Field Party: Roush and Reitmire DESCRIPTION Soil type, color, texture, consistency, sampler driving n blows per foot on casing, depths wash water lost, obser fluctuations in water level, notes on drilling ease, etc. 1 3-4.5 4/4/6 17" - 4				OI - Pr	oposed	ASD P	ona	Type of Boring Auger Rig B-01. Casing used Size Drilling mud used
Water Level 45.5' Time Date To did a series of the series	Locat	tion of Bo			.a <u></u>			Boring begun 10-28-76 Boring completed 10-28-76
The late Field Party: Roush and Reitmire To i	Water	Level	45.5'	1 11	,			Ground Elevation 597.40' referred to
DESCRIPTION Soil type, color, texture, consistency, sampler driving n blows per foot on casing, depths wash water lost, observed as a served as a ser		-	ļ	/				Datum
1 3-4.5 4/4/6 17" 4 Medium brown clayey silt. 2 8-9.5 3/4/5 13" 9 Same as sample number 1. 3 13-14.5 3/4/4 13" /4 Medium brown clayey fine sand.	Date		1					Fleid Party: Rodsh and Refemile
1 3-4.5 4/6 17" 4 Medium brown clayey silt. 2 8-9.5 3/4/5 13" 9 Same as sample number 1. 3 13-14.5 3/4/4 13"	Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN	1 -	Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
3 13-14.5 3/4/4 13"		1	3-4.5	4/4/6	17"	1 - 2 -		Medium brown clayey silt.
3 13-14.5 3/4/4 13" /4 Medium brown clayey fine sand.		2	8-9.5	^{3/} 4/ ₅	13"	7 - 8 9		Same as sample number 1.
		3	13-14.5	3/4/4	13"	/3 -		Medium brown clayey fine sand.
4 18-19.5 10 14" /9 J		4	18-19.5	3/ _{9/} 10	14"	/8/9		Same as sample number 3
Engineer								Engineer

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							10.00.74
Compan	У						Boring No. <u>402</u> Date <u>10-28-76</u> Sheet <u>2</u> of <u>3</u> Type of Boring Rig
roject	(5	uina.					Casing used Size Drilling mud used
Locati	on of Bo						Boring begun Boring completed
Water I	Level	45.5					Ground Elevation referred to Datum
Time							Field Party: Roush and Reitmire
Date		<u> </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.
-					2 2 23		
	5	23-24.5	7/ _{7/₅}	12"	24 = 25 =		Medium brown sand and gravel.
					27 - 27 - 28 -		
	6	28-29.5	8/ ₁₀	13"	30 -		Medium brown sand w/trace of gravel.
			10/ 14/ ₁₇		31 - 32 - 33 -		
	7	33-34.5	1417	14"	34 - 35 - 36 -		Same as sample number 6 w/more gravel.
	_		9/5/13		38-		
	8	38-39.5	13	1"	-59- -40-		Same as sample number 6 - Large gravel in end of spoon.
					•		E-si-
L		<u></u>	<u></u>	<u></u>		Ш_	Engineer

AMERICAN ELECTRIC POWER SERVICE CORTORATION

Boring No. 402** Dist in 10-26-76, Sheet 3 of 3 o	ob No.							10.20.76 Short 3 of 3
Water Level 45.5 Surface Level 10.5 Surface Level Level						· · · · · · · · · · · · · · · · · · ·		Boring No. 402 Date 10-28-76 Sheet 3 of 3
Water Level 45.5 Surface Level 10.5 Surface Level Level	roject							Casing used Size Drilling mud used
Time Date Locati	on of Bo	oring:					1 Device bogun Roring completed	
Date	Water	Level	45.5					Ground Elevation referred to
10 48-49.5 6/9/11 13" 58-59.5 8/11/2 11" 59 11 58-59.5 8/11/2 11" 59 12" 54 56 56 56 56 56 56 56	Time							Field Party: Rough and REitmire
10 48-49.5 5/9/11 13" 5/8 12" 5/8	Date		<u></u>					Field Faity. 16dell 4.12
10 48-49.5 5/9/11 13" 5/8 12" 5/8		ć	Ť.	E 0 5	p d	DEPTH	\PH	· ·
10 48-49.5 5/9/11 13" 5/8 12" 5/8	* *	ž	d of G	dard ratic tanc	ng th sam	1	GRA	Soil type, color, texture, consistency, sampler driving notes,
9 43-44.5 9/6/8 - 4/4 No recovery. 10 48-49.5 6/9/11 13" - 4/5	epth sing	nple	rple from n fe	itan ineti esis	. ler ov.	FEET		blows per foot on casing, depths wash water lost, observed
9 43-44.5 9/6/8 - 4/4 No recovery. 10 48-49.5 6/9/11 13" - 4/5	۵۵	Sar	San (i)	P. S.	Tot		S	fluctuations in water level, notes on diffiling ease, etc.
9 43-44.5 9/6/8 - 4/3						F //2 -		
10						E	}	
10						<u> </u>		
10			,			E , =]	
10	 					1-42 -	1	
10			1			E //2 =]]_	
10				9/6/		E 7 3 -		
Water		9	43-44.5	8	<u> </u>	<u> </u>		No recovery.
Water						E', =	#	
10 48-49.5 6/9/11 13"						- 45 -	-	Water
10 48-49.5 6/9/11 13"						- 1/6	1	
10 48-49.5 6/9/11 13"			1			E .		
11 53-54.5 7/8/10 12"						F7 -	1	
11 53-54.5 7/8/10 12"						F	-	
11 53-54.5 7/8/10 12"				6/01	 	F 48 -		
11 53-54.5 7/8/10 12"		10	48-49.5	19/11	13"	F 1/0	11//	Medium brown sand w/trace of gravel.
11 53-54.5						E"-		
11 53-54.5						£ 50 -		
11 53-54.5						E]	
11 53-54.5				<u> </u>	 	-51-		
11 53-54.5						F 3		
11 53-54.5							1	
12 58-59.5 8/11/2 11" - 59 - Same as sample number 10 Stopped hole at 59.5' 10-28-76				7,		- 53 -	11/	
12 58-59.5 8/11/2 11" - 59 - Same as sample number 10 Stopped hole at 59.5' 10-28-76		11	53-54.5	118/10	12"	F / -	31/	Same as sample number 10.
12 58-59.5 12 11" 59			33 3163	10	 	54 -	11/	
12 58-59.5 12 11" 59						E < 5	1	
12 58-59.5 8/11/ 12 58-59.5 12 11" - 59 - Same as sample number 10 Stopped hole at 59.5' 10-28-76						<u></u>		
12 58-59.5 8/11/ 12 11" 59				ļ	 	-56-]	
12 58-59.5 8/11/ 12 11" 59						E	-	
Stopped note at 39.3 10-28-76	-	<u> </u>			 			
Stopped note at 39.3 10-28-76			1			E (8 -	1	
Stopped note at 39.3 10-28-76				8/11/	1 , , , ,	F _	11/	Same as sample number 10
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		12	58-59.5	12	 11"	-59-	31/	
						F , -		
Engineer		 		1	1	F 60 -		
Engineer				<u> </u>	<u> </u>	E,	\exists	
Engineer								Engineer
	<u></u>	L	<u> L</u>	<u> </u>	<u></u>	<u>. l</u>	Щ.	Engineer

AMERICAN ELECTRIC POWER SERVICE CORTORATION

roject	Pro on of Bo	alachian ject 1301 ring: 50.5	Power (Compan posed	y Ash Pon	d <i>P</i>	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 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.
	1	3-4.5	4/ _{5/7}	17"	0		Medium brown clayey silt.
	2	8-9.5	4/3/4	13"	7 - 8 9 / 0 / 1		Same as sample number 1.
	3	13-14.5	6/7/6	13"	/2 - /3 /4 /5 /6 /6		Same as sample number 1. Medium brown, medium grain sand and gravel.
	4	18-19.5	4/ _{5/₅}	12"	/8 - /9		Same as sample number 3 w/less gravel.
			,				Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

lob No.	***				_		
							Boring No. 403 Date 10-29-76 Sheet 2 of 3
Project							Type of Boring Rig Casing used Size Drilling mud used
	ion of Bo						Casing used Size Drilling mud used
Water	Loval	50.5					Boring begun Boring completed Ground Elevation referred to
Time	Level	30.3					Datum
Date							Field Party: Roush and Keitmire
				. 4 0	T	Ŧ	DESCRIPTION
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	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		
	5	23-24.5	5/ 5/ ₄	12"	23 -		Medium brown, medium grain sand w/trace of gravel.
					25 -		
				,	21 -		
	6	28-29.5	4/ 5/ ₇	12"	28 =		Same as sample humber 5 w/medium and fine grain
					30 -		gravel.
					31 = 32 =		
			6/		E 33-	1//	
	7	33-34.5	6/8	12"	34 = 35 = =		Same as sample number 5 w/more gravel.
					36 =		
	0	20 20 5	5/ 8/ ₁₂		38 =	1//	Same as sample number 7.
	8	3839.5	12	13"	39-		same as sample number /.
					+ 40 - - - 1 -		
							Engineer

AMERICAN ELECTRIC FORER SERVICE CORTORATION

	12	58-59.5	8/ _{11/₁₂}	13"	F 59 -		Medium and dark brown sand and gravel. Stopped hole at 59.5
					F 51 =		
		<u></u>			56 -		
					55 -		
	**	33 34.3	1 13		54 -		
	11	53-54.5	7/ 10/3	0	<u> </u>		No recovery.
					£ 52 =		
				-	<u> </u>		
					E (0 -		Water
	10	48-49.5	97 15/ ₁₉	15"	E 49 =		Medium brown sand and gravel.
			9/		F 48 -		
					F 47 -		
					46 =		
					= 4° = = = = = = = = = = = = = = = = = =	#	
	9	43-44.5	8/ 13/ 14	14"	44-		Light brown, medium grain sand w/trace of gravel.
					$\begin{bmatrix} -\sqrt{2} & -\sqrt{2} \\ -\sqrt{3} & -\sqrt{3} \end{bmatrix}$		
					H1 -		
			-		- 40 - -		
ڭ ۵	Sa	Sam f (i)	Pe Re Bio	Tot		S	fluctuations in water level, notes on drilling ease, etc.
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standord Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN FEET	OIL GRA	Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
	ا ہ	£	E 0 to	of e e	DEPTH	RAPH	DESCRIPTION
Time Date							Field Party: Roush and Reitmire Datum
Water		50.5					Boring begun Boring completed Ground Elevation referred to
roject	ion of Bo	rina:					Type of Boring Rig Casing used Size Drilling mud used

MERICAN ELECTRIC POWER SERVICE CORTORATION

Job No							
Compar		ppalachia					Boring No. 404 Date 10-28-76 Sheet 1 of 3
Project	Ļ	roject 13	01 - Pr	oposed	l Ash P	ond	Area Type of Boring Auger Rig B-61 Casing used Size Drilling mud used
Local	tion of B	oring:					Boring begun 10–28–76 Boring completed 10–28–76
Water	Level	47.0) '				Ground Elevation 600.27 referred to
Time							Datum
Date							Field Party: Roush and Reitmire
F 7		T		- 0	T	Ŧ	DESCRIPTION
-a ÷	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot, length of recov, sample	DEPTH	GRAPH	Soil type, color, texture, consistency, sampler driving notes,
Depth of Casing, ft.	Sample No.	ie com-	ande etra iste iste	eng . sc	FEET		blows per foot on casing, depth's wash water lost, observed
Del	amı	fr.	Stc Pen Res Slow	0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LCEI	SOIL	fluctuations in water level, notes on drilling ease, etc.
		N N		<u>⊢ º</u>		1	
					F 0 -		Boring off set about 15' east because of corn field.
-]	Corn Ficht.
				<u> </u>	- 1-	1	
					F 2 -		
					E ' =		
			21		F 3 -	11,	
	1	3-4.5	3/ _{4/6}	,	F -	11//	Medium brown silty clay.
	<u> </u>	3-4.5	6	17"	- 4	1//	Action blown siley clay.
					<u> </u>	#	
					5 -		
					E 6-		
]	
				ļ	7 7 -	#	
		ľ		1	F -	1	
ļ			^{3/} 6/ ₈	<u> </u>	8 -		
	2	8-9.5	6/8	13"	F	1//	Same as sample number 1.
					E '-		
	. •				<u> </u>	-	
					<u> </u>	1	
				<u> </u>	E 1]	
					<u> </u> - , -		
			<u> </u>		 		
					E /3 =]],,	
	3	13-14.5	3/ 4/ ₆		<u> </u>	1//	Medium brown clayey sand.
	J	13-14-3	7,6	7"	- 14	1//	medium prownciayey sand.
				1	F , =	#/	
 					- /5 -		
					E /6 =]	
					E "		
					17-	1	
					E -]	
 			6/	<u> </u>	F /8 -	1//	
	4	18-19.5	5/ ₈	12"	F , =	1//	Medium brown sand and gravel.
 			Ο		E /9 -		
				1	E 20 =	1	
	-				L" =		
					F 1-	11	
							Engineer
	<u> </u>		<u> </u>	L			

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Compan Project Locat Water Time	y ion of Bo	oring: 47.0'					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 Field Party: Roush and Reitmire
Date	o Z	depth -to et)	lard ation fance Foot	gth of sample	DEPTH	GRAPH	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes,
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	FEET	SOIL	blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
	5	23-24.5	^{5/} 9/ ₉	12"	20		Medium brown fine sand and gravel.
	6	28-29.5	7/ 6/ ₅	11"	29 - 30 - 30 - 30 - 30 - 30 - 30 - 30 - 3		Same as sample number 5.
•	7	33-34.5	4/ _{5/₅}	7"	31 - 32 - 33 - 34 - 35 - 35 - 35 - 35 - 35 - 35		Medium brown fine sand w/trace of gravel.
	8	38-39.5	12/12/11	14"	36 - 37 - 38 - 39 - 40 -		Same as sample number 7 w/light brown sand

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

lob No.					•		
Compan	У						Boring No. 404 Date 10-28-76 Sheet 3 of 3
Project							Type of Boring Rig
Locat	ion of Bo	oring:					Roring bogun Roring completed
Water	Level	47.0			***		Ground Elevation referred to Datum
Time							Field Party: Roush and Reitmire Datum
Date		<u> </u>					Field Party: Abdon and notice
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.
	9	43-44.5	^{5/} 8/ ₁₃	13"	41 - 41 - 41 - 41 - 41 - 41 - 41 - 41 -		Medium brown fine sand w/trace of gravel.
	10	48-49.5	4/6/9	14"	48 - 48 - 50 - 50 - 50 - 50 - 50 - 50 - 50 - 5		Water Same as sample number 9.
	11	53-54.5	3/4/6	18"	51-51-53-554-556-56		Same as sample number 9 w/medium grain sand.
	12	58-59.5	4/7/8		58-		No recovery. Stopped hole at 59.5' 10-28-76
							Engineer
							

AMERICAN ELECTRIC POWER SERVICE CURPURATION

Job No	0.				I	LOC	G OF BORING
Compa	ıny	Appa lachi	an Powe	r Comp	any		Paring No. 405 Data 1-24-77 Short 1 4 2
Projec		Project 1	.301 – A	sh Pon	d		Boring No. <u>405</u> Date <u>1-24-77</u> Sheet <u>1</u> of <u>3</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
Loca	ition of I	Boring:				•	Casing used Size Drilling mudused
Water	Level	51.0	1			************	Boring begun 1-24-77 Boring completed 1-25-77 Ground Elevation 603.14 referred to
Time							———— Datum
Date		1-24	-//		~ 		Field Party: King and Smithson
- =	, o Z	ŧ.	- F 6 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ngth of sample	DEPTH	GRAPH	DESCRIPTION
Depth of Casing, ft.	9	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Fobt	Tot. length or recov. samp	IN		Soil type, color, texture, consistency, sampler driving notes,
Sep	Sample 1	amp fro	Sta Pene Resi	ot. 16	FEET	SOIL	blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		<u> </u>		100	water level, notes on driving ease, etc.
		-	 		F 0 =		
					E,=		
					F =		
					2 -		
			<u> </u>		$E_3 =$		
		1				177	
			2/	<u> </u>	E 4 =		
	1	3.5-5	4/3	5"	5 -		Fragments of clay with silt.
					F , =		
					6 -		
			1		7 -		
	1			-	E 8 =		
					E°3		
			5/		- 9 -		
	2	8.5-10	5/ 6/ ₇	8"	E /0 =		Brown sand.
					F " =		
					F/1=]		
					E /2 =		
		ŀ			E . =		
					- /3 -		
			7/2/		14	///	
	3	13.5-15	7/ _{8/9}	7"			Same as sample number 2 w/some larger grains.
					- /5 - -		0 8
					/6 -		
					- /7 =		
	. ,	•			= ' =	-	
					_ /8 _	-	,
			/. /		- - - / 9 -	///	
	4	18.5-20	4/ 4/ ₇	6''	_		Same as sample number 3.
				0	-20-	4	come to eximple fidumet ?.
	·				_ ,]		
					-		Engineer
·						<u>-</u>	

AMERICAN ELECTRIC TOWER SERVICE CORTORATION

Job No	o				. !	_OG	OF BORING
							Boring No. 405 Date 1-24-77 Sheet 2 of 3
		1		-			Boring No. <u>405</u> Date <u>1-24-77</u> Sheet <u>2</u> of <u>3</u> Type of BoringRig
Loca	ition of B	oring:					Casing used Size Drilling mud used
Water	Level						Boring begun Boring completed Ground Elevation referred to
Time							Datu
Date					·		Field Party: King and Smithson
	ó	#	_ 5 0 5	Tot. length of recov. sample	DEPTH	H.	DESCRIPTION
Depth of Casing, ft.	0 Z	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	ng th sam	IN	GRAPH	Soil type, color, texture, consistency, sampler driving notes,
Oept osin	Sample	fror fron	Stan enet esis ows	۰. او	FEET	SOIL	blows per foot on casing, depths wash water lost, observed
- 0	Ň	Sa		င္ မိ	<u> </u>	S	fluctuations in water level, notes on drilling ease, etc.
					E20 =		
	. *				= =		
	 		 		F21 =		
					F . =		
			1		£ 22 =		
			<u> </u>	ļ	上23二		
1					F =	777	
			4/		F 24 =		
	5	23.5-25	4/4/8	6''	F 25 -		Light brown sand.
					E" =		
		<u> </u>	ļ		- 56 -		
		41			F =		
		l			27 -		
					E 28 =		
						77	
			6/		- 29 -	<i>V//</i>	
	6	28.5-30	6/ 8/ ₇	5"	E 30 =	<i>\</i> //	Larger grain sand with small gravel light brown.
					E		
					-31-		
	No. 19						
					32		
					E 33 =		
					F =	77	
			8/		[34]	///	
	7	33.5-35	11/11	6"			Medium grain sand - light brown.
					\mathbb{E}_{2} , \mathbb{E}_{3}		
			<u> </u>		36 -		
					F =		
				····	37	t	
					E 38 =		
					F =	//	
			11/	······································	39-	///	
	8	38.5-40	11/1/15	6"	F 1/2 =	1//	Gravely sand - light brown.
					E 70-3		
					1=	-	
				•			Engineer
	·I						

ORM CE - 5

HITCH LEADING TO THE STATE OF T

lob No	•				1	_OG	G OF BORING
Compar	ıy						Boring No. 405 Date 1-25-77 Sheet 3 of 3 Type of Boring Rig Casing used Size Drilling mud used
			Mark Control of the C				Type of Boring Rig Prilling mud used
Locat	tion of B	oring:					Boring begun Boring completed
Water	Level						Ground Elevation referred to
Time							Datum
Date		1					Field Party: King and Smithson
- =	o Z	ŧ .	d no d	h of npie	DEPTH	GRAPH	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	FEET	SOIL GR	blows per foot on casing, depths wash water lost, observed
				<u> </u>	- //2 =	\prod	
					E-40 =		
	 	ļ	-	<u></u>	<u> </u>		
					F , -	$\ \ $	
					£ 4/2 =		
					F_/3 =	$\ \ $	
					F' -	11,,	
	<u></u>	 ,	4.7	<u> </u>	- /4 -	1//	
	9	43.5-45	7/6	5"	F /5 -	1//	Same as sample number 8 with more gravel.
			<u> </u>		£ \frac{1}{5} =	11	
					E 46 =		
					E . =		
				<u> </u>	<u> </u>		
					E 48 =		
					-	 ,,	
				<u> </u>	<u>-</u> 49 -	<i>\\\\</i>	1
	10	48.5-50	⁹ 9/ ₁₁	8"	E_{A}	1//	Small gravel with some sand.
	10	40.3 30	1 1	0 -	F50=	11//	
					E /1 -	1	Water
					E -		
					- 52 -	11	
					ļ		
		<u> </u>			£ 5/3 =	<u> </u>	
		<u> </u>	<u> </u>	<u> </u>	E 54 =	1//	7
		E0 E 55	4/ 7/ ₈	10"	F -	1//)
	11	53.5-55	8	10	55 -	#	Brown medium grain sand.
				1	E 56 =		
					E		
					<u> </u>		
					E		
				<u> </u>	<u> </u>		
					F 59 -	1//	
			4/4/7		E"=	1//	<u></u>
	12	58.5-60	. 77	8"	- 60 =	1//	Fine medium brown sand. Stopped hole at 60.0'
					E		1-25-77
					1-		
				<u> </u>	<u> </u>	Ш_	Engineer

AEP CIVIL ENGINEERING LABORATORY

Compa	any	Appalachia Project 1	an Power	Compa	ny		Boring No. 406 Date 1-25-77 Sheet 1 of Type of Boring Auger Rig B-50
L	ation of	Boring:	301 - A	SH FOIL	<u> </u>		Type of Boring Auger Rig B-50 Casing used Size Drilling mud used Boring begun 1-25-77 Boring begun 1-25-77
Water Time	r Level	51.0'					Ground Elevation 603.14 referred to
Date				· · · · · · · · · · · · · · · · · · ·			Field Party: King and Smithson
F	Τ .	J -c		T + 0	1	Ι±	
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.
			3/		2		
	1	3.5-5	5/7	18"	4 -		Silty clay.
	-	1					
					_ 7 _		
					8 =		
			3/		- 9 -	///-	
	2	8.5-10	4/5	8''	- , =		Same as sample number 1.
					- , 3		
					-/- =	-	
					- 2		
					- 3 -	-	
			5/		4 =		
	3	13.5-15	5/ 6/ ₇	6"	- 5	//-	Light brown sand,
					- 。 計		vagate brown Sanu,
					- 6 -	_	
					- 7]	-	
					8 =		
				_ =		7	
	4	18.5-20	4/ ₆	8" -	9 -		Medium grain sand with trace of small gravel.
					, 引	-	
					'		
	L						Engineer

AEP CIVIL ENGINEERING LABORATORY

Compa				-			G OF BURING
					_		Boring No. 406 Date 1-25-77 Sheet 2 of 3
Projec Loca		Boring:			-	===	Boring No. 406 Date 1-25-77 Sheet 2 of 3 Type of Boring Rig Casing used Size Drilling mud used
	r Level						
Time							Ground Elevation referred to
Date							Field Party: King and Smithson
	Γ.	T <u>e</u>		T + 0		TI	
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH	RAPH	DESCRIPTION
Sept!	n d m	nple from in fe	tand netri ssist	lenc v. s	FEET	U	Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed
ŭ	S	San	2 8 8 E	Tot.		SOIL	fluctuations in water level, notes on drilling ease, etc.
	L				<u> </u>	打	
	^	T			20 -	1 1	
	Í	-		-	21 -	11	
					F ,, -	<u> </u>	
					22 -] [
 				1	23 =		
					$F_{i,j}$	Hof	
	5	T = 25	6/7		F24]	1//	
	3	23.5-25	+/	9"	25	14	Light brown medium grain sand.
			•		F	1	
	Annual de la companya		1		E 26	. [
			 '	ļ	上加昌	, -	
1	21 - <u> </u>		1		F =	1 +	
					E 28]		
			5,		E 29 =	7//-	
	6	28.5-30	⁵ / ₆ / ₇	6"	F 1	1//-	Comp. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
					巨多計	1	Same as sample number 5 w/larger grain.
					巨羽引	1 -	
			1.	, /	E 1	1 -	
					32		
		 	 		E 33	, <u> </u>	
L			1	F		// 	
	7	22 5 25	10/2/2		34 -		
		33.5-35	12	6"	E 35 = 1/2	4	Light brown to light gray sand.
				F		<u> </u>	
					36		
					37		
		1		F	- 1		
					38		
			3/		39	/_	
1	8 .		101	10"		/ -	Same as sample number 7.
					- 40 - 11/2	4	bame as sample number /.
					- 1 =		
L_		<u> </u>		1			Engineer
					LL		Ligiteer

REV 3/74

Job No.	•				_		
Compan	ıy						Boring No. 406 Date 1-25-77 Sheet 3 of 3 Type of Boring Rig
					-		Type of BoringRig
Locat	ion of B	oring:					Casing used Size Drilling mud used
Water	Loval	<u> </u>					Boring begun Boring completed Ground Elevation referred to
Time	Level						Da:
Date							Field Party: King and Smithson
		T _c	T		T	Ŧ	DESCRIPTION
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	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 -		
					$\mathbf{E}'_{ij} =$		
					卡州 -		
					F-42 =		
					F =	1	
					-		
					F /4 =	1///	
		10 5 15	18/ 18/2	9"	- 4 -	1///	Same as sample number 8.
	9	43.5-45	1022	9"	<u> </u>	///	Same as sample number o.
					_ <u>_</u>		
					1/6 -	11	
					E 47 =]]	
	-				F =		
		-	<u> </u>	ļ.———	¥8 =		
					¥9 =	1///	
		40 5 50	17/32	6"	F -	1///	Medium brown sand w/trace of coal.
	10	48.5-50	32	6	<u> </u>	1//	Accuration of the second secon
					F =		Water
					<u> </u>		
		<u> </u>			- 52 -		
]	
					£ 53 =	11,,	
			10/		-54-	1///	
	11	53.5-55	14/12	5"	F -		Grayish gravely sand.
	11	33.3 33	12		<u> </u>	 	020,201. 820.02
					E 56 =]]	
					F -	1	
		<u> </u>	<u> </u>		F 57 -]	
			j		E 58 =		
					T _][,,	
			14/		<u> </u>	1///	
	12	58.5-60	14/ 16/ ₇		E60=		Small gravely sand (dark)
		1	†		E		•
			ļ	<u> </u>	‡ 1 =		Stopped hole at 60'
				* ,			Engineer
L		1	L			Ц.	

FORM CE'S REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No.	***************************************						0 0	
Compan	y <u>Ap</u>	palachiar	Power	Compar	ny			Boring No. 407 Date 10-27-76 Sheet 1 of 3
Project		oject 130)1 - Pro	posed	Ash P	ond	Area	Type of Boring Auger Rig B-61. Cossing yeard Size Drilling mudused
Locat	ion of Bo	oring:	Total Control					Casing used Size Drilling mud used Boring begun 10-27-76 Boring completed 10-27-76
Water	Level	Dry						Ground Elevation 613.27 referred to
Time			and the same of th					Datum
Date		<u></u>						Field Party: Roush and Reitmire
Г		+	E 0 5	e e	DEPTI	1 0	=	DESCRIPTION
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN	Havad	Soil	type, color, texture, consistency, sampler driving notes,
epth sing	nple	ple rom r fe	tand netr sist	e n	FEET	· _	u blow	s per foot on casing, depths wash water lost, observed
ان ۵	San	Sam	P. B.	Tot.		5	fluc	uations in water level, notes on drilling ease, etc.
					F	31		
					F 0 -	4		
					Ε,.			
					<u></u>	4		
	,				2 -	$\exists I$		
					–	1		
	/	<u> </u>	3/ _{4/3}		- 3 -	7/	7/	
	1	3-4.5	4/3	8''	E 4.	$\exists \ell$	Med	ium coarse and brown sand.
					E.	-14	4	
			<u> </u>		5 -	4		
			ŀ		F .]		
	<u> </u>			 -	- 6.	1		
					E 7.	川	*******	
					E	1		
 			3/	<u> </u>	8 -		7/	
	2	8-9.5	3/3/3	8"	F .	1	Sam	e as sample number 1.
			<u> </u>		F 9	3/		
					E /0 -	$\exists I$		
					<u></u>	4	ļ	
			 	ļ	<u> </u>	-]		
					F /-	- -		
				<u> </u>	E /2			
				ļ	E 13.	4	,	
	3	13-14.5	^{3/} _{4/6}	12"	E	-11/	-	ne as sample numberl.
		122 14.7	 	1.4	 /4 -	1/	/	ile as sample numbert.
	3°				<u> -</u> /5 .	#		
<u> </u>					E''			
					16.	1		
					E	士	 	
<u> </u>		<u> </u>			<u> </u>	1	<u> </u>	
					E/8-	1	,	
		10 10 5	7/7/6	1 / 11	E	41	//	
 	4	18-19.5	. 6	14"		31	Sai	ne as sample number 1.
	•				F .	41		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
\vdash					20 -]		
			,		E,]		
		<u> </u>	<u></u>	L. <u></u>	<u> </u>	_11_		Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

ob No.	*					.06	3 OF BOKING
Company	<i></i>		<u>,</u>			-	Boring No. 407 Date 10-27-76 Sheet 2 of 3
							Type of Boring Rig Casing used Size Drilling mud used
Locati	on of Bo	ring:					Boring begun Boring completed
Water I	evel	<u> </u>	<u>,, , , , , , , , , , , , , , , , , , ,</u>				Ground Etevation referred to
Time	_GVCI						Datum
Date	<u></u>						Field Party: Roush and Reitmire
		<u> </u>				II	DESCRIPTION
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	t to recipe donthe wach water lost observed
					- 20 - - 21 -		
		·			22-		
			6.1		- 23 -	#77	77
	5	23-24.5	6/ _{6/7}	10"	E 24 =		Medium brown and medium coarse sand.
		20 2.00			E		
					- 25 -]	
				Ì	26 -	1	
					E' =]	
					- 27 -		
						1	
			6/ 7/ ₉		E	1//	Fine medium brown sand.
	6	28-29.5	1 9	12"	- 29 -		Time medical provide the control of
					- - 30 -	11	
					E'	-	
			<u> </u>	 	<u> </u>		
				ļ	- 22][
					- 32 -		
		<u> </u>	9/	 	上33-	11/	///
	7	33-34.5	9/ _{10/15}	12"	F	11/	First six tenths fine sand.
					<u>-</u> 34 -	11/	Second six tenths sand with small gravel.
					35 -		
					E .		
-				 	- 36 -	#	
					F 31 -		
					F	=	
<u> </u>		 	17/	 	38 -	3//	//
	8	38-39.5	19/6	12"	 39	31/	Sand and small gravel.
1	<u> </u>				E".	31/	<u>//</u>
<u></u>		<u> </u>		 	-40-		
					E .		
-			 	 	1-	7	
		<u> </u>	<u></u>	<u> </u>	<u></u>	$\perp \! \! \! \! \! \! \! \! \perp$	Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Same as sample number 11.	Job No.					ŗ	.06	UP BURING
Type of Boring Segue Casing used Size Drilling mud used Barring Segue Size Size Size Size Size Size Size Siz		-	•				 	Boring No. 407 Date 10-27-76 Sheet 3 of 3
Water Level Time Date Solid Parly: Roush and Reitmire Date Solid Parly: Roush and Reitmire Description Field Parly: Roush and Reitmire Description Solid								Type of Boring Rig
Same as sample number 11. Stopped hole at 59.5 Same as sample number 11. Stopped hole at 59.5 Same as sample number 11. Stopped hole at 59.5 Stopp								Casing used Size Drilling mud used
Date Field Party: Roush and Reftmire Date Depth Roush and Reftmire Date Date Depth Roush and Reftmire Date	Water	l evel	T					Ground Flevation referred to
Date Field Party: Rough and Rettmire DESCRIPTION Soil type, color, twire, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Sand with larger gravel. Sand with larger gravel. Sand with small gravel. Sand gravel. Sand with small gravel. Sand gra		LEVCI .						
10 48-49.5 15/20 24 12" 48 48-49.5 15/20 24 12" 48 48 49.5 13/20 26 48 48 48 48 48 48 48 4	Date							Field Party: Roush and Reitmire
10 48-49.5 15/20 24 12" 48 48-49.5 15/20 24 12" 48 48 49.5 13/20 26 48 48 48 48 48 48 48 4					0		Œ	DESCRIPTION
10 48-49.5 15/2024 12" 48 50 50 50 50 50 50 50 5	Depth of Casing, ft.	Sample No.	Sample depti from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length o recov. sampl	IN		Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
10 48-49.5 15/2024 12" 48 50 50 50 50 50 50 50 5						E40 =		
10 48-49.5 15/20/24 12" 48						<u> </u>		
Sand with larger gravel. Second six tenths sand. Second six tenths sand and gravel. Sand with small gr						F#1 -		
Sand with larger gravel. Second six tenths sand. Second six tenths sand and gravel. Sand with small gr						Edo =]	
9 43-44.5 30/50/2 6" 7/4						L -		Ran through bolder.
10 48-49.5 20½4 12"				307		43 -	1//	
10 48-49.5 20½4 12"		9	43-44.5	50/2	6''	F // =		Sand with larger gravel.
10 48-49.5 15/20½4 12"						E''=		
10 48-49.5 15/2024 12" 9/3						<u> </u>		
10 48-49.5 15/2024 12" 9/3						$E_{J} =$]]	
10 48-49.5 15/2024 12" - 49 First six tenths sand. Second six tenths sand and gravel. Sand with small gravel. Sand with sm				<u> </u>		- 96 -		
10 48-49.5 15/2024 12" - 49 First six tenths sand. Second six tenths sand and gravel. Sand with small gravel. Sand with sm						E 47 =		
First six tenths sand. Second six tenths sand and gravel. Second six tenths sand and gravel. Second six tenths sand and gravel. Sand with small gravel. Sand with small gravel. Same as sample number 11. Stopped hole at 59.5' 10-27-76						<u> </u>		
Second six tenths sand and gravel. 10				15/		F 48 =	177	
Second six tenths sand and gravel. 10		10	48-49.5	2024	12"	E 1/2 =		First six tenths sand.
11 53-54.5 13/20/8 14" 54				,			1//	Second six tenths sand and gravel.
11 53-54.5 13/20/18 14" 54 Sand with small gravel. 12 58-59.5 20/8/22 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76						<u> </u>	11	
11 53-54.5 13/20/18 14" 54 Sand with small gravel. 12 58-59.5 20/8/22 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76						F / =		
11 53-54.5 13/20/8 14" 54						E		
12 58-59.5 20/ 18/2 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76						£ 52 -		
12 58-59.5 20/ 18/2 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76					i_	E_{A}		
12 58-59.5 20/ 18/2 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76				13/		E 33	1//	
12 58-59.5 20/ 18/2 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76		11	53-54.5	2018	14"	54 -		Sand with small gravel,
12 58-59.5 20/ 18/2 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76				}	٠	F -	 	
12 58-59.5 207 18 22 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76	· -					F-55 -		
12 58-59.5 20/ 18/2 14" 59 = Same as sample number 11. Stopped hole at 59.5' 10-27-76						E 56 =		
12 58-59.5 20/ 18/2 14" 59 = Same as sample number 11. Stopped hole at 59.5' 10-27-76						E =		
12 58-59.5 20 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76			<u></u>	 		 57 =		
12 58-59.5 20 14" 59 Same as sample number 11. Stopped hole at 59.5' 10-27-76						E <8_		
				207 18/		F		1 11
		12	58-59.5	22	14"	59 -		
						F / =	1/~	
Engineer						E 60 =		
Engineer				+		1 -		
								Engineer

AMERICAN ELECTRIC POWER SERVICE CORTORATION

lob No.							
Compan		ppalachia				,	Boring No. <u>408</u> Date <u>10-27-76</u> Sheet <u>1</u> of <u>3</u>
roject	P	roject 13	01 – P1	copose	d Ash I	ond	d Area Type of Boring Auger Rig B-61
	ion of B	oring:					Casing used Size Drilling mud used Boring begun 10-27-76 Boring completed 10-28-76
Water	Lovel	59.5		<u></u>			Ground Elevation 608.06 referred to
Time	Level	1 29.5		•			Datum
Date							Field Party: Roush and Reitmire
T		1		- o	T	II	DESCRIPTION
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	blows per foot on casing, depths wash water lost, observed
					F 0-		Boring offset about 40' because of corn field
	7				E , =		
					<u> </u>	1	
				 	2 -		
			1		F -		
		<u> </u>	3/4/		- 3 -	3///	
<u> </u>	1	3-4.5	3/ _{4/4}	8"	F 4 -	11/	Medium brown fine sand w/trace of gravel.
					<u> </u>	#/	/
		<u> </u>	<u> </u>		5 –]	
					F 6		
					E	3	
				<u> </u>	7 -	4	
					E -]	
			3/ _{4/4}	1	- 8 -	1//	
	2	8-9.5	4/4	18"	E , -		Same as sample number 1.
						#/	/
				 	E /0 -][
		1			上九二]]	
					<u> </u>		
		ļ		 	/2 -		
					上/3二		
			3/2/		E .		/
	3	13-14.5	3/5	14"		11/	Same as sample number 1.
					E -	11/	4
•			 	 	/5 - 		
					E 16]	
					F -		
			 	-	F /7 -] .	
					E /8 =	1	
			4/ _{3/₃}	1	E'	3//	<u>//</u>
	4	18-19.5	1 3	12"		31/	Same as sample number 1.
					F	#2	
				1	<u> </u>]	
			-	<u> </u>	1-		
							Engineer
L	L	1	<u> </u>	<u> </u>			

AEP	CIVIL	ENGI	NEI	ERING LABORATOR	Y	
	1	LOG ()F	BORING	•	

| Time Date Time Date Time |
|--|--|
| Water Level Time Date Time Date Time Time Date Time |
Water Level Time Date Time	sed
Time Date Time Date Time Date Time Date Dat	
Field Party: Roush and Reitmire Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, Solitype, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on driving blows per foot on casing, depths wash water lost, or fluctuation	Datum
DESCRIPTION Soil type, color, texture, consistency, sampler driving blows per foot on casing, depths wash water lost, or fluctuations in water level, notes on drilling ease, 5 23-24.5 8" Medium Provn fine sand.	
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	ing notes, observed
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	etc.
5 23-24.5 3/4/5 8" 24 = Medium brown fine sand.	
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	
5 23-24.5 374/5 8" 24 Medium brown fine sand.	
5 23-24.5 374/5 8" 24 Medium brown fine sand.	
5 23-24.5 3/4/5 8" 24 Medium brown fine sand.	
5 23-24.5 3/4/5 8" = 24 = Medium brown fine sand.	A
25 - 25 - 25 - 26 - 26 - 26 - 26 - 26 -	
25 - 25 - 25 - 26 - 26 - 26 - 26 - 26 -	
	·
6 28-29.5 12/14 14" = 29 = Light brown fine sand w/some grave1.	-
$\begin{bmatrix} & & & & & & & & & & & & & & & & & & &$	
73 77	
	Annual subseque de la reconstant de la participa de la company de la com
7 33-34.5 18" F g4 - Light brown coarse sand w/some gravel.	
F 36 =	
37 -	
8/8/6 14" So Light brown coarse sand and gravel.	
8 38-39.5 6 14" 39 Light brown coarse sand and gravel.	· · · · · · · · · · · · · · · · · · ·
Engineer	<u> </u>

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORTORATION

Job No.					L.	.OG	OF BORING
							Boring No. 408 Date 10-27-76 Sheet 3 of 3
							Type of BoringRig Casing usedSize Drilling mud used
Locat	ion of Bo	ring:					Casing used Size Driffing mud used Boring begun Boring completed
<u> </u>	11	1					Ground Elevation referred to
Water Time	Level						Datum
Date							Field Party: Roush and Reitmire Datum
Date				4.	т	T - 1	
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.
	9	43-44.5	15/ 30/34	18"	42 - 43 - 44 - 45 - 45 - 45 - 45 - 45 - 45		Light brown sand and gravel.
					F. 46 =		
				<u> </u>	47 -	$\exists \parallel \parallel$	
			·		E . =]	
-		<u></u>	20/		- 4/8 -	1///	
	10	48-49.5	²⁰ / ₂₉ / ₂₁	18"	E 49 =		Light brown coarse sand w/some gravel.
					上ンニ	1//	
	<u></u>			<u> </u>	- ⁵ 0 -	41	
					E_{J}]	
}	 	. :	 		51	- -	
					<u>-</u> 52 -]	
						-	
		ļ	107		- 53 -	11/7	
	11	53-54.5	10/11/10	14"	E _ =	1//	Light brown fine sand.
		33 31.3			54	1//	
					E 5 5		
-	 				E		
				ļ	<u> </u>]	
			1				
	<u> </u>	<u> </u>		<u> </u>	£ 57 -	3	
				}	<u> </u>	_	
	 		^{5/} 6/ ₆	 	-1- 28-	1//	
	12	58-59.5	6/6	12"	E 59][Coarse medium brown sand.
			T		E '-		Water
	L			ļ	- 60-	1	Stopped hole at 59.5
					 -		10-28-76
<u> </u>			 		- 1-	71	
				1		11	Engineer

AMERICAN ELECTRIC TOTAL SERVICE

lob No. Company	, Ap	palachia	n Power	Compa	ny		Boring No. <u>410</u> Date <u>10-26-76</u> Sheet <u>1</u> of <u>3</u>
Project	_	oject 130 ring:)1 - Pro	oposed	Ash Po	ond	Area Type of Boring Auger Rig B-61 Casing used Size Drilling mud used Boring begun 10-26-76 Boring completed 10-26-76
Water l		51.5					Ground Elevation 604.65 referred to
Time							Field Party: Roush and Retimire
Date						I	DESCRIPTION
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	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.
		n e			0 -		Boring offset 5' east.
			27		2 -	77	
	1	3-4.5	2/4/4	5"	4 - 5 -		Medium brown fine sand.
					6 -		
	2	8-9.5	3/4/5	12"	8 -		Same as sample number 1 w/light colored sand.
					/0 -		
	3	13-14.5	^{5/} _{5/6}	14"	/3 - /4 -		Same as sample number 2.
•					/ 5 -		
	4	18-19.5	6/7/8	14"	/8 -		Same as sample number 2 w/some gravel.
					20 -		Engineer

FORM CE-5 REV. 3/74

AEP CIVIL ENGINEERING LABORATORY

Job No.	4					.00	or boking
Compan	у						Boring No. 410 Date 10-22-76 Sheet 2 of 3 Type of Boring Rig Casing used Size Drilling mud used
Project							Type of Boring Rig Rig Prilling mud used
Locat	ion of Bo	oring:					
Water	Level	T					Boring begun Boring completed Ground Elevation referred to Datum
Time							Field Party: Roush and REitmire Datum
Date		<u> </u>					Field Party: Kodsii and KEILMITE
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.
	5		8/ _{10/₁₁}	14"	21 - 22 - 23 - 25 - 26 - 27 - 28 - 28 - 28 - 28 - 28 - 28 - 28		Medium brown sand and gravel.
	6		8/ _{8/8} 6/ _{9/12}	13"	30 - 31 - 31 - 32 - 33 - 33 - 33		Same as sample number 5.
•	7				34 - 35 - 36 - 37 - 38 - 38 - 38 - 38 - 38 - 38 - 38		Same as sample number 5.
	8	38-39.5	6/10/12	13"	×9		Same as sample number 5. Engineer

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

							Boring No. 410 Date 10-26-76 Sheet 3 of 3
							Type of Boring Rig Casing used Size Drilling mud used
	ion of Bo						Boring begun Boring completed
Water Time	Level	51.5		·			Ground Elevation referred to Datum
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 foct on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
	9	43~44.5	12/	8"	42 - 43 -		Medium brown sand w/trace of gravel.
	10		5/10/		45 - 45 - 45 - 45 - 45 - 45 - 45 - 45 -		Same as sample number 9.
			7/10/19		51 - 52 - 53 - 53 - 53 - 53 - 53 - 53 - 53		Water
•	11	53-54.5			56		Same as sample number 9 w/more gravel.
	12	58-59.5	14/	16"	58 =		Same as sample number 11. Stopped hole at 59.5 10-26-76 Engineer

AMERICAN ELECTRIC PONEL SERVICE

Job No.					L	OG.	OF BORING
Compan	v Ar	palachia	n Power	Comar	ny		Boring No. <u>411</u> Date <u>10-27 76</u> Sheet <u>1</u> of <u>3</u>
Project	Br	oject 13	<u>01 - Pr</u>	oposed	l Ash P	ónd	Area Type of Boring Auger Rig B-61
Locat	ion of Bo	ring:					Casing used Size Drilling mud used Boring begun 10-22-76 Boring completed 10-26-76
Water	Level	55'					Ground Flevation 607, 25 referred to
Time							Field Party: Roush and Reitmire
Date		<u> </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.
ი ვ	S	Sar	~ ~ <u>~</u>	는 e		S	
					<u> </u>		Moved boring 5' north
					F , =		
					E ' =		
					F 2 -	1	
					F 3 =	1	
		2 / 5	3/ _{4/4}	9 4 11	F -		Medium brown fine sand.
	1	3-4.5	44	14"	F 4 =		Hedram brown Time Start.
					5 _	1	
					<u> </u>		
					F 6 -		
					F 7 =		
					E =		
			3/ _{4/4}		£ 8=		
 	2	8-9.5	4/4	12"	- 9 -		Same as sample number 1.
					F 10 =	#	
			1.5		F / -		
-	<u> </u>				上カー		
			·		F /2 -		
					E / =	1	
			8/	 	F /3 =	1//	
	3	13-14.5	8/ 3/ ₅	14"	E 14		Same as sample number 1.
					F -	#	
-	 				/5 -]	
		ļ		<u></u>			
					F		
					E''=]	
	<u> </u>	<u> </u>	5/	ļ	/8-	#>	
	4	18-19.5	5/ 5/ ₅	12"	- 19 -		Same as sample number 1.
					<u> </u>	#2	
·	-		 	 	- J0 −		
	<u> </u>		·	ļ	F 13][
			1				Engineer

FORM CE-5 REV. 3/74 AMERICAN ELECTRIC POWER SERVICE CORPORATION

Project Location Water Lev Time Date	of Bor				DEPTH	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 DESCRIPTION ype, color, texture, consistency, sampler driving notes, sper foot on casing, depths wash water lost, observed		
Depth of Casing, ft.	v	23-24.5	27/5/4 Sesis 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	8"	70	SOIL GRAPH	Medium brown fine sand. Light brown fine sand,	
		33-34.5 38-39.5	6/ _{8/5}	10"	32		Medium brown sand w/trace of gravel. Light brown fine sand.	

FORM CE-5

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Company Project		oring:					Boring No. 411 Date 10-26-76 Sheet 3 of 3 Type of Boring Rig Casing used Size Drilling mud used
Water L Time Date	,	55 '				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.
	9	43-44.5	8/ _{9/13}	14"	/2 - /3 /4 /5 /6 - /6 /6 - /6		Medium brown sand and gravel.
	10	48-49.5	5/ _{6/₁₁}	13"	/7 - - - - - - - - - - - - - - - - - - -		Same as sample number 9 w/less gravel.
	11	53-54.5	6/ _{9/₁₂}	13"	52		Same as sample number 9 Water
	12	58-59.5	8/6/6	15"	57 - 58 - 59 - 60 - 1 -		Same sample number 9, Stopped hole at 59.5' 10-26-76

THE WALL THE CASE OF THE CASE OF THE PARTY O

Job No.	·						
Compan	y Appa	alachian	Power C	ompany	7		Boring No. 412 Date 1-26-77 Sheet 1 of 3 Type of Boring Auger Rig B-50
Project		ect 1301	- Ash	Ponds			Type of Boring Auger Rig B-30
Locat	ion of Bo	oring:					Casing used Size Drilling mud used Boring begun 1-26-77 Boring completed 1-27-77
Water	Level	52.0'					Ground Elevation 600.49' referred to
Time							Datum
Date		1-26-77					Field Party: King and Smithson
		Æ	F 0 +	e 5¢	DEDTIL	APH	DESCRIPTION
Depth of Casing, ft.	ž	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH	GRAI	Soil type, color, texture, consistency, sampler driving notes,
pth ing	Sample	a Eo	and netro sist	v. s	FEET		blows per foot on casing, depths wash water lost, observed
9 S	Sam	E i	Per Re Blo	ot.		SOIL	fluctuations in water level, notes on drilling ease, etc.
	<u></u>				_	1	
					- 0 -		
		·			F , =		
		,			E ' =	1	
					2 -	11	
					E =		
					3 -	1	
	•				E 4=	1//	
			10/1 ₁₅		E =		
	1	3.5-5	15	18"	<u> </u>	1//	Sandy, silty clay.
	i e i				E =]	
			<u> </u>		6 -]	
					- , -		
					E :]	
			<u> </u>	ļ	8 -	:[]	
-			7/ _{8/8}		- 9 -	1///	
	2	8.5-10	· °/8	8''	$E_{0}=$		Red sand - medium grain.
					F ' =	#	
					<u>-</u> / -		
					F , =		
					L /2 -		
	. • • • • • • • • • • • • • • • • • • •				E /3 =		
					E	1/7	
			3/		 	1//	
	3	13.5-15	4/7	9"	E /5 =	11/2	Medium grain brown sand.
					E / 3	1	
<u> </u>			ļ <u>.</u>		- 16-		
					E . =		
					 		
					E /8 =		
					F =	#-	
 			3/			1//	
	4	18.5-20	^{3/} _{4/3}	5"	E 20 =	1//	Fine grain brown sand
					E	\prod'	
					<u> </u>	11	
		·			1		Engineer
L		L	L	<u> </u>	1	<u> </u>	Litymeet

Job No.				-			LO	G OF BORING
Company	/							Decis N 412 - 1 06 77
Project								Boring No. 412 Date 1-26-77 Sheet 2 of Type of Boring Rig
Locati	on of E	Boring:						Casing used 5176 Prilling mud used
.Water L	evel	T						Boring begun Boring completed
Time								Ground Elevation referred to
Date								Field Party: King and Smtihson
	•	T- <u>s</u>			·- 0	1	Ιx	Trick tarty and Smithson
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration	Too!	lot, length of recov. sample	DEPT	GRAPH	DESCRIPTION
e p†	nple	ple rom fee	and	× S/1	leng ′. sc	FEET		Soil type, color, texture, consistency, sampler driving note
اگ ۵	Sar	Sam f (ir	\2 P	B o B	9°.	[[]	- -	1 MIGWS DELIUOL ON CASINA denthe wach water I
					- <u>-</u>	<u> </u>	- 	fluctuations in water level, notes on drilling ease, etc.
					······································	20 -	-][
						F ,	1	
						E 21 -	31	
	· · · · · · · · · · · · · · · · · · ·					- 22 -		
						E -	- -	
						-23 -	31	
						24 -		
	5	23.5-25	; //7/	,				
 		-000 20	<u></u>	/ 6	5"	z5	1//	Medium grain sand - light brown.
				1-		_ 26 _]	
 						- - 27 -		
					ţ] -	
						- 28 -	11 F	
			1		þ		177	
			4/3/3			- 79 -	1//	
	6 2	8.5-30	3	91		-30 -	1/4	Medium to fine grain sand.
25					E		'l -	
11,40			1			-31-	1 -	
					F		1 L	
					F	32 =	1	
			 		<u> </u>	- 33	1 -	
			<u></u>		F	_, =	1//	
7	2.	3.5-35	6/6/6		E	34		
	- 3	0.3-33	6	8''	<u></u>	35.	//_	Same as sample number 6.
				1	E		_	
			 	 		36	-	
	_				F	37		
					E	"]		
				 	<u></u>	78	_	
				1	F	+	//	
	20	- , <u>.</u>	8/		+	39	//-	
8	138	.5-40	11/10	6"	E	40 ±1/		Medium grain sand w/one large gravel.
				1	上'	TE *		whome rarge gravel.
				 		1 -	-	
	<u></u>							Engineer
								

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING Job No. Company ____ Boring No. <u>412</u> Date <u>1-27-77</u> Sheet <u>3</u> of Project Type of Boring _____Rig__ Location of Boring: Casing used_____ Size____ Drilling mud used___ Boring begun Boring completed Ground Elevation referred to Water Level Time Date Field Party: King and Smithson Tot. length of recov. sample Sample depth from-to (in feet) Standard Penetration Resistance Blows/Foot Sample No. ₩# DEPTH DESCRIPTION Depth Casing, IN Soil type, color, texture, consistency, sampler driving not blows per foot on casing, depths wash water lost, observe FEET fluctuations in water level, notes on drilling ease, etc. 40 -10/15 9 43.5-45 7" Medium grain sand - light brown Trace of coal. 4 8 9/ 12/ 15 10 48.5-50 7" Same as sample number 9 w/no coal. 51 -Water 53 · 9/8 11 53.5-55 12" Medium grain sand. 56 57 -<u>√8</u> -167 9/11 12 58.5-60 -0-No recovery. Stopped hole at 60.0' 1-27-77 Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No.					•		or boxime
Compan	y Ar	palachia	n Power	Compa	my		Boring No. 413 Date 3-3-77 Sheet 1 of 3 Type of Boring Auger Rig B-50
Project	Pr	oject 13	01 - As	h Pond	l Area	Type of Boring <u>Auger</u> Rig <u>B-50</u> Casing used Size Drilling mud used	
Locat	ion of Bo	oring:					Boring begun 3-3-77 Boring completed 3-3-77
Water	Level	50 '					Ground Elevation referred to
Time						Datum Datum	
Date		1					Field Party: Smithson and Smith
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.
					1 - 2 -		
	1	3.55	5/ _{5/6}	6"	3 — - 4 — - 5 —		Medium brown sand w/small pea gravel.
					7 -		
	2	8.5-10	4/ 3/ ₄	7"	9 -		Same as sample number 1.
					/1 -		
					E /3 =	1	
•	3	13,5-15	3/4	9''	/4		Medium brown sand w/legnite.
			4/,		/7 - /8 -		
	4	18.5-20	4/ _{7/8}	10"	20-		Medium brown sand w/some pea gravel.
							Engineer

Job No							G OF BORING
							Boring No ⁴¹³ Date <u>3-3-77</u> Sheet <u>2</u> of <u>3</u>
Project	t						Type of BoringRigRig
Locat	tion of B	oring:				Casing used Size Drilling mud used	
Water	Level	T			·	Boring begun Boring completed Ground Elevation referred to	
Time							Datum
Date		1	·				Field Party: Smithson and Smith
Γ.		ŧ.	E # 5	of o	DEPTH	RAPH	DESCRIPTION
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN	GRA	Soil type, color, texture, consistency, sampler driving notes,
)ept	E C	from fer from	Stan enet es is	. ler 0V.	FEET	SOIL (
L Ö	×	Sai	0.00	Te a		S	fluctuations in water level, notes on drilling ease, etc.
					E, 0 =]	
					E =]	
		<u> </u>			21 -	11	
					E 22 =		
				.]	E		
			7/ _{6/7}		- 33 -	1	
	5	23.5-25	6/7	8''	F 24 -		Medium brown sand w/trace of pea gravel.
•					F -		/
		<u> </u>		1	- 55 -	$\mathbb{H}^{\prime\prime}$	
					E 26 =		
					_ =		
			ļ 		27 -]]	
					E 28 =		
	6	28.5-30	6/ 7/ ₆	7"		1	
		20.5-30	0	-/	- 29 -		Same as sample number 5.
					E 30.	1//	
					31-		
				<u> </u>	E 3 2		
	•		9/		<i>- 3</i> 3 <i></i>		
	7	33.5-35	9/ 12/ ₁₂	11"	E34 =		Medium brown medium coarse sand and gravel.
					35	177	
			· · · · · · · · · · · · · · · · · · ·		36 -		
					F _ =		
	******		-	 	37		
			61		38 =		
	8	38.5-40	6/ 8/ ₁₁	12''	F	1/1	Same as sample number 7.
			**		39 -		A SANCE OF THE SAN
					1/0-	1/	
			*		F. =		
					'		
		<u> </u>			Ll		Engineer

AEP CIVIL ENGINEERING LABORATORY

Job No).					LOC	G OF BORING
Compai							Boring No. <u>413 Date</u> <u>3-3-77</u> Sheet <u>3</u> of <u>3</u>
Projec							RigRigRigRigRig
Loca	tion of E	Boring:					Casing used Size Drilling mud used
	Level						Boring begun Boring completed Ground Elevation referred to
Time Date				······································			Datum
Date		<u> </u>				T ==	Field Party: Smithson and Smith
~ ±	Š.	epth (+)	rd fion nce	ngth of sample	DEPTH	1 4	DESCRIPTION
Depth of Casing, ft.	Sample	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	FEET	SOIL GR.	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.
					E1/0 =		
					E -	1	
		 		 	41 -		
					E 42 =		
					L -		
			12/		$\frac{1}{2}$		
	9	43.5-45	15/14	15"	F.44 =		Light brown sand and gravel.
					F ,, =		Very small claylike seam. Light brown sand and gravel.
					£ 45 —		am o
<u> </u>	· · · · · · · · · · · · · · · · · · ·		 		46 =		
					F =		
					E" =		
		<u> </u>	18/	 	<u> </u>		
	10	48.5-50	18/ 26/ ₂₄	10"	- 49 -		Dark brown silty sand and gravel.
].	ł	上 ' =		
			 	 	F 70-	4/4	Water
					E - 3		
					F , -		
				 	52		
			10/		E 83 3		
	11	53.5-55	10/12/11	12"		1	Light brown fine sand w/trace of gravel.
					- 5 ⁴ -		
					55-	$ \mathcal{L} $	
					_ 56 _		
					E 57 =	-	
					$=$ ≤ 8 $=$		
	12	58 . 5-60	5/ 8/ ₁₀	9"		-,-	Paul brown - 114
	17	00-J-00	10	י י	- (9 -	// /t	Dark brown silty sand.
					= 60 	1/4	Stopped hole at 60.0'
		-				-	3-3-77
					- 1 -	-	
				1			Engineer

AEP CIVIL ENGINEERING LABORATORY

Jób No).				i	LOG	OF BORING
Compai	Company Appalachian Power Company				pany	Boring No. 414 Date 3-3-77 Sheet 1 of 3	
Projec	t	Project :	1301 – .	Ash Por	nd ARea		Boring No. 414 Date 3-3-77 Sheet 1 of 3 Type of Boring Auger Rig B-50
Loca	tion of B	foring:					Casing used Size Drilling mud used Boring begun 3-3-77 Boring completed 3-3-77
Water	Level	481					Ground Elevation referred to
Time							Datum
Date							Field Party: Smithson and Smith
	o Z	##	_ 5 8 5	p of	DEPTH	Hd	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN FEET	SOIL GRAPH	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.
					上。二	<u> </u>	
					F . =]	
					E '=		
		 	<u> </u>	 	2 -	 	
]]	
			4/ _{7/10}		E 3 =		
	1	3.5-5	// 10	12'	4 -	1///	Light brown silty clay.
				 	5		
					E 6 =		
			1.		E =		
			 		7 -		
			<u> </u>		E 8 =		
	2	8.5-10	4/ _{4/5}	811	_	1//	Medium brown, medium silty sand.
					- 9 -		AND
					三 ルニ		
					F . =		
					E '' =		
					E /2 =		
						-	
			5/ 4/ ₄		- /3 - 		
	3	13.5-15	4/4	7''	L /4 _		Same as sample number 2 w/trace of pea gravel.
					E , =		
.	- 	<u> </u>			/5 <u></u>		
						-	
					- /7 - -		
	-		6/		/8		
	4	18.5-20	5/ ₅	10"	F _ =	1//	Same as sample number 3.
				**	- /9 - -		
					- 20 -	/	
					= =	-	
					- 1 -		
							Engineer

AMERICAN ELECTRIC PUMER SELVICE CORPORATION

Job No),					_0G	OF BORING
Compar							Boring No. 414 Date <u>3-3-77</u> Sheet <u>2</u> of <u>3</u>
Project	t						RigRig
Locat	ition of B	oring:					Casing usedSizeDrilling mud used Boring begunBoring completed
	Level						Ground Elevation referred to
Time		_					Datur
Date							Field Party: <u>Smithson and Smith</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.
	5	23.5-25	7/ _{8/8}	11"	20 - 21 - 22 - 23 - 23 - 24 - 234 -		Medium brown coarse sand and pea gravel.
					25		
	6	28.5-30	8/ ₉	9"	29		Light brown fine sand.
			8/ .		31 - 32 - 33 - 33 - 33		
	7	33.5-35	8/ _{8/10}	13"	34 =		Medium brown coarse sand and gravel (pea)
					36 -		
	8	38.5-40	8/0/ ₁₀	8"	38 - 59 - 70 -		Same as sample number 7.
							Engineer

AMERICAN ELECTRIC FORER SERVICE CORPORATION

Job No). <u> </u>		-	-	•	-00	o or boxino
							Boring No. <u>414</u> Date <u>3-3-77</u> Sheet <u>3</u> of <u>3</u>
Projec	<u>t</u>						Type of Boring Rig
	ation of B						Type of Boring Rig Casing used Size Drilling mud used
Water	r Level						Boring begun Boring completed
Time							Ground Elevation referred to Date
Date							Field Party: Smithson and Smith
	Γ.	T	T	of of	-	T	
₩ ±	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	ngth of sample	DEPTH	RAPH	DESCRIPTION Soil type soler toylure sensistency sampler driving pater
Depth o Casing, 1	Sample	one com-	andc letra sisti	ot. length	FEET	ပ	son type, color, texture, consistency, sampler driving notes,
اق ۵	Sam	fr fr (in	Pen Res	Tot. ler	Par.	SOIL	fluctuations in water level, notes on drilling ease, etc.
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		+==		1	Tradecastrone in trace to any increase the same and the s
			-		- 1/4 -]	
1 1	-		ļ		E/1 =	1	
					E"=		
					E /2 =	<u> </u>	
	l				 	4 '	
 			57	+	¥3 =	<u> </u>	
1 1	9	43.5-45	5/ 6/ ₈	10"	F ,, =	11//	Dark brown medium to coarse sand and pea gravel.
	1	1	ļv	1	E 44 =	1//	
	Ĺ				F 45 =	1/2	
	ľ				F =	11 1	:
-	·		 	 	F46 =	$\prod_{i=1}^{n} A_i$	
	1 1				\mathbb{F}_{y_7}		
	i			 	+41=	1 1	
	<u> </u>		<u> </u>		E 48 =	\coprod	Water
	10	48.5-50	10/ _{3/₁₄}		F' =	4	Ne_1s
	10	40.5-50	14	14"	<u> </u>	1//	Medium brown silty sand and pea gravel.
) 	1			E&3	KA	
					上"三	1	
		<u> </u>	<u> </u>	<u> </u>	Esil		
	, '	1	1 '	1	E	11	
 			 	<u> </u>	F 52 =	1 1	
	<u> </u>		<u> </u>		F ,]	,	
			77	1	$\begin{bmatrix} -5^3 \end{bmatrix}$		
	11	53.5-55	8/10	4''	E 54 =	1//	Medium silty sand w/gravel.
	1	1	1	1	F =	VA	
<i>i</i>			-		55	++	
					56	1	
	,				F I		
	J	 			57	1 }	
		1	1 1	1 1	F 4	1 +	
			15/19/20				
	12	58.5-60	20	10"	59 =	1/1	Medium brown fine to medium coarse sand.
	1	,		it	F , 1	1//	
				, -	[4 -	14	Stopped hole at 60.0' 3-3-77
			, [, ,	F . #	1+	3-3-//
		1		,	1 -	1	
							Engineer

						LOC	G OF BORING
Projec		Appalachi Project I Boring:				<u>a</u>	Boring No. 415 Date 3-8-77 Sheet 1 of Type of Boring Auger Rig B-61 Casing used Size Drilling mud used
Water Time	r Level						Boring begun Boring completed Ground Elevation 3-8-77 referred to 3-8-77
Date							Field Party: Roush and Reitmire
Depth of Casing, ft.	Samplo 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.
			2/		1 - 2 - 3		
	1	3-4.5	4/4	14"	5 - 6 -		Medium brown clayey silt.
	2	8-9.5	4/ _{5/7}	13"	7 - 8 - 9 - - -/0 -		Medium brown clayey silt. Medium brown sand.
			3/		/1	177	
	3	13-14.5	3/4/6	8"	/ 4		Medium brown, medium grain sand
	4	18-19.5	2/3/5	8"	/7/8/9/9/9/9/		Medium brown sand,
					20 =		Findinger

Job No	o,					LOG	OF BORING
Compa	ny						Doning No. 415 Det. 2 0 77
Projec	t				-		Boring No. <u>415</u> Date <u>3-8-77</u> Sheet <u>2</u> of <u>3</u> Type of Boring Rig
Loca	tion of	Boring:	-				Type of Boring Rig Casing used Size Drilling mud used
	Level						Boring begun Boring completed
Time							Ground Elevation referred to Date
Date							Field Party: Roush and Reitmire
	, o	đ ŧ	E e e e	<u> </u>	DEPTH	APH	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN FEET	GR	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.
	5	23-24.	3/4/7	15"	21 - 22 - 23 - 24 - 25 - 26 - 26 - 26 - 26 - 26 - 26 - 26		Medium brown sand w/trace of pea gravel.
	6	28-29.5	5/8/8	13"	28 - 30 - 31 - 31 -		Same as sample number 5 w/more pea gravel. Medium brown coarse sand and pea gravel.
					-32 -		
					_		
	7	33-34.5	6/ 10/ ₁₂	14"	33-		Medium brown sand and pea gravel.
					-35 -		
					- 36 -	-	
					- 37 -		
				Ė	- =		
			10/		- 1/8 -	///_	
	8	38-39.5	22/28	16"	- 59 -	///-	Medium and medium brown coarse sand and gravel,
					- 40	7	Medium brown medium coarse sand and pea gravel w/trace of large gravel.
					- 1-	-	Fnginoor

AEP CIVIL ENGINEERING LABORATORY

laot						LOG	OF BORING
Comp	oany			-			
Proj€	ect						Boring No. 415 Date 3-8-77 Sheet 3 of Type of Boring Rig Casing used Size Drilling mud used
		of Boring:					Type of Boring Rig Rig
Wate	er Leve	21			<u> </u>		Boring used Size Drilling mud used
Time		31					Boring begun Boring completed Ground Elevation referred to
Date							
Γ	T						Field Party: Roush and Reitmire
75 #	, o	Sample depth from to (in feet)	- E 0 to	p e	DEPTH	APH	DESCRIPTION
Depth of Casing, ft.	<u>a</u>	a de	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN	GRA	Soil type color taytura consists
Der	Sample	fro f	Stan enet esi:	 	FEET	1 2	Soil type, color, texture, consistency, sampler driving note blows per foot on casing, depths wash water lost, observed fluctuations in water lovel, and
<u> </u>	1 0	Sa	<u> </u>	Tot		S	fluctuations in water level, notes on drilling ease, etc.
<u></u>						11	The state of the s
				 	F/0 -]	
ļ	 				E , =	# E	
					+ 41 =	11 [
<u> </u>	 			-	F/2 =] L	
					F' =	11 F	
	 		10/12/4		-43 -	11/	
	9	43-44.5	12/4	13"	E -	1///	Modd 1
					- 44 -	1///	Medium brown gravely sand.
					F , 7	1	
					<u> </u>		
					46	1 1	
				F	= ' =		
					-47 -		
				E		-	
			11/3/5		- 4/8 -	7/	
	10	48-49.5	1315	14"	- "一二	///	Medium brown good and
				E	- 49		Medium brown sand and pea gravel. Water
		 			-6-		
					- 1		
			 	E	1-11-		
			1 1	þ			
	-				- 52		
			.,,	E	- 3 = 1		
	11	53-54.5	10/	E	/E ,	//	
-		22-24.2	13	10" F	-54]	//	Medium brown sand with pea gravel and lignite.
				F	#	4_	For Stayer and Tignite.
				— <u>E</u>	· 5 5	-	
		<u> </u>		F	ノ出	-	
.				-	56		
					1		
	.]			E	s']		•
			11/		5/8		
	12	58-59.5	12/:1	1 1 11	$\rightarrow -100$	1-	N 11
					59-	}	Medium brown coarse sand and pea gravel.
				F	/ #/	1	Stopped hole at 59.5'
				E	10-	-	3-8-77
				E	,]		
	1						
	<u>l</u>					<u> </u>	Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

lob No.					-		
Compan	у Ар	palachia	n Power	Compa	ny		Boring No. <u>505</u> Date <u>11-17-76</u> Sheet <u>1</u> of <u>4</u>
Project	D~	oject 13	01 - Co	nveyor	•		Type of Boring Auger Rig B-61
Locati	ion of Bo	oring:					Casing used Size Drilling mud used Boring begun 11-17-76 Boring completed 11-18-76 Ground Elevation 586.9' referred to
Water	Level						Ground Elevation 380.9 referred to Datum
Time Date							Field Party: Roush and Reitmire
Date					T	ΙI	
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 -		
					2 -		
	1	3-4.5	2/ 3/ ₆	10"	4 -		Medium brown clay silt.
					5 -	#	
					- 6 -		
					- 7 -		
					8 -	11,	7
	2	8-9.5	3/5	811		3//	Top .3 medium brown silt
	4	0-7.3	ļ. — <u> </u>		上 9-	31/	remainder medium brown very wet
					E /0 -	1	pure silt.
					上 / -		
	1.				<u>-</u> -	- -	
		100	<u> </u>		F /2 -		
			2/	 	/3 	1	<i>/</i>
	3	13-14.5	2/ _{2/5}	6"		31/	Same as sample number 2.
					E	#	1
					-F '5 -	1	
			<u> </u>		F 16-]	
					<u>-</u> -	1	
			 	1	上/7-	引.	
			157			#/	
	4	18-19.5	15/17/2	3 8"	- /9 -	31/	Medium grain brown sand with gravel some
		1.0.17.5	1	1	L'	别	broken gravel.
	<u> </u>					1	
					<u> </u>		
							Engineer
	<u> </u>	1	<u></u>	ــــــــــــــــــــــــــــــــــــــ			Engineer

FORM CE-5

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

lob No.					L	UG	UF BURING
							Boring No. <u>505</u> Date <u>11-17-76</u> Sheet <u>2</u> of <u>4</u>
							Type of Boring Rig Casing used Size Drilling mud used
	ion of Bò						Casing used Size Drilling mud used
1		····					Boring begun Boring completed Ground Elevation referred to
Water	Level						Ground Elevation Datum
Time Date							Field Party: Roush and Reitmire
Date					1	II	DESCRIPTION
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	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.
				Υ	= Zo =		
					上四二]	
						1	
					L 2 -	11	
			761		<u> - 23 - </u>	11,,	
	5	23-24.5	16/ 18/ ₂₂	10'	<u>.</u> E		Sand and gravel with more smaller gravel.
	3	23-24.5	- 24	. 10	- 24 -	1//	
					E 25	\prod	
					= =	1	
					- 26 -		
					E 27 =	4	
ļ					E]	
			15/		<u> </u>	11/	
	. 6	28-29.5	17/18	10'	1 29	11/	Light to medium brown sand with medimm amount
					下"。	31/2	of gravel.
					F -]	
					E -]	
					32 -		
					F 2]	
			13/,,		<i>33</i>	II/	Same as sample number 6.
	7	33-34.5	13/	8**	34 -	71/	Same as sample number o.
				1		#	
	+	 	 	1	-		
			<u> </u>		3 ₆ -]	
					F		
-	-		-	1	37 -	=	
			1]]_	
	8	38-39.5	13/	10"	E -	31/	Fine to medium grain sand with gravel.
	°	10-09.0	1 18	10		11/2	Some broken gravel.
					E 40-	扩	
					F/0		
			 	 	1	-	
							Engineer
	E						

FORM CE-5

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Compan							Boring No. 505 Date 11–17–76 Sheet3 of 4
							Type of BoringRig
	ion of Bo						Boring No. 505 Date 11-17-76 Sheet3 of 4 Type of Boring Rig Casing used Size Drilling mud used
Water	Lovel	<u> </u>			•		Boring begun Boring completed Ground Elevation referred to
Time	Level					<u> </u>	Datum Datum
Date							Field Party: <u>Roush & Reitmire</u>
			E 0 5	of 3le	DEPTH	APH	DESCRIPTION
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recoy. sample	IN FEET	SOIL GRA	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.
			ý		40 =		
					- 42 -		
					E // =		Water
	9	43-44.5	13/ 18/ ₁₅	6"	F / =		Sand with small amount of small gravel.
		7			Ψ ₅ =	//	
					E 46 =		
					E 47 =		
					_ ' _ _ /8 _	177	
	10	48-49.5	11/ 13/ ₁₁	6''	E 49 =		Large grain sand with traces of larger gravel.
					E 50 =		
					E51 =		
					E 52 =		
			7/11,		53 =	1//	
	11	53-54.5	11/13	6''	E 54 =		Top.3 large grain sand Remainder small to medium grain sand.
					55 -		
					- 56 - - =		
					<u> </u>		
	12	58-59.5	11/3/15	10"	58 =		Medium to dark sand with small amount of gravel
					E / =		with traces of coal in the top of spoom.
							Engineer

REV. 3/74

Job No	***************************************	No material management of the characteristic account.	ere made had to write a common or or or or		ı	_0G	G OF BORING
						····	Boring No. <u>505</u> Date <u>11-18-76</u> Sheet <u>4</u> of <u>4</u>
Project	t						Type of BoringRigRig
Locat	tion of B	oring:	*				Casing used Size Drilling mud used Boring begun Boring completed
	Level						Ground Elevation referred to
Time							Datum
Date							Field Party: Roush and Reitmire
- =	Zo.	a c	- 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ngth of sample	DEPTH	GRAPH	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length (recov. samp	FEET	SOIL GR.	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.
					<u> </u>		
					E" =]	
			<u> </u>	 	<u> </u>]	
	ĺ				F , =]	
l	-		 	 	E 62 =		
		<u>'</u>	<u> </u>		E 43 =	Щ,	
			22 ₃₆		= =	1///	Medium brown and grain sand with a few gravels.
<u> </u>	13	63-64.5		6"	£ 64 =	W//	medium brown and grain sand with a rew gravers.
			* 1,000		E =	#	
 				 	- 45 <u> </u>		
	Í				E 16 =		
	Fig.				E		
		<u> </u>	ļ		- 67 -		
					<u> </u>		
		<u> </u>	117	 	- 68-	1//	
!	14	68-69.5	11/	6"	E /19 =	1///	Medium brown with large grain sand with some
					F ", =	1	gravel.
		<u> </u>			E 70 =		
] .	 		
<u> </u>			ļ	ļ	上ガー		
					F , =		
l I				†	 		
			11/		E 13 -	Щ,,	
	15	73-74.5	11/ _{12/}	0	F / =	1//	No recovery.
	1.7	73-74.5	r		[74]	1//	no recovery.
					- 3	1-	
		 	 		F737		
					E763		
					L' =		
			ļ		上77日		
				ł	E' =		
			65/	İ	F 78 7	17	
	16	78-79.5	65/2	0	E 79]		Large gravel in end of spoon
					E (; d		
					F % =		Rock Stopped hole at 80.6'
					E E		
					1 -		
							Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

⊃roject	Pron of Bo	opalachia coject 130 oring:	01 - Co	Compa	my .		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: Robsh 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.
	1		2/4/4	6"	2		Elevation changed about 1' lower. Dark brown pure silt.
	2	8-9.5	6/2/3	6"	9 - /0 - /1 - /2 - /2 -		Top.2 dark brown silt Remainder medium grain brown sand with small pieces of gravel.
	3	13-14.5	14/		/3 /4 /5 /6 /7 /8		Fine grain light brown sand with some small gravel.
	4	18-19.5	15/ 23/ ₂	4 2"	- '		Gravel with medium grain dark brown sand - one fragments of broken sandstone. Engineer

MERICAN LEECTRIC FORER SERVICE CORPORATION

							506 Data 11-17-76 Shoot 2 of A
							Type of Boring Rig Sneet 2 of 4
	tion of B		CONTROL CONTRO				Boring No. 506 Date 11-17-76 Sheet 2 of 4 Type of Boring Rig Casing used Size Drilling mud used
Water	Level	<u> </u>					Boring begun Boring completed
Time							Ground Elevation referred to Datur
Date			***************************************				Field Party: Roush and Reitmire
	· .	T	T = = =	4 0	T	Ĭ	DESCRIPTION
Depth of Casing, ft.	Sample No.	Sampie depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH IN FEET	SOIL GRAPH	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 -		
					22		
	5	23-24.5	24/ 31/ ₃₉	12"	23 -		Medium and light brown sand and gravel.
					25		
					27		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	28-29.5	267 564 • 3	/ 12"	29 -		Same as sample number 5 w/large gravels in spoon.
					-30 - -31 - -31 -		
			28/		32 -		
	7	33-34.5	30/33	13"	<i>3</i> 4		Same as sample number 5.
•					36 - - - - - - - - -		
		?	16/		- 57 - - 58 -		Water
	8	38-39.5	10/10	4"	59		Medium brown sand and gravel.
						-	Fnaincer

AMERICAN ELECTRIC POWER SERVICE COM

				LO	G O	F BORING
						Boring No. <u>506</u> Date <u>11-17-76</u> Sheet <u>3</u> of <u>4</u>
						Type of Boring Size Drilling mud used
n of Bor	ina:					Casing used Size Diffing find used
						Boring begun Boring completed Ground Elevation referred to Datum
evel						Field Party: Roush and Reitmire
		T	± 0	DEPTH	<u> </u>	DESCRIPTION
Sample No.	Sample dept from-to (in feet)	Standard Penetration Resistance Blows/Foo	Tot. length recov. samp	FEET	וב	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 -		
		11/		$-\frac{1}{2}$	7/	Medium brown sand and gravel.
9	43-44.5	10/13	7"	45		Medium brown sand and grown
				46 =		
				E 47 =		
10	48-49.5	10/22/34	6''	β - 48 - 3 - 49 - 3		Medium brown, dark brown sand and small gravel w/traces of coal.
				F 52 =		
11	53-54.	5 13/ ₁₅ / ₁₈	5"	\$4		Medium brown sand and gravel.
				56		
				<u> </u>		
12	58-59.	5 17/13/14	7"	\$ 8 \$ 9 -		Same as sample number 11 w/small gravel.
				E 60 -		
-				1 -		Engineer
	n of Borevel vel y oda 10	n of Boring: evel overlapse administration of the policy	9 43-44.5 10/ ₁₃ 10 48-49.5 22/ ₃ 4 11 53-54.5 13/ ₅ / ₁₈	n of Boring: evel or land land land land land land land land	### Part of Boring: Part of Boring: Part of	n of Boring: evel

AMERICAN ELECTRIC FOREK SERVICE SERVICE

Company Project							Boring No. <u>506</u> Date <u>11-17-76</u> Sheet <u>4</u> of <u>4</u> Type of Boring Rig Casing used Size Drilling mud used
1		лиц. т					 Boring begun Boring completed Ground Elevation referred to
Water I	_evel						 Datin
Time Date		<u> </u>					 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.
	13	3 -64.5	15/ 24/ ₃₀	14"	61 - 62 - 64 - 64 - 65 - 65 - 65 - 65 - 65 - 65		Medium brown sand and gravel.
	14	68-69.5	12/9/	9"	68 - 69 - 71 - 71		Same as sample number 13.
	15	73-74.5	17/ 2664	6"	$\begin{array}{c c} & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline & & & \\ \hline \end{array}$		Same as sample number 13.
	15	/3-/4.3			74 - 75 - 76 - 77 - 78 - 78 - 79 - 78		Stopped hole at 75.6' 11-17-76
							Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No.			······			-06	UF BURING
Compan	у Арг	alachian	Power	Compar	ıy		Boring No. <u>513</u> Date <u>2-3-77</u> Sheet <u>1</u> of <u>4</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
Project	Pro	ject 130	1 – Coa	1 Hand	lling		Type of Boring Auger Rig B-50
	ion of Bo	oring:					Casing used Size Drilling mud used Boring begun 2-3-77 Boring completed 2-3-77
Water	Level	33.5					Ground Elevation 573.73 referred to
Time							Datum
Date		2-3-7	7				Field Party: King and Smithson
		ŧ	5 e 5	p of	DEPTH	H d	DESCRIPTION
Depth of Casing, ft.	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot, length of recov. sample	IN	GRAPH	Soil type, color, texture, consistency, sampler driving notes,
epti	Sample	nple fron in fe	Stan enet esis ows	. e	FEET	91	blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
20	<u>-</u>	Sar	7 × 8	L se		×	fluctuations in water level, notes on diffining case, etc.
					E 0 =		
]	i		1	
					F 1-	1	
					F 2 -]	
]	
			5/ 6/ ₈		3 -		
	1	3.5-5	6/8	13"	E 4		Medium light and medium brown mottled silty clay.
					F -		
					5 -	1/	
					E 6		
					-	41	
-				 	F 7		
					<u> </u>	1	
		8.5-10	5/ 12/ ₁₇	18"	<u></u>	#/	Very stiff mottled brown silty clay.
	2	8.5-10	1/	10	- 9 -	1//	
			·		E /0 =		
					L '-	- -	
-					F/1-		
					/2 -		
					E		
		 	5/ ₉ / ₁₂		/3 -		
	3	13.5-15	12	18"	E 14 3	11/	Very stiff mottled brown silty clay.
					<u> </u>	11/	
ļ			<u> </u>		/5 -	#	
					E /6 -		
					-]	
		 			/7		
			ļ,,,		/8		
	4	18.5-20	4/ _{8/12}	18"	<u> </u>	#/	Same as sample number 3.
	T	10,0 20	 	<u></u>	<u> </u>	1//	
			<u> </u>		£20-	1//	
	,		1		F -		
					1-	1	
			<u> </u>]	<u> </u>	Ш_	Engineer

Company Project	y ion of Bo	33.5				T = 1	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
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 -20-	SOIL GRAPH	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.
	5	23-24.5	3/4/5	18"	23 - 24 - 25 - 26 - 26 - 26 - 26 - 26 - 26 - 26		Loose medium brown silty sand.
	6	25-29.5	23/4/25	14"	27 - - 28 - - 29 - - 30 -		Dense medium brown gray sand w/trace of silt.
	7	33.5-35	8/ 12/ ₁₁	10"	32 -		Water Medium brown to medium gray sand w/trace of silt.
	8	38.5-40	1/1/4	6"	37-		Loose medium brown and gray sand w/trace of silt.
							Engineer

ob No.							
ompan	У			· · · · · · · · · · · · · · · · · · ·			Boring No. <u>513</u> Date <u>2-3-77</u> Sheet <u>3</u> of <u>4</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
roject							Casing used Size Drilling mud used
Locat	ion of Bo	ring:					Boring begun Boring completed
Water	Level	33.5					Ground Elevation referred to Datum
Time							Field Party: King and Smithson
Date		2-3-77					Fleid Party:
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	OIL 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.
O	ν .	SS	u	F- 2	- 1/0 - - 1/1 -		
	9	43.5-45	5/ 7/ ₉	0	\$\frac{1}{2} = \frac{1}{2} = \		Sand and gray wash water.
			5/ _{9/11}		47 = 48 =		Medium brown sand and gravel.
	10	48.5-50	7/11	4"	50 -		Medium brown sand and graver.
	11	53.5-55	9/ 14/ ₁₆	8"	53 -		Dense medium brown gray sand w/trace of silt.
	12	58.5-60	12/ 20 ₂₅	10"	57-		Dense medium brown, gray sand.
	12	30.3-00	23	10	- 59 - - 20 - - 1 -		
		<u></u>	<u> </u>	<u> </u>	1	Ш_	Engineer

lob No.						.0G	G OF BORING
Compan	у						Boring No. <u>513 Date</u> <u>2-3-77</u> Sheet <u>4</u> of <u>4</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
roject							Type of Boring Auger Rig B-50
Locat	ion of Bo	bring:					Casing usedSizeDrilling mud used Boring begunBoring completed
Water	Level	33.5					Ground Elevation referred to
Time Date		2-3-77					Datum Field Party: King and Smithson
T				· · · 0	1	ΙΞ	
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 GRAPI	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.
	13	63.5-65	13/ ₂₃ / ₂₇ 11/ ₈₆₀	6"	6 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 6 - 7 - 7	s	Very dense medium brown and gray sand w/trace of silt. Same as sample number 13, .2 gray sandstone in end of tube. Stopped hole at 70.0' 2-3-77
					1 -		Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No.							r1/ 0 / 77 1 . /
Compan	7	Appalachi					Boring No.514 Date 2-4-77 Sheet 1 of 4 Type of Boring Auger Rig B-50
Project		Project l	.301- C	oar ra	LU		Casing used Size Drilling mud used
Locat	ion of Bo	rıng:					Casing usedSizeDrilling mud usedBoring begun 2-4-77 Boring completed 2-4-77 Ground Elevation 573.09 referred to
Water	Level						Ground Elevation 573.09 referred to
Time							Field Party: King and Smithson
Date							Fleid raity. King and omzenson
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	GRI	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
نٌ ث	San	Sam f (i)	Per Re Blo	Tot.		SOIL	fluctuations in water level, notes on drilling ease, etc.
					E o =]	
		*]	
					E]	
					2 -]	
					E =		
<u> </u>					- 3 -		
					E 43		
	1	3.5-5	5/ 9/ ₁₃	12"			Mottled light brown and rusty sandy silty clay
\vdash		3.5-5	13	12	<u></u>	1/4	w/rock fragments. Very stiff - dry -
					E 6 -		
					E =		
					7 -		
					E 8 -		
					E -	$\parallel_{\mathcal{D}}$	
			11/ 22/ ₂₇		- 9 -		
	2	8.5-10	22/27	14"	E /0 =	1//	Medium brown silty clayey sand w/gravel, dense-dry
					-]	
			-	 	十八一	4	
					F /2 -]	
					F . :		
					上 /3 -	1	
			15/	ļ	F /4 -	1//	1
	3	13.5-15	15/ 20/ ₁₉	12"	F . =	31//	Medium brown coarse sand and gravel dense-dry-
		13.5-13	1 19	12	上 /5 -]["	
					E 16	-]	
		1			F		
				 	上/7-		
				ļ <u>.</u>			
					-	17	
			15/ 16/ 20	 	E 19-	31/	
	4	18.5-20	20	10"	F 20 -	1//	Medium brown coarse sand and gravel.
					F -		dense - dry
				 	1 -	1	
		<u> </u>]	<u></u>		Ш_	Engineer

AMERICAN ELECTRIC POWER SERVICE CORTORATION

lob No.							
Compan	У		<u> </u>				Boring No.514 Date <u>2-4-77</u> Sheet <u>2 of 4</u>
Project							Type of Boring <u>Auger</u> Rig <u>B-50</u> Casing used Size Drilling mud used
Locati	on of Bo	oring:					Boring begun Boring completed
Water I	Level						Ground Elevation referred to
Time							Datum
Date							Field Party: <u>King and Smithson</u>
Г		-E			Torozu.	표	DESCRIPTION
Depth of Casing, ft.	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot, length of recov, sample	DEPTH	GRAPH	Soil type, color, texture, consistency, sampler driving notes,
pth ing	Sample	ple rom ree	and netro sist ws/	len v. s	FEET		blows per foot on casing, depths wash water lost, observed
اق م	San	Sam f (ir	St Per Re Blo	rot. eco		SOIL	fluctuations in water level, notes on drilling ease, etc.
		're			F 20 -		
					E21=		
					<u> </u>		
					12 -]	
					F =		
					-23 -		
					E24 =		
	_		19/ 19 / 20		F =		Medium brown sand and gravel dense and dry
	5	23.5-25	20	8"	15-	#/-	Medium prown sand and graver dense and dry
					F		
			<u> </u>	<u> </u>	26 -	1	
1 1					E27 -]	
					F =	1	
					- 28 -		
						1///	
			7/ _{9/15}		199-		
	6	28.5-30	9/15	6''	E 30-	1//	Medium brown damp sand and gravel - medium -
						1	
			<u> </u>		上31一		
					F =		
					= 32 -		
					上 33 二		
					F -	1/7	Water
			12/	 	34 -	17	water
	7	33.5-35	15/3	6"	E 25 -	1//	Medium brown wet - sand and gravel.
•							- medium -
			<u> </u>		36 -	1	
					E =		
		<u> </u>	 		- 37 -		
					<u> </u>]	
					E	11-	
			4/	ļ	39 _	1//	
	•	20 5 10	4/ 6/ ₇	5"	F //	1//	Medium brown gravelly sand - wet -
-	8	38.5-40	 '-		+ 1º0 -	11//	ACCURATION DIONE BENEVOLE J. DUMB. 1100
]	
		<u> </u>	<u></u>	<u> </u>		Ш_	Engineer

MALKICAN LELCTRIC TOWLK OLK TOLK

					٠	.00	OF BOKING
		;) -		Boring No. <u>514</u> Date <u>2-4-77</u> Sheet <u>3</u> of <u>4</u>
							Type of Boring <u>Auger</u> Rig <u>B-50</u> Casing used <u>Size</u> Drilling mud used
	on of Bo	oring: 					Boring begun Boring completed
Water	Level						Ground Elevation referred to Datum
Time Date		 					Field Party: King and Smithson
r				of Sie	1	I	DESCRIPTION
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	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.
					<u>-</u> 1/0 -		
					F -		
					E" =		
					- 42 -		
					E 4/3 =]	
					L -		Washed out plug 2'
			7/4/15		- 44 -		
	9	43.5-45	1415	-0-	- 1/5 -	#//	- Lost sample -
					- /6 -		
					E " =		
					-47 -		
					4/8	1	
					├	1/7	
			11/8/21		E 49 =		
	10	48.5-50	1821	7"	E50-	#//	Medium brown sand and gravel Dense - wet
]	Defise - Wet
					E 51 =]	
					<u>- 52</u> -		
					E 53 =		
					F -	1//	
			6/ 8/ ₁₂		54 -		
	11	53.5-55	012	12"	£ 55 -	#/	Medium brown fine to medium sand
					F 56 -		
					-	\parallel	
	· .			<u> </u>	F-57-		,
					E 58 -		
					F =	1//	
			13/ ₂₅ / ₇		59		Washed out plug 2'
	12	58,5-60	2317	-0-	- 60 -	#//	Lost sample
					<u>E</u> ,=		
		<u></u> .	1	<u></u>	<u> </u>	Ш_	Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

ob No.					i	.06	OF BURING
							Boring No. 514 Date 2-4-77 Sheet 4 of 4
					-		Boring No. <u>514</u> Date <u>2-4-77</u> Sheet <u>4</u> of <u>4</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
	ion of B						Casing used Size Drilling mud used
		ormg.					Boring begun Boring completed
Vater	Level						Ground Elevation referred to Datu
Time							Field Party: King and Smithson
Date							Tielu Larty. 3
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	IL GRA	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
<u>۵</u> گ	S	San (i)	2.5 % !!	Tot		S	fluctuations in water level, notes on drilling ease, etc.
					E 60 =	1	
					1-61-		Augers settled down after drilling 6"
			İ		-	11	
					62 -]	
				·	E 43 =		
		 			- 63 -	1	
					E 64 =		
			12/22/23		F " =	∃///	No recovery. * Used stiff spring.
	13	63.5-65	23	-0-	L 65 -	1//	No recovery. " used still spring.
					E]	
		 	 		66 -	1	
·					E 1/7 -	4	
		<u> </u>			E][
					F 68 -	=	
					F) -	11/	
			24/	 	-69-	3///	
	14	68.5-70	30 80	8"	F 10-	1//	Medium brown sand and gravel w/trace of sandston
			•	1	E/"=	\prod	fragments in end of spoon.
			<u> </u>]	上/11-	1	
					<u></u>	41	0. 11.1 . 70!
			ļ	 	12 -]	Stopped hole at 70' 2-4-77
					F		
					- 1/3 -	4	
	-				E 14		
					F' =		
			 		15 -]	
•					-	-	
		 	 	1.	76 -		
	-				F 17][
					E "		
		ļ	<u> </u>	ļ	18 -		
					E ']	
		 			19-	_	
-				İ	F.		
			1		F 80 -]	
					F , -		
			1	1		Ш_	Engineer

AMERICAN ELECTRIC TOWER SERVICE

Job No.						.00	OF BURING
Company	<u> </u>	ppalachia	n Powe	Comp	any	ri de	Boring No. 701 Date 2-4-77 Sheet 1 of 5 ge Type of Boring Auger Rig B-50
Project		roject 13	301 - F.	Lyasn	Pipe b	LLU	Casing used Size Drilling mud used
Location	on ot Bo	oring:					Roring begun 2-4-// Borring completed 25//
Water L	evel	40.0	1				Ground Elevation 584.92 referred to Datur
Time							Field Party: King and Smithson
Date		2-4-				T	
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	3.5-5	6/ 9/ ₁₂	15"	3 - 4 - 5 -		Silty medium brown to gray clay.
					7 - 8 -		
	2	8.5-10	5/ _{5/8}	8"	- /0 - - /1 -		Sandy silt.
			5/ _{9/₇}		/2 - /3 - /4 -		
•	3	13.5-15	777	8"	/5 - - - - - - - - - - - - - - - - - - -		Medium grain brown sand and silt.
	4	18.5-20	15/ 20/ ₂₂	2 11"	/8 - /9 -		Medium grain sand w/trace of gravel.
					1		Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Barring No. 701 pate 2-7-77 Sheet 2 of 5	Job No.							
### Boring begun Boring campleted Boring begun Boring campleted to Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom								Boring No. 701 Date 2-7-77 Sheet 2 of 5
### Boring begun Boring campleted Boring begun Boring campleted to Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom Field Party: King and Smithson Datom								Type of BoringRig
Time Date	Locati	ion of Bo	oring:					Casing used Size Driffing mud used Reging begun Boring completed
Time	Water	Lovel	1		· · · · · · · · · · · · · · · · · · ·			Ground Elevation referred to
Date		LEVEI	<u> </u>			· · · · · · · · · · · · · · · · · · ·		Light Datum
Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, texture, consistency, sampler driving notes, blews per foot on casing depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc. Solitype, color, etc. Solitype, color, etc. Solitype, color,	Date							Field Party: King and Smithson
5 23.5-25	<u>г</u>				4 0	T	I	DESCRIPTION
5 23.5-25 8 3 7 9" 25	Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length o recov. sampl	IN	SOIL GRAP	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.
5 23.5-25 8 3 3 7 9" 5 23.5-25 8 3 3 7 9" 7 33.5-30 7 8 4 1 8" 7 33.5-35 6 8 12" 7 33.5-35 6 8 12" 8 38.5-40 6 9 11 18" 8 38.5-40 6 9 11 18" 8 38.5-40 6 9 11 18" 8 38.5-40 6 9 11 18" 8 38.5-40 6 9 11 18" 8 38.5-40 6 9 11 18" 8 38.5-40 7 11 18"						120-		
5 23.5-25 8 3 3 7 9"			S	ŀ]	
5 23.5-25 8 3 3 7 9" 24 -						1-21-	 	
5 23.5-25 8 3 3 7 9" 24 -						- 22]	
5 23.5-25 8 4 3 4 7 9" 24 7 Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Medium grain sand w/small gravel. 7 33.5-35 6 8 12" 35 7 8 7 7 7 8 7 7 7 8 7 7 7 8 7 7 7 8 7 7 7 8 7 7 7 7 8 7 7 7 7 8 7 7 7 7 8 7 7 7 7 8 7 7 7 7 8 7 7 7 7 8 7						E"]	
Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Medium grain sand w/small gravel. Medium grain sand = medium brown Medium grain sand = medium brown Light brown medium grain sand. Water at 40.0'						- 23 -		
Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Fine sand w/trace of coal and some gravel. Medium grain sand w/small gravel. Medium grain sand = medium brown Medium grain sand = medium brown Light brown medium grain sand. Water at 40.0'				1		F	1//	77
6 28.5-30 8/1 8" 30 Medium grain sand w/small gravel. 7 33.5-35 6/8 12" 35 Medium grain sand - medium brown 8 38.5-40 4/9/11 18" /0 Light brown medium grain sand. Water at 40.0'			<u> </u>	8/2/	 	 24 -		
6 28.5-30 8/1 8" 30 Medium grain sand w/small gravel. 7 33.5-35 6/8 12" 35 Medium grain sand - medium brown 8 38.5-40 4/9/11 18" /0 Light brown medium grain sand. Water at 40.0'		- 5	23.5-25	13/17	9"		1//	Fine sand w/trace of coal and some gravel.
6 28.5-30						E -	1	
6 28.5-30					ļ	26 -		
6 28.5-30						E		
6 28.5-30		<u> </u>	<u> </u>		 	1-27 -	1	
6 28.5-30]	
6 28.5-30						-	11,	77
6 28.5-30 8 1 8" 30 Medium grain sand w/small gravel. 32 33 - 34 7 33.5-35 6/8 12" 35 Medium grain sand - medium brown 8 38.5-40 49/11 18" /0 Light brown medium grain sand. Water at 40.0'				17/-	 	- 29 -	31//	//
7 33.5-35 5/6/8 12" 35 Medium grain sand - medium brown 8 38.5-40 49/11 18" -/0. Light brown medium grain sand. Water at 40.0'		6	28.5-30		8"	F	1//	Medium grain sand w/small gravel.
7 33.5-35 6/ ₈ 12" 35 Medium grain sand - medium brown 8 38.5-40 4/ ₁₁ 18" / ₀ Light brown medium grain sand. Water at 40.0'							1	
7 33.5-35 6/ ₈ 12" 35 Medium grain sand - medium brown 8 38.5-40 4/ ₁₁ 18" / ₀ Light brown medium grain sand. Water at 40.0'				<u> </u>		F 31 -		
7 33.5-35 6/8 12" 35						<u> </u>]	
7 33.5-35 5/6/8 12" 35 Medium grain sand - medium hrown 8 38.5-40 46/11 18" 40.0 Light brown medium grain sand. Water at 40.0'	-			 	-	- 32 -		
7 33.5-35 5/6/8 12" 35 Medium grain sand - medium hrown 8 38.5-40 46/11 18" 40.0 Light brown medium grain sand. Water at 40.0'						E 23 -		
7 33.5-35 36/8 12" 35 Medium grain sand - medium brown 36 37 38 38.5-40 49/11 18" 1 Light brown medium grain sand. Water at 40.0'						E.	11,	7/
7 33.5-35 6/8 12" 35				\ 5/	<u> </u>	_= 34 -	71/	//
8 38.5-40 49/11 18" /0 Light brown medium grain sand. Water at 40.0'		7	33 5-35	6/ ₈	1211	F	31/	Medium grain sand - medium brown
8 38.5-40 49/11 18"		 	33.3.33	- O	1 12		+	
8 38.5-40 49/11 18"				<u> </u>		F 36 -]	
8 38.5-40 49/11 18" - 1/0 - Light brown medium grain sand. Water at 40.0'						 	4	
8 38.5-40 49/11 18" - 1/0 Light brown medium grain sand. Water at 40.0'				 	 	37 -][
8 38.5-40 49/11 18" - 1/0 Light brown medium grain sand. Water at 40.0'	•					- 20	1	
8 38.5-40 49/11 18"	-	 				上".	韭.	
8 38.5-40 49/11 18"		<u> </u>		1,,		39 -	41/	///
Water at 40.0			20 5 10	49/	101	E	31/	Light brown medium grain sand.
	-	8	38.5-40	1 11	18	/ O -	#	
Engineer				1		E,		
Engineer								
	<u> </u>	<u> </u>					Ш	Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

				·			Boring No. <u>701</u> Date <u>2-8-77</u> Sheet <u>3</u> of <u>5</u>
Project Locat	ion of Bo	ring:					Type of Boring Rig
Water Time	Level						Ground Elevation referred to Datum 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 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 - - 11 -		
		`			- 1/2 - - - 1/3 -		
	9	43.5-45	4/ 6/ ₇ _	-0-	- 44 - - - √5 -		No recovery.
					46 -		
			2/		√8 - √9 -		
	10	48.5-50	2/4/7	3"	50-		Medium grain sand w/small gravel.
					52 - - - - - - - - - - - - - -		
	11	53.5-55	17/ _{12/5}	16"	54		Medium grain sand w/several large gravel.
•					56 -		
					57 -		
	12	58.5-60	6/12/6	8"	59-		Medium grain sand w/small gravel.
					1 -		Engineer

FORM CE-5

AMERICAN ELECTRIC POWER SERVICE CORTORATION

lob No					L.	υG	OF BUR	
								Reging No. 701 Date 2-8-77 Sheet 5 of 5
								Boring No. 701 Date 2-8-77 Sheet 5 of 5 Type of Boring Rig Casing used Size Drilling mud used
roject	· f D .	win out						Casing used Size Drilling mud used
Locat	ion of Bo	ring.						Boring begun Boring completed
Water	Level							Ground Elevation referred to
Time								Wing and Smithson
Date		<u> </u>						Field Party: King and Smithson Datum
·		£	_	- e	DEPTH	APH		DESCRIPTION
Depth of Casing, ft.	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN	GRA	Soil typ	e, color, texture, consistency, sampler driving notes,
pth ing,	<u> </u>	om- fee	and etro sist	leng	FEET	<u> </u>	blows p	er foot on casing, depths wash water lost, observed
a လိ	Sample	amp fr	Pen Res	, o o		SOI	fluctuat	ions in water level, notes on drilling ease, etc.
		S		<u> </u>		T		
,				<u> </u>	- × 0 -		Auger r	refusal at 80.5'
i.	i ,•				- U	1//	7	
				<u> </u>		1//	Started	coring at 80.5'
					E (2 =	₩,	/	
					F ' -	//	/ 	
·				 	_ g 3 _	1//	<u> </u>	
					F	{//	/	
ļ				 	F- 84 =	1//		
	Core	80.5-90.5		7.6	E (5 =	W		
					E * =	1//	Gray co	parse grain sandstone.
		<u> </u>		ļ	F- 86 -	1//	/}	
				1	E / =	1//	<i>\</i>	
<u> </u>			<u> </u>		<u> </u>	1//	/	
1				l	E 88 =	1//	/	
		<u> </u>			E''	$\ / \ $	/	
					£ 8/9 =	11/	<u>/</u>	
					F -	11/	/}	
ļ			 	-	<u> </u>	11/	Stopped	l hole at 90.5'
					F a, -	#	2-8-77	
					E':]		
L				<u> </u>	F 92 -			
					E		·	
	 		 	 	+ 43 -			
					E an][
					E / =	1		
		<u> </u>	<u> </u>		F 95 -		 	
					E_{λ}			
 		 	 	 	1-96-			
					F 47]		
					下"三			
			<u> </u>	ļ	F 98 -			
				1	F' =			
	<u> </u>		 	1	199-			
					E/10-][
	†	T			E			
					+ 1-	#		
							*	Engineer
· I	<u> </u>	1	<u> </u>			1	<u> </u>	

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No).				i	LOG	OF BORING
Compai		Appalachi	an Powe	r Comp	any		Roring No. 703 Date 2-1-77 Sheet 1 of 5
Projec	tI	roject l	301 –	Fly as	h Pond		Boring No. <u>703</u> Date <u>2-1-77</u> Sheet <u>1</u> of <u>5</u> Type of Boring <u>Auger</u> Rig <u>B-50</u>
Loca	tion of B	oring:					Casing used Size Drilling mud used Boring begun 2-1-77 Boring completed 2-2-77 Ground Elevation 567.70 referred to
Water	Level	39.0	· · · · · · · · · · · · · · · · · · ·				Ground Flevation 567.70 referred to
Time							Date
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.
	1	3.5-5	5/7/7	16"	3 - 4		Silty clay.
	2	8.5-10	3/ _{4/5}	12"	9		Sandy, silty clay.
	3	13.5-15	1/3/3	12"	/2/3/4/5/6/6/6/6/6/6/6/6/6/6/6		Sandy clay.
	4	18.5-20	13/	5"	/7		Sand and medium large gravel. Trace of coal.
					1 -		Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

ob No.							
ompany	/						Boring No. 703 Date 2-1-77 Sheet 2 of
							Type of Boring <u>Auger</u> Rig <u>B-50</u> Casing used <u>Size</u> Drilling mud used
	on of Bo						Boring begun Boring completed 1
Water I	evel	39.0					Ground Elevation referred to
Time	_C 4 C I	32.0					Datu
Date		2-1-77					Field Party: King and Smithson
				7 0	Toenzu.	I	DESCRIPTION
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	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-		
]] .	
 					F21 -	1	
					- 22 -		
					E -		
				<u> </u>	Z3		
					F -	1//	
			10/_,		- 24 -	3 <i>W</i> /	
	5	23.5-25	10/ 15/ ₁₈	8"	F 25 -	1//	Medium grain sand, light gray.
					-		
		ļ		<u> </u>	26 -]	
					27 -]	
						-	
			<u> </u>		<u> </u>	1	
						1//	
			7/	5"	E .		
	6	28.5-30	8/11		30 -	11/	Medium grain sand w/trace of coal.
					<u> </u>	-]	
			+	 	31 -	1	
					F 32 -		
	T					4	
-			5/	-	- 73 -		
	7	33.5-35	5/6/10	7"	- 34	JI/	Medium grain sand, medium brown.
					E	-11/)
						#	
1					- 36	=	
		1		1	E	1	
					37.	4	
					F	1	
	 			+	== 378	业	
						$\exists V$	Water
		38.5-40	5/ 0 5/5	8"	E,	1/	Same as sample number 7.
	8	38.3-4	2/5	- 8"	-40	\mathbb{H}	/ Dame as bumple transfer
					Ε,	且	
	-				1		
		<u> </u>					Engineer

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No	•				L	.00	G OF BORING
							Boring No. <u>703</u> Date <u>2-1-77</u> Sheet <u>3</u> of <u>5</u>
							Type of Boring Auger Rig B-50
	ion of B						Casing used Size Drilling mud used Boring begun Boring completed
Water	Level	T					Ground Elevation referred to
Time							Datum
Date		2-1-7	7				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	Soil type, color, texture, consistency, sampler driving notes,
					- 40 -	T	
	~				E 70 =		·
				<u> </u>	<u>-</u> 41 -		
					- //2 -		
					F 42 -		
					-43 -		
					F	1///	//
		<u> </u>	4/ 6/ ₇		44 =	1//	Washed out.
	9	43.5-45	6/7	1".	F 45 =		Two large gravels and medium grain sand.
]	
			<u> </u>	 	¥6 <u> </u>		
					F 47 =		
					L' =		
			5/ 4/ ₆		F- 48 =		
	10	48.5-50	4/6	10"	E49		Same as sample number 9.
					F'_=		//
					50-	1//	
					E 51 =]] -	
					F -		
	· ·			ļ	F 52 -		
					E 53 =		
			,			11-	
ļ			8/0,		54 =	1//	/
	11	53.5-55	8/8/10	10"	E 55 =		Smaller gravel - medium grain sand.
•					 -		
		 			56 -		
					E 57-		
					_ =	1	
					58 -		
					F 59-	1//	
	10	EO E 60	15/ 20/22	0,11	E ' =		/
ļ	12	58.5-60	2022	8''	- 60 =	//	Medium brown - medium grain sand.
					<u> </u>		
							
1			<u> </u>	<u></u>		Ц	Engineer

FORM CE-5 REV: 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

lob No.					L	.0G	OF BORING
							Boring No. <u>703</u> Date <u>2-1-77</u> Sheet <u>4</u> of <u>5</u>
					•		Type of Boring auger Rig B-50 Casing used Size Drilling mud used
Locat	ion of B	oring:					Casing used Size Drilling mud used
Water	Level	7 20 0					Boring begun Boring completed Ground Elevation referred to
Time	Level	19.0				,	Datum
Date							Field Party: King and Smithson
γ		1	1	[<u></u>	T	ェー	DECORIDETION
نت _ک	Š	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot, length of recov. sample	DEPTH	арн	DESCRIPTION Soll have paler toylurg consistency campler driving notes
Depth of Casing, ft.	9	e d m-t feet	nda trai	eng.	IN	GR,	Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
Dep	Sample	fro fro	Sta Ses Ses Iow	5. L	FEET	SOIL	fluctuations in water level, notes on drilling ease, etc.
3	<u> </u>	Š .	L	F 2		8	Traduction of the state of the
					上60二		
		1					
		<u> </u>			1-61-		
					Eloz=		
					E"2=		
					F 63 =		
					L " =	1 ,,	
		<u> </u>	 		- 64 -		
	13	63.5-65	7/ _{6/14}	5"			Several large gravel and medium grain sand.
	1 13	03.3-03	1-7		L 65 -	11'1	
					E 66 =		
				1	- "° -		
					F 67 =		
					<u> </u>		
					F , -	177	
			15/		F 69 =	11///	
	14	68.5-70	15/ 20 ₂₂	10"	F10-		Medium grain sand w/trace of gravel and shale.
					E' =		
				ļ	上 71 二		
				 	72 -		
					E 73 =		
					E / 3 =		
			1117		<u> </u>	1///	
	15	73.5-75	12/12/4	9"	F' =	1//	Large grain Sand and small gravel.
	1.7	1,3,5,7,5	14	 	- 75 -	144	marke Praracella and amount by a
					F . =		
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<u> </u>			56/		 79 -	1///	
	16	78.5-80	56/ 20/ ₁₇	10,"	£80=		Same
					E		
				<u> </u>	+ 1-		
							Engineer
L	L	1		L			

FORM CE-5 REV. 3/74

ob No	•					.06	OF BOK	
Compar	ıy							Boring No. 703 Date 2-1-77 Sheet 5 of 5 Type of Boring Auger Rig B-50
roject	t							Casing used Size Drilling mad used
Locat	tion of Bo	oring:						Boring begun Boring completed
	Level							Ground Elevation referred to Datum
Time								Field Party: King and Smithson
Date		L			· · · · · · · · · · · · · · · · · · ·	Ιτ		
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	hlows	DESCRIPTION De, color, texture, consistency, sampler driving notes, over foot on casing, depths wash water lost, observed tions in water level, notes on drilling ease, etc.
			 		-80-			
					E 81 -]]		
]	Rock	
		<u> </u>		ļ	£ 12 -			
	`				F /3 -	#17	<u> </u>	
					E 84 =	3//		
					L =			
	Run #1	82.7-92.	1	10.0	<u> </u>	11//	82.7	started coring.
					F /6 -		/	
 	 		1		上'][/	/1	
	ļ	<u> </u>			87 -	31/	A	
					E /8 -	<u> </u>		
	†				E , -	-11/	/	
	<u> </u>			 	F 19 -	3ľ/	/	
ľ			:		F 90 -] /		
					<u> </u>	 /	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	andstone core
 	 			 	十71-	∜/		recovery.
					F 92 -	31/	/ 	ed coring at 92.7'
					E :]//	/ Stopp 2-2-7	
-		 			- - 3 -	11		
					<u> </u>			
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-		<u> </u>			E /3.			
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					F 99.]		
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. L					F 1.	1		
								Engineer

AEP CIVIL ENGINEERING LABORATORY

Job No		***************************************					h., \	,,	OI BORING
		Appalachi						·	Boring No. <u>801</u> Date <u>3-16-77</u> Sheet <u>1</u> of <u>5</u>
		<u>Project 1</u>	<u> 301 – T</u>	ruck B	rid	ge (Cro	oss	Type of Boring <u>Auger</u> Rig B-61
Loca	tion of	Boring:							Casing used Size Drilling mudusod
Water	Level			·		·····			Boring begun3-16-77 Boring completed 3-16-77 Ground Elevation 594.95 referred to
Time									
Date									Field Party: Roush and Reitmire
			T.	1 + 0	T		1	rТ	
Depth of Casing, ft.	o Z	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	1	EPTH	1 !	GRAPH	DESCRIPTION
pth ing	Sample	om- fee	andc etra isto /s/F	eng . so	1	IN	6	5	Soil type, color, texture, consistency, sampler driving notes,
ပို့ ကို	Sam	mp tri)	St. Res Slov	ot.	-	EET	;	5	blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
 	······································	- 	+	<u> - "</u>	\vdash		۲,	~	traditions in water level, notes on driffing ease, etc.
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				 	+	1		f	
					Ē	2 -	1		
					E		1		
			1211	ļ	<u> </u>	3	∃1/	/}-	
	1	2.5-4	21/24/27	15"	E		31/	$/\!\!\!/$	Black fly ash and dark brown sand and gravel.
				1 - 13	F	4 -	\mathbb{H}	+	(Fill)
					F	5	41		
[E	J			
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					_	88	11	1	
	_		7/ _{4/5}		E	0			
	2	7.5-9	5	13"	_	9	1//	4	Dark fill brown sand and gravel.
						-	11	-	N. 1
			 		_ /	′0 —		-	Medium brown clayey silt.
						., -			
	·	ļ	 		 /	2 -		-	
					-		1//	+	
			2/		/	3	1//	}-	
	3	12.5-14	3/4	14"	/	4	\mathbb{Z}		Medium brown clayey, sandy silt.
					_ ′				
	· · ·				_/	5 _		-	
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				<u>. </u>	- /	, J			
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			3/		_/	8 -	///	-	
	4	17.5-19	4/5	16"	- .	_ =	///	-	Medium brown clayey sand.
					-/	9-	1		January Carret
				F	- -21	EV			
				E]			
				<u>-</u>	- 1	ı =			
									Engineer
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FORM CE-5 REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No	o		·			LOG	OF BORING
Compa	ny			· · · · · · · · · · · · · · · · · · ·			Boring No. <u>801</u> Date <u>3-16-77</u> Sheet <u>2</u> of <u>5</u>
Projec							Type of Boring Rig Casing used Size Drilling mud used
Loca	tion of E	Boring:					Boring begun Boring completed
	Level						Ground Elevation referred to
Time Date							Field Party: Pouch and Points
r Date	<u> </u>						Field Party: <u>Roush and Reitmire</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.
	5	22.5-24	10/5/7	15"	20 - 21 - 22 - 23 - 24 - 25 - 26 - 26 - 26 - 26 - 26 - 26 - 26		Medium brown gravely sand.
	6	27.5-29	8/	16"	38 - 38 - 29 -		Same as sample number 5,
					<i>3</i> 1 <i>3</i> 2		
	•						
	7	32.5-34	5/ 6/ ₉	15"	33 — — 34 —		Medium brown sand w/trace of gravel.
	,				- 35 - - 35 -		
					36 -		
					_ =	1/	
	8	37.5-39	6/ _{8/11}	14"	38 <u> </u>		Medium brown sand.
					- 6 =	$\dagger \dagger$	Water
					-/"=		
					_ 1 =	-	
					1		Engineer

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC FOREX SERVICE CORPORATION

Job No).				i	LUG	OF BURING
							Boring No.801 Date 3-16-77 Sheet 3 of
Projec							Type of Boring Rig Casing used Size Drilling mud used
		oung.					Boring begun Boring completed
	Level	_					Ground Elevation referred to
Time Date		 					Da
Date							Field Party:
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.
					= /=		
			 	 	F-40 -		
					E/1=		
					F , -		
			 		F /2 -		
	۶.				E # 3 =	//	
	_		2/3/4				
ļ	9	42.5-44	4	13"	¥4 —	12	Medium brown sand w/trace of gravel.
					F . =		
					5 -		
		<u> </u>		ļ	F 46 =		
					<i>y</i> 7 −		
					E 48 =		
	10	47.5-49	6/ 7/ ₈	.,,	E =		Same as sample number 9.
	10	47.5-43	8	1"	- 49 -	1 1	Delice do Campie Mandel 74
		,			E 50 =		
					F S =		
					E 12 =		
						1-,	
			4/ _{4/7}		- 53 -		
	11	52.5-54	4/7	2"	E 54 =	14	Same as sample number 9.
					トコ		
					55		
					E (8)		
			, ,		F 7		
					57		
					E 58 =	///	
	12	57.5-59	12/3	14"	E	//	Medium brown sand.
	14,	31.5-39	1.0	T	59-	14	ARTON AND MANUAL MARKET
	· ·				E 60 =		
		·			F · d	-	
		, ",			1 -		
	· • • • • • • • • • • • • • • • • • • •						Engineer

REV- 3/74

AEP CIVIL ENGINEERING LABORATORY

Job No	o			•	*	LO	OG OF BORING
Projec	at .						Boring No. <u>801</u> Date <u>3-16-77</u> Sheet 4 of 5
Loca	ation of E	Boring:					Type of Boring Rig Casing used Size Drilling mud used
L	•						Boring begun Boring completed
Water Time	r Level						Ground Elevation referred to
Date							Date
Date							Field Party: <u>Roush and Reitimre</u>
1 _ ;	o Z	p t	_ 5 8 5	p of	DEPTH	APH	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	FEET	SOIL GR	Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed
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1					E' -	11	
ļ!	 			<u></u>	- 62 -	1	
1	1		,		E , =	H_{J_j}	
			8/2,	 	<u></u>	1//	/
	13	62.5-64	8/ _{9/13}	13"	F 4	11/2	Medium brown sand.
			1		EWE	1	The state of the s
	<u> </u>				F 45 =]]	
1 1	1		'	1	F =		
 	Γ		-		- 66		
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			1		-67	11	
			1,,	<u></u>	E 68 =	1//	
			8/ 10/ 12		F -	1//	Same
	14	67.5-69	12	10**	L 69	44	Same
	ı			1	F , =	1 1	
		†	1	1	E 10 -	1	
		<u> </u>		Ĺ'	En13		
		1		, , ,	E' : 1		
		 		!	12	1 1	
		1	1	, 1	F' =	17/	
			4/0,		F 13-	1//	
	15	72.5-74	4/ _{8/13}	11"	E 14 =		Same
		-			E / = 1		
			 		25	1 +	
	. 1		1	}	Ē		
					76		
	-		1				
	1		i	+	트"']		
			1207		78	1//	
1	16	77.5-79	10/ 26/ ₂₇	- ~ F	를 크!		
		()		12"	19-	1	Same
		i	i . [F	= 1/2 =1	i	
					= yo =		
					- 1 -	-	
i	j	I					Engineer

FORM CE-5

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

Job No),	·				LOG	OF BORING
Compa	ny						Daving No. 901 Day 2 16 77 6 7 7
Projec	t				-		Boring No. <u>801</u> Date <u>3-16-77</u> Sheet <u>5</u> of <u>5</u>
Loca	tion of E	Boring:					Type of Boring Rig Casing used Size Drilling mud used
Water	Level		·				Boring begun Boring completed
Time	LEVEI						Ground Elevation referred to
Date							Field Party: <u>Roush and Reitmire</u> Date
r		T _		1 0	1	T = 1	
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.
	17		12/18/21		\$1		
				-	- 1 =		
							Engineer

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No	0.					LOG	OF BORING
Compa	ıny	Appalachi	an Powe	r Comp	any		Roring No. 802 Date 3-17-77 Sheet 1 of
		Project 1				ros	Boring No. <u>802</u> Date <u>3-17-77</u> Sheet <u>1</u> of
Loca	ation of	Boring:					Casing used Size Drilling mud used Boring begun 3-17-77 Boring completed 3-17-77
Water	r Level	34.5	·				Ground Elevation 588, 46 referred to
Time							Da
Date						·	Field Party: Roush and Rietmire
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.
	S	35		<u> </u>	0 -	Š	nuctuations in water level, notes on uniming ease, etc.
					2 -		
			5/8/8	17"	3		
	1	3.5-5	8	17	5		Medium brown and gray clayey silt.
					7 - 8 -	-	
	2	8.5-10	3/ _{4/5}	16"	9		Medium brown and gray sandy, clayey silt.
					上 /0 ~ E /1 = E /1 =	-	
					/2		
	2	10 5 15	2/ 5/ ₆		F /4 =		
	3	13.5-15	5,6	14"	16		Medium brown clayey sand.
	* * * * * * * * * * * * * * * * * * * *				E /7 =		
			7/		/8 -		
	4	18.5-20	7/ 8/ ₁₁	8"	20=		Medium brown gravely sand.
							Engineer

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC POWER SERVICE CORPORATION

Job No)					LOG	OF BORING
							Boring No. 802 Date 3-17-77 Sheet 2 of 4
Projec	t						RigRigRig
Loca	tion of E	Boring:					Casing used Size Drilling mud used
	Level	34.5					Boring begun Boring completed Ground Elevation referred to
Time					***		Dat
Date					· · · · · · · · · · · · · · · · · · ·		Field Party: <u>Roush and Reitmire</u>
	No.	pth	on ce oot	of	DEPTH	RAPH	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample dep from-to (in faet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	IN FEET	SOIL GRA	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.
	5	23.5-25	5//10	14"	20 - 21 - 23 - 24 - 25 - 25 - 28 - 28		Medium brown sand - fine grain
	6	28.5-30	3/7/9	14"	28 - 20 - 20 - 21 - 32 - 32		Same as sample number 5 fine grain.
	7	33.5-35	13/	15"	33 - 34 - 35 - 36 - 36 - 36 - 36 - 36 - 36 - 36		Same as sample number 5 w/medium and coarse grain sand.
	8	38.5-40	4/ _{7/8}	13"	37 - 38 - 39 - 39 - 39 - 39 - 39 - 39 - 39		Same as sample number 5 w/medium and coarse grain sand.
					1 -		Engineer

Job No). <u> </u>	• w			í	_OG	OF BORING
							Raring No. 802 Data 317.77 Shoot 2 of 4
Projec	t						Boring No. <u>802</u> Date <u>3-17-77</u> Sheet <u>3</u> of <u>4</u> Type of Boring Rig
Loca	tion of E	Boring:					Casing used Size Drilling mud used
Water	Level	34.5	·····				Boring begun Boring completed
Time					·····		Ground Elevation referred to Datu
Date							Field Party: <u>Roush and Reitmire</u>
f.	o Z	pth	ot es of	of pple	DEPTH	АРН	DESCRIPTION
Depth of Casing, ft.	Sample N	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	FEET	SOIL GRA	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		
	9	43.5-45	3/ 5 5/ ₆	13"	43 - - - - - - - - - - - - - - - - - - -		Medium brown sand - medium and coarse grain.
			6/		/6 = /7 = - /8 = - /9 =		
	10	48.5-50	8/10	14"	51 - 52 - 53 - 5		Same as sample number 9, medium grain.
	1 1	53.5-55	5/ 6/10	12"	54		Same as sample number 10 - medium grain.
					57		
	12	58.5-60	8/ 10/4	13"	59 =		Same as sample number 11 - medium grain.
			-				Engineer

FORM CE-5 REV. 3/74

AMERICAN ELECTRIC TOTAL SERVICE CORPORATION

Job No.		LUG Ur	BURING
Company			Boring No. <u>802</u> Date <u>3-17-77</u> Sheet <u>4</u> of <u>4</u>
Project			Type of BoringRig
Location of Boring:			Casing used Size Drilling mud used Boring begun Boring completed
Water Level 34.	5		Ground Elevation referred to
Time			Dat
Date	•		Field Party: Roush and Reitmire
Depth of Casing, ft. Sample No. Sample depth from-to	Standard Penetration Resistance Blows/Foot Tot. length of recov. sample	FEET _ b	DESCRIPTION oil type, color, texture, consistency, sampler driving notes, lows per foot on casing, depths wash water lost, observed uctuations in water level, notes on drilling ease, etc.
13 63.5-	13/,,	61 - 62 - 63 - M - 8 - 66 - 67 - 67 - 67 - 67 - 67 - 67	edium brown sand - fine grain - medium coarse
14 68.5-	-70 ^{5/8} / ₁₂ 12"		ame as sample number 13 - medium and coarse rain.
15 73.5-	.75 8/ _{15/} 15"	73 - 74 - 75 - 76 - 77 - 77 - 77 - 77 - 77 - 77	Same as sample number 13 - medium grain.
16 78.5-	80 14/ ₂₀ 14"	78 =	Same as sample number 13 - medium and coarse grain. Auger refusal at 82.5' Engineer

Job No),		····				O BOXING
Compa	ny <u>Ap</u>	palachia	n Power	Compar	ıy		Boring No. <u>803</u> Date <u>3-15-77</u> Sheet <u>1</u> of
	t Protion of E	oject 130 Boring:	01 - Tri	ıck Bri	ldge Cr	ossi	Ing Type of Boring Auger Rig B-61 Casing used Size Drilling mud used
Water	Level		····			···	Boring begun3-15-77 Boring completed 3-16-77
Time							Ground Elevation referred to Date to
Date							Field Party: Roush and Reitmire
Depth of Casing, ft.	le No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH	GRA	1 Soli type, color, texture, consistency, sampler driving notes
Casi	Sample	Samp fro (in	Sta Pene Res Blow	Tot. le	FEET	SOIL	blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
		·			0 -		*Boring offset about 25'east because of power lines.
					1 -		
	······································				2 -		
	_		3/ _{4/6}		3 -		
	1	2.5-4	476	14"	£ 4 =		Medium brown clayey silt.
				<u> </u>	5		
					6 -		
					F 7 -		
			4/		8 =		
	2	7.5-9	4/ 5/ ₅	13"	9 -		Medium brown, medium grain, gravely sand.
					<u> </u>		
					E /1 =		
	·				/2		
			/. /		/3 _		
	3	12.5-14	4/ _{4/₅}	7"	E /4 =		Same as sample number 2 w/fine and medium grain
					/5		sand.
					_ / _ / 6		
					- / ₇ -		
		e.			/8	1/1	
	4	17.5-19	5/ 6/7	14"	- / ₉ -		Medium brown sand and gravel.
					= 20 =	T	5441
		,			- 1-		

Job No),				l	_00	G OF BORING
							Boring No. 803 Date 3-15-77 Sheet 2 of 5
							Type of BoringRig
	tion of B						Casing usedSizeDrilling mud used
Water	Level					**********	Boring begun Boring completed Crown Flourities Referred to
Time				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Ground Elevation referred to Datur
Date							Field Party: Roush and Reitmire
	f	T	T	T 4 0	1	H.d.	
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 GRAP	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.
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					120		
					E 21 =]	
					E' 3]	
	 		-	ļ	- 22 -		
	1				_	1//	
	 	-	10/	+	F 23 =	1///	
	5	22.5-24	1 11/	12"	E 24 =	\mathbb{Z}	Medium brown sand and gravel.
	ĺ				E"3		
<u> </u>	 	<u> </u>			25 -		
	ĺ				F =		
 		-	+		26 -	1	
	İ				F 27 =		
	1				F"3		
L	·	<u> </u>	<u> </u>	<u> </u>	E 28 =	1//	
	6	27.5-29	6/ _{8/6}	111	E -	1//	Medium brown gravely sand.
 	, <u> </u>	21.5-25	D		F 29 =	HZ-	recitum brown gravery same.
.	ı				F 30 =		
					Εď∃		
		<u> </u>	<u> </u>	ļ	Eg1 3		
	I		.		F = 3		
 	<u></u>		1	-	F 32 -		
1 1	i				F 33 =	1//	
		1	8/		E, 3		
ļ	7	32.5-34	10/5	6"	F 24 -	1//	Medium brown, medium grain gravely sand.
	ı ·		. !	!	F =		
		ļ'	ļ		<u> </u>		
				ļ. ,	F , =		
					36		
		<u> </u>	<u> </u>	<u> </u>	37		
				1	E =	1/	
			57.		38		
	8	37.5-39	^{5/} 6/ ₈	14"	F 39		Same
					E', 3		
		ļ	<u> </u>		1/0-		
	!				F′ ∃		
					FI		
1	ļ						Engineer

Job No	o	· · · · · · · · · · · · · · · · · · ·				LUC	S OF BURING
Compa	ıny						Device No 000 Day of the man
Projec						***************************************	Boring No.803 Date 3-15-77 Sheet 3 of 5
Loca	ition of	Boring:					Type of Boring Rig Casing used Size Drilling mud used
Water	Level						Boring begun Boring completed
Time							Ground Elevation referred to
Date	***************************************						Dati
	Τ						Field Party: <u>Roush and Reitmire</u>
± ±	o Z	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot. length of recov. sample	DEPTH	APH	DESCRIPTION
Depth of Casing, ft.	9	e de	rat rat	ngtl sam	IN	GR/	Soil type, color, texture, consistency, sampler driving notes,
Dep	Sample	fro fr	Star ene esis	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	FEET		l plows per foot on casing, depths wash water lost observed.
	S	S	7 N W	Tec 7		S	fluctuations in water level, notes on drilling ease, etc.
					F 1/0 -		
					E 70 -]	
		<u> </u>		_	<u> </u>		
				1.	F′, -	41 1	
		-		 	F-42 -]	
					F /2 =	1//	
	•		5/4/6		- 4/3 -	1//	
	9	42.5-44	4/6	13"	E 1/4 =	1//	Medium brown, medium coarse grain gravely sand.
					F	<u> </u>	
		 	 	 	4/5	41 F	
]	
					- 46 -		
	-				E 47 =		
	***************************************		17/	 	_ 4/8 _	11//	
	10	47.5-49	8/10	12"	- 49 -	1//	Medium brown, coarse grain sand w/some gravel.
			**		F9	144	graver.
		<u> </u>			_50 =		
			1				
	· · · · · · · · · · · · · · · · · · ·		 		_ ડો _	-	
					=	-	
					- 52 -		
			6/		- <3 <u></u>		
	11	52 . 5-54	6/ 8/ 12	6"		1//	
		32.63 34	12		- 54 -	 // -	Same as sample number 10 w/medium grain sand trace of gravel.
		•		F	7/1	-	trace of graver.
					- 55 -		
					-56		
				F			
					-57	-	
				F	· / #	//	,
			8/	E	- 58 -		
	12	57.5-59	10/2	_7" -	-59-	1/1_	Same
			1	<u> </u>		-	
				$ \mathbb{E}$	-60	-	
					, 킈	-	
	T				'		
							Engineer

Job No. Compan	y Ap	palachia				oggi	Boring No. <u>803</u> Date <u>3-15-77</u> Sheet <u>4</u> of
Project Locat Water Time	ion of E	Boring:	UI - III	uck Br	idge Cr	ossi	Type of BoringRig
Date							Field Party: Roush and Reitmire
Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tat. 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.
	13	62.5-64	7/11/15	6"	62 = 63 = 64 = 65 = 66 = 66 = 66 = 66 = 66 = 66		Medium brown coarse grain gravelly sand.
	14	67.5-69	13/ 17/ ₂₅	5"	/8 - /9 -		Medium brown fine sand,
	15	72.5-74	6/ ₉ / ₃	13"	71 - 72 - 73 - 74 - 75 -		Same
	16	77.5-79	8/ 13/ ₂₀	13"	76 77 78 79		Same - medium grain.
			:		1 -		Engineer

AEP CIVIL ENGINEERING LABORATORY

Job N	0	· · · · · · · · · · · · · · · · · · ·				1.00	G OF BORING
Compa	any						5 () () () ()
Projec	ct						Boring No. 803 Date 3-15-77 Sheet 5 of
Loca	ation of	Boring:					Casing used Size Drilling mud used
Wate	r Level				· · · · · · · · · · · · · · · · · · ·		Boring begun Boring completed
Time							Ground Elevation referred to
Date							Field Party: Roush and Reitmire
	Ι .		<u> </u>	- 0	1	1 =	
Depth of Casing, ft.	o Z	Sample depth from-to (in feet)	Standard Penetration Resistance Blows/Foot	Tot, length of recov. sample	DEPTH	~) ~ Q	DESCRIPTION
epth sing	Sample 1	om. fee	etra etra isto	eng so	IN	GR	Soil type, color, texture, consistency, sampler driving notes
ن م	San	fr. (i.i.)	Sten Res Slov	ot.	FEET	SOIL	I blows per 1001 on casing denths wash water lost observed
		· · · · · · · · · · · · · · · · · ·		<u> - 2</u>	<u> </u>	10	fluctuations in water level, notes on drilling ease, etc.
					= 90 =		
	,				=		
					F / 1 -		
					E /2 =		
					F =	177	10.
	****	 	8/		_ ∮3 _		
	17	82.5-84	8/ _{10/22}	1"	- 84 -		Modium bross and 11
				···		14	Medium brown gravelly sand.
<u> </u>					_ {5 _		
						-	
					_ 86 =	-	
					- 17 -		
				ŀ	- !/ -		
					-	T.	
	18	87.3-87.4	50/	. [- , -	-	Hit rock at 86.8'
					- 19 -		No recovery
					-90=		Started coring at 87.6'
		'		E	- /° -]		
					-91	1	100' recovery. 8.0' of +.4 core
				E	- ', -]	-	8.0' of +.4 core
	11.9	07 (07			- 92		10.0' medium gray medium grain hard sandstone.
	ın #1	87.6-97.6		10.0	93 3		grain hard sandstone,
	.			E	· ′ ,	-	
					- 94 -]	-	
				-	- 95	 	
				E	- /° -]		
					96 -		
-	- 1			E	\ <u>-</u>		
					77-1	-	
				E	98	- 5	Stopped hole at 97.6'
				E	/ 1	3	3-16-77
				[-	99-	-	
				F		-	
				E	160		
				<u> </u>	[[
							_
						ı	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



JO	B NUI	MBER _							LO	00	i Bortiivo					
	MPA							_					TE 7/23/15 SI		2	
		T EPF									_		BORING FINIS			
		INATES _					State	Plane usin					WELL TYP			
GF	ROUN	D ELEVAT	TION _	569.2	SY	STEM	NAD2	7					2.14 DI.			
W	ater L	evel, ft	<u> </u>	4.9	Ţ		Ā						EN <u>27.0</u> BOTTOM			
TII	ME												BACKFIL		JT	
DA	ATE		6-18	8-97						FIE	ELD PARTY MO	CR-WEB	RI	G BK-81		
SAMPLE	NUMBER	SAM DEI IN F FROM	MPLE PTH EEET TO	PENET RESIS	DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	%	DEPTH IN FEET	GRAPHIC	S O S O	Road gravel, gr	SOIL / ROO IDENTIFICAT	TION	DRILLEF NOTES		
1	SS	5 1.5	3.0	4-:	5-4	1.0		5 -			minor cl- silty cla limestone aggre	ay at base, als gate, dry, no o	own, 10yr 4\2, with so gravel and contamination no e to medium grain.			
2	SS SS	6.5	8.0	4-	3-3	1.5				SM	% fines, 80% cla contamination, p medium sand, 1 95% sand, medi	ay, 20% silt, dooorly graded, Oyr 4\2, <15% ium to fine 25	own, 10 yr 4\2, >50 lry, no CL grades into SM 6 gravel, well sorted, % silt, moist, black tamination, grades			
3	3 55	S 11.5	13.0	1-:	2-3	.7		-		CL	silty clay Mode clay, 20% silty, r contamination, r	moist, slight p	•	11' TO 13' SH TUBE TAKEN 6-25-97.		
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	- SS	S 16.5	18.0	1-	3-4	.7		15 -		SM	· · · · · · · · · · · · · · · · · · ·	silt and gravel grain, sub-rou	A4 SILTY SAND Sand well washed, nded, no contamin	18.5 TOP OF	SEAL	
NTAIN		TYPE	E OF C	ASING	USED			Continued Next Page								
PORN_MOU		NQ-2 R0 6" x 3.25 9" x 6.25	OCK CO 5 HSA					PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
EPRI_SF		HW CAS	SING AD	VANCER	?	4" 3"		WELL T	YPE:	O'	W = OPEN TU	BE SLOTT	ED SCREEN, GN	M = GEOMON		
		NW CAS	SING			6"					RECORDER	T ROGE	RS			
AEP		AIR HAI				8"		RECORDER TROGERS								



JOB	NUMI	BER						LOG OF BORING						
COM	IPAN'	<i></i>		OUND WATER						RING NO. <u>001</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF <u>2</u> RING START 6/18/97 BORING FINISH 6/18/97				
SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	(APH LOG	NSCS	SOIL / ROCK ☐ DRILLER'S IDENTIFICATION NOTES				
5	ST	21.5	23.5		.7					MATTER BROWN 5YR 4\4 SILTY SAND 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		25 -		SW	DARK YELLOW BROWN 10 YR 4\2 TO MODERATE BROWN 5YR 4\2 GRAVELLY SAND Well graded sand, <15% gravel, 90% sand, course to fine grain, well graded, quartz sub-rounded, wet, no odor, no contamination.				
7	SS	31.5	33.0	7-12-11	1.5		30 -			DARK YELLOW BROWN 10 YR 4\\(\)2 MODERATE BROWN 5\(\)78\(\)4 GRAVELLY SAND 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'.				
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	36.5	38.0	4-6-4	.9		35 -		ML SM	LIGHT BROWN 5 YR5\6 CLAYEY SILT Interval grading in SM. PALE YELLOW BROWN 10YR6\2 SAND 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.				
EPRI_SPORN_MOUN														



JOB	NUM	BER _					-			-					
	1PAN'										ORING NO. <u>002</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>4</u>				
				OUND V							DRING START 6/19/97 BORING FINISH 6/24/97				
COC	RDIN	IATES _	N 724	4 <u>,857.8</u>	E 1,7	33,65		- Dii-		PIE	EZOMETER TYPE WELL TYPE				
GRO	UND	ELEVAT	ION _	580.8	SY	STEM	NAE	e Plane usin 027	ng ———		ST. RISER ABOVE GROUND 1.99 DIA 2				
Wat	er Lev	el, ft	<u> </u>	7.8	Ţ		$ar{ar{arLambda}}$				PTH TO TOP OF WELL SCREEN 60.5 BOTTOM 70.5				
TIMI	E										ELL DEVELOPMENT YES BACKFILL QUICK GROUT				
DAT	Έ		6-2	5-97						FIE	ELD PARTY MCR-WEB RIG BK-81				
		000	1D. F	OTAN	DADD		DOD								
SAMPLE	빌	_	IPLE PTH	1	DARD RATION		RQD	DEPTH	GRAPHIC LOG	S	SOIL / ROCK ☐ DRILLER'S				
AMF	SAMPLE	IN F			TANCE	PNS	%	IN	ZAP LOC	SC	SOIL / ROCK ☐ ☐ DRILLER'S IDENTIFICATION > NOTES				
ωΞ	S	FROM	TO	BLOV	VS / 6"		, •	FEET	5	⊃					
										ML	FILL MATERIAL, GRASS AND GRAVEL WITH				
									-		TOP SOIL				
1	SS	1.6	3.1	1 1	1-11	1.4				CL	MODERATE BROWN 5YR4\4 SANDY SILT				
'	33	1.0	3.1	4-1	1-11	1.4				CL	60% silt, 40 % sand, minor clay, sub-rounded with				
									<u> </u>		quartz gravels 1/2-3/4", dry, no contamination.				
									+						
								5 -							
								5							
									=						
2	SS	6.6	8.1	4-4	4-3	1.5			<u> </u>		MODERATE BROWN 5YR4\4 SANDY SILT				
	33	0.0	0.1		1 -0	1.5			+=-		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%				
									<u> </u>	CL	sand, sand fine grain, minor gravel and black				
									+=-	interbedded clay, moist, no contamination.					
								10 -			10 YR5\4 MODERATE YELLOW BROWN SILTY CLAY 90% clay, 10% silt, minor sand,				
								10	<u> </u>		clay very stiff, light gray interbeds with some root				
									+==		zones, moist, no contamination, no odor.				
3	SS	11.6	13.1	3-9	5-6	1.1									
									Ţ						
									E						
									ţ						
								15 -							
								15							
									+==						
23/12	SS	16.6	18.1	3-4	4-5	1.5					MODERATE YELLOW BROWN 10YR5\4				
		10.0	10.1		. 0	'			1-		SILTY CLAY 90% clay, 10% silt, minor sand,				
P.GD									<u></u>		very still, with light gray to black interbedded root zones, moist, no contamination, no odor, some				
AE O											mica present.				
Z.GP.									+=-						
							,								
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15		TYPE	OF C	ASING	USED						Continued Next Page				
ž Z		NQ-2 R0		RE			-	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE							
POR		6" x 3.25 9" x 6.25	HSA				SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
EPRI S		HW CAS		VANCEF	?	4" 3"	_	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
		SW CAS	SING			6"		RECORDER TROGERS							
AEP		AIR HAN				8"					. ESS. IN SAIN				



LOG OF BORING JOB NUMBER DATE **7/23/15** SHEET **2** OF COMPANY BORING NO. 002 PROJECT EPRI GROUND WATER STUDY 6/19/97 BORING FINISH 6/24/97 **BORING START** SAMPLE **STANDARD** SAMPLE NUMBER DEPTH SAMPLE **DEPTH** PENETRATION SOIL / ROCK DRILLER'S LOG WELL SC IN FEET RESISTANCE **IDENTIFICATION NOTES FEET** FROM BLOWS / 6" TO SS 21.6 **MODERATE BROWN TO LIGHT BROWN 10** 5 23.1 2-1-3 1.5 YR 5\4 TO 5YR 4\4 SANDY CLAY 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, **MODERATE YELLOW BROWN 10YR5\4** SS 26.6 28.1 1-1-2 1.5 SILTY CLAY 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. SS 31.6 33.1 1-1-1 0 SS 34.6 36.1 1.5 **MODERATE BROWN 5YR4\4 SANDY CLAY** Sample wet at base 1-1-2 60% clay, 40% sand, clay moderate stiff, sand (perched). fine grain, mica and quartz, with iron coloring at base, very red minor black (organic?), sample wet at base. SS 36.6 38.1 1-1-1 1.5 LIGHT BROWN 5YR 5\6 SANDY CLAY 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. SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 **LIGHT BROWN 5YR 6\6 SILTY CLAYEY SAND** 10 SS 41.6 43.1 1.5 1-8-13 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 Water in sample. n5 40% clay 60% sand, clay is moderate stiff, Will add water inside wet, sand is quartz, mica, fine grain, wet, grading augers. into sw at 1.8 -2' well graded sand, dark yellow Water in sample. brown 10yr4\2 medium to coarse sand 90% sand, 10% silt\clay, sand quartz, sub-rounded, wet. EPR m=sc

Continued Next Page



JOB	NUMI	BER						LO	G O	F BORING				
COM	1PAN	′		OUND WATER						ORING NO. <u>002</u> DATE <u>7/23/15</u> SHORING START <u>6/19/97</u> BORING FINISH				
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	☐ DRILLER'S NOTES			
11	SS	46.6	48.1	11-12-14	1.5		50 -			MODERATE YELLOW BROWN SAND 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 -			PALE YELLOW BROWN 10 YR 6\2 SAND 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 5yr4\4 from 52.4-52.7, grades into medium sand. 95% sand with 5% 52.7-53.1 silty\clay, wet, no contimination.	54.1 Top of seal.			
13	SS	56.6	58.1	6-6-7	1.3				SP	DARK YELLOW BROWN 10YR 4\2 SAND 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		60 -			PALE YELLOW BROWN SAND 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 cllected.			
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	66.6	68.1	8-4-5	.9		65 - 70 -		SW	BROWN GRAY 5YR 4\1 SAND 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 contimiantion.	70.5 Bottom of screen			
P EPRI_SPOR										Continued Next Page	STATE DOLLOTTION SCIENT			
AEP								Continued Next Page						



JOB NUMBER									LO	GΟ	F BORING		
		PAN					_			RΩ	RING NO. 002 DATE 7/23/15 SH	HEET	4 OF 4
				I GRO	UND WATER	STU	IDY				RING START 6/19/97 BORING FINISH		
•	NOC	LCI		u Oito	OND WAILK	010	<u> </u>				TAING STAIN	·	24/31
ר וכויי	NUMBER	SAMPLE	SAM DEF IN F	IPLE PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	uscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
L	16	SS	FROM 71.7	TO 71.9	50/.2	.2					LICHT CRAY CANDSTONE NZ Modium grain		71.8 Bottom of sand.
		55	11.1	71.9	301.2	.2		-			LIGHT GRAY SANDSTONE N7 Medium grain sand, friable at top of sample, competent at base, loosely cemented, quartz grain , sub-angular to sub-rounded, dry. Auger return includes sub-angular cobbles and gravel of granite, quartzite, gneiss from bottom of borehole.		Approximately 200 gallons water injected into bore hole during augering.
5													

EPRI SPORN MOUNTAINFER GPJ



JOB	NUM	BER _					_		LO	GO	BORING					
COM	IPAN'	Y								ВО	RING NO. <u>003</u>	DATE_7	7/23/15 SHI	EET <u>1</u>	_ OF 2	
PRO	JECT	EPF	RI GRO	DUND V	VATER	STU	DY			ВО	RING START 6/2	25/97	BORING FINISH	6/25/9	7	
COO	RDIN	IATES _	N 719	9,877.2	E 1,7	33,71	3.7			PIE	ZOMETER TYPE		WELL TYPE	OW		
GRO	UND	ELEVAT	TON _	604.9	SY	STEM	Stat NAD	e Plane usin 027	ng	HG	T. RISER ABOVE GRO	OUND <u>2.30</u>	DIA	2		
Wate	er Lev	el, ft	<u> </u>	1 9	lacksquare		1			DE	PTH TO TOP OF WEL	L SCREEN _	32.3 BOTTOM	42.3		
TIME		-,			_		+-			WE	ELL DEVELOPMENT	YES	BACKFILL	QUIC	K GROUT	
DAT			6-2	6-97			+			FIE	LD PARTY MCR-	WEB	RIG	BK-81	1	
D/ (1)	_							•								
SAMPLE	SAMPLE	DE	IPLE PTH EEET TO	PENETI	TANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	SOSO		OIL / ROCK NTIFICATION		WELL	DRILLER'S NOTES	
										ML						
1	SS	1.5	3.0	3-{	5-6	1.5					GRAYISH ORANGE ORANGE 10YR\7\2 80% clay, 20% silt, d staining possibly, no	TO 10YR 6/6 S dry, mottled, so	me mica, iron,			
2	SS	6.5	8.0	3-2	2-4	1.5		5 -			GRAYISH ORANGE 70% clay, 30% silt, n with depth, mottled, i contamination.	noist, clay cont	tent decrease			
3	SS	11.5	13.0	2-2	2-3	1.5		10 -		CL	MODERATE YELLO SILTY CLAY 90% cl clay, moist to minor v contamination.	lay, 10% silt, in	crease in	Percl	hed water.	
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	16.5	18.0	5-6	5-8	1.1		15 -		SW	MODERATE YELLO Well graded, 95% sa grain gravel, sand is sub-rounded, quartz,	and, 5% silt, so medium to coa	me coarse arse,			
INTAI		TYPE	OF C	ASING	USED				Continued Next Page							
SPORN MOL		NQ-2 R0 6" x 3.25 9" x 6.25	OCK CO 5 HSA 5 HSA			4"		SLO	METER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE OTTED SCREEN, G = GEONOR, P = PNEUMATIC TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
EPR		NW CAS	SING	- V, 11 VOLI	•	3"		WELL T	YPE:	<u>ا</u>	N = OPEN TUBE	SLUTTED	SCREEN, GM	- GEUN	/IUN	
AEP I		SW CAS				6" 8"	\dashv	RECORDER TROGERS								
▼ ∟		, vii / i i/\l	• · · · · · · · · · · · · · · · · · · ·						NEGONDER TROOPING							



LOG OF BORING JOB NUMBER DATE **7/23/15** SHEET **2** OF COMPANY BORING NO. 003 PROJECT EPRI GROUND WATER STUDY 6/25/97 BORING FINISH 6/25/97 **BORING START** STANDARD
PENETRATION TO SESTANCE ON SESTANCE SAMPLE RQD SAMPLE NUMBER DEPTH SAMPLE S DEPTH F0G SOIL / ROCK DRILLER'S WELL SC IN FEET **IDENTIFICATION** NOTES **FEET** FROM BLOWS / 6" TO **MODERATE YELLOWISH BROWN 10YR 5**\4 SS 21.5 23.0 8-9-9 1.2 SAND 95% sand, 5% silt\fine sand, some coarse gravel of quartzite\granite, sand is medium to coarse grain quartz, dry, subrounded, no contamination. 25 25.3 Top of seal. DARK YELLOW BROWN 10YR 4\2 SILTY SS 26.5 28.0 4-4-5 1.2 SAND 95% sand, 5% silt, sand sand medium to coarse minor silt, sand rounded to sub-rounded quartz, minor mica, some gravel, moist, sand 28.1 Top of sand. increase in sorting, no comtamination. 30 SM DARK YELLOW BROWN 10YR 4\2 SILTY SS 31.5 33.0 3-2-3 1.2 SAND 95% sand, 5% silt, no gravel, sand fine to medium, poorly graded, wet, no contamination, 32.3 Top of screen. SW at bottom sand. SS 33.0 34.5 2-2-2 1.5 DARK YELLOW BROWN 10YR 4\2 SILTY SAND 95% sand, 5% silt, sand is fine to 35 medium quartz, some mica, poorly graded, n0o contamination. Grain size analysis sample 35.3-36.8 DARK YELLOW BROWN 10YR 4\2 SILTY SS 36.5 38.0 1-1-2 1.4 **SAND** 95% sand, 5% silt, sand medium to fine grain quartz, where poorly graded. SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 100 gallons of water DARK YELLOW BROWN 10YR 4\2 SILTY used in augers. SAND 95% sand, 5% silt, sand medium to fine, Filled augers with quartz, wet, poorly graded and uniform grain size, water. 10 SS 41.5 43.0 7-10-7 1.5 no contamination. 42.4 Bottom of screen. 43.4 Bottom of sand. Advance augers to 43.4 to install screen. EPRI



		Y _					-			R(ORING NO. 1	0 4	DATE .	7 <i>1231</i> 15 SHF	=FT	1 OF 3
				DUND V	VATER	R STUI	DY							BORING FINISH		
				4,865.9										WELL TYPE		
				581.1				D: :	g					DIA		
		/el, ft			T									37.6 BOTTOM		
TIME		701, 11		1.0	-		+			W	ELL DEVELOR	PMEN	T YES	BACKFILL	QI	JICK GROUT
DAT			6-3	0-97										RIG		
D/ (1	_			J J1												
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	PENET RESIS	IDARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs		I	SOIL / ROCK DENTIFICATION		WELL	DRILLER'S NOTES
								5								
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	TYPE OF CASING USED NQ-2 ROCK CORE 6" x 3.25 HSA 9" x 6.25 HSA HW CASING ADVANCER NW CASING 3" SW CASING 6" AIR HAMMER 8"						PIEZOM SLC WELL TY	OTTE	ED S	PE: PT = (SCREEN, G	OPEI G = G	SEONOR, P =	OUS TIP, SS =			
		SW CAS	SING			6"					RECORDI	FR	T ROGERS			
AEP						8"					I LOUINDI	<u>-'` -</u>	. INCOLING			



JOE	NUM	BER _				_		LO	GO	F BURING				
COMPANY									ВО	RING NO. <u>004</u>	DATE	7/23/15 SI	HEET	2 OF 3
PRO	DJECT	EPF	RI GRO	OUND WATER	STU					RING START	6/26/97	_ BORING FINIS	H <u>6/</u>	30/97
SAMPLE	SAMPLE	DEI	MPLE PTH FEET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS		SOIL / ROCK	ı	WELL	DRILLER'S NOTES
1	ST	26.0	28.0	BLOWS 7 6"			25 - 30 -							26.0 Shelby tube. 30.0 Top of seal. 32.8 Top of sand.
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ss	41.5	43.0	4-6-7	1.5		40 -		SC	MEDILIM CPA	Y N5 CLAYEY SAI	ND 60% cand		
3	SS	43.5	45.0	8-13-21	1.5				SW	40 % clay, clay fine , quartz, m DARK YELLO SAND Well gree 90% sand, 1000	v slight plasticity, sa nica, wet, well sorte W BROWN 10YR 2 eaded, sand is med % silt\clay, sand qu ret, no contamination	and is medium to d. 4\2 BROWN iium to coarse, partz,		Grain size analysis 43.5-45.0
P -							45 -	1.000						

Continued Next Page



JOB	NUM	BER _				_		LO	OG OF BORING						
	COMPANY					во	RING NO. <u>004</u>	DATE_	7/23/15 SHE	/15 SHEET 3 OF 3					
PROJECT		EPRI GROUND WATER STUDY								RING START	6/26/97	BORING FINISH	6/30/97		
SAMPLE	SAMPLE	DEF	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL / ROCK IDENTIFICATION		☐ DRILLER'S NOTES		
													47.6 Bottom of screen. 48.2 Bottom of sand.		

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB	NUM	IBER _							LO	00	DI BORING			
CON	/IPAN	Υ								ВС	ORING NO. <u>005</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>			
PRC	JECT	_ EPF	RIGRO	DUND V	VATER	STU	YC			ВС	ORING START BORING FINISH			
COC	ORDIN	NATES _	N 719	9,152.8	E 1,7	34,428				PIE	EZOMETER TYPE WELL TYPE			
GRO	DUND	ELEVAT	ION _	591.0	SY	STEM	State NAD	e Plane usin 027	g	HG	GT. RISER ABOVE GROUND 2.19 DIA 2			
Water Level, ft 33.8										DE	EPTH TO TOP OF WELL SCREEN <u>37.7</u> BOTTOM <u>47.7</u>			
TIM		,			_		+-			WE	VELL DEVELOPMENT YES BACKFILL QUICK GROUT			
DAT			7-2	2-97			+			FIE	ELD PARTY MCR-WEB RIG BK-81			
			1-2	01										
SAMPLE	SAMPLE	DE	IPLE PTH EEET TO	PENET RESIS	DARD RATION TANCE VS / 6"		RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK			
1	ss	2.0	3.5	3-:	3-4	1.1		- - - 5 -		ML	SOILS, SILT, FINE SAND			
2	ST	7.0	9.0			2.0		10 -		SC	Sample from bottom of shelby tube MOTTLED YELLOW BROWN 10YR 5/4 CLAYEY SAND 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	Sample from bottom of shelby tube MOTTLED YELLOW BROWN 10 YR 5/4 CLAYEY SAND 90% sand 10% silt/clay, moist, sand is fine to medium grain subrounded, quartz, no contamination.			
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	18.5	20.0	6-4	6-7	1.25		-		SW	MOTTLED YELLOW BROWN 10YR 5/4 SAND Well graded 95% sand, 5% silt, sand is medium to coarse grain quartz subrounded, moist, no contamination, some gravel is granite.			
Z NO		TYPE	OF C	ASING	USED						Continued Next Page			
SPORN_MO		NQ-2 R0 6" x 3.25 9" x 6.25	HSA HSA					PIEZOM SLO						
EPRI		HW CAS		VANCER	?	4" 3"	=	WELL T	YPE:	0\	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON			
						6"					RECORDER T ROGERS			
SW CASING 6" AIR HAMMER 8"											RECORDER I NOCERO			



JOB NUMBER DATE **7/23/15** SHEET **2** OF COMPANY BORING NO. 005 PROJECT EPRI GROUND WATER STUDY 7/1/97 BORING FINISH 7/1/97 BORING START STANDARD
PENETRATION PENETRATI SAMPLE RQD SAMPLE NUMBER DEPTH SAMPLE S **DEPTH** F0G SOIL / ROCK DRILLER'S WELL SC IN FEET **IDENTIFICATION** NOTES **FEET** FROM BLOWS / 6" TO MOTTLED YELLOW BROWN 10YR 5/4 SAND Poorly grade, 95% sand, 5% silt, sand is medium to fine grain, very well sorted, moist, sand subrounded quartz, no contamination, stringers of 5 SS 23.5 25.0 2-1-2 1.4 coal .25" thick at 22.7'. 25 **DARK YELLOW ORANGE 10YR 6/6 SAND** Well graded sand, 95 % sand, 5% silt, medium to coarse with fine interbedded rounded quartz, grades into SP, poorly graded sand DARK SS 6 28.5 30.0 3-4-5 1.5 YELLOW ORANGE 10YR 6/6 SAND, 95 % sand 5% silt, sand is medium to fine grain, well sorted, subrounded quartz, wet. 29.7 Top of seal. 30 DARK YELLOW ORANGE 10YR 6/6 SAND 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 SS 33.5 35.0 2-3-4 33.5 Top of sand. 7 1.2 contamination. Rods wet 34.5. 35 Adding water to augers 125 gallons. SM/SW MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND, TO WELL GRADED SAND 37.7 Top of screen. 100% sand, fine to coarse, w\minor gravel, sand is subrounded quartz, wet, no contamination. SS 38.5 40.0 1.5 3-4-4 SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 **MODERATE YELLOW BROWN 10YR 5/4** SAND 100% sand, medium grain, well sorted quartz, subrounded to rounded, wet, no contamination, minor clay at bottom 1/2". SS 43.5 45.0 3-4-7 1.4 45 SS 45.0 46.5 4-4-6 1.5 **MODERATE YELLOW BROWN SAND** Poorly EPRI Sample 10 grain size

Continued Next Page



JOE	NUN	IBER _				_		LO	G OF BORING					
	MPAN								ВО	ORING NO. <u>005</u> DATE <u>7/23/15</u> SHEET <u>3</u> OF	3			
PROJECT EPRI GROUND WATER STUDY										DRING START BORING FINISH				
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION ROT				
10	SS		50.0	4-4-6	1.5		- 50 -			graded, 100% sand, medium grain quartz, including gravel layers, wet, no contamination. MODERATE YELLOW BROWN 10YR 5/4 SAND Medium grain, quartz, well rounded to subrounded, wet, no visible contamination. 47.7 Bottom screen. 48.8 Bottom	n of			
רטוא <u>י</u> שוסטויואוואבה סרט הבי סטי יובט יובט יובט יובט יובט יובט יובט יו							50 -							



JC	A BC	NUMI	BER _					-				DOI NITO
C	OMI	PAN	Y									ORING NO. <u>006</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>4</u>
PI	ROJ	IECT	_EPF	RIGRO	OUND V	VATER	STU	DY			BC	ORING START 7/1/97 BORING FINISH 7/8/97
C	OOF	RDIN	ATES _	N 720),255.7	E 1,7	35,68				PII	EZOMETER TYPE WELL TYPE
G	ROI	JND	ELEVAT	TON _	601.3	SY	STEM	NAD	e Plane usii 127	ng ———		GT. RISER ABOVE GROUND <u>0.26</u> DIA <u>2</u>
V	Water Level, ft ▼ 50.3 ▼ 61.0 ▼ 70.0										DE	EPTH TO TOP OF WELL SCREEN 81.1 BOTTOM 91.1
Т	IME										W	ELL DEVELOPMENT YES BACKFILL QUICK GROUT
D	ATE	.		7-29	9-97	7-7	7-97		7-8-97	7	FII	ELD PARTY MCR-WEB RIG BK-81
Щ	I H	믜	_	IPLE PTH		DARD RATION		RQD	DEPTH	GRAPHIC	S	SOIL / ROCK - DRILLER'S
AMP	NUMBER	SAMPLE		EET	RESIS	RATION TANCE	1000 1000 1000 1000 1000 1000 1000 100	%	IN	ZAPI LOC	SC	SOIL / ROCK ☐ ☐ DRILLER'S IDENTIFICATION NOTES
S	Z	S	FROM	TO	BLOV	VS / 6"	Lij	, •	FEET	5	⊃	
												ASPHALT, BOTTOM ASH, GRAVEL ROAD
										-		BED
										16		
										-		
									5 -			
									5	▮₽		
	1	SS	6.0	7.5	18-2	2-24	1.5			••••	SW	LIGHT BROWN 5YR 5/6 SILTY SAND Well
	'	00	0.0	7.0	102	<i>L L</i> ¬	1.0					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	9-1	5-13	1.5			-		subrounded, no contamination, dry.

	3	SS	9.0	10.5	9-13	3-15	1.5			-		
									10 -	_:::::		
	4	SS	10.5	12.0	7-0	9-9	1.5		. •			LIGHT BROWN 5YR 5/6 SAND Well graded, fill,
	7	00	10.0	12.0	'	5 0	1.0			-::::		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	DARK YELLOW BROWN 10YR 4/2 SILTY SAND 95% sand, 5% silty, minor gravel, sand is
										-		quartz dry, no contamination, fill ?.
	6	SS	13.5	15.0	9-10	0-12	1.4					LIGHT BROWN 5YR 5/6 SILTY SAND/GRAVEL
												90% sand, 10% silt, sand medium grain. MODERATE YELLOW BROWN 10YR 5/4
-	7	SS	15.0	16.5	7.0)-13	1.5		15 -	_		SILTY CLAY TO CLAYEY SILT 10% clay, 90%
	'	33	15.0	10.5	7-8	-13	1.5					silt, fine grain , minor sand, dry, no contamination.
2												
7/23/15	8	SS	16.5	18.0	7-9)-10	1.8			_		
SDT												
AEP.(9	SS	18.0	19.5	5-5	i-11	1.5			-		
3PJ /												
EER.(10	92	10.5	21 0	6	9_9	15					
SPORN MOUNTAINEER.GPJ AEP.GDT	10 SS 19.5 21.0 6-9-9 1.5 TYPE OF CASING USED											Continued Next Page
MO	NQ-2 ROCK CORE PIEZOMETER											
ORN	6" x3.25 HSA SLOTTE											SCREEN, G = GEONOR, P = PNEUMATIC
J SP(9" x 6.25 HSA HW CASING ADVANCER 4" WELL TYPE:											W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
EPRI			NW CAS	SING			3"	-	vv⊏LL I	TPE:		
AEP											_	RECORDER TROGERS



JOB	NUM	RFR						LO	GΟ	F BORING				
	IPAN'								ВО	RING NO. <u>006</u>	DATE_	7/23/15 SHEE	ΞT _	2 OF 4
PRO	JECT	EPF	RI GRO	OUND WATER	STU	IDY			ВО	RING START	7/1/97	BORING FINISH	7/8	/97
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL / ROCK		WELL	DRILLER'S NOTES
11	SS	21.0	22.5	4-6-7	1.3		-							
12	SS	22.5	24.0	5-7-11	1.5		-							
13	SS	24.0	25.5	9-10-9	1.5		25 -							
14	SS	25.5	27.0	7-7-8	1.4		-	_						
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		30 -							
18	SS	31.5	33.0	4-6-9	1.5		-	_						
19	SS	33.0	34.5	5-5-8	1.3		-							
	SS		36.0	3-6-9	1.5		35 -							
21	SS	36.0	37.5	3-3-6	1.5									
22		37.5	39.0	3-3-5	1.5		-							
23	SS SS	39.0	42.0	3-4-6 4-4-6	1.5		40 -	-						
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		45 -							

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/2

Continued Next Page



JOB NUMBER ______ 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

PRO	JECT	EPR	RIGRO	OUND WATER	SIU	צט			ВО	RING START	7/1/97	BORING FINISH		18/97
SAMPLE NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	II	SOIL / ROCK DENTIFICATION		WELL	DRILLER'S NOTES
28	SS	46.5	48.0	2-3-4	1.5		-							
29	SS	48.0	49.5	3-3-4	1.5		-	-						
30	SS	49.5	51.0	1-2-3	1.5		50 –							
31	SS	51.0	52.5	3-4-4	1.5		-							
32	SS	52.5	54.0	1-1-2	1.5		-							52.5 Wet. 53.2 Wet zone.
33	SS	54.0	55.5	2-3-4	1.5		-	_						55.2 Wet ZOHE.
34	SS	55.5	57.0	2-3-3	1.5		55 -							
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		60 –							
38	SS	61.5	63.0	1-2-4	1.5		-	_						62.2 Wet at 62.2-63.
39	SS	63.0	64.5	3-4-5	1.5		-							
40	SS	64.5	66.0	3-3-3	1.5		65 –							
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		70							
44	SS	70.5	72.0	1-4-4	1.5		70 – -							
										Cont	inued Next Pa	//		

AEP EP

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LOG OF BORING JOB NUMBER __ ____ DATE <u>7/23/15</u> SHEET <u>4</u> OF __ COMPANY BORING NO. 006 PROJECT EPRI GROUND WATER STUDY BORING FINISH 7/8/97 EEE RQD SAMPLE PENETRATION RESISTANCE STANDARD GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH S **DEPTH** SOIL / ROCK DRILLER'S WELL SC IN FEET **IDENTIFICATION NOTES** FEET BLOWS / 6" **FROM** TO 45 SS 72.0 73.5 1-3-4 1.5 46 SS 73.5 75.0 4-4-5 1.5 73.6 Top of seal. 75 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. SS 78.0 79.5 2-3-3 1.5 49 78.5 Wet sand. 50 SS 79.5 81.0 2-5-9 1.5 79.5 Water in sand 80 base (80.8-81.0) water added to augers. 82.5 SS 81.0 1.5 51 11-11-11 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 SS 85.5 87.0 8-10-15 54 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 12-21-17 Total of 250 gallon of 57 SS 90.0 91.5 1.5 water added to bore hole. 91.1 Bottom of SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 58 SS 91.5 93.0 7-14-14 1.2 screen. 59 SS 93.0 94.5 16-29-50/.2 1.1 93.7 Bottom of sand. 95

AEP EPRI_



JOB	NUM	BER _					_		LO	00	BONING					
	IPANY										RING NO. 008 DATE 7/23/15 SHEET 1 OF 2					
											RING START BORING FINISH					
		_		8,915.8			Ct-	te Plane usin			ZOMETER TYPE WELL TYPE					
GRO	UND	ELEVAT	TION _		SY	'STEM	NAI	D27	y 		T. RISER ABOVE GROUND 2.10 DIA 2					
Water Level, ft								-			PTH TO TOP OF WELL SCREEN 23.8 BOTTOM 33.8					
TIME	Ē										ELL DEVELOPMENT YES BACKFILL QUICK GROUT					
DAT	E		7-2	21-97							ELD PARTY MCR-WEB RIG BK-81					
SAMPLE	SAMPLE	DEI	MPLE PTH EEET TO		IDARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	SOSO	SOIL / ROCK IDENTIFICATION DRILLER'S NOTES ORGANIC MATERIAL, GRASS, WEEDS. ROOT ZONE IN SILTY CLAY AND CLAYEY					
1	SS	1.9	3.4	4-:	3-2	.7		5 -		CL	MODERATE BROWN 5YR 4/4 SILTY CLAY 90% clay, 10% silt, dry, some organics, roots zone, no contamination.					
2	SS	6.9	8.4	4-:	2-3	1.5		10 -			MODERATE BROWN 5YR 4/4 TO YELLOW ORANGE 10YR 6/6 SILTY CLAY 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.					
3	SS	11.9	13.4	4-:	3-2	1.4		15 -		CL	MODERATE BROWN-DARK YELLOW ORANGE 5YR 4/4 TO 10YR 6/6 SILTY CLAY From above grading into SM at 12.6. MODERATE BROWN 5YR 3/4 CLAYEY SAND 70% sand, 30% clay, sand is v-fine grain quartz, moist no contamination.					
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	SS	16.9	18.4	2-	2-1	1.2					MODERATE YELLOW BROWN 10YR 5/4 CLAYEY/SILT SAND 80% sand, 20% clay, moist, sand is v-fine grain, quartz, mica flakes, no visible contamination.					
		TYPE	E OF (CASING	USED	ı					Continued Next Page					
<u> </u>		NQ-2 R	OCK C	ORE				PIEZOM	ETFR	TYP	E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE					
, I ILZOIVIL I L											ED SCREEN, G = GEONOR, P = PNEUMATIC					
HW CASING ADVANCER 4" WELL TYPE																
NW CASING 3"																
SW CASING 6" AIR HAMMER 8"											RECORDER TROGERS					



JOB	NUM	BFR						LO	G OI	F BORING		
	/IPAN					_			ВО	RING NO. <u>008</u> DATE <u>7/23/15</u> SH	HEET	2 OF 2
			I GRC	UND WATER	STU	IDY				RING START 7/14/97 BORING FINISH		
SAMPLE	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
5	SS	21.9	23.4	1-1-1	1.5		- - - 25 –			MODERATE YELLOW BROWN 10YR 5/4 CLAYEY/SILTY SAND 80% sand, 20% clay, sand is v-fine grain, quartz with some silty and clay, sand is wet and contains mica, no visible contamination.		21.4 Top of sand. 23.8 Top of screen.
6	SS	26.9	28.4	1-1-2	1.5		- - - - -			MODERATE YELLOW BROWN 10YR 5/4 SILTY/CLAYEY SAND 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.		Wet.
7 8	SS	31.9	33.4	3-1-2 2-2-4	1.3		- - -			MODERATE BROWN 5YR 4/4 SILTY SAND 95% sand, 5% silt, sand is fine grading to medium at 32.3', quartz, f's par, mica flakes, wet, no visible contamination. MODERATE BROWN 5YR 4/4 SILTY SAND 95%sand, 5% silt, sand is fine to medium grain, quartz, subrounded, wet, no contamination, then fine sand and clay at base.		31.9 Grain sized analysis. 33.8 Bottom of screen. 34.9 Bottom of sand.
5.												39.9 Added water to augers.



JOB	NUM	BER _					-				or beruite
	1PAN'										BORING NO. <u>009</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>
				OUND V							BORING START <u>7/15/97</u> BORING FINISH <u>7/15/97</u>
COC	RDIN	IATES _	N 718	3,328.2	E 1,7	36,32		- Di		PII	PIEZOMETER TYPE WELL TYPE
GRO	UND	ELEVAT	ION _	575.0	SY	'STEM	NAE	e Plane usin 027	1g		HGT. RISER ABOVE GROUND 1.57 DIA 2
Wat	er Lev	el, ft	¥ 25	5.6	Ţ		$ar{ar{arLambda}}$				DEPTH TO TOP OF WELL SCREEN 42.3 BOTTOM 52.3
TIMI	E										WELL DEVELOPMENT YES BACKFILL QUICK GROUT
DAT	Έ		7-1	7-97						FII	FIELD PARTY MCR-WEB-JCM RIG BK-81
SAMPLE	SAMPLE	DEF		STAN PENET	DARD RATION	ral GTH VERY	RQD	DEPTH	GRAPHIC LOG	S C	
SAN	SAN	IN F FROM		RESIS	RATION TANCE VS / 6"	RECO	%	IN FEET	1	S N	
									4. A. A. A. A. A. A. A. A. A. A. A. A. A.		ASH
1	SS	1.9	3.4	4	4-4	1.5		5 -			FLY ASH With coal stringers, some clay,interbedded, dry, compact.
2	SS	6.9	8.4	8-	7-5	1.5		3 -		CL	L MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND 95% sand, 5% silt, sand medium grain with quartz grading into CL SILTY CLAY
								10 -			DARK GRAY N3, v-fine grain, stiff, 90% , clay, 10% silt moist, no combinations.
3	SS	11.9	13.4	2-	2-3	1.4		15 -			MODERATE YELLOW 10YR 5/4 BROWN SILTY SAND 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.
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	16.9	18.4	2-:	2-2	1.5					MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY 90% clay, 10% silt, very stiff, wet, no visible contamination, trace of black organics.
NTAIN		TYPF	OF C	ASING	USFD			_		1	Continued Next Page
PORN_MOUR		NQ-2 R0 6" x 3.25 9" x 6.25	OCK CO 5 HSA		USED			PIEZON SLO			
<u>8</u>		HW CAS	SING AD	VANCEF	?	4"		WELL T	YPE:	O'	OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
EPRI		NW CAS				3" 6"	\dashv				
AEP		AIR HAN				8"					RECORDER TROGERS



LOG OF BORING JOB NUMBER DATE **7/23/15** SHEET **2** OF COMPANY BORING NO. 009 PROJECT EPRI GROUND WATER STUDY **BORING START** 7/15/97 BORING FINISH 7/15/97 SAMPLE **STANDARD** SAMPLE NUMBER DEPTH SAMPLE **DEPTH** PENETRATION F0G SOIL / ROCK WELL DRILLER'S SCS IN FEET RESISTANCE **IDENTIFICATION NOTES** FEET FROM BLOWS / 6" TO **MODERATE YELLOW BROWN 10YR 5/4** 21.9 5 SS 23.4 2-2-1 1.5 SILTY CLAY 70% clay, 30% silty/sand, fine to 22.4 Sandy zone. medium grain at bottom, wet, no contamination, clay is little stiff. DARK GRAY N3 SILTY CLAY 90% clay, 10% SS 26.9 28.4 1-2-2 1.5 silt, very stiff, moist. 30 **DARK GRAY N3 SILTY CLAY** 70% clay 30% SS 31.9 33.4 1.5 7 1-2-1 silt, fine sand, wet throughout, sand v-fine grain with interbedded in section, no visible contamination. 35 34.8 Top of seal. DARK GRAY N3 SILTY CLAY 90% clay, 10% SS 36.9 38.4 15 1-1-1 8 silt, moist, clay is v-stiff, trace of black organic material. 38.5 Top of sand. SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 41.9-43.9 Shelby tube 800 PSi, 20 sec., 42.3 Top of screen. SS 42.9 **MEDIUM DARK GRAY N4 SILTY GRAVEL 60%** 44.4 8-17-27 1.5 gravel, 40% sand/silty, gravel subrounded, quartz, quartzite wet, no contamination. EPRI



JOB COM						_			ВО	RING NO. <u>009</u> DATE <u>7/23/15 SHE</u>	EET _	3 OF 3
PRO	JECT	EPF	RIGRO	OUND WATER	STU	IDY			ВО	RING START 7/15/97 BORING FINISH	<u>7/</u>	15/97
SAMPLE NUMBER	SAMPLE	DEI	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	SOSO	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
10	SS	46.9	48.4	15-15-10	1.5		50 -			MEDIUM DARK GRAY N4 60% gravel, 40% sand/silt, gravel is quartz, subrounded, sand is fine to coarse, wet, quartzite, wet, no contamiantion.		46.9-48.4 Grain size analysis.
11	SS	51.9	53.4	10-15-20	1.5					MEDIUM DARK GRAY N4 SILTY SANDY GRAVEL 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.



JOB	NUMI	BER _							LO	00	BONING
COM											RING NO. <u>011</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>
				OUND V							RING START <u>7/22/97</u> BORING FINISH <u>7/23/97</u>
COO	RDIN	ATES _	N 71	7,666.4	E 1,7	36,450		e Plane usin		PIE	ZOMETER TYPE WELL TYPE OW
GRO	UND	ELEVA	TION _		SY	STEM _	NAD				ST. RISER ABOVE GROUND 2.39 DIA 2
Wate	er Lev	el, ft	∑ 3	2.0	Ī		$ar{ar{ar{\Lambda}}}$				PTH TO TOP OF WELL SCREEN 36.3 BOTTOM 46.3
TIME	Ξ										ELL DEVELOPMENT YES BACKFILL QUICK GROUT
DAT	Ε		7-2	24-97						FIE	ELD PARTY MCR-WEB RIG BK-81
SAMPLE	SAMPLE	DE	MPLE PTH FEET TO	PENET RESIS	IDARD RATION STANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	SOSO	SOIL / ROCK IDENTIFICATION DRILLER'S NOTES GRASS, OM.ML, SILT, GRAYISH ORANGE.
1	SS	1.5	3.0	6-	8-8	.8		5 -			MEDIUM DARK GRAY N4 ASH V-fine grain, dry, no contamination, ash is very dusty, coarse, bottom ash 1.8-2.4
2	SS	6.5	8.0	7-7	7-10	1.3					MEDIUM DARK GRAY N4 ASH V-fine-fine sandy texture, dry at top moist at base.
3	SS	11.5	13.0	5-	3-5	1.4		10 -			DARK GRAY N4 ASH/BOTTOM ASH V-fine sand texture, dry throughout with thin coal layers, no contamination.
MOUNTAINEER, GPJ AEP, GDJ 7723/15	SS	16.5	18.0	4-5	5-10	1.5		15 -		CL	SAME AS ABOVE 16.5-17.0 MODERATE YELLOW BROWN 10YR 5/4 SILTY CLAY Clay is moderately stiff with silt and fine sand, interbedded, moist, no contaminate.
Z		TYPE	E OF (CASING	USED					1	Continued Next Page
	_	NQ-2 R					+	DIEZO		T /-	-
SPOKN		6" x 3.2	5 HSA	UI\L				PIEZOM SLO			E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
<u> </u>		9" x 6.25		DVANCER	₹	4"					
파		NW CA	SING	PAVINCEL	`	3"		WELL T	YPE:	O	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
7		SW CAS	SING			6"					RECORDER TROGER
₹∟		AIR HAI	<u> WIMER</u>			8"					



LOG OF BORING JOB NUMBER ___ BORING NO. <u>011</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF __ COMPANY BORING START 7/22/97 BORING FINISH 7/23/97 PROJECT **EPRI GROUND WATER STUDY** SAMPLE MPLE MBER MPLE DEPTH SOIL / ROCK DRILLER'S

SAME	SAMF	IN F	EET TO	RESISTANCE BLOWS / 6"	LENG	% IN FEET	GRAP LOC USC	IDENTIFICATION	WEI	NOTES
5	SS	21.5	23.0	5-5-5	1.5			BROWNISH GRAY 5YR 4/1 BOTTOM ASH Fine sand texture, moist, includes coal, no contamination.		
6	SS	26.5	28.0	3-2-5	1.5	25		MEDIUM DARK GRAY N4 BOTTOM ASH 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	30	A A A A A A A A A A A A A A A A A A A	MODERATE YELLOW BROWN 10YR 5/4 SILTY SAND 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	35		SAME AS ABOVE		36.3 Top of screen.
EP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	41.5	43.0	4-2-2	1.3	40		MODERATE YELLOW BROWN 10YR 5/4 CLAYEY SAND 70% sand, 30% clay, sand fine to medium grain, quartz, subrounded, wet, no visible contamination.		41.5-43.0 Grain size analysis.
EPRI_SF								Continued Next Page		



LOG OF BORING JOB NUMBER __ BORING NO. **011** DATE **7/23/15** SHEET **3** OF COMPANY PROJECT EPRI GROUND WATER STUDY BORING START **7/22/97** BORING FINISH **7/23/97** STANDARD
PENETRATION
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PENETRA EEE RQD SAMPLE DEPTH HTGAD GRAPHIC LOG SAMPLE NUMBER SAMPLE S DEPTH SOIL / ROCK DRILLER'S WELL SC IN FEET **IDENTIFICATION NOTES** FROM BLOWS / 6" TO 46.3 Bottom of CL DARK YELLOW ORANGE 10YR 6/6 SILTY 10 SS 46.5 48.0 8-11-12 1.5 screen. **CLAY** 90% clay, 10% silt, wet. **MODERATE BROWN 5YR 4/4 SILTY SAND** 80% sand, 20% silt/clay, sand medium to coarse grain with some gravel, subrounded, wet. 50.0 Bottom of sand. YELLOW BROWN 10YR 5/4 SILTY SAND 90% SS 51.5 53.0 11 12-14-14 1.5 sand, 10% silt, sand medium grain, quartz, wet grading into GM. MODERATE YELLOW BROWN SANDY GRAVEL 70% gravel, 30% sand/silt, gravel subrounded, granite, quartzite, sand medium to fine grain, wet, no contamination. **MODERATE YELLOW BROWN 10YR 5/4** 12 SS 56.5 58.0 9-7-6 1.2 SANDY/SILTY GRAVEL 80% gravel, 20% sand /silt, minor clay, gravel is subrounded, quartz, granite, quartzite, sand medium to fine quartz, wet, no contamination.

EPRI SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOE	B NUM	IBER _									n bortinto									
CO	MPAN	Υ						_		ВС	ORING NO. <u>012</u>	2		DATE	7/23/1	<u>5</u> 9	SHEE	=T <u>1</u>	OF _	4
PRO	OJEC	EPF	RI GRO	OUND V	VATER	STUE	Υ			BC	ORING START	_	7/23/9	7	BORII	NG FINIS	SH .	7/29	/97	
CO	ORDI	NATES _	N 718	3,753.1	E 1,7	37,045				PI	EZOMETER TY	/PE			W	ELL TYP	PE .	OW		
GR	OUND	ELEVAT	TION _	580.0	SY	STEM	State NAD2	Plane usin	g	Н	GT. RISER ABO	OVE	GROUN	D <u>2.</u>	02	D)IA	2		
Wa	ter Le	vel, ft	<u> </u>	3.8	Ţ		Ā			DE	EPTH TO TOP (OF V	VELL SC	CREEN	62.3	BOTTC	OM .	72.3		
TIM	1E										ELL DEVELOPI									DUT
DA	TE		7-30	0-97						FII	ELD PARTY _	MC	R-WE	В		R	lG .	BK-8	81	
SAMPLE	SAMPLE	DEI IN F	MPLE PTH EEET	PENET RESIS	DARD RATION TANCE	TOTAL LENGTH RECOVERY	%	DEPTH IN FEET	GRAPHIC LOG	USCS		II	SOIL / DENTIFI	ROCK ICATIOI			113/0/	, , , , , , , , , , , , , , , , , , ,	DRILLE NOTE	
1	SS		4.5	3-	VS / 6" 2-2	1.5		5 -			MEDIUM DA BOTTOM AS top of spoon.	SH A	sh dust,	some ii	nterbedde					
3	ss	13.0	14.5	1-	2-2	1.5		10 -	_											
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS		19.5		3-3	1.5		15 -												
INUC		TYPE	OF C	ASING	USED						C	Cont	inued	Next F	Page					
SPORN_MC		NQ-2 R0 6" x 3.25 9" x 6.25	5 HSA 5 HSA					PIEZOM SLO			E: PT = OI SCREEN, G							PEN	TUBE	
EPRIS		HW CAS		VANCER	?	4" 3"		WELL T	YPE:	0	W = OPEN 7	TUE	BE SLO	OTTE	O SCRE	EN, G	M =	GEC	MON	
		SW CAS	SING			6"					RECORDE	R	T RO	GERS	 }					
AEP		AIR HAN	MMER			8"						–								



JC	B 1	NUME	BER _				_		LO	GO	r buring				
C	OMI	PANY	<i></i>							ВО	RING NO. <u>012</u>	DATE_	7/23/15 SH	EET	OF4
PF	ROJ	ECT	EPF	RIGRO	UND WATER	STU	DY			ВО	RING START	7/23/97	BORING FINISH	_7	7/29/97
SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS		SOIL / ROCK IDENTIFICATION		WELL	DRILLER'S NOTES
	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 -							
20/10	8	SS	38.0	39.5	2-2-2	1.5		- - - 40 –	-						
IN INIOON AINEEN. GFJ. AEF. GDI.	9	SS	43.0	44.5	2-2-2	1.5		-							
5								45 -							45.5 Water on rods.

AEP



JOB NUMBER __ COMPANY _____ DATE <u>7/23/15</u> SHEET <u>3</u> OF _ BORING NO. 012 BORING START <u>7/23/97</u> BORING FINISH <u>7/29/97</u> PROJECT EPRI GROUND WATER STUDY STANDARD
PENETRATION PLOOP
SISTANCE HAD ROD SAMPLE GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH S DEPTH SOIL / ROCK WELL DRILLER'S USC IN FEET **IDENTIFICATION NOTES** FEET FROM TO SS 48.0 2-3-3 10 49.5 1.5 50 11 SS 53.0 54.5 22-24-29 1.3 55 57.4 Top of seal. 17-15-19 SS 58.0 12 59.5 1.1 60 61.4 Top of sand. 62.3 Top of screen. SS 63.0 10-16-22 13 64.5 1.1 65 EPRI SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 SS 68.0 69.5 3-3-5 1.5 68.0-69.5 Grain size analysis. 70

AEP E



JOB	NUM	BER _						LO	G O	FBORING			
COM									во	RING NO. 012	DATE	7/23/15 SH	HEET 4 OF 4
			RI GRO	UND WATER	STU	DY					7/23/97		
SAMPLE	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS		SOIL / ROCK IDENTIFICATION		☐ DRILLER'S NOTES
75 15 15 15 15 15 15 15 15 15 15 15 15 15	SS SS	73.0	TO 74.5	50/.3	.3		75 —	5	n en en en en en en en en en en en en en				72.3 Bottom of screen. 73.9 Bottom of sand.
į													



JOE	NUM	IBER _									DOM:									
	MPAN																		OF	4
				DUND V							ORING START									
		_		9,504.2			Ctata	e Plane usin			EZOMETER T									
GR	OUND	ELEVAT	TON _	599.9	SY	STEM .	NAD	27												
Wa	ter Le	vel, ft	∑ 22	2.6	Ā		Ā				EPTH TO TOP									
TIN	1E																		UICK GROU	T
DA	TE		12/1	0/01						FI	ELD PARTY _	MC	R-REB				RIG	<u>B</u>	K-81	
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	PENET RESIS	IDARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS		II	SOIL / RO				į	WELL	DRILLER'S NOTES Grounding procedures not in	
1	SS	1.9	3.4	6-	7-8	1.5					BOTTOM A	ASH							on this boring. This boring used collect soil samp determine where set well. Potable water for drilling from old (Lab site. Flushe lines for approx.	I to les to to r C E
2	SS	6.9	8.4	2-:	3-3	1.5		5 -			LOOSE 5B Dry; 0.2' mo				RAY FL	Y ASH	1		before using.	
3	SS	11.9	13.4	2-:	2-2	1.5														
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 T A P P P P P P P P P P P P P P P P P P	SS	16.9	18.4	2-:	2-2	1.5		15 -												
TAIN .		TVDE		ASING	HIGED		\exists		<u> </u>			Cont	nued N	eyt Da	nne					
	,	NQ-2 R0 6" x 3.25 9" x 6.25	OCK CO 5 HSA 5 HSA	RE		4"			TTC	ED S	PE: PT = C SCREEN, G	PEN G = G	N TUBE SEONOF	POR R, P =	OUS .	UMA	TIC		EN TUBE	
EPRI		NW CAS	SING	OVANCER	`	3"		WELL T	YPE:	0	W = OPEN	TUE	SE SLO	HED	SCRI	ΕĒΝ,	GM =	= G	LOMON	
AEP E	+	SW CAS				6" 8"	\dashv				RECORDE	ER _	MCR							
< ∟		AIL LILY	VIIVIL⊏I_			U														



JOB	NUM	BER _				_		LO	J O	FBORING		
	/IPAN								ВС	RING NO. <u>MW-015</u> DATE <u>7/23/15</u> SH	HEET	2 OF 4
PRC	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВС	RING START <u>12/6/01</u> BORING FINISH	1 <u>1</u>	2/11/01
SAMPLE	SAMPLE	DEI	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
5	SS	21.9	23.4	2-3-3	1.5		25 -			LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH 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
6	SS	26.9	28.4	1-1-2	1.5					LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH Wet		from saturated fly ash from 6.0' to 43.4'
7	SS	31.9	33.4	2-2-3	1.5		30 -			LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH Moist in some areas, wet in others		
8	SS	36.9	38.4	1-1-1	1.5		35 -			LOOSE 5B 7/1 LIGHT BLUISH GRAY FLY ASH Wet		
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	41.9	43.4	0-0-0	1.5		40 -			VERY LOOSE 5B 5/1 MEDIUM BLUISH GRAY FLY ASH Saturated, very fine		Weight of hammer pushed spoon.
EPRI_SPORN_							45 -	1.0.0.0.				
AEP E										Continued Next Page		



JOB	NUM	BER _				_		LO	GΟ	FBORING		
	1PAN JECT		RI GRO	OUND WATER	STU	IDY				RING NO. <u>MW-015</u> DATE <u>7/23/15</u> S RING START <u>12/6/01</u> BORING FINIS		
SAMPLE	SAMPLE	DE	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPH LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
10	SS	46.9	48.4	3-4-6	1.5			\(\lambda\), \(\la		STIFF 10YR 5/4 MODERATE YELLOWISH BROWN CLAYEY SILT 1.5 tsf, moist		
11	SS	51.9	53.4	3-4-5	1.4		50 -					Started adding drill mud to inside of HSA's to prevent heaving sand @ 51.9'
12	SS	56.9	58.4	2-3-3	1.5		55 -			MEDIUM STIFF 10YR 5/4 MODERATE YELLOWISH BROWN CLAYEY SILT 1.0 tsf, moist		
13	SS	61.9	63.4	2-2-2	1.5		60 -			MEDIUM STIFF N5 MEDIUM GRAY CLAYEY SILT 1.0 tsf, moist	_	
14	SS	66.9	68.4	2-2-2	1.5		65 -					
							70 –					



LOG OF BORING JOB NUMBER __ BORING NO. MW-015 DATE 7/23/15 SHEET 4 OF COMPANY PROJECT EPRI GROUND WATER STUDY BORING START 12/6/01 BORING FINISH 12/11/01 !EE RQD SAMPLE STANDARD PENETRATION PENETR GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH S **DEPTH** SOIL / ROCK DRILLER'S USC WELL IN FEET **IDENTIFICATION NOTES FEET** BLOWS / 6" FROM TO 15 SS 71.9 73.4 2-3-3 1.5 LOOSE BROWN & GRAY FINE GRAIN SAND Wet 75 1.3 VERY DENSE 10YR 5/4 MODERATE 16 SS 76.9 78.3 19-39-50/.4 Gravely area @ YELLOWISH BROWN MEDIUM to COARSE 77.0'-88.4' (set well) **GRAIN SAND** 0 With little gravel 0 0. 0 0 0 (SS 81.9 83.4 30-37-21 VERY DENSE 10YR 6/6 DARK YELLOWISH 17 1.5 **ORANGE MEDIUM to COARSE GRAIN SAND** 0 (With little gravel 0 0 0 85 Ø 0 18 SS 86.9 88.4 11-12-12 1.5 MEDIUM DENSE N5 MEDIUM GRAY MEDIUM to COARSE GRAIN SAND With trace gravel, wet 90 SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 19 SS 91.9 **DENSE N5 MEDIUM GRAY MEDIUM to** 93.4 15-16-17 1.5 **COARSE GRAIN SAND** Wet 20 SS 94.3 94.5 50/.2 0.2 N7 LIGHT GRAY SANDSTONE Stopped boring at auger and spoon refusal @ 94.5' on 12/11/01. Tremie grouted from 94.5' to grade using approx. 150 gallons of EPRI (quick grout.



JOB	NUM	BER _						LO	GO	BONING
COM	1PAN'	Y							ВС	RING NO. <u>MW-16</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>4</u>
PRO	JECT	_EPF	RI GRO	OUND WATER	STU	DY			ВС	RING START <u>6/17/08</u> BORING FINISH <u>6/18/08</u>
COO	RDIN	IATES _	N 721	1,431.5 E 1,7	32,814	4.2			PII	ZOMETER TYPE N/A WELL TYPE OW
GRO	UND	ELEVA	TION _	586.8 SY	STEM	Stat NAD	e Plane usin 027	g 	НС	IT. RISER ABOVE GROUND <u>1.787</u> DIA <u>2</u>
			$\overline{\nabla}$	▼		T			DE	PTH TO TOP OF WELL SCREEN 67.5 BOTTOM 77.5
TIME		-,				-			WI	ELL DEVELOPMENT Yes/ReclaimerBACKFILL Quick Grout
DAT									FIE	ELD PARTY MCR / ZLR RIG D-120
	_						•			
SAMPLE	SAMPLE	DE	MPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"		RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION □ DRILLER'S NOTES
1	SPT		8.2	3-3-6	1.5		5			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 STIFF 10YR 6/6 DARK YELLOWISH ORANGE SILTY CLAY tsf 2.75, moist
2	SPT	11.7	13.2	1-1-3	1.5		- - 15 -			SOFT 5YR 5/6 LIGHT BROWN CLAYEY SILT tsf 0.5, very moist
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15	SPT	16.7	18.2	10-13-15	1.2		- - -			5YR 5/6 LIGHT BROWN FINE to MEDIUM SAND w/trace of fine gravel, moist
NTAIN	1	TYPI	E OF C	ASING USED			<u> </u>	1		Continued Next Page
SPORN MOUI		NQ-2 R 6" x 3.25 9" x 6.25	OCK CO 5 HSA 5 HSA	RE			PIEZOM SLO		ED S	E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
EPRI		HW CA		VANCER	4" 3"		WELL T	YPE:	0	N = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
		SW CA	SING		6"					RECORDER
AEP		AIR HAI	MMER		8"					



J	ов і	NUMI	BER _						LO	GO	F BORING		
			·							ВС	ORING NO. <u>MW-16</u> DATE <u>7/23/15</u> SI	HEET	_2_ OF4
Р	RO	JECT	EPF	RIGRO	UND WATER	STU	DY			ВС	PRING START 6/17/08 BORING FINIS		
	NUMBER	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	4	SPT	21.7	23.2	8-10-13	1.1							
	5	SPT	26.7	28.2	5-8-13	1.2		25 - - -			MEDIUM DENSE 10YR 5/4 MODERATE YELLOWISH BROWN COARSE SAND w/trace of fine gravel, moist		
	6	SPT	31.7	33.2	6-8-12	.8		30 -			MEDIUM DENSE 5YR 6/4 LIGHT BROWN COARSE SAND w/some coarse gravel, moist		
	7	SPT	36.7	38.2	1-3-6	1.2		35 -			LOOSE 10YR 4/2 DARK YELLOWISH BROWN SAND 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
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	8	SPT	41.7	43.2	3-4-5	1.2		40 -			LOOSE 5 YR 4/4 MODERATE BROWN MEDIUM SAND w/trace of coarse gravel, wet		DRILLING MUD TO INSIDE OF AUGERS TO PREVENT HEAVING SANDS
AEP EPRI_SPOR								45 -			Continued Next Page		



JOB	NUM	BER _				_		LO	00	F BORING		
COM	PAN	<i></i>							ВС	DRING NO. <u>MW-16</u> DATE <u>7/23/15</u> SI	HEET	3 OF 4
PRO	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВС	DRING START 6/17/08 BORING FINISH	H <u>6</u> /	18/08
SAMPLE NUMBER	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
9	SPT	46.7	48.2	3-3-3	1.5		50 -			LOOSE 5YR 4/4 MODERATE BROWN MEDIUM GRAIN SAND w/trace of fine gravel, wet		
10	SPT	51.7	53.2	2-3-5	1.4					LOOSE 5YR 4/4 MODERATE BROWN MEDIUM GRAIN SAND w/trace of fine gravel, wet		
11	SPT	56.7	58.2	6-10-15	1.5		55			MEDIUM DENSE 5YR 3/4 MODERATE BROWN COARSE GRAIN SAND wet		
12	SPT	61.7	63.2	4-7-12	1.5		60 -			MEDIUM DENSE 10YR 5/4 MODERATE YELLOWISH BROWN MEDIUM GRAIN SAND wet		
13	SPT	66.7	68.2	6-12-15	1.5		65 -			MEDIUM DENSE 5YR 5/2 PALE BROWN MEDIUM to COARSE GRAIN SAND wet		
							70 -					



JOB	NUM	RFR						LO	GO	OF BORING	
	ΛΡΑΝ`					_			ВО	ORING NO. <u>MW-16</u> DATE <u>7/23/15</u> SHEET <u>4</u> OF <u>4</u>	
			RI GRO	UND WATER	STU	DY			во	ORING START <u>6/17/08</u> BORING FINISH <u>6/18/08</u>	
SAMPLE	SAMPLE	1	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION SOIL / ROCK □ □ DRILLER'S NOTES	
14	SPT		73.2	10-15-17	1.0		- - 75 –			MEDIUM DENSE 10YR 6/2 PALE YELLOWISH BROWN FINE SAND and FINE GRAVEL wet	
15	SPT	76.7	78.2	15-18-25	1.3		- - -			DENSE N5 MEDIUM GRAY COARSE SAND w/some coarse gravel, wet	
16	SPT	81.7	82.0	50/3	.2		80			N6 MEDIUM LIGHT GRAY WEATHERED COARSE GRAIN SANDSTONE STOPPED BORING @ 82.0'; INSTALLED 2" MONITORING WELL	



JO	3 NUN	IBER _							LO		DOMINO					
CO	MPAN	IY						_		ВС	ORING NO. <u>96-</u>	01	DATE	7/23/15 SH	EET	_1_ OF3_
PR	OJEC	T EP F	RI GRO	OUND V	VATER	STUE	ΟY			BC	RING START	6/1	14/96	BORING FINISH	6	/20/96
CO	ORDII	NATES _	N 717	7,700.5	E 1,7	35,921	1.2			PII	EZOMETER TY	PE		WELL TYPE	:	
GR	OUNE	ELEVA1	TION _	592.7	SY	STEM .	STAT	E PLANE		НС	ST. RISER ABO	VE GR	OUND	DIA		
Wa	ater Le	vel, ft	<u> </u>	7.9	T		Ā			DE	EPTH TO TOP C	OF WEL	L SCREEN	BOTTOM	_	
TIN	ΛE									W	ELL DEVELOPN	MENT		BACKFILL	_ C	UICK GROUT
DA	TE		6-20	0-96						FII	ELD PARTY _	MCR-	WEB	RIG	_ <u>B</u>	K-81
										1						
SAMPLE	X 빌		IPLE PTH	1	DARD RATION		RQD	DEPTH	GRAPHIC	S		sc	OIL / ROCK		بـ	DRILLER'S
AMP	SAMPLE		EET	RESIS	TANCE	P S S S S S S S S S S S S S S S S S S S	%	IN	% API	SC			NTIFICATION	J	WELL	NOTES
S)	≥ ⊗	FROM	TO		VS / 6"	Lai	,,	FEET	9)						
		0.0	1.5								ROAD BASE	<u> </u>				
								-	_							
									-							
								_								
2	SS	3.0	4.5	11-	10-7	1.5										
										SW	BLACK BOT	TOM A	SH Moist.			
								_		•						
3	SS	5.0	6.5	8-9)-11	1.3		5 -						.LY SAND Dry		
										•	to moist, 3/4"	max si	ze .			
										•						
										•						
										•						
	00	0.5	40.0	40.0	NE 20	4.0			***	•	DI ACK DOT	TON4 A	CUMeiet			
4	SS	8.5	10.0	10-2	25-30	1.2			- A . Z		BLACK BOT	TOW A	ISIOIST.			
								40	4.7							
								10 -	1. \(\delta\). \(\delta\). \(\delta\). \(\delta\). \(\delta\).							
								-								
_		1				, _			4.7							
5	SS	11.7	13.2	11-1	2-16	1.5		-			sand.	<u>VN SAN</u>	NDY SILT MO	ist, v-fine grain		
											ou.ru.					
								-	-							
								15								
								15 -								
								-	-							
3/15						, _							••••			
6	SS	16.7	18.2	7-7	'-11	1.5			14.4		BLACK BOT	TOM A	I <mark>SH</mark> Dry.			
GD.								-	4.7							
AEF									1. 4.							
GPJ									7. 4.							
삙									4.7							
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	•	TYPE	OF C	ASING	USED						C	ontinu	ied Next P	Page		
- MO		NQ-2 R	OCK CO	RE				PIEZOM	IETER	TYP	E: PT = 01	PEN T	TUBE POR	ROUS TIP, SS =	OP	PEN TUBE
NO RN		6" x 3.25 9" x 6.25					┤ .							= PNEUMATIC		
		HW CAS	SING AD	VANCEF	?	4"		WELL T	YPE:	O'	W = OPEN 1	TUBE	SLOTTER	SCREEN, GM	= C	SEOMON
EPRI	+	NW CAS				3" 6"	+	·								2111-11
AEP		AIR HAI				8"					RECORDER	≺ <u>۷۷</u>	IER			



	IOB I	NUME	BER						LO	GO	F BORING		
			·							ВС	PRING NO. 96-01 DATE 7/23/15 S	HEET	_2_ OF3
				RI GRO	OUND WATER	STU	DY				RING START 6/14/96 BORING FINIS		
	SAMPLE	SAMPLE	DEI	MPLE PTH EEET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	7	SS	21.7	23.2	7-3-2	1.5					Moist this area		
	8	SS	26.7	28.2	1-1-1	1.5		25 -			Saturated this area	Ā	
	9	SS	31.7	33.2	1-2-2	1.5		30 -		CL	GREENISH BROWN SANDY CLAY Saturated, low plasticity.	_	
15	10	SS	36.7	38.2	3-2-2	1.2		35 -		CL	MULTI-COLORED BROWN SANDY CLAY Wet to saturated, low plasticity, v-fine sand.	_	
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	11	ST	41.7	43.7		0		40 -				-	Belive material to soft to pickup in tube.
PRI_SPORN_MOUN	12	ST	43.7	45.7		0		45 -					
AEP EF											Continued Next Page		



							_				BOITHITO				
		PAN						_							3 OF 3
Ρ	RO	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВО	RING START	6/14/96	BORING FINISI	⊣ <u>6</u>	/20/96
A IdMAS	NUMBER	SAMPLE	DE	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL / ROCK	N	WELL	DRILLER'S NOTES
N_STONY_MOUNTAINEER, STO AET, STON 1123/15	13	SS	51.7	53.2	1-1-2	1.0		50 -		CL	DARK GRAY S sand.	SANDY CLAY Satu	urated, v-fine		Stopped boring at 53.2' grouted from 53.2 to grade with approximately 60 gallons of quick grout.



JC	B N	IUME	BER						LO	GC	F BORING					
										BC	ORING NO 96-0	02	DATE 7	/23/15 SHI	FFT	1 OF 3
					OUND WATER	STU								BORING FINISH		
					8,158.5 E 1,7											
					594.6 SY											
				<u>V</u>	Y									ВОТТОМ		
-			el, ft -	<u>-</u>	<u>+</u>		_ <u></u>							<u> </u>		UICK GROUT
\vdash	ME													RIG		
Ь	ATE														_	
	œ	111	SAM	1PLE	STANDARD	.т <u>≿</u>	RQD	DEPTH	U	S						
/PLI	JB	MPLI		PTH	PENETRATION	본등병		IN	용퇴	Ö		SOIL	/ ROCK		WELL	DRILLER'S
SAN	NUMBER	SAMPLE		EET			%	FEET	GRAPHIC LOG	S U		IDENTIF	FICATION		≷	NOTES
			FROM		BLOWS / 6"	4.0					CDAY DOTT	OM ACUE	\	Oll of county.		
	1	SS	0.0	1.5	10-12-13	1.2			A Z		GRAY BOTTO	OM ASH	ory, with 2 to	3" of sandy		
								-	4.4	1						
									1. 4.							
								-	74.4							
								-	4.4	1	GRAY BOTT	OM VSH L)n/			
	2	SS	3.0	4.5	10-13-13	1.5			1. 4.		GRAT BOTT	OW ASH	и у.			
								-	7. 7.							
								_	4.4	1						
	3	SS	5.0	6.5	9-8-7	1.3		5 -		CL		VN CLAY	Ory, medium	to high		
								-	<u> </u>		plasticity.					
									 							
								-	⇇							
								-								
'	4	SS	8.5	10.0	16-16-12	1.1		-	.	GP	max size, rou			<u>EL</u> Dry, 3/4"		
									•		max size, roui	nueu with s	some mies.			
-								10 -	- • • • • • • • • • • • • • • • • • • •							
									-							
								-		1						
	5	ss	11.9	12.4	8-10-8	1 1		-								
	9	33	11.9	13.4	0-10-6	1.4				•						
								-	-							
									5 ;}							
								-	\ <u>\</u>							
								15 -	3							
								15								
								-	2.							
7/23/15									7.0							
7/23	6	ss	16.9	18.4	6-11-9	1.3		-			DARK BROW			_ ′		
GDT									. •	1	quartz, 1/2" m	nax size, ro	unded with	some fines.		
AEP.								-								
3PJ										•						
ER.									-							
TAIN			T\/DE						X•	1						
SPORN MOUNTAINEER.GPJ AEP.GDT					ASING USED						C	ontinued	Next Pag	ge 		
Z N	X		NQ-2 R0 6" x 3.25	OCK CO	PRE		\dashv	PIEZOM						US TIP, SS =	OP	EN TUBE
POP			9" x 6.25	HSA				SLC	ווע	בט צ	SCKEEN, G	= GEON	UK, P = 1	PNEUMATIC		
EPRI			HW CAS		OVANCER	<u>4"</u> 3"		WELL T	YPE:	0	W = OPEN T	UBE SL	OTTED S	SCREEN, GM	= G	EOMON
			SW CAS	SING		6"					RECORDER	WEF	3			
AEP			AIR HAN			8"							_			

AIR HAMMER



JOB NUMBER COMPANY BORING NO. <u>96-02</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF _ PROJECT EPRI GROUND WATER STUDY BORING START 6/13/96 BORING FINISH 6/13/96 STANDARD PENETRATION RESISTANCE BLOWS / 6" RQD % SAMPLE GRAPHIC LOG SAMPLE NUMBER DEPTH SAMPLE S **DEPTH** SOIL / ROCK WELL DRILLER'S USC IN IN FEET **IDENTIFICATION NOTES FEET** FROM TO DARK BROWN SAND AND GRAVEL 7 SS 21.9 23.4 7-7-7 1.3 Saturated, rounded, 1" max size, quartz with some fines. SS 1.5 **DARK GRAY FLY ASH** Saturated. 26.9 28.4 1-1-2 8 ☆ φ. . :¢: φ. ☆ ∜ **:**\$: φ. 30 **☆** ≎ ⊹¢ ₩. **:** SS 31.9 33.4 1.5 9 1-1-1 \$ **:** φ. ÷. ♦ **:** Ġ. ψ. 35 ৾৾৻ ₩ **:** φ. ☆ ♦ ψ. 10 SS 36.9 38.4 1.5 1-1-1 φ. **:** Ö: ☼ ⊹ ÷¢: ψ. SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 ☼ ♦ 40 **:** φ. **:** Ö: ☼ ⊹ SS 11 41.9 43.4 4-4-6 1.3 CL DARK GRAY CLAY Wet, medium to high plasticity, trace of organic material. 1.0 12 ST 43.9 45.9 45 EPRI



JOB	NUM	BER _				_		LO	GO	FBORING				
	1PAN'								ВО	RING NO. 96-02	2 DATE	7/23/15 SH	IEET	3 OF 3
			RI GRO	UND WATER	STU	IDY					6/13/96			
SAMPLE NUMBER	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS		SOIL / ROCK	N	WELL	DRILLER'S NOTES
13	ST	46.9	48.9		2.0		50 -							
14	SS	51.9	53.4	3-3-4	1.5		-							
15	SS	56.9	58.4	1-3-4	1.5		55 - -							Grouted hole from 58.4' to grade with approximately 75 gallons
														gallons of quick grout.



JOE	3 NUM	IBFR					LO	G OI	- BORING					
		Y						BO	RING NO 96-	03	DATE 7/2	2 3/15 SH	FFT	_1OF3_
				OUND WATER	STUE									/18/96
				3,215.9 E 1,7										
				566.9 s										
			<u> </u>			Y						BOTTOM		
		vel, ft	<u> </u>	2.2 ₹		<u> </u>								UICK GROUT
TIN												BAOKI ILL RIG		
DA	IE		6-18	8-96				1 1	LDIAKII	MOIX-WE	ــــــــــــــــــــــــــــــــــــــ			11-01
SAMPLE	SAMPLE	DEI	MPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	N SE	RQD DEPTH IN FEET	GRAPHIC LOG	USCS			ROCK ICATION		WELL	DRILLER'S NOTES
2			1.5 4.5	1-2-4 6-5-4	1.3		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		GRAY FLY A		loist.			Boring was grouted from grade to 60' w\ 60 gallons of quick grout
3	SS	5.0	6.5	3-2-2	1.5	5 -								
4	ss	8.5	10.0	4-6-6	1.5		7.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0		BLACK COA	AL.				
5	SS	11.7	13.2	4-3-3	1.5	10 -		SC	LIGHT BROW v-fine grain s	WN SANDY	CLAY Dry to	o moist,		
						15 -		CL	DARK GRAY plasticity, trac			hight		
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	16.7	18.2	7-1-1	1.5									
NATAIN		TVDE		L ASING USED	<u> </u>				<u> </u>	ontinued	Next Page	L		l
		NQ-2 R0 6" x 3.25 9" x 6.25	OCK CO 5 HSA 5 HSA		4"		OTTE	ED S	E: PT = OI CREEN, G	PEN TUB = GEON(BE POROU DR, P = PI	JS TIP, SS = NEUMATIC		
EPRI		NW CAS	SING		3"	WELL T	YPE:		V - OPEN I	OBE SL	OLIED 20	CREEN, GM	- G	PEOIVION
AEP I		SW CAS			<u>6"</u> 8"				RECORDER	R WEB	i			

AIR HAMMER



JOE	NUN	IBER _				-		LO	GO	FBORING				
COI	ЛРАN	IY							ВО	RING NO. <u>96-0</u> 3	3 DATE	7/23/15	SHEET _	2 OF 3
PRO)JEC	T _ EPF	≀I GRC	OUND WATER	STU	DY				RING START	6/17/96	_ BORING FINIS	SH 6/1	8/96
SAMPLE	SAMPLE	DEI	MPLE PTH EEET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL / ROCK IDENTIFICATIO		WELL	DRILLER'S NOTES
7	ST	21.7	23.7		2.0		-						Ţ	
8	SS	26.7	28.2	1-1-1	1.5		25 - - - -							
9	ST	31.7	33.7		2.0		30 -							
10	SS	36.7	38.2	1-2-2	1.5		35		SP		AND BROWN SIL uartz, fine grain.	<u>TY SAND</u> Wet		
11	SS	41.7	43.2	7-14-19	.6		40 -		GW	GRAY SAND A	AND GRAVEL Sat rounded.	turated, quartz,		
; 							45 -							



JOB	NUM	BER _				_		LU	J UI	BURING		
COM								во	RING NO. 96-03 DATE 7/23/15	SHEET	3 OF 3	
PRO	JECT	EPF	RIGRO	UND WATER	STU	IDY			во	RING START <u>6/17/96</u> BORING F	INISH 6/	18/96
SAMPLE NUMBER	SAMPLE	SAM DEI IN F FROM	EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPH LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
12	SS	46.7	47.6	37-50/.4	.9		- - - 50 –	00,00,00,00		<u>Brown</u>		
13	SS	51.7	53.2	18-19-20	1.5		- - -	· 10 · 10 · 10 · 10 · 10 · 10 · 10 · 10		Same with 3/4" max size.		
14	SS	56.7	57.0	50/.3	.3		55 - - -			<u>Brown</u>		
15	SS	59.8	60.0	50/.2	.2		60 -			LIGHT GRAY SANDSTONE Fine grain.		



JO	B NU	JME	BER _							LO		DOMINO					
CC	MPA	ANY	<i>-</i>									ORING NO. <u>96-04</u>	4 [DATE 7/23/15	SHE	ET .	1 OF 4
PR	OJE	СТ	_EPF	RI GRO	OUND V	VATER	STU	ΣY			BC	ORING START	6/18/96	BORING	FINISH	6/	19/96
CC	ORI	DIN	ATES .	N 717	7,954.5	E 1,7	35,752	2.5			PII	EZOMETER TYPE	E	WEL	L TYPE		
GF	NOO	ND I	ELEVA	TION _	593.5	SY	'STEM	STA	TE PLANE								
W	ater	Leve	el, ft	$\overline{\nabla}$		Ţ		Ā			DE	PTH TO TOP OF	WELL SCR	EEN B	ОТТОМ	_	
TII	ME										W	ELL DEVELOPME	ENT	BA	CKFILL	Q	UICK GROUT
DA	ATE										FII	ELD PARTY <u>M</u>	ICR-WEB		RIG	В	K-81
					1							ı					
Щ	띪 !	Щ		/IPLE PTH		DARD		RQD	DEPTH	GRAPHIC LOG	S		SOIL / RO	nck		_	DRILLER'S
SAMPLE	JMB	SAMPLE		EET	RESIS	RATION TANCE	N S S S S S S S S S S S S S S S S S S S	%	IN	ZAPI LOG	SC		IDENTIFICA		ļ	WELL	NOTES
S	z (S)	FROM	TO		VS / 6"	L EI EI	,0	FEET	Ę) >		IBEITII 10	···o··	'		110120
			0.0							Б		ROAD BASE					Grouted boring from
									-	-1		107.15 27.102					88' to grade w\ 80 gallons of quick grout
									_								and placed concrete plug in road bed.
																	plug in road bed.
2	2 8	ss	3.0	4.5	11-1	2-13	1.3		-		SC		N CLAYEY S	AND Moist, trace	of		
									-			small gravel.					
	3 5	SS	5.0	6.5	11_1	9-16	1.5		5 -		SP	DARK BROWN	N GRAVELL	Y SAND Moist, 1/2	2"		
			0.0	0.5	''-'	10-10	1.5		-			max size, round			-		
									-								
									-	-							
4	1 8	SS	8.5	10.0	9-12	2-10	1.5		-								
									10 -								
	.								-	- · · · · · · · · · · · · · · · · · · ·							
5	5 8	SS	11.6	13.1	16-2	22-17	1.5		-	4.4		silty clay with s		ist with 1" layer of /.			
									-	A. Z.							
									_	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\							
],	1						
-									15 -								
									_]. A. L							
3/15										4.4	-	DARK BROWN	N BI VCK CI	L AYEY SAND Mo	ict		
T 7/23	5	SS	16.6	18.1	9-9	9-7	.4		-			some organic,			ist,		
VEP.GE									-	+							
GPJ /																	
INEER.																	
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15					ASING	USED						Сог	ntinued Ne	ext Page			
RN N	x		NQ-2 R 6" x 3.2	OCK CO 5 HSA	RE				PIEZOM SI (POROUS TIP R, P = PNEUM		OP	EN TUBE
	$-\Gamma$	(9" x 6.2	5 HSA	VANCER	<u> </u>	4"									_	FOMON
EPRI		1	NW CA	SING	VANCER	`	3"		WELL T	YPE:	O	W = OPEN TU	JRF SFO1	TED SCREE	N, GM =	= G	EUMUN
AEP E			SW CAS				6" 8"					RECORDER	WEB				
∢ ∟			ana na	VIIVIE/			U										



JOE	NUN	IBER _					LO	GO	FBORING					
CO	MPAN	IY						ВС	RING NO. <u>96-0</u>	4 DATE	7/23/15 s	HEET _	2 OF 4	
PROJECT EPRI GROUND WATER STUDY									RING START	SH 6/19/96				
SAMPLE	SAMPLE	SAMPLE STANDARD PENETRATION PENETRATION RESISTANCE FROM TO BLOWS / 6" FEET			GRAPHIC LOG	USCS		SOIL / ROCK		WELL	DRILLER'S NOTES			
7	SS	21.6	23.1	5-5-6	1.5				BLACK BOTT	T <u>OM ASH</u> Saturate ASH Saturated.	ed.			
8	SS	26.6	28.1	1-2-2	1.2	25 -								
9	SS	31.6	33.1	1-1-1	1.5	30 -	- 14-							
10	SS	36.6	38.1	.2-3-3	1.5	35 -	_	CL		D LIGHT BROWN Wet to saturated, r				
11	SS	41.6	43.1	3-3-3	1.5	40 -			Same as sam	ple with trace of	organic material.			
; ; !						45 -	=							



JOB	NUM	BER _						LO	G O	BORING				
	1PAN'								ВО	RING NO. <u>96-04</u>	DATE	7/23/15	SHEET	3 OF 4
PROJECT EPRI GROUND WATER STUDY									ВО	RING START _	6/18/96	BORING F	INISH 6/	19/96
SAMPLE	SAMPLE	DEI	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD DEF	PTH N ET	GRAPHIC LOG	USCS	ı	SOIL / ROCK	N	WELL	DRILLER'S NOTES
12	ST	46.6	48.6		2.0	ļ.	-							
13	SS	51.6	53.1	1-1-1	1.5		- - -		SC		OWN CLAYEY S grain sand, sligh			
14	SS	59.3	60.8	3-3-3	.8		55 — - - -		SP	DARK PROMIN	SAND Saturated	fine grain		
14	33	39.3	00.8	3-3-3	.0	6	60 — - - -		35	with some fines,		, illie graiii,		
15	SS	64.3	65.8	15-16-2	1.5	6	65 — - -			DARK BROWN with some fines,	SAND Saturated quartz.	, v-fine grain		
16	SS	69.3	70.8	8-9-11	1.5	7	- 0 —		SW	DARK BROWN	SAND Saturated	, quartz.		



JOB	NUM	BFR						LO	OG OF BORING									
	/IPAN					_			ВО	4 OF 4								
			I GRO	UND WATER	STU				во	RING START 6/18/96 BORING FINISH								
		I		I			DEPTH IN FEET											
出出		SAMPLE DEPTH		STANDARD PENETRATION RESISTANCE BLOWS / 6"		RQD	DEPTH	⊇ <u>"</u>	S	SOIL / ROCK	_	DRILLER'S						
SAMPLE	SAMPLE	IN F		RESISTANCE	1500 1500 1500 1500 1500 1500 1500 1500	%	IN	RAPI LOG	usc	IDENTIFICATION	WELL	NOTES						
S Z	Ś	FROM	ТО	BLOWS / 6"		, ,	FEET	9	\supset	is a mornior		110120						
							-											
							_											
17	SS	74.3	75.8	14-14-19	1.5													
							75 –											
							_											
							-											
							-											
18	SS	79.3	80.8	8-10-8	1.5		-	****	SP	DARK BROWN AND GRAY SAND Saturated,								
-	-			0.00			80 –			quartz, fine grain.								
							-											
							-											
19	SS	04.0	05.4	0.50/0			-	0,0	CVA	BROWN SAND AND GRAVEL Saturated,								
19	33	84.3	85.1	8-50/.3	.8		85 -		GW	quartz, 1/2" max size, rounded.								
								8										
							-	50										
							-											
20	SS	87.7	87.9	50/.2	.2		_			¬ GRAY CLAY SHALE Dry.								
		0	00	00/.12	· <u>-</u>					GRAT CLAT SHALE DIY.								
: !																		



JOB	NUM	BER _					-			-						
CON	(PAN	Y								ВС	RING NO. <u>96-05</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>					
PRC	JECT	EPF	RIGRO	UND V	VATER	STU	DY			BC	RING START <u>6/12/96</u> BORING FINISH <u>6/12/96</u>					
COC	RDIN	IATES _	N 718	3,463.6	E 1,7	36,11	3.5			PIE	ZOMETER TYPE WELL TYPE					
GRO	UND	ELEVAT	ION _	597.4	SY	'STEM	STA	TE PLANE		HG	T. RISER ABOVE GROUND DIA					
Wat	er Lev	el, ft	∑ 48	3.8	lacksquare		T			DE	PTH TO TOP OF WELL SCREEN BOTTOM					
TIM		,			_					WE	ELL DEVELOPMENT BACKFILL QUICK GROUT					
DAT			6-13	2-96						FIE	ELD PARTY MCR-WEB RIG BK-81					
D/ (1	_		0-12													
SAMPLE	SAMPLE	DEF IN F	IPLE PTH EET	PENET RESIS	DARD RATION TANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK ☐ DRILLER'S IDENTIFICATION NOTES					
1	SS	FROM 0.0	1.5		VS / 6" 22-35	1.0			<u> </u>		GRAY BOTTOM ASH Boring grouted from					
2	SS	3.0	4.5		2-15	1.0				SP	DARK BROWN GRAVELLY SAND Moist, 1/2"					
											max size, some fines. BROWN CLAYEY SILT Moist, slight to non					
								5 -			plasticity.					
3	SS	5.0	6.5	10-1	0-15	1.3				SM	LIGHT BROWN SILTY SAND Dry, v-fine grain.					
5	SS	8.5	10.0	8-1:	3-15	1.5		10 -		SC	LIGHT AND DARK BROWN CLAYEY SAND Moist, trace of small gravel.					
6	SS	11.7	13.2	11-1	1-13	1.2			-	GP	DARK BROWN CLAYEY SAND AND GRAVEL Moist, quartz, 3/4" max size, rounded.					
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	16.7	18.2	3-:	2-4	1.5		15 -		SM CL	LIGHT BROWN SILTY SAND Moist, v-fine grain sand. DARK GRAY SILTY CLAY Wet, medium to low plasticity, trace of organic material.					
TYPE OF CASING USED											Continued Next Page					
NQ-2 ROCK CORE X 6" x 3.25 HSA 9" x 6.25 HSA HW CASING ADVANCER 4"										ED S	E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE CREEN, G = GEONOR, P = PNEUMATIC					
E PR		NW CAS	SING			3"	-	vvELL I	TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
AEP		SW CAS				6" 8"	\dashv				RECORDER WEB					
< ∟			/IIVILL			U										



JOB	NUM	BER _				_		LO	GO	- BORING					
COMPANY										RING NO. <u>96-05</u> DATE <u>7/23/15</u>	05 DATE 7/23/15 SHEET 2 OF				
PROJECT EPRI GROUND WATER STUDY									ВО	RING START 6/12/96 BORING FINIS	SH <u>6/</u>	12/96			
SAMPLE	SAMPLE	SAM DEF IN F FROM		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES			
8	SS	21.7	23.2	3-4-6	1.5		- 25 -		CL	LIGHT BROWN CLAYEY SILTY Moist to wet, slight plasticity.					
9	SS	26.7	28.2	2-2-1	1.1		- 30 –			GRAY BOTTOM ASH Saturated.					
10	SS	31.7	33.2	1-2-2	1.3		- - -		CL	DARK GRAY CLAY Wet to saturated, medium to low plasticity, trace of organic.					
11	SS	36.7	38.2	1-1-1	1.5		35			GRAY FLY ASH Saturated.					
12	SS	41.7	43.2	1-1-1	1.5		40 - - - 45	*	CL	DARK GRAY SILTY CLAYMoist, low to medium plasticity, trace of organic material.					
į							.5								



JOB	NUM	BER						LO	LOG OF BORING								
	1PAN					_			ВО	RING NO. 96-05	HEET	3 OF 3					
			I GRO	UND WATER	STU	DY				RING START 6/12	6/ <i>°</i>						
SAMPLE	SAMPLE	SAMPLE DEPTH		STANDARD PENETRATION RESISTANCE BLOWS / 6"	AL STH VERY	RQD	DEPTH IN FEET	HIC G	c s	SOIL	. / ROCK		DRILLER'S				
MAN	NA.	IN F	EET	RESISTANCE		%	IN	RAF LO	USC	IDENTI	WELL	NOTES					
0, 2	0)	FROM	TO	BLOWS / 6"	78		FEET	Θ									
13	SS	46.7	48.2	1-1-2	1.5		-				saturated, medium to low						
							-			plasticity.							
												$ \nabla $					
							-										
							50 –										
							-										
14	ST	51.7	53.7		2.0		-										
							-										
							=										
							55 -										
							55 -										
							-										
15	SS	56.7	58.2	2-2-3	1.5		-			DARK GRAY SILTY CI to medium plasticity, tra	LAY Wet to saturated, low ace of v-fine grain sand						
							-			lens.							
il .																	



JOF	NUM	IBFR						LO	GO	F BORING	i				
		Y							ВО	RING NO. 96	6-06	DATE	7/23/15 SH	EET	_1OF2
				OUND WATER	STU								BORING FINISH		
				8,519.1 E 1,7											
		_		566.1 SY											
			<u> </u>			1							BOTTOM		
		vei, it	<u> </u>).0 <u>+</u>		<u> –</u>							BACKFILL		
TIM			C 40	0.00		+							RIG		
DA	<u> </u>		6-18	8-96										_	
SAMPLE	SAMPLE	DEI	MPLE PTH EET	STANDARD PENETRATION RESISTANCE	世法国	RQD %	DEPTH IN	GRAPHIC LOG	SCS			SOIL / ROCK		WELL	DRILLER'S NOTES
S Z	Š	FROM	TO	BLOWS / 6"	LENC	,0	FEET	5)						
1	SS	0.0	1.5	1-1-4	1.5		-	* ¢		GRAY FLY	ASH N	Moist.			
2	SS	3.0	4.5	5-6-4	1.5		-	* * * \$ * \$ * \$ * \$							
							5 -	\$ \$ \$ \$ \$							
3	SS	5.0	6.5	3-3-2	1.5		-			GRAY BOT	TOM A	ASH Saturated.			
4	SS	8.5	10.0	5-5-6	1.5		10 -		CL	BROWN SI plasticity (D		LAY Moist, low ATERIAL).	to medium		
5	SS	11.5	13.0	3-4-2	1.5		-					ILTY CLAY Sa Isticity, (DIKE N	·		
9	SS	16.5	18.0	4-4-3	1.5		15 -								
SPORN_MOUNTAINEER.GRJ AEP.GDT 7							-		SM	GRAY SILT quartz.	TY SAN	<u>ND</u> Saturated, ν	r-fine grain,		
INTAI		TYPE	OF C	ASING USED		T					Contii	nued Next F	Page		
		NQ-2 R0 6" x 3.25 9" x 6.25 HW CAS	OCK CO 5 HSA 5 HSA SING AD		4"			IEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC							
EPRI		NW CAS	SING		3"	_	VVLLL I	⊆.					J JOINELIN, GIVI	. – O	LOIVIOI
AEP		SW CAS			6" 8"					RECORDE	ER _	WEB			

AIR HAMMER



JOB	NUM	BER _				_		LO	0 0	- BORING				
	/IPAN								ВО	RING NO. 96-06	DATE	7/23/15 SH	IEET	2 OF 2
			RI GRO	UND WATER	STU	DY				RING START				
SAMPLE	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL / ROCK		WELL	DRILLER'S NOTES
7	SS	21.5	23.0	1-1-2	1.3		- - - 25 —						∇	
8	SS	26.5	28.0	1-1-1	1.5		- - - - 30 —		CL		CLAY Saturated, fine grain sand le			
9	SS	31.5	33.0	2-3-3	1.5		-							



JOE	NUM	BER _							LO		ST BOTTING
											ORING NO. <u>96-101</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>
PRO	DJECT	_EPI	RI GRO	DUND V	VATER	STU	YC			BC	ORING START 6/5/96 BORING FINISH 6/5/96
CO	ORDIN	IATES	N 720	0,983.0	E 1,7	34,516	6.1			PII	IEZOMETER TYPE SS WELL TYPE
GR	DUND	ELEVA [*]	TION _	619.0	SY	'STEM	STA	TE PLANE		НС	GT. RISER ABOVE GROUND DIA
Wa	ter Lev	el, ft	$\overline{\nabla}$		Ţ		Ā			DE	EPTH TO TOP OF WELL SCREEN 24.4 BOTTOM 33.4
TIM	IE									W	VELL DEVELOPMENT NO BACKFILL QUICK GROUT
DA ⁻	ΓE									FII	IELD PARTY MCR-REB RIG BK-81
		1									
ще	ήщ		MPLE	STAN	DARD		RQD	DEPTH	≌	S	COIL / DOCK
SAMPLE	SAMPLE		PTH EET	RESIS	TANCE	A POS	%	IN	GRAPHIC LOG	SC	Ш
S ≥	8 8	FROM	TO	BLOW	RATION TANCE VS / 6"		70	FEET	GR	\supset	IDENTIFICATION NOTES NOTES
1		0.0		BEGI	.0,0	0					No sample taken boring in road way
								_			
									1		
								-	▍		
2	SS	3.0	4.5	12-1	3-16	1.1		-		SM	BROWN SILTY GRAVELLY SAND Dry to moist,
								_			1/2" max size, rounded, quartz.
3	SS	5.0	6.5	7-9	a_a	1.2		5 -	-		
		0.0	0.5	'-	J-J	'					
								-		-	
								-			
								-	-		
3	SS	8.5	10.0	3-4	4-5	1.2				SC	· •
											trace of gravel.
								10 -			
								-		1	
4	SS	11.5	13.0	17-2	7-38	1.2		=		SM	
											grain, trace of gravel, quartz.
								-	-		
								=			
								15 -			
								10			
								-	-	-	
5 23/15	SS	16.5	18.0	12-1	9-26	1.1					
Z/Z								-	1	-	
GD.								-			
AEI											
K.GPJ								-	-		
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15		TYP	E OF C	ASING	USED					•	Continued Next Page
ž z			OCK CO	RE			=	PIEZOM			
NOOR X		6" x 3.2 9" x 6.2						SLC	OTTE	ED S	SCREEN, G = GEONOR, P = PNEUMATIC
EPRI_S		HW CA	SING AD	OVANCER	₹	4"	_	WELL T	YPE:	O'	OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
		NW CA SW CA				3" 6"					RECORDER REB
AEP		AIR HA				8"					NEOUNDER NED



LOG OF BORING JOB NUMBER BORING NO. <u>96-101</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF _ COMPANY PROJECT EPRI GROUND WATER STUDY BORING START 6/5/96 BORING FINISH 6/5/96 STANDARD
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PEN SAMPLE RQD GRAPHIC LOG SAMPLE NUMBER DEPTH SAMPLE **DEPTH** SOIL / ROCK DRILLER'S WELL SC IN FEET **IDENTIFICATION NOTES FEET** FROM BLOWS / 6" TO 20.0 Top of seal. SS 21.5 23.0 16-21-27 1.1 SW BROWN GRAVELLY SAND Moist, trace of small gravel, quartz, rounded. 22.0 Top of sand. · 24.4 Top of screen. 25 SS 26.5 28.0 12-20-23 1.2 BROWN SAND AND GRAVEL Moist to wet, quartz, rounded, 3/4" max size, some fines. SS 31.5 33.0 4-5-7 1.1 BROWN SILTY SAND Moist, 100% fine grain. Push 2.0 ST 35.5 33.5 1.6 Time 5 sec. 34.0 Bottom of pipe. PSI 800 34.4 Bottom of CL Top of sample, BROWN SILTY SAND screen. Bottom of sample, LIGHT GRAY CLAY Moist, 35.0 Bottom of sand. low to medium plasticity. 10 SS 36.5 38.0 4-6-8 1.1 SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 SS 41.5 43.0 4-5-6 1.1 SM DARK GRAY SILTY SAND Wet, non to slight plasticity, with reddish brown quartz sand lens. 12 ST 43.5 45.5 1.5 ML**PUSH 2.0** TIME 5 SEC PSI 800 45 Bottom of sample, Drillers identification fly ash believe it is a light gray clay EPRI



JOB	NUM	BER _				_		LO	GO	FBORING	
COM	1PAN	Y	PRI GROUND WATER STUDY SAMPLE STANDARD PENETRATION RESISTANCE MM TO BLOWS / 6" ROUND WATER STUDY							RING NO. <u>96-101</u> DATE <u>7/23/15</u> SHEET	
SAMPLE	SAMPLE	DEI IN F	PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	DRILLER'S NOTES
MAS 13				RESISTANCE BLOWS / 6" 7-9-11	IOL 1.1	%	FEET	GRAF	SP	### IDENTIFICATION ### Provided Records #	NOTES

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB	NUM	BER _							LO		n Bortinto					
CON	/IPAN	Y														_1 OF3
PRO	JECT	_EPI	RI GRO	OUND V	VATER	STU	ΟY			BC	ORING START	6/5/96	<u> </u>	BORING FINISH	_6	/5/96
COC	ORDIN	IATES	N 720	0,707.5	E 1,7	34,001	1.7			PII	EZOMETER TYP	E		WELL TYPE		
GRO	DUND	ELEVA [*]	TION _	619.6	SY	STEM	STA	TE PLANE								
Wat	er Lev	el, ft	∇		Ţ		$ar{ar{\Lambda}}$			DE	EPTH TO TOP OF	WELL S	CREEN .	BOTTOM	_	
TIM	E									W	ELL DEVELOPM	ENT		BACKFILL	_ C	UICK GROUT
DAT	E									FII	ELD PARTY N	ICR-RE	В	RIG	_ <u>B</u>	K-81
																T
当 6	: Ш		MPLE :PTH	STAN	DARD		RQD	DEPTH	<u>≥</u> .,	S		SOIL /	ROCK		_	DRILLER'S
SAMPLE	SAMPLE		FEET	PENETI RESIST	TANCE	P S S S S S S S S S S S S S S S S S S S	%	IN	GRAPHIC LOG	SC			ICATION		WELL	NOTES
S Z	S)	FROM	ТО	BLOW	/S / 6"		/0	FEET	Ę)		152.7711	10, 111011			110120
1		0.0				0			Б		NO SAMPLE					Boring was grouted
								-			AUGER CUTT AND GRAVEL		ICATE BF	ROWN SAND		from grade to 48.2' with quick grout.
									H		AND CITATE	=				with quick grout.
								-	┪₽							
								_								
2	SS	3.0	4.5	12-1	6-19	1.1				SP	BROWN GRA			, 1/2" max		
								-	-		size, rourider,	qualiz wili	i ililes.			
								_								
3	SS	5.0	6.5	17-2	1-26	1.2		5 -								
								-								
								-								
								-								
4	SS	8.5	10.0	13_1	6-19	1.2										
-	33	0.5	10.0	13-1	0-13	1.2		-								
								10 -								
								10								
								-								
_	00	11.7	12.0	15.0	8-32	1.2										
5	33	11.7	13.2	15-2	0-32	1.2		-								
								-								
								-								
								15 -								
								13								
								-								
3/15	00	40.7	40.0	47.0	4.00	10										
9	SS	16.7	18.2	17-2	1-26	1.2		-								
P.GD.								-								
) AE																
S.GP.								-								
<u> </u>																
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15		TYP	E OF C	ASING	USED)					Co	ntinued	Next Pa	age		
× X			OCK CO	RE			-	PIEZOM						OUS TIP, SS =	OP	PEN TUBE
POR		6" x 3.2 9" x 6.2						SLC	OTTE	ED S	SCREEN, G =	: GEON	OR, P =	PNEUMATIC		
EPRI_S		HW CA NW CA		VANCER		4" 3"	_	WELL T	YPE:	_O	W = OPEN T	UBE SL	OTTED	SCREEN, GM	I = G	SEOMON
		SW CA	SING			6"					RECORDER	REB				
AEP		AIR HA				8"					NEGONDEN	. \				



JOB	NUMI	BER _				_		LO	G O	F BORING		
COM	PAN	Y								RING NO. <u>96-102</u> DATE <u>7/23/15</u> S		
PRO	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВО	RING START 6/5/96 BORING FINIS	H <u>6</u>	/5/96
SAMPLE NUMBER	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
7	SS	21.7	23.2	19-21-24	1.1		-		-	Sample moist to wet.		
8	SS	26.7	28.2	9-9-11	1.1		25 - -		SM	DARK BROWN SANDY SILT Moist, non-plastic.		
							30 —					
9	SS	31.7	33.2	3-4-5	1.1		-		SC	BROWN SANDY CLAY Moist, low plasticity, with v-fine sand lens.		
10	ST	33.7	35.7		?		35 —			Time 5 sec. Push 2.0 PSI 1000		
11	SS	36.7	38.2	4-4-5	1.1		-		SM	BROWN SILTY SAND Moist, with very fine sand lens.	_	
							-					
12	SS	41.7	43.2	3-5-8	1.1		40		SP	BROWN GRAVELLY SAND Moist, 3/4" max		
							- AF			size, rounded, quartz.		
							45 -					



JOB	NUM	BER _				_		LO	00	FBORING				
COM	PAN'	Y	EPRI GROUND WATER STUD						ВС	RING NO. <u>96-</u> 1	102	DATE 7/23/15	SHEET	3 OF3_
PRO	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВС	RING START	6/5/96	BORING F	INISH 6/	5/96
SAMPLE	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET		USCS		SOIL /		WELL	DRILLER'S NOTES
13	SS	46.7	48.2	13-15-21	1.2									

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB	NUM	BER _							LO		or Borting					
CON	/IPAN	Υ														_1 OF3
PRO	JECT	_EPI	RI GRO	OUND V	VATER	STU	ΣY			ВС	ORING START	6/4/96	3	BORING FINISH	6	/4/96
COC	ORDIN	IATES	N 719	9,785.3	E 1,7	34,133	3.3			PI	EZOMETER TYP	'E		WELL TYPE	<u> </u>	
GRO	DUND	ELEVA [®]	TION _	618.0	SY	STEM	STA	TE PLANE		Н	GT. RISER ABOV	E GROUN	ND	DIA	<u> </u>	
Wat	er Lev	el, ft	$\overline{\nabla}$		Ţ		Ā			DE	EPTH TO TOP OF	F WELL S	CREEN _	BOTTOM	1	
TIM	E									W	ELL DEVELOPM	ENT		BACKFILL		UICK GROUT
DAT	E									FII	ELD PARTY N	ICR-RE	В	RIG	_ B	8K-81
				T							T					1
当 6	: Ш		MPLE :PTH	STAN	DARD BATION		RQD	DEPTH	2 €	S		SOIL /	/ ROCK		_	DRILLER'S
SAMPLE	SAMPLE	1	FEET	RESIS	RATION TANCE VS / 6"	N S	%	IN	GRAPHIC LOG	SC			FICATION		WELL	NOTES
S Z	Ŝ	FROM	TO	BLOW	VS / 6"	L H H	,0	FEET	<u>p</u>)		ibertiii	10, 111011			110120
1		0.0				0			Б		NO SAMPLE					Boring grouted from
								-	4		ROAD CUTTII AND GRAVEL		CATE BRO	OWN SAND		grade to 48.1 w\ 60 gallons of guick grout.
									Н		AND OIGHTE	=:				gallons of quick grout.
								-	┪┣							
								_								
2	SS	3.0	4.5	12-1	9-24	1.1				SP	park brow rounded, quart					
								-		Ī	rounded, quan	ı∠, Witti iiri€	es, 3/4 ma	ax size.		
								_								
3	SS	5.0	6.5	14-1	7-19	1.2		5 -								
								-								
								-								
								-								
4	SS	8.5	10.0	17.0	1-25	1.1										
4	33	0.5	10.0	17-2	1-20	1.1		-								
								10 -								
								10		Ī						
								-								
5	92	11.6	13.1	10-2	25-28	1.1										
		11.0	10.1	10 2	.0 20	'''		-								
								_								
								-								
								15								
								15 -								
								-								
3/15	SS	16.6	18.1	12.1	0.25	12										
6 7/23	33	16.6	10.1	12-1	9-25	1.2		-								
GD.								_								
AE																
GPJ								-								
EER																
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15	'	TYP	E OF C	ASING	USED)					Со	ntinued	Next Pa	nge		1
× X			OCK CO	RE			4	PIEZOM						OUS TIP, SS =	OF	PEN TUBE
POR		6" x 3.2 9" x 6.2						SLC	OTTI	ED S	SCREEN, G =	: GEON	OR, P =	PNEUMATIC		
EPRIS		HW CA	SING AD	OVANCER	₹	4" 3"	\dashv	WELL T	YPE:	0	W = OPEN T	UBE SL	OTTED	SCREEN, GM	1 = 0	SEOMON
		NW CA SW CA	SING			6"	\equiv				RECORDER	RFR				
AEP		AIR HA				8"					NECONDER	-,/LD				



JC	DB N	NUME	BER _				_		LO	G O	FBORING	
			<i></i>							ВС	RING NO. <u>96-103</u> DATE <u>7/23/15</u> SHEET _	2 OF 3
PI	ROJ	IECT	EPR	I GRC	UND WATER	STU	DY			ВС	RING START 6/4/96 BORING FINISH 6/4	/96
SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	PLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	DRILLER'S NOTES
	7	SS	21.6	23.1	5-14-21	1.1		-				
	8	SS	26.6	28.1	11-17-28	1.2		25 - - - -				
	9	SS	31.6	33.1	8-9-10	1.1		30 -		CL	BROWN SILTY CLAY Moist, with fine grin sand lens, low plasticity.	
	10	ST	36.6	38.6		1.6		35 - - - -		SP	time 5 sec. Push 2.0 PSI 700 LIGHT BROWN SAND Fine grain.	
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	11	SS	41.6	43.1	4-5-6	1.1		40 - - - -			BROWN SAND Moist, 100% fine grain, with fines.	
EPRI_SPORN_M								45 -				



•	PAN'	Υ							во	RING NO. <u>96-1</u>	1 03 DATE	7/23/15 SH	IEET	
RO	JECT	EPF	RIGRO	OUND WATER	STU	DY			ВО	RING START	6/4/96	BORING FINISH	<u>6</u>	/4/96
NUMBER	SAMPLE	DEI	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC	USCS		SOIL / ROCK		WELL	DRILLER'S NOTES
12	SS	46.6	48.1	6-6-5	?									



JOB	NUM	BER _					_		LO		BONING
	IPANY										ORING NO. <u>96-104</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>3</u>
											DRING START <u>6/4/96</u> BORING FINISH <u>6/4/96</u>
COO	RDIN	ATES _	N 719	9,229.2	E 1,7	34,60	0.2			PII	EZOMETER TYPE SS WELL TYPE
GRO	UND	ELEVAT	TON _	618.7	SY	STEM	STA	ATE PLANE		HC	ST. RISER ABOVE GROUND DIA
Wate	er Lev	el, ft	$\overline{\nabla}$		Ţ		Ā			DE	PTH TO TOP OF WELL SCREEN 24.1 BOTTOM 33.1
TIME	=									WI	ELL DEVELOPMENT NO BACKFILL QUICK GROUT
DAT	E									FIE	ELD PARTY MCR-REB RIG BK-81
				1		T .		1		1	
SAMPLE	SAMPLE	DEF IN F	IPLE PTH EET	STAN PENET RESIS	DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK ☐ ☐ DRILLER'S IDENTIFICATION ☐ NOTES
1	SS	FROM 0.0	TO		VS / 6" 4-8	1.1			+	CL	_
2	SS	3.0	4.5		4-18	1.2					
									<u>-</u>	SP	DARK BROWN CLAY Moist, medium to high plasticity trace of sand.
3	SS	5.0	6.5	7	'3	1.1		5 -	00	GW	BROWN GRAVELLY SAND Dry, quartz, 1/2" max, rounded.
										1	DARK BROWN SAND AND GRAVEL Dry, quartz, 1/2" max, rounded.
4	SS	8.5	10.0	9-18	8-25	1.2		10 -	0.000.00		Same as above some fines, moist
5	SS	11.7	13.2	19-2	26-31	1.2				SP	DARK BROWN GRAVELLY SAND Dry, 3/4" max, rounded, quartz.
61/67	SS	16.7	18.2	18-2	21-26	1.2		15 -	- -	SC	DARK BROWN CLAYEY SAND Moist, trace of
Neen Cro	30	10.7	10.2	10-2	20	1.2					gravel.
		TYPE	OF C	ASING	USED)					Continued Next Page
X		NQ-2 R0 6" x 3.25 9" x 6.25	5 HSA 5 HSA					PIEZOM SLO		ED S	SCREEN, G = GEONOR, P = PNEUMATIC
<u> </u>		<u>HW CAS</u> NW CAS		OVANCER	₹	4" 3"	-	WELL T	YPE:	0	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
		SW CAS	SING			6"					RECORDER REB
₹		AIR HAN	иMER			8"					



LOG OF BORING JOB NUMBER COMPANY BORING NO. <u>96-104</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF _ PROJECT EPRI GROUND WATER STUDY BORING START 6/4/96 BORING FINISH 6/4/96 STANDARD
PENETRATION
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PENETRATI SAMPLE GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH **DEPTH** SOIL / ROCK DRILLER'S SCS WELL IN FEET **IDENTIFICATION NOTES** FEET FROM TO 20.4 Top seal. 7 SS 21.7 23.2 17-21-25 1.2 **LIGHT BROWN GRAVELLY SAND** Dry, quartz, 3/4" max, rounded. 22.5 Top of sand. 24.1 Top of screen. 25 **LIGHT BROWN SILTY CLAY** Moist, low to SS 28.2 26.7 4-6-8 1.1 medium plasticity. 30 **PUSH 2.0** ST 31.7 33.7 1.6 PSI 900 TIME 6 SEC. **BROWN CLAYEY SAND** Fine grain? 33.1 Bottom of screen. 34.7 Bottom of sand. **LIGHT BROWN SILTY CLAY** Moist, low to 10 SS 36.7 38.2 3-3-5 1.2 medium plasticity. SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 40 11 SS 41.7 43.2 **LIGHT BROWN SILTY SAND** Moist. v-fine grain 4-4-7 1.1 SM 100%. 45 EPRI



JOB	NUM	BER _						LO	GO	FBORING	•
COM	IPAN'	Υ				IDY			ВО	ORING NO. 96-104 DATE 7/23/15 SHEET 3 OF 3 ORING START 6/4/96 BORING FINISH 6/4/96	_
SAMPLE	SAMPLE	DE	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC	nscs	SOIL / ROCK IDENTIFICATION DRILLER'S NOTES	
12			TO 48.7	BLOWS / 6"	1.5		FEET			PUSH 2.0 PSI 1200 TIME 6 SEC. DARK BROWN SANDY CLAY Fine grain.	

EPRI SPORN MOUNTAINEER.GPJ



JOE	NUM	BER _								00	DOMINO					
CO	MPAN'	Y						_			ORING NO. <u>96-1</u>	05	DATE_7	7/23/15 SH	IEET	_1 OF3
PRO	DJECT	_EPI	RI GRO	OUND V	VATER	STUE	ΣY			ВС	RING START	6/3/96	<u> </u>	BORING FINISH	_6	/3/96
CO	ORDIN	IATES	N 718	8,782.8	E 1,7	35,084	1.7			PII	EZOMETER TYP	E		WELL TYPE	_	
GR	DUND	ELEVA [®]	TION _	619.3	SY	STEM .	STAT	E PLANE								
Wa	ter Lev	el, ft	$\overline{\Delta}$		Ī		Ā			DE	PTH TO TOP OF	WELL SO	CREEN _	BOTTOM		
TIM	ΙE															UICK GROUT
DA	ΓΕ									FIE	ELD PARTY N	ICR-RE	В	RIG	<u> </u>	SK-81
			45.5													
SAMPLE	ب از		MPLE :PTH		DARD RATION		RQD	DEPTH	GRAPHIC LOG	S		SOIL /	ROCK		بـ	DRILLER'S
AMP	SAMPLE		FEET	RESIS	RATION TANCE	COV	%	IN	ZAPI CO	SC			ICATION		WELL	NOTES
S Z	Š	FROM	ТО	BLOV	VS / 6"		, ,	FEET	9)						
								-			No sample tal Auger cutting			in road bed.		Boring grouted from grade to 48.5' with 75 gallons of quick grout
1	SS	3.0	4.5	7-10	0-11	1.1		-		SW	BROWN SANI of gravel.	D Dry, qua	irtz, rounde	d with trace		
2	SS	5.0	6.5	10.4	6-21	1.2		5 -			BROWN GRA	VELLY SA	ND Drv a	ıartz.		
	33	5.0	0.5	12-1	0-21	1.2					rounded, 1/2"		<u></u> 2., 90			
								-								
								-								
								-			3/4" max size	troop of f	finos			
3	SS	8.5	10.0	9-1	5-17	1.2		-			5/4 IIIAX SIZE	trace or i	iiies.			
								10 -								
								10								
4	SS	11.5	13.0	9-16	6-19	1.1		-								
								15 -								
SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	16.5	18.0	9-14	4-17	1.2		-			Moist					
AINEE								_								
TNOC		TYP	E OF C	ASING	USED		_				Co	ntinued	Next Pa	ge		
∑ X		NQ-2 R 6" x 3.2	OCK CO	RE				PIEZOM						OUS TIP, SS =	OF	PEN TUBE
SPOR		9" x 6.2	5 HSA					SLC	ΣΓΤΕ	-D S	SCREEN, G =	: GEON(UK, P =	PNEUMATIC		
EPRI		HW CA		VANCER	?	4" 3"		WELL T	YPE:	0	W = OPEN T	UBE SL	OTTED	SCREEN, GM	1 = G	SEOMON
AEP EF		SW CA	SING			6"					RECORDER	_REB				
¥		AIR HA	MMER			8"										



JOB	NUM	BFR						LO	G O	FBORING
									во	RING NO. <u>96-105</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF <u>3</u>
			RI GRO	UND WATER	STU	DY			во	RING START 6/3/96 BORING FINISH 6/3/96
SAMPLE NUMBER	SAMPLE	DEF	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	uscs	SOIL / ROCK IDENTIFICATION DRILLER'S NOTES
6	SS	21.5	23.0	7-9-14	1.1		- - -		SM	DARK BROWN SILTY SAND Moist, with trace of small gravel.
7	SS	26.5	28.0	5-6-7	1.2		25 - - -		CL	BROWN SILTY CLAY Moist, low to medium plasticity.
8	ST	31.5	33.5		1.7		30			PUSH 2.0 PSI 700 TIME 8 SEC.
9	SS	36.5	38.0	3-3-5	1.1		35 -			
10	SS	41.5	43.0	4-4-5	1.2		40 - - -		SP SC	LIGHT BROWN CLAYEY SAND Moist, 100% v-fine grain.
; ; 							45 -			



FROW TO BLOWS/6 L	JOB NUMBER		LUG UF	BURING		
PROJECT EPRI GROUND WATER STUDY BORING START 6/3/96 BORING FINISH 6/3/96 BORING FINISH 6/3/96 BORING FINISH 6/3/96 BORING FINISH 6/3/96 BORING FINISH 6/3/96 BORING FINISH 6/3/96	COMPANY		BORI	NG NO. 96-105 DATE	7/23/15 SHEET	3 OF 3
		STUDY				
11 ST 46.5 48.0 1.8 TIME 5 SEC	SAMPLE STANDARD PENETRATION RESISTANCE FROM TO BLOWS / 6"	RQD DEPTH CONCERN FEET OF STREET OF	LOG		WELL	
PSI 800 PUSH 2.0	11 ST 46.5 48.0	1.8				



JOB	NUM	BER _					_		LO	G O	FBORING					
COM	PAN	Y								ВС	RING NO. 96	5-106	_ DATE_7	7/23/15	SHEET	OF
PRO	JECT	EPF	RIGRO	DUND V	VATER	STU	DY			ВС	RING START	5/28	/96	BORING FI	NISH _	5/28/96
COO	RDIN	IATES _	N 719	9,271.8	E 1,7	35,85	8.4			PIE	ZOMETER T	YPE		WELL 1	TYPE _	
GRO	UND	ELEVAT	ION _	618.9	SY	'STEM	STA	TE PLANE		HG	T. RISER AB	OVE GROU	JND		DIA _	
Wate	er I ev	el, ft	<u> </u>	າ 2	lacksquare		T			DE	PTH TO TOP	OF WELL	SCREEN _	ВОТ	ТОМ _	
TIME		0, 10		7. -	_		+			WE	ELL DEVELOF	PMENT		BACK	KFILL _	QUICK GROUT
DAT			5-2	8-96			+			FIE	LD PARTY _					
DAT			J-Z								_					
SAMPLE	SAMPLE	DEI	IPLE PTH EET TO	STAN PENET RESIS BLOV	DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs			_ / ROCK TFICATION		WELL	DRILLER'S NOTES
									▮₿		NO SAMPL	<u>E TAKEN I</u>	BORING IN I	ROAD BED.		
1	SS	3.0	4.5	15-1	7-21	1.1			_	GP			AND GRAV artz, some fir			
2	SS	5.0	6.5	17-2	24-30	1.1		5 -	-		1" max siz	е				
	00	0.0	0.5	17-2	-4-00											
3	SS	8.5	10.0	13-1	7-20	1.2		10 -			<u>1/2" max s</u>	i <u>ze</u>				
5 5	SS	11.5	13.0		5-17	1.2		15 -			1/2" max s	i <u>ze</u>				
		T\/=-		A 60:5				_	ě			2"	-1 N - 1 T			
				ASING	USED								d Next Pa			
X		NQ-2 R0		RE				PIEZON								PEN TUBE
		9" x 6.25	HSA					SLO	OHE	בט צ	SCREEN, G	= GEON	10K, P =	PNEUMA	IIC	
<u> </u>		HW CAS		OVANCER	?	4" 3"		WELL T	YPE:	0\	N = OPEN	TUBE S	LOTTED	SCREEN,	GM = (GEOMON
		SW CAS	SING			6"					RECORD	R REI	В			
¥		AIR HAI				8"					, LOONDI	-·\ <u> </u>	_			



JOB NUMBER __ COMPANY BORING NO. <u>96-106</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF _ PROJECT EPRI GROUND WATER STUDY BORING START <u>5/28/96</u> BORING FINISH <u>5/28/96</u> STANDARD
PENETRATION
RESISTANCE
BLOWS / 6"

RQD
RQD
W SAMPLE GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH S DEPTH SOIL / ROCK WELL DRILLER'S USC IN IN FEET **IDENTIFICATION NOTES FEET** FROM TO SC SS 21.5 23.0 6-8-10 1.2 BROWN SANDY CLAY Dry, slight to low plasticity. SS **GRAY FLY ASH** Dry. 26.5 28.0 4-6-6 1.2 Ó. ⊹ ☼ ♦ ☆ ø ☆ ⊹ ☆ 30 -♦ ☼ ⊹ ☆ ∜ ☆ SS 31.5 33.0 1-1-1 1.2 ♦ ☆ ψ ☆ ¢ **Saturated** ☆ ⊹ ⊹ ∜ ☆ 35 ѷ ৾⇔ ⊹ ☆ φ. ☆ SS 36.5 38.0 1-1-1 1.2 ⊹ ☆ ⊹ ☆ Ö: ৾⇔ ♦ ☼ φ. SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15 ☼ 40 ♦ ☆ ♦ ☼ Ö: 10 SS 41.5 43.0 1-1-1 1.2 ☼ ⊹ ☼ Ċ. ☼ ☼ ৾৾৾ ☆ ፟⇔ ♦ ☆ 45 ⊹ ☆ EPRI (Ŏ:



JOB	NUM	BER						LO	GO	F BORING		
COM									во	RING NO. <u>96-106</u> DATE <u>7/23/15 S</u>	HEET	_ 3 _ OF 3 _
			RI GRO	UND WATER	STU	DY				RING START <u>5/28/96</u> BORING FINIS		
SAMPLE	SAMPLE	DEI	MPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
11	SS	46.5	48.0	3-2-2	1.1		50 -					
12	SS	51.5	53.0	2-2-2	1.2		-					
13	SS	56.5	58.0	3-4-4	1.2		55 -	*	CL	DARK GRAY SILTY CLAY Wet, low to medium plasticity, trace of organic material.	_	
14	ST	61.5	63.5		1.6		60 -			Time 7 sec. Push 2.0 PSI 600 BROWN SILTY CLAY Trace of fine sand.	\Box	
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	SS	66.5	68.0	3-4-5	1.2		65 -			BROWN CLAY Wet, medium to high plasticity.	_	Boring grouted from 68.0' to grade with 125 gallons quick grout.
AEP EPRI_SF												



JOB	NUMI	BER _					_		LO	JG U	FBORING					
		Y									RING NO. 90	6-107	DATE_	7/23/15 SH	HEET	_1_ OF4_
PRO	JECT	_EPF	RIGRO	OUND V	VATER	STU	DY			ВС	RING START	5/29	/96	BORING FINISH	∃ _5	/29/96
COC	RDIN	IATES _	N 719	9,691.4	E 1,7	36,04	0.0			PIE	ZOMETER T	YPE		WELL TYPE	≣ _	
GRO	UND	ELEVAT	TON _	618.8	SY	'STEM	STA	ATE PLANE		HG	T. RISER AB	OVE GROU	JND	DIA	۸	
Wate	er Lev	el, ft	<u> </u>	9.1	lacksquare		Ī	-		DE	PTH TO TOP	OF WELL	SCREEN	BOTTON	Λ	
TIME	<u> </u>									WE	ELL DEVELOR	PMENT		BACKFILI	L C	UICK GROUT
DAT	E		5-2	9-96						FIE	LD PARTY _	MCR-R	EB	RIC	3 <u>B</u>	8K-81
									$\overline{}$		T					T
SAMPLE	SAMPLE	DEI	IPLE PTH EEET TO	STAN PENET RESIS	DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS			L / ROCK TFICATION		WELL	DRILLER'S NOTES
1	SS	3.0	4.5		7-21	1.1				GP		TTINGS IN EL.	IDICATE BR	ROAD BED. ROWN SAND		Boring was grouted from 73.1 to grade w/approximately 100 gallons of quick grout.
2	SS	5.0	6.5	17-2	21-28	1.2		5 -								
3	SS	SS 8.5 10.0 14-18-24 1.1						10 -			<u>1/2" max s</u>	ize				
4	SS	11.6	13.1	13-1	6-21	1.2										
2 SER. GED 1723/13	SS	16.6	18.1	5-8	3-10	1.1		15 -		ML	BROWN SI	<u>LT</u> Moist, n	on to v-sligh	nt plasticity.		
	1	TYPE	OF O	ASING	USFD	<u> </u>		1	_ · · · · ·		· · · · · · · · · · · · · · · · · · ·	Continue	d Next Pa	age.	<u> </u>	1
					JOLD											SENTINE
X		NQ-2 R0 6" x 3.25 9" x 6.25	5 HSA	YKE.				PIEZOM SL(OUS TIP, SS : PNEUMATIC		'EN IUBE
<u>'</u>		HW CAS	SING AD	VANCEF	?	4"		WELL T	YPE:	O	N = OPEN	TUBE S	LOTTED	SCREEN, GN	/I = C	SEOMON
		NW CAS				3" 6"					RECUBD!	R RE I	 В			
Ī		AIR HAI				8"					NECORDI	_i\ <u> </u>				



JOB	NUM	BER _				_		LO	GO	F BORING		
COM	IPAN'	Y								RING NO. <u>96-107</u> DATE <u>7/23/15 S RING START <u>5/29/96</u> BORING FINIS</u>		
SAMPLE NUMBER	SAMPLE	DEF	EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
6	SS	21.6	23.1	8-8-11	1.2		-		SM	Attempted shelby tube lifted rig BROWN SILT SAND Moist, 100% v-fine grain.		
7	SS	26.6	28.1	4-5-9	1.2		25 - - -			GRAY FLY ASH Moist.	_	
8	SS	31.6	33.1	5-8-11	1.2		30 -			<u>Saturated</u>		
9	SS	36.6	38.1	1-1-1	1.1		35				\Box	
10	SS	41.6	43.1	1-1-1	1.2		- - -					
5							-70	[\$~~				



						_		LO		- BORING		
	IPAN` JECT		RI GRO	OUND WATER	STU	IDY				RING NO. <u>96-107</u> DATE <u>7/23/15</u> S RING START <u>5/29/96</u> BORING FINIS		
SAMPLE		1	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
11	SS	46.6	48.1	1-1-1	1.2		-					
12	SS	51.6	53.1	2-1-1	1.2		50					
13	SS	56.6	58.1	0	1.3		55					Weight of 140# hammer.
14	SS	61.6	63.1	4-7-10	1.2		60 -	\$ \$ \$ \\ \ \ \ \ \ \ \ \ \ \ \ \	CL	DARK BROWN CLAY Moist. medium to high plasticity.		
15	ST	66.6	68.6		1.5		65			Push 2.0 Time 5 sec. PSI 600 BROWN CLAY		
							70 -					



JOB	NUM	BER _				-		LO		FBORING				
		′												OF
PRO	JECT	EPF	RIGRO	UND WATER	STU	DY			ВО	RING START	5/29/96	BORING FINISH	∃ <u>5/</u>	/29/96
SAMPLE	SAMPLE	SAM DEF IN F	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS		SOIL / ROCK IDENTIFICATION		WELL	DRILLER'S NOTES

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JO	B NUN	MBER _									DOMINO					
CC	MPAN	NY								ВС	ORING NO. <u>96-10</u>	08	DATE_	7/23/15	SHEE	T 1 0F 4
PR	OJEC	T <u>EP</u> I	RI GRO	DUND V	VATER	STU	DY			BC	ORING START	6/11/9	96	BORING FINIS	SH _	6/11/96
CC	ORDI	NATES	N 719	9,761.8	E 1,7	36,12	5.4			PII	EZOMETER TYPE	E <u>SS</u>		WELL TY	PE _	
GR	OUNE	D ELEVA	TION _	603.4	SY	'STEM	STAT	TE PLANE		HC	GT. RISER ABOVI	E GROUI	ND	[DIA _	
W	ater Le	evel, ft	∇		lacksquare		$ar{ar{\Lambda}}$			DE	EPTH TO TOP OF	WELL S	SCREEN _	63.3 BOTTO	OM _	72.3
TII	ИE									WI	ELL DEVELOPME	ENT _N	10	BACKFI	ILL _	QUICK GROUT
DA	TE									FIE	ELD PARTY <u>M</u>	ICR-W	EB	R	RIG _	BK-81
											1					
щ	ж	SAM	MPLE		DARD		RQD	DEPTH	೨	S		2011	/ DOO! /		│.	
SAMPLE	NUMBER SAMPLE	IN I	PTH FEET	RESIS	RATION TANCE	トラロ	0/	IN	GRAPHIC	SC			/ ROCK		WELL	DRILLER'S
S	S S	FROM	то		/S / 6"	REF	%	FEET	GR _	⊃		IDENTI	FICATION		>	NOTES
		1110111		BLOT					1		No sample roa	ad base				
								_	J I							
									19							
								-	┦₽							
									14							
1	SS	3.0	4.5	11-1	5-16	1.2		-	4.7		BLACK SAND	AND BO	TTOM AS	H Moist.		
								-	1.6							
									1. 4.							
3	SS	5.0	6.5	12-1	7-21	1.5		5 -	- 2. 3	1						
									1. 4.							
]. \(\alpha\). [1							
								ē								
									4.4							
								=	1.6.1							
4	SS	8.5	10.0	12-1	6-29	.9		-		SC		N CLAYE	Y SAND M	loist, with fine		
											sand lens.					
								10 -								
5	SS	11.6	13.1	9-18	3-22	1.2			-	SP				Moist,		
										1	quartz, some fi	ine, 1/2" r	max size.			
								-	†::::::							
								_								
								15 -	-							
2								-	1							
6 7/23/1	SS	16.6	18.1	18-2	4-21	.8		-		SC	DARK BROWN		Y SAND M	loist, trace of		
17											small gravel an	nd ash.				
EP.G								-								
P.																
ER.G								-		1						
AINE								_	1//	1						
SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15		TYP	E OF C	ASING	USED						Сог	ntinued	l Next Pa	ige		
ž Z	(NQ-2 R 6" x 3.2	OCK CO	RE			$-\Gamma$	PIEZOM						OUS TIP, SS		PEN TUBE
SPOR		9" x 6.2	5 HSA					SLC	JITI	-D S	SCREEN, G =	GEON	IOR, P =	PNEUMATI	C	
EPRI		HW CA		OVANCER	?	4" 3"		WELL T	YPE:	0	W = OPEN TU	JBE SL	OTTED	SCREEN, G	= M	GEOMON
		SW CA	SING			6"					RECORDER	REB	 B			
AEP		AIR HA				8"							-			



JOB	NUM	BER _				_		LO	GO	FBORING			
	IPAN'									RING NO. <u>96-108</u> DATE <u>7/23/15</u> S			
PRO	JECT	EPF	RIGRO	UND WATER	STU	DY			ВО	RING START 6/11/96 BORING FINIS	Н _	6/11/	96
SAMPLE	SAMPLE	DEI	EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	, , , , , , , , , , , , , , , , , , ,	DRILLER'S NOTES
7	SS	21.6	23.1	6-6-8	1.5		-		CL	LIGHT BROWN SILTY CLAY Moist, low plasticity.			
8	SS	26.6	28.1	4-4-4	1.0		25 - - - -			BLACK BOTTOM ASH Saturated.			
9	SS	31.6	33.1	2-1-2	1.1		30 -			GRAY FLY ASH Saturated.			
10	SS	36.6	38.1	2-1-1	1.5		35						
11	SS	41.6	43.1	3-5-7	.8		40 - - -	*	CL	LIGHT GRAY CLAY Moist to wet, medium to high plasticity.			
5							45 -						



LOG OF BORING JOB NUMBER COMPANY BORING NO. <u>96-108</u> DATE <u>7/23/15</u> SHEET <u>3</u> OF _ PROJECT EPRI GROUND WATER STUDY BORING START 6/11/96 BORING FINISH 6/11/96 STANDARD
PENETRATION PLOOP
SISTANCE SAMPLE SAMPLE NUMBER DEPTH SAMPLE DEPTH LOG SOIL / ROCK WELL DRILLER'S USC IN IN FEET **IDENTIFICATION NOTES** FEET FROM TO **PUSH 2.0** 12 ST 46.6 48.6 2.0 TIME 7 SEC. PSI 1000 50 SS 51.6 53.1 2-2-3 ? **DARK GRAY SILTY CLAY** Wet, low plasticity, 13 trace of organic and sand. 55 SS 56.6 58.1 2-2-3 1.5 57.0 Top of seal. 60 -60.6 Top of sand. SS 61.6 63.1 3-4-5 1.5 15 : 63.3 Top screen. 65 SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 16 SS 66.6 68.1 4-4-5 1.5 70 17 SS 71.6 73.1 4-5-6 1.5



JOB NUMBER	
COMPANY BORING NO. <u>96-108</u> DATE <u>7/23/15</u>	SHEET <u>4</u> OF <u>4</u>
PROJECT EPRI GROUND WATER STUDY BORING START 6/11/96 BORING	FINISH <u>6/11/96</u>
SAMPLE STANDARD PENETRATION RESISTANCE FROM TO BLOWS / 6" PEET STANDARD PENETRATION RESISTANCE BLOWS / 6" FEET STANDARD PENETRATION RESISTANCE BLOWS / 6" FEET STANDARD PENETRATION FEET STANDARD PENETR	☐ DRILLER'S NOTES
	72.3 Bottom of screen. 74.0 Bottom of sand.

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB I	NUM	BER _							LO		BOTAIIVO		_
COM											RING NO. <u>96-109</u> DATE <u>7/23/15</u> SHE		•
											RING START <u>5/29/96</u> BORING FINISH	5/30/96	
COO	RDIN	ATES _	N 720	0,227.5	E 1,7	35,579	0.0			PIE	ZOMETER TYPE WELL TYPE		
GRO	UND	ELEVAT	TION _	619.6	SY	STEM _	STA	TE PLANE			T. RISER ABOVE GROUND DIA		
Wate	r Lev	el, ft	<u> </u>	0.5	Ī		$ar{ar{A}}$				PTH TO TOP OF WELL SCREEN BOTTOM		
TIME											LL DEVELOPMENT BACKFILL		
DATE	Ξ		5-3	0-96						FIE	LD PARTY MCR-REB RIG	BK-81	
SAMPLE	SAMPLE	DE	MPLE PTH EET TO		DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC	USCS	NO SAMPLE TAKEN BORING LOCATED IN ROAD BASE. AUGER CUTTINGS INDICATE	DRILLER'S NOTES Boring grouted from 73.2 to grade with	
1	SS	3.0	4.5		9-24 8-21	1.2		5 -		GP	DARK BROWN SAND AND GRAVEL Moist, 1/2" max size, quartz, rounded, some fines.	150 gallons quick grout.	
3	SS	8.5	10.0		8-21	1.2		10 -					
4	SS	11.7	13.2	12-1	3-14	1.0		15 -	-	SP	DARK BROWN SAND Moist, fine grain.		
OUNIAINEER.GPJ AEF.GDJ //23/15	SS	16.7	18.2	4-:	5-6	1.1				ML	BROWN SANDY SILT Moist, non plasticity.		
Z Z		TYPE	OF C	ASING	USED	•	\top				Continued Next Page		
X X	X NQ-2 ROCK CORE 6" x 3.25 HSA 9" x 6.25 HSA HW CASING ADVANCER 4"								IETER OTTE	ED S			
7 X		NW CAS				3" 6"	\dashv	******		\neg		3203.1	
HE HE		AIR HAI				8"					RECORDER REB		



JOB NUMBER _ COMPANY BORING NO. <u>96-109</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF _ PROJECT EPRI GROUND WATER STUDY BORING START 5/29/96 BORING FINISH 5/30/96 STANDARD PENETRATION RESISTANCE BLOWS / 6" RQD % SAMPLE GRAPHIC LOG SAMPLE NUMBER DEPTH SAMPLE S DEPTH SOIL / ROCK WELL DRILLER'S USC IN IN FEET **IDENTIFICATION NOTES** FEET FROM TO $\sqrt{}$ SS 21.7 23.2 4-6-8 1.2 25 Time 10 sec ST 1.5 7 26.7 28.7 PSI 1200 Push 2.0 By watching rig psi possible .4 to .5 of fly ash in \$ bottom of tube. ¢ భ **GRAY FLY ASH** Moist. ÷ ☼ 30 -¢ Ŏ. ⊹ Ċ. **:** ST 33.2 4-7-10 31.7 1.1 ģ. ⊹ :¢: ψ. ÷. Ċ. ÷ φ. **:** ≎ 35 ⊹⇔ **:** ÷ **:** ☼ ¢ 9 SS 36.7 38.2 1-1-1 1.2 **Saturated** ☼ φ. **:** ☼ ⊹ ÷ **:** SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 ÷. ♦ 40 ÷. ☆ ÷ ģ. ⊹ 10 SS 41.7 43.2 1-1-1 1.2 :¢: **:** ÷. ♦ ☼ **:** ÷ \$ ፟⇔ 45 ☼ ÷ **:** EPRI



JOB I	NUMI	BER						LOG OF BORING							
COM						_			ВС	RING NO. 96-109 DATE 7/23/15	SHEET	3 OF 4			
			RI GRO	UND WATER	STU	DY				RING START <u>5/29/96</u> BORING FINIS					
SAMPLE NUMBER	SAMPLE	DEF	IPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES			
11	SS	46.7	48.2	1-1-3	?										
12	SS	51.7	66.7	1-1-2	1.2		50 -								
13	SS	56.7	58.2	1-1-4	1.2		55 -	*							
14	SS	61.7	63.2	4-6-8	?		60 -	\$ \$ \$ \$	CL	DARK BROWN CLAY Moist, medium to high plasticity.					
EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15	ST	66.7	68.7		1.7		65 -			Time 8 sec. Push 2.0 PSI 1000 Material same as sample no. 14					
AEP EPRI_SPORN_MOUT							70 -			Continued Next Page					



								BORING NO. <u>96-109</u> DATE <u>7/23/15</u> SHEET <u>4</u> OF					
		f	I CPC	UND WATER	STUDY								
PRU	JECT	EPN	II GRO	UND WATER	ועטונ			BURING START	5/29/96	BORING FINISE	1 <u>5</u>	/30/96	
SAMPLE		SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	D DEPTH IN FEET	GRAPHIC LOG	n s c s	SOIL / ROCK		WELL	DRILLER'S NOTES	
16	SS	71.7	73.2	3-4-5	1.2								

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB NUMBER																
CC	MPAN	IY								BORING NO. 96-110 DATE 7/23/15 SHEET 1 OF 4						
											DRING START <u>6/6/96</u> BORING FINISH <u>6/10/96</u>					
CC	ORDI	NATES	N 720	0,277.1	E 1,7	35,665	5.6			PII	EZOMETER TYPE SS WELL TYPE					
GF	ROUNI	ELEVA	TION _	602.3	SY	STEM _	STA	TE PLANE	HGT. RISER ABOVE GROUND DIA							
W	ater Le	vel, ft	Ų DI	RY	Ţ		Ā			DE	EPTH TO TOP OF WELL SCREEN 43.7 BOTTOM 52.7					
TI	ME									ELL DEVELOPMENT NO BACKFILL QUICK GROUT						
DATE 6-10-96									FIELD PARTY MCR-REB RIG BK-							
		1														
SAMPLE	NUMBER	DE IN F	MPLE EPTH FEET TO		DARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION □ DRILLER'S NOTES					
											No sample taken, boring in road. Grouted grade to 73.1' with approximately 80 gallons.					
	I SS		4.5		8-24	1.1		5 -		51.51.51.51.51	DARK GRAY BOTTOM ASH Dry.					
2	2 SS	5.0	6.5	10-1	1-14	1.2				12/12/12/12/12/12/12/12/12/12/12/12/12/1						
-	3 SS	8.5	10.0	5-	7-9	1.1		10 -		GP	DARK BROWN SAND AND GRAVEL Dry, quartz, rounded, 3/4" max.					
715	\$ SS				·-10	1.1		15 -								
AEP.GDI //	5 SS		18.1		0-10	1.2				CL	BROWN CLAY Dry, low to medium plasticity with trace of v-fine sand. Attempted to push tube lifted drill, declarated and					
JUNIAINEER.GPJ	S SS	18.6	20.1	9-1	1-12	1.2				SC	Attempted to push tube lifted drill, destroyed end of tube. BROWN SANDY CLAY Moist, low to medium					
ĕ N	TYPE OF CASING USED										Continued Next Page					
	X	6" x 3.2 9" x 6.2	5 HSA)	4"		PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC								
파 로	HW CASING ADVANCER 4" NW CASING 3"							WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON								
		SW CA	SING			6"	\exists	RECORDER REB								
₩ AIR HAMMER 8"																



JOB NUMBER											OG OF BORING							
		PANY								во	RING NO. <u>96-110</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF <u>4</u>							
F	PRO	JECT	EPF	RI GRO	UND WATER	STU					RING START <u>6/6/96</u> BORING FINISH <u>6/10/96</u>							
	SAMPLE	SAMPLE	DEF	MPLE PTH EEET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION DRILLER'S NOTES							
			TROW		BLOWOTO	_			7//		plasticity with v-fine grain sand lens.							
	7	SS	21.6	23.1	5-7-11	1.2					Grading to more sand							
			23.6								Attempted to push tube, top hole broken in tube, pushed approximately 1' lifted rig.							
	9	SS	26.6	28.1	5-7-11	1.2		25 -			GRAYISH BROWN SILTY CLAY Moist, low to medium plasticity.							
	10	SS	31.6	33.1	7-10-9	1.3		30 -		CL	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 untill this point. SWL dry augers to 26.6'. Auger set all weekend at this point. REDDISH BROWN CLAY Dry to moist, medium to high plasticity.							
	11	SS	36.6	38.1		1.5		35 -		CL	MEDIUM GRAY CLAY Moist to dry, medium to							
23/13	12	ST	38.6	40.6		2.0		40 -		OL.	high plasticity, with odor of organic. PUSH 2.0 PSI 1200 TIME 6 SEC. Top DARK BROWNISH GRAY SANDY CLAY							
MOON MINEEN. GF3 AEF. GD1 77.	13	SS	41.6	43.1	3-5-7	1.5					DARK GRAY CLAY Moist to wet, medium to high plasticity, strong odor of organic. 41.7 Top of sand.							
ביים ביים								45 -										



JOB NUM	BER _				_		LO	GC	DE BURING					
COMPAN								ВС	DRING NO. <u>96-110</u> DATE <u>7/23/15</u> SHEET <u>3</u> OF <u>4</u>					
PROJECT	EPF	RI GRO	OUND WATER	STU	DY			BORING START 6/6/96 BORING FINISH 6/10/96						
SAMPLE NUMBER SAMPLE	DEI	MPLE PTH EEET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	%	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK ☐ DRILLER'S IDENTIFICATION NOTES					
14 SS	46.6	48.1	3-4-4	1.5		-			GRAY BROWN CLAY Moist to wet, medium to high plasticity, odor of organic with v-fine grain sand lens, water on out side of spoon.					
15 SS	51.6	53.1	3-3-5	1.5		50 -			52.7 Bottom of screen. 53.3 Bottom of sand					
16 SS	56.6 58.6	58.1	3-4-4	1.5		55 - -			PUSH 2.0 TIME 7 SEC.					
18 SS	61.6	63.1		?		60 -			PSI 770 DARK GRAY SILTY CLAY DARK GRAY CLAY 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 -			Continued Next Page					



JOB	NUM	BER _				_		LO	LOG OF BORING								
							_		ВО	RING NO. <u>96-1</u>	110	DATE 7/23/15	SHEET <u>4</u> OF <u>4</u>				
PRO	JECT	EPR	I GRO	UND WATER	STU	DY			ВО	RING START	6/6/96 BORING FI		FINISH 6/	10/96			
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs		SOIL /		WELL	DRILLER'S NOTES			

AEP EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB	NUMI	BER _				_		LO	GO	F BORING					
									BORING NO. <u>JTMN-1</u> DATE <u>7/23/15</u> SHEET <u>1</u> OF <u>4</u>				1 OF 4		
PRO	JECT	EPF	RI GRO	OUND WATER	STU	DY			ВС	RING START	BORING FINISH	_7/	19/90		
COO	RDIN	ATES _	N 723	3,463.5 E 1,7	34,06				PIE	EZOMETER TYPE	WELL TYPE				
GRO	UND	ELEVAT	ION _	582.2 SY	STEM	Stat NAI	e Plane usin 027	g 		ST. RISER ABOVE GROUND					
Wate	er Lev	el, ft	<u> </u>	3.0 ▼		T			DEPTH TO TOP OF WELL SCREEN 56.7 BOTTOM 75.7						
TIME		, .				+-			WI	ELL DEVELOPMENT	BACKFILL	В	enseal		
DAT	 E		7/19	9/90					FIE	ELD PARTY MCR / JD	RIG	В	-61		
				1			I								
出品	Щ		1PLE PTH	STANDARD	그도쌂	RQD	DEPTH IN FEET	일	ဟ	SOIL / ROCK			DRILLER'S		
SAMPLE	SAMPLE		EET	PENETRATION RESISTANCE	ON S	%	IN	AP LOG	SC	IDENTIFICATION		WELL	NOTES		
S ≥	/S	FROM	ТО	BLOWS / 6"	RECO	/0	FEET	R _P	⊃	IDENTIFICATION		_	NOTES		
													20' North of well hub.		
							_								
							-								
1	SS	2.7	4.2	4-8-7	1.4					BROWN SANDY SILT					
'		2	7.2	407]		Moist, w/some quartz sand (fill)					
							-	-							
							_								
							5 -								
							-								
							-	1111							
2	SS	7.7	9.2	3-3-3	0.9		_								
							-	-							
							10								
							10 –								
							-	-							
							-	 							
3	SS	12.7	14.2	4-7-9	1.3		_	1		MULTI-COLORED BROWN CLAY					
								<u></u>		Moist, med to low plasticity					
							-	+=-							
							15 -	F							
							.5	-							
							-	[
20/12								F							
5							-								
<u>.</u> 4	SS	17.7	19.2	4-7-9	1.3		-	E		w/ trace of very fine sand					
5															
5							-	‡==							
						1									
TYPE OF CASING USED										Continued Next Page					
<u> </u>	NQ-2 ROCK CORE PIEZOMET														
X		9" x 6.25	5 HSA				SLC	JTTE	TED SCREEN, G = GEONOR, P = PNEUMATIC						
<u></u>		HW CAS		VANCER	4" 3"		WELL T	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
		SW CAS			6"					RECORDER JCM					
- 1	1	AID LIAM			OII	- 1			- 1						

AIR HAMMER

8"



.IOB	JOB NUMBER LOG OF BORING															
	COMPANY							BORING NO. <u>JTMN-1</u> DATE <u>7/23/15</u> SHEET <u>2</u> OF								
			I GRO	UND WATER	STU	DY			ВО	RING START <u>7/19/90</u> BORING FINIS						
		CAN	DI E	STANDARD PENETRATION RESISTANCE BLOWS / 6"		DOD	DEPTH IN FEET									
SAMPLE	SAMPLE	SAM DEF	PLE PTH	PENETRATION	AH HE HE HE HE HE HE HE HE HE HE HE HE HE	RQD	DEPTH	S E	S	SOIL / ROCK	╛	DRILLER'S				
SAME	SAME	IN F	EET	RESISTANCE		%	IN 	LO JA	nsc	IDENTIFICATION	WELL	NOTES				
0) 2	0)	FROM	ТО	BLOWS / 6"	78		FEET	Θ	_							
							-									
							-									
5	SS	22.7	24.2	4-7-9	1.4		-			BROWN SILTY CLAY w/ trace of very fine sand, low to medium plasticity						
							-									
							25 –									
							=									
							-									
6	SS	27.7	29.2	3-4-6	1.4		-									
										BROWN SAND Moist to wet, 100% fine grain						
							-			moter to med, 100% into gram.						
							30 –									
							_									
							-									
7	SS	32.7	34.2	3-4-4	1.3		_									
							-									
							35 -									
							=									
							-									
8	SS	37.7	39.2	6-6-10	1.3			Ο΄,		BROWN CLAYEY SAND & GRAVEL	$ $ ∇					
°	33	31.1	39.2	0-0-10	1.3		-			Saturated, quartz - 3/4" max size, rounded						
							-									
2							40									
							40 -	0								
							-	, , q								
!] q								
							-	. 0 .								
9	SS	42.7	44.2	6-8-10	1.1		-	0		BROWN SAND & GRAVEL						
							_			Saturated, quartz - 3/4" max size, rounded, w/ trace of fines						
								· · · ·								
5							45 -	, 0, .								
Э	1							1								

Continued Next Page



JOB	NUM	BER _				_		LO	G O	BONING					
COM	1PAN'	<i></i>							BORING NO. JTMN-1 DATE 7/23/15 SHEET 3 OF						
PRO	JECT	EPR	RIGRO	UND WATER	STU	IDY			BORING START <u>7/19/90</u> BORING FINISH <u>7/19/90</u>						
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK ☐ DRILLER'S IDENTIFICATION NOTES					
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		-	0,0		BROWN SAND Saturated, 70% fine grain, w/ some fines					
12	ss	57.7	59.2	10-12-17	1.3		55 - - - -			BROWN SAND Saturated, 90% medium to fine grain					
13	SS	62.7	64.2	12-17-15	0.9		- - - -			BROWN SAND Saturated, 80% medium to fine grain quartz, trace of fines					
14	SS	67.7	69.2	17-16-16	1.0		- - - - 70 –			BROWN SILTY SAND Saturated, quartz, w/ trace of small gravel					
							70 -								

Continued Next Page



JOB	JOB NUMBER													
COM	IPAN'	Y							BORING NO. <u>JTMN-1</u> DATE <u>7/23/15</u> SHEET <u>4</u> OF					
PRO	JECT	EPF	RIGRO	UND WATER	STU	DY			BORING START <u>7/19/90</u> BORING FINISH <u>7/19/90</u>					
SAMPLE NUMBER	SAMPLE	DEF	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK DIDENTIFICATION			☐ DRILLER'S NOTES	
15		72.7	TO 74.2	9-18-19	0.4		75 -			BROWN SAND Saturated, quar	tz, w/ trace of fines			Auger refusal @ 76.6'. Installed 2" observation well.
j -														



JOB	NUMI	BER						LO	GO	F BORING					
	OMPANY								ВС	RING NO. <u>JTMN-2</u> DATE <u>7/23/15</u> SH	HEET .	1 OF 4			
PRO	JECT	EPF	RI GRO	OUND WATE	R STUI	DY			ВС	RING START 7/17/90 BORING FINISH	1 <u>7/</u>	18/90			
COO	RDIN	ATES _	N 723	3,392.8 E 1,	734,10				PII	ZOMETER TYPE WELL TYPE	≣				
GRO	UND	ELEVAT	ION _	582.2 S	YSTEM	Stat NAI	te Plane usin D27	g		ST. RISER ABOVE GROUND 1.9 DIA					
Wate	er Lev	el, ft	<u> </u>	0.2 ▼		T			DE	PTH TO TOP OF WELL SCREEN BOTTOM	1 _76	6.9			
TIME		,		-		+-			WI	ELL DEVELOPMENT BACKFILI	_B	enseal			
DAT			7/18	8/90					FIE	ELD PARTY MCR / JD RIG	B	-61			
쁘쏪	Щ		1PLE PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"		RQD	DEPTH IN FEET	일	တ	SOIL / ROCK	_	DRILLER'S			
SAMPLE	SAMPLE		EET	RESISTANCE	N S S S S S S S S S S S S S S S S S S S	0/2	IN	APP LOG	SC	IDENTIFICATION	WELL	NOTES			
S ≥	S/S	FROM	ТО	BLOWS / 6"		70	FEET	GR	\supset	IDENTIFICATION	_	NOTES			
												100' North of potable			
												well hub.			
								-							
1	SS	2.7	4.2	5-2-12	0					NO RECOVERY - DROVE SPOON ON					
'	00	2.1	7.2	J-Z-1Z						COBBLES					
								-							
							_								
							5 -								
2	SS	7.7	9.2	2-2-8	0					CONCRETE FRAGMENTS & SAND ON					
										SPOON					
							10								
							10 -								
								-							
							-								
3	SS	12.7	14.2	4-5-8	0.9			<u> </u>		BROWN CLAY					
										Moist, medium to low plasticity					
								+=-							
							15 -								
							15 -								
								+=-							
6								-							
: -								E							
2 4	SS	17.7	19.2	3-5-8	1.0			+==							
Ĭ															
L E															
		TYPE	OF C	ASING USE)					Continued Next Page					
ž –			OCK CO	RE					TER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE						
X 9" X 6.25 HSA							SLO	OTTE	TTED SCREEN, G = GEONOR, P = PNEUMATIC						
HW CASING ADVANCER 4" WELL TO NW CASING 3"							WELL T	YPE:	PE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON						
		SW CAS			6"		RECORDER JCM								
□	1	AID LIA	ANAED.		O"	- 1									

AIR HAMMER

8"



JOB NUMBER								LOG OF BORING							
COM									во	RING NO. <u>JTMN-2</u> DATE <u>7/23/15</u> S	HEET	_2 OF4			
PRO	JECT	EPF	RIGRO	UND WATER	STU	IDY			ВО	RING START <u>7/17/90</u> BORING FINIS	:Н <u>7</u>	/18/90			
SAMPLE	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES			
5	SS	22.7	24.2	3-4-7	0		- 25								
6	SS	27.7	29.2	3-5-4	0.4		- 30 -			BROWN SILTY SAND Moist, 100% fine grain	_				
7	SS	32.7	34.2	4-5-5	1.3		- - -			BROWN CLAY Moist, medium to low plasticity BROWN SAND Quartz, 95% fine grain, trace of fines	-				
8	SS	37.7	39.2	3-5-7	1.3		35			BROWN CLAYEY SAND Wet to saturated.					
9	SS	42.7	44.2	10-11-8	1.0		40 - - - 45			BROWN SAND & GRAVEL Quartz, rounded, 3/4" max size, w/ fines		Started washing out augers.			
; !							70	, , , , q							

Continued Next Page



JOB NUMBER BORING NO. JTMN-2 DATE 7/23/15 SHEET 3 OF _ COMPANY PROJECT EPRI GROUND WATER STUDY BORING START 7/17/90 BORING FINISH 7/18/90 STANDARD
PENETRATION PLOOP
SISTANCE HAD ROD SAMPLE GRAPHIC LOG SAMPLE NUMBER SAMPLE DEPTH USCS DEPTH SOIL / ROCK WELL DRILLER'S IN FEET **IDENTIFICATION NOTES FEET** FROM TO o´ 10 SS 47.7 49.2 8-11-11 0.3 50 SS 11 52.7 54.2 9-14-10 0.5 55 o´ O o o **BROWN SAND** SS 57.7 59.2 7-7-7 0.9 12 Quartz, saturated, trace of gravel 60 13 SS 62.7 64.2 8-14-12 1.1 **BROWN SAND** Quartz, saturated, trace of gravel, trace of fines 65 EPRI SPORN MOUNTAINEER.GPJ AEP.GDT 7/23/15 SS 67.7 69.2 7-13-14 1.2 70

Continued Next Page



JOB NUMBER								LO	LOG OF BORING								
COMPANY									ВО	RING NO. JTMN-2 DATE 7/23/15 S	HEET	4 OF 4					
			RIGRO	UND WATER	STU	IDY				RING START 7/17/90 BORING FINIS							
SAMPLE	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES					
15	SS	72.7	74.2	8-13-16	1.2		- - 75 - -			BROWN SAND Saturated	_						
16	SS	77.7	77.8	50/0.1	0.1		-			LIGHT BROWN SANDSTONE	=	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



COMPANY	WELL No. MW-00	1 BORING No. 001	INSTALLED 6/18/97
PROJECT EPRI GROUND WATER STUDY	WELL NO. IVIVV-00	1 BORING NO. 001	_ INSTALLED <u>0/10/97</u>
COORDINATES N 724,498.7 E 1,733,165.9			
SYSTEM State Plane using NAD27			
		TOP RISER: 571.32 FT.	
GROUND ELEVATION 569.18 FT.			
Y//\X//\X//\X//\X/			
GROUT SEAL: 50 GALLONS QUICK GROUT			
		TOP BENTONITE SEAL:	· 550 68 FT
BENTONITE SEAL: 125 #BENTONITE PELLETS		TOT BEITTOTHTE GETTE.	000.0011.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'			
GRAVEL PACK: 95 #7@#4 QUARTZ		TOD ODANIEL DAOIG FA	7.00 FT
		TOP GRAVEL PACK: 54	7.00 F1.
RISER PIPE: 2.0, dia., PVC SCH 40	<u> </u>	TOP SCREEN: 542.18 F	т.
SPACERS, DEPTH:			
G. 7, 62.1 (G. 7)			
	토르네크 그 본 토르네		
25 			
PRE-PACK SCREEN. DRILLED WITH 4.25 HSA.			
Coordinates and elevations are from the re-survey in June 2008.			
N AE			
8. A. A. A. A. A. A. A. A. A. A. A. A. A.		— BOTTOM SCREEN: 532	.18 FT.
PRE-PACK SCREEN. DRILLED WITH 4.25 HSA. Coordinates and elevations are from the re-survey in June 2008. Go June 2008.		BOTTOM WELL: 531.88	FT.
N	-	BOTTOM GRAVEL PAC	K: 531.68 FT.
ED A		BOTTOM BORING: 531.	18 FT.



JOB NON						
COMPAN		WELL N	No. <u>MW</u>	-002	BORING No. 002	INSTALLED 6/24/97
COORDIN	T <u>EPRI GROUND WATER STUDY</u> NATES N 724,857.8 E 1,733,650.5					
SYSTEM						
OTOTEM	State Francisching Past					
					TOP RISER: 582.81 FT.	
					TOF RISER. 302.0111.	
GROUND	DELEVATION 580.82 FT.					
	GROUT SEAL: 100 GALLONS QUICK GROUT					
	BENTONITE SEAL: 25# BENTONITE PELLETS				TOP BENTONITE SEAL: 5	26.72 FT.
	SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'					
	GRAVEL PACK: 97# 7@#4 QUARTZ				TOP GRAVEL PACK: 522.	92 FT.
	RISER PIPE: 2.0, dia., PVC SCH 40				TOP SCREEN: 520.32 FT.	
	SPACERS, DEPTH:					
3/15						
	PRE-PACK SCREEN DRILLED WITH 4.25" HSA					
J AEP.GDI	Coordinates and elevations are from the re-survey in June 2008.					
EPKL_SPOKN_MOUNIAINEEK.GPJ AEP.GDI 7723/15					BOTTOM SCREEN: 510.3.	2 FT.
					BOTTOM WELL: 510.32 F	T.
M L L L L L L L L L L L L L L L L L L L					BOTTOM GRAVEL PACK:	509.02 FT.
ጠ ቻ ፫					BOTTOM BORING: 507.82	2 FT.



JOB NUMBER		WELL I	No. MW-003	BORING No. 003	INSTALLED 6/25/97
	OUND WATER STUDY				
	9,877.2 E 1,733,713.7 e using NAD27				
			٦		
				TOP RISER: 607.20 FT	
GROUND ELEVATION 6	604.90 FT.				
GROUT SEAL: 5	50 GALLONS QUICK GROUT				
BENTONITE SE	AL: 70# BENTONITE PELLETS			TOP BENTONITE SEAL	L: 579.60 FT.
SCREEN: 2.0 dia	a., PVC SCH 40 20 SLOT, 9.7'				
GRAVEL PACK:	175 #7@#4 QUARTZ			TOP GRAVEL PACK: 5	74.50 FT.
RISER PIPE: 2.0), dia., PVC SCH 40			TOP SCREEN: 572.60	FT.
SPACERS, DEP	TH:				
K	EEN DRILLED WITH 4.25" HSA elevations are from the re-survey in				
AINEER.				BOTTOM SCREEN: 56	2.60 FT.
NOON NOON				BOTTOM WELL: 562.6	0 FT.
SPORN_T				BOTTOM GRAVEL PAG	CK: 561.50 FT.
<u>~</u> .				DOTTOM DODING, 504	4 50 FT



JOB NUMBER WELL No. MW-004 BORING No. 004 INSTALLED **6/30/97** COMPANY PROJECT EPRI GROUND WATER STUDY COORDINATES N 724,865.9 E 1,733,643.4 SYSTEM State Plane using NAD27 TOP RISER: 583.13 FT. GROUND ELEVATION 581.08 FT. GROUT SEAL: 50 GALLONS QUICK GROUT TOP BENTONITE SEAL: 551.08 FT. BENTONITE SEAL: 50# BENTONITE PELLETS SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7' GRAVEL PACK: 375 #7@#4 QUARTZ TOP GRAVEL PACK: 546.08 FT. RISER PIPE: 2.0, dia., PVC SCH 40 TOP SCREEN: 543.48 FT. SPACERS, DEPTH: PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008. BOTTOM SCREEN: 533.48 FT. BOTTOM WELL: 533.48 FT. BOTTOM GRAVEL PACK: 532.88 FT. BOTTOM BORING: 532.88 FT.

GEOMCNST EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB NUMBER				
COMPANY	WELL	No. <u>MW-005</u>	BORING No. 005	INSTALLED 7/1/97
PROJECT EPRI GROUND WATER STUDY				
COORDINATES N 719,152.8 E 1,734,428.9				
SYSTEM State Plane using NAD27				
		┦ —	TOP RISER: 593.19 F	T.
GROUND ELEVATION 591.00 FT.				
4///2///2///2//			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
GROUT SEAL: 80 GALLONS QUICK GROUT				
GROUT SEAL. 80 GALLONS QUICK GROUT				
			TOP BENTONITE SEA	ΔI · 561 30 FT
BENTONITE SEAL: 150# BENTONITE PELLETS			TOT BEITTOTHTE OF	L. 001.001 1.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'				
GRAVEL PACK: 75# 7@#4 QUARTZ				
GRAVEL FACK. 15# 1@#4 QUARTZ			TOP GRAVEL PACK:	557.50 FT.
RISER PIPE: 2.0, dia., PVC SCH 40			TOP SCREEN: 553.30) FT.
SPACERS, DEPTH:				
5				
PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA				
Coordinates and elevations are from the re-survey in June 2008.				
A PROPERTY OF THE PROPERTY OF				
Reg ()				
		784 -	 BOTTOM SCREEN: 5- 	43.30 FT.
E C C C C C C C C C C C C C C C C C C C				
DO STATE OF THE ST			BOTTOM WELL: 543.	30 FT.
			BOTTOM GRAVEL PA	ACK: 542.20 FT.
PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.				
A Marian		//////////////////////////////////////	BOTTOM BORING: 54	11.00 FT.



JOB NUMBER				
COMPANY	WELL	No. <u>MW-006</u>	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				
		┦ —	TOP RISER: 601.57 F	T.
GROUND ELEVATION 601.31 FT.				
			Y// <i>/</i> X/// <i>/</i> X///	
GROUT SEAL: GALLONS QUICK GROUT				
GROUT SEAL. GALLONS QUICK GROUT				
			TOP BENTONITE SEA	ΔI · 527 71 FT
BENTONITE SEAL: 80# BENTONITE PELLETS			TOT BENTONTE OF	L. 027.7111.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'				
GRAVEL PACK: 185# 7@#4 QUARTZ				
GRAVEL FACK. 105# / QUARTZ		<i>/////</i>	TOP GRAVEL PACK:	520.31 FT.
RISER PIPE: 2.0, dia., PVC SCH 40			TOP SCREEN: 520.21	I FT.
SPACERS, DEPTH:				
6				
PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA				
Coordinates and elevations are from the re-survey in June 2008.				
A PER CONTRACTOR OF THE PER CONTRACTOR OF TH				
Rago				
		T. 3 -	BOTTOM SCREEN: 5	10.21 FT.
OOW.			BOTTOM WELL: 510.	21 FT.
N			BOTTOM GRAVEL PA	ACK: 507.61 FT.
PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.				
A A A A A A A A A A A A A A A A A A A			BOTTOM BORING: 50)5.31 FT.



JOB NUN		WELL N	lo. <u>MW-00</u>)7 [BORING No. 007	INSTALLED 7/10/97
	T <u>EPRI GROUND WATER STUDY</u> NATES <u>N 720,265.1 E 1,735,674.4</u> <u>State Plane using NAD27</u>					
]		TOP RISER: 601.67 FT.	
GROUNE	DELEVATION 601.49 FT.					
	GROUT SEAL: 100 GALLONS QUICK GROUT					
	BENTONITE SEAL: 100# BENTONITE PELLETS			_	TOP BENTONITE SEAL: 5	52.49 FT.
	SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'					
	GRAVEL PACK: 525# 7@#4 QUARTZ				TOP GRAVEL PACK: 549.	39 FT.
	RISER PIPE: 2.0, dia., PVC SCH 40				TOP SCREEN: 545.49 FT.	
2	SPACERS, DEPTH:					
7/23/15	PRE-PACK SCREEN HOLE DRILL WITH HSA					
PR_SPORN_MOUNTAINEER.GPJ AEP.GDT 7	Coordinates and elevations are from the re-survey in June 2008.					
AINEER.C				—	BOTTOM SCREEN: 535.55	9 FT.
NOON NOON					BOTTOM WELL: 535.59 F	т.
R_SPORN_N					BOTTOM GRAVEL PACK:	534.49 FT.
<u>r</u>	\///	///////////////////////////////////////			DOTTOM DODING: 524 40	·



JOB NUMBER		\A/=! A			ODINON ASS	
PROJECT EPRI GROUND WATER	D STUDY	WELLN	lo. <u>MW-008</u>	5 E	BORING No. 008	INSTALLED 7/22/97
COORDINATES N 718,915.8 E 1,7						
SYSTEM State Plane using NAD27	130,133.3					
Glate Flane doing NADZI						
					TOD DICED: ET	
			_	<u>_</u>	TOP RISER: FT.	
GROUND ELEVATION FT.						
GROUT SEAL: GALLONS QUICK	(GROUT					
					TOP BENTONITE SEAL:	=T
BENTONITE SEAL: 70# BENTON	NITE PELLETS				TOP BENTONITE SEAL.	1.
SCREEN: 2.0 dia., PVC SCH 40 (08 SLOT, 9.7'					
ODANEL DACK 2004 7.044 OLL	ADTZ					
GRAVEL PACK: 360# 7@#4 QU/	ARIZ				TOP GRAVEL PACK: FT.	
RISER PIPE: 2.0, dia., PVC SCH	40		- -		TOP SCREEN: FT.	
SPACERS, DEPTH:						
25						
ଞ୍ଜି PRE-PACK SCREEN HOLE DR						
Coordinates and elevations are fro June 2008.	om the re-survey in					
A PER						
ଦ୍ର ଓ ଅ					BOTTOM SCREEN: FT.	
N N N N N N N N N N N N N N N N N N N				=	DOTTOWISOREEN. FT.	
\$ \$					BOTTOM WELL: FT.	
O N						
OQ &	· · · · ////		-		BOTTOM GRAVEL PACK:	FT.
PRE-PACK SCREEN HOLE DR Coordinates and elevations are fro June 2008.					BOTTOM BORING: ET	
_					BUT TOWERDRING, FT	



JOB NUMBER WELL No. MW-009 BORING No. 009 INSTALLED **7/15/97** COMPANY PROJECT EPRI GROUND WATER STUDY COORDINATES N 718,328.2 E 1,736,320.9 SYSTEM State Plane using NAD27 TOP RISER: 576.55 FT. GROUND ELEVATION 574.98 FT. GROUT SEAL: 180 GALLONS QUICK GROUT TOP BENTONITE SEAL: 540.18 FT. BENTONITE SEAL: 100# BENTONITE PELLETS SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7' GRAVEL PACK: 65# 7@#4 QUARTZ TOP GRAVEL PACK: 536.38 FT. RISER PIPE: 2.0, dia., PVC SCH 40 TOP SCREEN: 532.68 FT. SPACERS, DEPTH: PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008. BOTTOM SCREEN: 522.68 FT. BOTTOM WELL: 522.28 FT. BOTTOM GRAVEL PACK: 520.48 FT. BOTTOM BORING: 520.48 FT.

GEOMCNST EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB NUMBER			0011011	
COMPANY	WELL N	lo. <u>MW-010</u>	BORING No. 010	INSTALLED <u>7/17/97</u>
PROJECT EPRI GROUND WATER STUDY	_			
COORDINATES N 716,771.2 E 1,738,107.3				
SYSTEM State Plane using NAD27				
		1		
		_	— TOP RISER: 585.19 FT.	
GROUND ELEVATION 583.19 FT.				
GROUND ELEVATION 300:1011.				
GROUT SEAL: 100 GALLONS QUICK GROUT				
BENTONITE SEAL: 100# BENTONITE PELLETS		-	TOP BENTONITE SEAL:	: 556.99 FT.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'				
GRAVEL PACK: 255# 7@#4 QUARTZ			TOP GRAVEL PACK: 55	:2 00 ET
			TOF GRAVEL FACE. 33	3.9911.
RISER PIPE: 2.0, dia., PVC SCH 40		-	TOP SCREEN: 549.19 F	·T
1 1 2 2 3 3 da., 1 7 3 3 3 1 1 3			TOT CONCERN CTO. TO T	
[:				
SPACERS, DEPTH:				
PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA				
Coordinates and elevations are from the re-survey in June 2008.				
E C				
			— BOTTOM SCREEN: 539	10 FT
			DOTTONI SONLLIN. 939	.1011.
			BOTTOM WELL: 538.59	FT.
D E			50 1 1 GM WELL. 000.00	
		-	BOTTOM GRAVEL PAC	K: 538.19 FT.
PRE-PACK SCREEN. HOLE DRILL WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.				
1	11111111111111	/////	DOTTOM DODING, FOR	40 ET



JOB NUMBER	NO WELL OO	101110	711014	
COMPANY	WELL No.	/IW-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				
			TOP RISER: FT.	
GROUND ELEVATION FT.				
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
GROUT SEAL: 75 GALLONS QUICK GROUT				
BENTONITE SEAL: 30# BENTONITE PELLETS)	TOP BENTONITE SEA	AL: FT.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'				
= = = SCREEN. 2.0 did., FVC 3CH 40 20 3LO1, 9.7				
新型器				
GRAVEL PACK: 330# 7@#4 QUARTZ		<u> </u>	TOP GRAVEL PACK:	FT.
RISER PIPE: 2.0, dia., PVC SCH 40		# —	TOP SCREEN: FT.	
SPACERS, DEPTH:				
GIVELIE, DEI III.				
2				
PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA		시시 시시		
Coordinates and elevations are from the re-survey in June 2008.				
1				
X 11 12 2			BOTTOM SCREEN: I	FT.
			DOTTOM WELL ST	
2			BOTTOM WELL: FT.	
PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.			BOTTOM GRAVEL PA	ACK: FT.
<u>1</u>	V/////////////////////////////////////	<i>///</i> //	BOTTOM BORING: F	T.

GEOMONST EDBI SDOBN MOLINTAINEEP GBI AEP GDT 7/03/15



JOB NUMBER	\A/=! A!			DODING N. A4A	
PROJECT _ EPRI GROUND WATER STUDY	WELL N	0. <u>MW-U1</u>	121	BORING No. 012	INSTALLED 7/29/97
COORDINATES N 718,753.1 E 1,737,045.5					
SYSTEM State Plane using NAD27					
State Traile using NADZI					
				TOD DICED: 504 00 FT	
				TOP RISER: 581.98 FT.	
GROUND ELEVATION 579.96 FT.					
GROUT SEAL: 75 GALLONS QUICK GROUT					
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				TOD DENITONITE SEAL : 6	22 56 ET
BENTONITE SEAL: 40# BENTONITE PELLETS				TOP BENTONITE SEAL: 5	22.30 F1.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'					
GRAVEL PACK: 40# 7@#4 QUARTZ				TOP GRAVEL PACK: 519.	56 FT.
RISER PIPE: 2.0, dia., PVC SCH 40				TOP SCREEN: 517.66 FT.	
SPACERS, DEPTH:					
35 					
PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA					
Coordinates and elevations are from the re-survey in June 2008.					
A PER					
R G				BOTTOM SCREEN: 507.66	£ ET
			_	DOTTOW SUREEN. 307.00	утт.
A CONTRACTOR OF THE CONTRACTOR				BOTTOM WELL: 507.66 F	Т.
O N					
O K				BOTTOM GRAVEL PACK:	506.66 FT.
PRE-PACK SCREEN HOLE DRILLED WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.				BOTTOM BORING: 500 46	N.C.T.
				BUT TOWN BURNING, 200 VE	, - 1



JOB NUM	· · · · · · · · · · · · · · · · · · ·	WELL N	No. <u>MW-0</u>	13	BORING No. 013	INSTALLED 7/30/97
	T EPRI GROUND WATER STUDY NATES N 718,758.6 E 1,737,044.4 State Plane using NAD27					
SISILM	State Flatie using NAD21		_			
			Ţ		TOP RISER: 581.51 FT.	
GROUND	ELEVATION 579.48 FT.					
	GROUT SEAL: 50 GALLONS QUICK GROUT					
	BENTONITE SEAL: 85# BENTONITE PELLETS			_	TOP BENTONITE SEAL: 5	47.28 FT.
	SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'					
	GRAVEL PACK: 375# 7@#4 QUARTZ				TOP GRAVEL PACK: 543.	98 FT.
	RISER PIPE: 2.0, dia., PVC SCH 40				TOP SCREEN: 539.98 FT.	
10	SPACERS, DEPTH:					
7/23/15	PRE-PACK SCREEN HOLE DRILL WITH 4.25" HSA					
pr_sporn_mountaineer.gpj Aep.gdt ;	Coordinates and elevations are from the re-survey in June 2008.					
TAINEER.C					BOTTOM SCREEN: 529.9	8 FT.
NO O W					BOTTOM WELL: 529.98 F	Т.
a_sporn					BOTTOM GRAVEL PACK:	528.98 FT.
⊬	\// _/				DOTTOM DODING: 500 00	O ET



JOB NUMBER				
COMPANY	WELL	No. MW-014	BORING No. 014	INSTALLED 7/30/97
PROJECT EPRI GROUND WATER STUDY	=			
COORDINATES N 718,892.4 E 1,736,827.8				
SYSTEM State Plane using NAD27				
		┦ _	TOP RISER: 588.89 F	Т.
GROUND ELEVATION 586.89 FT.				
\/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			X// <i>/</i> X// <i>/</i> ///X//	
GROUT SEAL: 75 GALLONS QUICK GROUT				
			TOD DENITONITE OF	1 - 545 00 FT
BENTONITE SEAL: 100# BENTONITE PELLETS			TOP BENTONITE SEA	NL: 545.39 FT.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.7'				
= = 30(\LEI\. 2.0 did., 1 \ \text{VO 30(140 20 3LO1, 9.7)}				
GRAVEL PACK: 375# 7@#4 QUARTZ			TOP GRAVEL PACK:	522.69 FT.
RISER PIPE: 2.0, dia., PVC SCH 40			TOP SCREEN: 537.19	FT.
ODACEDO DEDTIL				
SPACERS, DEPTH:				
PRE-PACK SCREEN HOLE DRILLED WITH 4 25"				
PRE-PACK SCREEN. HOLE DRILLED WITH 4.25" HSA				
Coordinates and elevations are from the re-survey in June 2008.				
			BOTTOM SCREEN: 52	27.19 FT.
		J. J. J. –	BOTTOM WELL: 526.	79 FT.
			DOTTOM ODANIE: DO	014, 500 70 57
PRE-PACK SCREEN. HOLE DRILLED WITH 4.25" HSA Coordinates and elevations are from the re-survey in June 2008.			 BOTTOM GRAVEL PA 	IUN: 526.79 FT.
			- ROTTOM RORING: 52	95 90 ET

GEOMONST EDDI SDORN MOLINTAINEED GDI AED GDT 7/93/15



JOB NUMBER	WELL OOK			
COMPANY	WELL No. MY	W-015	BORING No. MW-015	INSTALLED 12/11/01
PROJECT EPRI GROUND WATER STUDY				
COORDINATES N 719,504.2 E 1,736,239.5				
SYSTEM State Plane using NAD27				
			TOP RISER: 601.60 FT.	
GROUND ELEVATION 599.87 FT.		<i>X</i>		
GROUT SEAL: QUICK GROUT				
SHOOT SEAL. QUICK SHOOT				
			TOP BENTONITE SEAL:	· 528 77 FT
BENTONITE SEAL: 50 lbs BENTONITE PELLETS			TOT BENTONTE GEAL.	320.7711.
SCREEN: 2.0 dia., PVC SCH 40 20 SLOT, 9.0				
= = 3 SCILLIV. 2.0 dia., 1 VO 3CIT 40 20 3E01, 9.0				
GRAVEL PACK: 200 lbs #4 Ohio Quartz from 77.0' - 89.6'; 75 lbs #7 Sand from 75.3' - 77.0'		<u> </u>	TOP GRAVEL PACK: 52	2 87 FT
50.0, 70 150 17 Carlo 110 17 7.50 77.50			TOT GIVIVEET MON. 02	2.07 1 1.
RISER PIPE: 2.0, dia., PVC SCH 40		4	TOP SCREEN: 521.67 F	т
THE LOCAL WELL SES, SHARP, I VO SOLL TO			TOT CONCERN OF THE	••
SPACERS, DEPTH:		충		
		Š		
25				
Installed with 4.25" HSA's Used 300 gallons of water to wash plug out of 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		À		
Coordinates and elevations are from the re-survey in				
ਰ June 2008.				
			BOTTOM SCREEN: 512	.67 FT.
NAME OF THE PROPERTY OF THE PR				
			BOTTOM WELL: 511.77	FT.
[,,,,,,,,,,,,,		BOTTOM GRAVEL PACI	K: 510.27 FT.
O				
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.			BOTTOM BORING: 505.	37 FT.



JOB NUMBER WELL No. M-16 BORING No. MW-16 INSTALLED 6/18/08 COMPANY PROJECT EPRI GROUND WATER STUDY COORDINATES N 721,431.5 E 1,732,814.2 SYSTEM State Plane using NAD27 TOP RISER: 588.61 FT. GROUND ELEVATION 586.82 FT. GROUT SEAL: 300 gals Quick Grout TOP BENTONITE SEAL: 525.62 FT. 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 TOP GRAVEL PACK: 521.12 FT. RISER PIPE: 2", dia., Sch 40 TOP SCREEN: 519.32 FT. SPACERS, DEPTH: N/A Installed with 6.25' HSA's and stainless steel plate SWL @ install = 36.7' BOTTOM SCREEN: 509.32 FT. BOTTOM WELL: 508.82 FT. BOTTOM GRAVEL PACK: 507.22 FT. BOTTOM BORING: 504.82 FT.

GEOMCNST EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB NON			\A/ = 1.1.1	NI= 00 4	04	DODING No. 00 404	INICTALLED GIEIOG
COMPAN	TEPRI GROUND WA	TED STIIDV	VVELL	NO. <u>96-</u> 1	01	BORING No. 96-101	INSTALLED 0/5/90
	NATES N 720,983.0 E						
SYSTEM		1,704,010.1					
STOTEM	STATE FLANE						
						TOD DIOSED	
				Ĭ	_	TOP RISER: FT.	
GROUND	ELEVATION 619.00 FT.	X//X\//X\//X\//X\/			X// <i>/</i> X///		
	GROUT SEAL: 60 GALLONS	QUICK GROUT					
	DENTONITE OF ALL FOUR DENI	TONUTE DELL'ETO				TOP BENTONITE SEAL:	599.00 FT.
	BENTONITE SEAL: 50# BEN	TONITE PELLETS					
	SCREEN: 1.0 dia., PVC SCH	40 20 SLOT, 9.0					
	GRAVEL PACK: 400# NO.4 (OHIO QUARTZ					
	ON WEET MORE 40011 NO.4 C	51110 Q074112		//////		TOP GRAVEL PACK: 597	.00 FT.
	RISER PIPE: 1.0, dia., PVC S	SCH 40				TOP SCREEN: 594.60 FT	•
	SPACERS, DEPTH:						
<u> </u>							
11231	Flush mounted protector. Piez	zometer					
AEP.		-					
규 지 지						BOTTOM SCREEN: 585.6	60 FT.
Z Z		-					
EPKL_SPOKN_MOUNIAINEEK.GPJ AEP.GDI 7723/15						BOTTOM WELL: 585.00 F	FT.
Z Z I		[7/////		BOTTOM GRAVEL PACK	: 584.00 FT.
<u></u>							
П Г Д						BOTTOM BORING: 571.0	0 FT.



JOB NUMBER	WELL No. 96-104	BORING No. 96-104	INSTALLED 6/4/96
PROJECT EPRI GROUND WATER STUDY COORDINATES N 719,229.2 E 1,734,600.2 SYSTEM STATE PLANE			
		TOP RISER: FT.	
GROUND ELEVATION 618.71 FT.			
GROUT SEAL: 35 GALLONS QUICK GROUT			
BENTONITE SEAL: 50# BENTONITE PELLETS		TOP BENTONITE SEA	L: 598.71 FT.
SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0			
GRAVEL PACK: 350# NO.4 OHIO QUARTZ		TOP GRAVEL PACK: 5	96.21 FT.
RISER PIPE: 1.0, dia., PVC SCH 40		TOP SCREEN: 594.61	FT.
SPACERS, DEPTH:			
SPORN_MOUNTAINEER, GDJ AEP, GD			
NEEK. C		BOTTOM SCREEN: 58	5.61 FT.
		BOTTOM WELL: 585.0	1 FT.
N N N N N N N N N N N N N N N N N N N		BOTTOM GRAVEL PAGE	CK: 584.01 FT.
<u> </u>		DOTTOM DODING: 57	2.04 FT



JOB NUMBER					
COMPANY	WELL	No. <u>96-10</u>	8	BORING No. 96-108	_ INSTALLED <u>6/11/96</u>
PROJECT EPRI GROUND WATER STUDY					
COORDINATES N 719,761.8 E 1,736,125.4					
SYSTEM STATE PLANE					
		٦			
	4			TOP RISER: FT.	
GROUND ELEVATION 603.40 FT.			//////		
· · · · · · · · · · · · · · · · · · ·			///>\///	/\\//\\//	
GROUT SEAL: 80 GALLONS QUICK GROUT					
BENTONITE SEAL: 50# BENTONITE PELLETS			—	TOP BENTONITE SEAL:	546.40 FT.
BENTONITE GEAL. SOF BENTONITE I ELLETO					
SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0					
GRAVEL PACK: 250# NO.4 OHIO QUARTZ				TOP GRAVEL PACK: 54	2 90 ET
				TOF GRAVEL FACK. 54	2.00 1-1.
RISER PIPE: 1.0, dia., PVC SCH 40				TOP SCREEN: 540.10 F	т.
SPACERS, DEPTH:					
Flush mounted protector Piezometer					
7 108					
NEW YORK TO A COLUMN TO A COLU					
C NOTE OF THE PROPERTY OF THE					
				BOTTOM SCREEN: 531.	.10 FT.
ATAIN ATAIN					
The second secon				BOTTOM WELL: 530.50	FT.
PRI_SPORN_MOUNTAINEER.GPJ AEP.GDT	///////////////////////////////////////	7/////		BOTTOM GRAVEL PACI	K: 529.40 FT.
NS.					
<u>u</u>	//////////////////////////////////////			BOTTOM BORING: 529	40 FT



JOB NUMBER WELL No. 96-110 BORING No. 96-110 INSTALLED 6/10/96 COMPANY PROJECT EPRI GROUND WATER STUDY COORDINATES N 720,277.1 E 1,735,665.6 SYSTEM STATE PLANE TOP RISER: FT. GROUND ELEVATION 602.29 FT. GROUT SEAL: 60 GALLONS QUICK GROUT TOP BENTONITE SEAL: 563.19 FT. BENTONITE SEAL: 50# BENTONITE PELLETS SCREEN: 1.0 dia., PVC SCH 40 20 SLOT, 9.0 GRAVEL PACK: 300# NO.4 OHIO QUARTZ TOP GRAVEL PACK: 560.59 FT. RISER PIPE: 1.0, dia., PVC SCH 40 TOP SCREEN: 558.59 FT. SPACERS, DEPTH: Flush mount protector Piezometer BOTTOM SCREEN: 549.59 FT. BOTTOM WELL: 549.99 FT. BOTTOM GRAVEL PACK: 548.99 FT. BOTTOM BORING: 529.19 FT.

GEOMCNST EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



JOB NUMBER	WELL 1	No. JTMN	l-1 E	BORING No. JTMN-1	INSTALLED 7/19/90
PROJECT EPRI GROUND WATER STUDY COORDINATES N 723,463.5 E 1,734,069.7 SYSTEM State Plane using NAD27	_				
				TOP RISER: 583.67 FT.	
GROUND ELEVATION 582.17 FT.					
GROUT SEAL: Benseal					
BENTONITE SEAL:				TOP BENTONITE SEAL: 5	529.47 FT.
SCREEN: 2.0 dia., 20 slot, 19'					
GRAVEL PACK:				TOP GRAVEL PACK: 527.	47 FT.
RISER PIPE: 2.0, dia.,				TOP SCREEN: 525.47 FT.	
SPACERS, DEPTH:					
TAINEER.G				BOTTOM SCREEN: 506.4	7 FT.
LNOW_N				BOTTOM WELL: 505.57 F	
PRI_SPOR				BOTTOM BORING: 505 5	



JOB NUMBER WELL No. JTMN-2 BORING No. JTMN-2 INSTALLED 7/18/90 COMPANY PROJECT EPRI GROUND WATER STUDY COORDINATES N 723,392.8 E 1,734,106.4 SYSTEM State Plane using NAD27 TOP RISER: 584.06 FT. GROUND ELEVATION 582.16 FT. GROUT SEAL: Benseal TOP BENTONITE SEAL: 528.26 FT. BENTONITE SEAL: SCREEN: 2.0 dia., 20 slot, 19' GRAVEL PACK: TOP GRAVEL PACK: 526.26 FT. RISER PIPE: 2.0, dia., TOP SCREEN: 524.26 FT. SPACERS, DEPTH: BOTTOM SCREEN: 505.26 FT. BOTTOM WELL: 504.36 FT. BOTTOM GRAVEL PACK: 504.36 FT. BOTTOM BORING: 504.36 FT.

GEOMCNST EPRI_SPORN_MOUNTAINEER.GPJ AEP.GDT 7/23/15



AEP 2008, 2010

Production Well Information

East 1, West 1, Well 4 to Well 6

MOUNTAINEER SUPPLY WELLS									
DATUM: N	AD27 / 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					
WEOT 1	704004 70	4704047.00	507.00	500					
WEST 1	721864.73	1734247.03	587.32		Top of Inspection Hole				
			585.64	GROUND					
WELL 4	721739.55	1734875.42	583.43	WASTEWATER WELL	Top of Inspection Hole				
	·		581.95	GROUND					
A/ELL E	704400 70	4700400 50	500.00	MADELIOLIOE	Town of he are a fine I I also				
WELL 5	721130.76	1733439.50		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

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 Easting/X: 1732461.99 **Latitude:** 38 58 50.07601 **Longitude:** 81 56 27.82955

Convergence: -0 34 54.34062 **Scale Factor:** 1.000022168



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	City: New Haven		State:		WV		
Well No.:	FGD West	Location:	in gravel are	ea				
Measured from Top Casing: X		Total Depth	77'	Inside Diam.	16"	Static Lev Standing	vel / Water Level	44.70'
Type Well:	Gravel Wall	X	Tubular		Rock		New	Х
2	Old		Cleaned	r*	Gravel Wall Dia	ım.	30"	
Screen:	Length	15'	Diam.	16"	Slot Size	60		
	Туре	Stainless Ste	eel-Pipe Size		Depth to top	62'		
Driven By:	Electric		Engine		Pump Bowl		Stages	
Length Suct		None X		Well Top to B	ottom of Suction			
Orifice Size	6	Ву	5	Water dischar	ged 200' from w	ell into pit ir	n building	
	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			13
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.

Job No. 68658 PAGE: 2 of 3 Date 12/12/2008 INCHES PUMPING DRAW SPECIFIC G.P.M. **AMPS LEVEL** DOWN TIME P.S.I. CAPACITY COMMENTS ON (ft) ORIFICE (ft) 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 49.55 10:28 AM 10:32 AM 49.56 10:35 AM 49.57 4.87 94.0 Step 3 10:40 AM 10:40 AM 603 23.5 6.30 98.0 10:41 AM 24.5 616 51.00 51.05 10:43 AM 10:45 AM 51.06 51.12 10:52 AM 6.43 96.0 51.13 10:55 AM 11:02 AM 51.18 6.48 51.21 11:08 AM 11:09 AM 39.50 **FGD East** 51.23 11:11 AM 51.24 6.54 94.0 11:14 AM 6.56 11:20 AM 51.26 51.28 11:25 AM Step 4 11:30 AM 30.0 682 51.85 7.15 11:32 AM

51.98

52.00

39.70

52.01

52.05

11:35 AM

11:40 AM

11:46 AM

11:50 AM

11:55 AM

7.28

7.30

7.31

7.35

94.0

FGD East

PUMPING DRAW SPECIFIC INCHES LEVEL **DOWN** CAPACITY COMMENTS **AMPS** G.P.M. P.S.I. TIME ON (ft) (ft) **ORIFICE** 52.07 7.37 92.5 12:00 PM 52.13 91.7 7.43 12:15 PM 30 682 7.46 52.16 12:30 PM **FGD East** 12:35 PM 39.80 52.19 7.49 12:45 PM 52.23 7.53 1:00 PM 52.23 7.53 1:05 PM 52.24 7.54 1:09 PM Pump off 1:10 PM 45.60 0.90 1:11 PM 45.60 0.90 1:12 PM 45.75 1.05 1:13 PM 40.20 **FGD East** 1:14 PM 45.70 1.00 1:17 PM 45.70 1.00 1:18 PM 45.64 0.94 1:20 PM 45.50 0.80 1:30 PM 0.70 45.40 1:37 PM 45.35 0.65 1:44 PM 45.12 0.42 2:30 PM FGD East 40.20 2:35 PM

Job No.

68658

12/12/2008

Date

Page No.

3 of 3



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 railro	oad tracks				
	om Ground Level:	Total Depth	78'	Inside Diam	16"			45.38'
				moido Didiri.	d tracks Static Level / Inside Diam. Rock Gravel Wall Diam. 16" Slot Size 60			
Type Well:	Gravel Wall	X	Tubular		Rock	*	New	X
	Old		Cleaned		Grave! Wall Di	am.	30"	
Screen:	Length	15'	Diam.	16"	Slot Size	60		
	Туре	Stainless St	eel - Pipe S	ize	Depth to top	63'		
Driven By:	Electric		Engine		Pump Bowl			
Length Suct	ion Pipe	None: X		Well Top to B	ottom of Suction	l		
Orifice Size		Ву		Water Discha	rged	600' + /-	from well into pit	in building
	Bottom of Air Line	N/A		Gauge Reads	: Feet		Pounds	
110.1110						1		0000000000
TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	LEVEL	DOWN		COMMENTS
10:30 AM		,		è				Stop surging east well
10:52 AM					45.45	+ 0.07		
11:00 AM					45.45	+ 0.07		
11:15 AM				j	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			ckenridge	Witnessed By	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)

PAGE: Page 2 of 4

PUMPING SPECIFIC DRAW INCHES COMMENTS **DOWN CAPACITY** G.P.M. P.S.I. **AMPS LEVEL** ON TIME **ORIFICE** (ft) (ft) 49.15 3.77 74 278 11:55 AM 5.0 49.14 3.76 12:00 PM FGD West 44.60 12:04 PM 3.81 49.19 12:10 PM 49.20 3.82 12:14 PM Rate 2 12:15 PM 5.53 50.91 12:19 PM 50.94 5.56 12:20 PM 5.59 72 50.97 10.5 403 12:23 PM 50.97 5.59 12:25 PM **FGD West** 44.62 12:29 PM 51.02 5.64 12:34 PM 71 51.04 5.66 12:38 PM 51.05 5.67 12:43 PM 51.08 5.7 12:50 PM **FGD West** 44.67 12:51 PM 5.73 51.10 12:55 PM Rate 3 1:00 PM 54.20 8.82 23.5 603 1:07 PM 8.82 54.20 1:08 PM 54.21 8.83 1:10 PM **FGD West** 47.67 1:11 PM 54.22 8.84 1:13 PM 8.85 54.23 1:18 PM 54.28 8.9 1:27 PM 54.30 8.92 1:35 PM 54.32 8.94 1:40 PM Rate 4 1:45 PM 70 56.88 11.5 41.5 802 1:47 PM 57.92 12.24 1:50 PM 12.22 57.60 1:52 PM 57.65 12.27 1:54 PM

Date	12/17/2008		Job No.				Page No.	Page 3 of 4
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			3		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	

Date

TIME	INCHES ON ORIFICE	G.P.M.	P.S.I.	AMPS	PUMPING LEVEL (ft)	DRAW DOWN (ft)	SPECIFIC CAPACITY	COMMENTS
3:15 PM								Pump off
3:16 PM					47.00	1.65		Recovery
3:18 PM	·	-			46.70	1.32		
3:19 PM					46.66	1.28		
3:20 PM					46.55	1.17		
3:21 PM					46.53	1.15		
3:22 PM					46.50	1.12		
3:23 PM					46.48	1.1		
3:25 PM					46.41	1.03		
3:30 PM					46.30	0.92		
3:40 PM					44.72			FGD West
			,					

							· · · · · · · · · · · · · · · · · · ·	



Tested and Witnessed By

6451 Germantown Road * Middletown, Ohio 45042 * Phone: (513) 424-7287

Date:

7/8/2008

Job No.:

68570

Page 1 of 1

PRODUCTION TEST

Owner:	AEP-Mountaineer P	lant		City:	New Haven		State:	WV
Well No.:	Fire Well #1	Location:	50' +/- fron	n old Fire Well#	f1 (Abandoned)			
	om Ground Level:	Total Depth	1	Inside Diam.	10	Static Le Standing	vel / Water Level	40.52
Type Well:	Gravel Wall	16	Tubular		Rock		New	Х
	Old		Cleaned		Gravel Wall Dia	am.	16"	
Screen:	Length	15'	Diam.	10" PS	Slot Size	80		
	Туре	Johnson			Depth to top		63 (Bel. Gr.)	
Driven By:	Electric	Test X Engine Pump Bowl Pump Stages					Stages	
Length Suct	ion Pipe	None		Well Top to B	ottom of Suction	NA		
Orifice Size	6	Ву	5	Water Discha	rged	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

Witnessed By For Purchaser

Steve Back

Rev 3	08		DATE THE WELL	STATE OF	FORM SW-258 THIS REPORT MUST BE					
1			WAS COMPLETED		SUBMITTED WITHIN 30 DAYS					
		ONLY	мм DD YY 07 08 0 8	WATER WELL	AFTER WELL IS COMPLETED					
J'AT	E RECI	EIVED		COMPLETION	FILL IN THIS FORM					
1	DD	VV	PERMIT NO.	REPORT	COMPLETELY					
IVIIVI	טט	1 1	DW		PLEASE PRINT OR TYPE					
LOCA Well C	Mner XX	OF WEL	AEP	XXXXXXXX Mountair	eer Power Plant					
		Route 6		County Mason	Zip Code 25265-0419					
				AREA NAME/LOCATION:	TYPE OF WELL:					
Latitud	e: <u>38</u>	Deg <u>58</u>	.603 Min	Fire Well #1	Potable Public Water Supply Geothermal X Industrial					
Longite	ide: <u>81</u>	Deg <u>56</u>	_240 Min Topo Other	Replacement Well	Commercial Dewatering					
Acquir	ed By: {	7] Ob2 F		6	Irrigation Test/Exploratory					
					Other					
		13/171	L LOG	DRILLING METHOD	GROUTING RECORD					
		<u> </u>	L DOG	X Cable Tool Rotary	Grouting Material:					
Do	ant la	State the	e kind of formation	Rotary Hammer Other	Cement Bentonite Clay					
De	pth	penetrat	ed, their color, caves,	Hole Diameter 16 (in)	Other No. of Bags:Bulk					
From	То		ater bearing with	Hole Diameter 16 (in) Total depth 78 (ft)	Installation Method:					
(ft.)	(ft.)	estimate	flow (GPM).	CASINGS RECORD	Tremic					
(11)				MAIN CASING TYPE	PUMP INSTALLED					
				K Steel Plastic	By Driller X Yes No					
0	3	Top S		Other (in)	ESTIMATED WELL YIELD					
3	15 30	Br. S	andy clay and and gravel	Casing Diameter 10 (in) Wall Thickness 0.365 (in)	Estimated at 500 G.P.M Static Water Level 40.5 (ft)					
30	35	Same	dila dila 924. ==	Casing Length 63 (ft)	*Pumping level below land surface					
35	40	Same		Other Casing or Liner Used	52 (ft) after 2.5 hrs. at					
40	45		edium sand	Type Steel Plastic	580 G.P.M. (Estimated)					
		lit	tle gravel	Other	*Note: For Public Water Supply					
45	60 78		medium sand medium sand	Casing/Liner Diameter(in) Length(ft) from(ft)	wells please submit required yield					
60	70		tle gravel	to (ft)	and drawdown tests. WELL HEAD COMPLETION					
				SCREEN RECORD - SS	Casing height above grade 2 (ft)					
				Not Installed X Installed	Type Of Well Cap Baker					
				Material: Bronze Plastic	Installed Pitless adaptor					
				Diameter of screen 10 PS (in) Slot size 70	VARIANCE ISSUED Yes No					
				Length 15 (ft) from (ft)	Request Number					
				to (ft)	COMMENTS BY INSTALLER:					
				GRAVEL PACK RECORD	New Fire Well #1 -					
		If additions	ol space is needed, use sheets and attach w/permit # at	Gravel Pack: Yes No From 63 (ft) to 78 (ft)	50' +/- from old					
				1.011	Well #1					
I hereby	certify tha	t this well h	as been constructed in accordan	nce with state rules and in conformance with e information presented herein is accurate						
and comi	dete to the	e best of my	knowledge.		Old Fire Well #1					
Compan	v Name	Revnol	ds, Inc. W	Y Contractor No. <u>WVOO0825</u> Il Driller Certification No.	abandoned/sealed					
Business	Registra	tion No	Master We	Il Driller Certification No.						
Master \	Vell Drill Vell Drill	er (print) _ er Signatur	John Workman							
itiagici.)	1 611 171 181		THE OF BUILDS OF 10	DUDNEVMAN RESPONSIBLE FOR						
O' LEM()RK IF D	HFFEREN	F FROM MASTER DRILLE							
	was Wall	Deiller (ple	rtification Noeasc print)							
Apprent	ice and N	ame (s)								

Rev 3/08 DATE THE WELL FORM SW-258 STATE OF WAS COMPLETED THIS REPORT MUST BE WEST VIRGINIA ST/CO USE ONLY MM DD YY SUBMITTED WITHIN 30 DAYS WATER WELL DATE RECEIVED 12 10 AFTER WELL IS COMPLETED COMPLETION FILL IN THIS FORM PERMIT NO. REPORT MM DD YY COMPLETELY DW-PLEASE PRINT OR TYPE LOCATION OF WELL Well Owner: Last Name American Electric Power KXXXXXXX Mountaineer Plant Street/Road Route 62, New Haven County Mason Zip.Code 26265-0419 AREA NAME/LOCATION: TYPE OF WELL: Latitude: ____ Deg ___ Min ___ Sec Potable Public Water Supply Longitude: Deg Min Sec A cquired By: Sec Topo Other FGD West Well Geothermal K Industrial Commercial Dewatering ☐ Irrigation ☐ Test/Exploratory Other WELL LOG DRILLING METHOD GROUTING RECORD X Cable Tool Rotary Grouting Material: X Cement Bentonite Clay Rotary Hammer Other State the kind of formation Depth Other penetrated, their color, caves, Hole Diameter No. of Bags: Bulk and if water bearing with (in) From To Total depth 78 (ft) Installation Method: estimate flow (GPM). (ft.) (ft.) **CASINGS RECORD** MAIN CASING TYPE PUMP INSTALLED X Steel Plastic By Driller X Yes No 0 13 Fill (fly ash) Other ____ ESTIMATED WELL YIELD Casing Diameter 16 (in) Estimated at 850 G.P.M 52 Band, Little gravel 3 Wall Thickness 0.375 (in) Static Water Level 44.70 (ft) Casing Length 63 (ft) 52 78 Med- Coarse sand and *Pumping level below land surface Other Casing or Liner Used gravel 52.24 (ft) after 4 hrs. at Type Steel Plastic 682 G.P.M. (Estimated) Other 78 Clay *Note: For Public Water Supply Casing/Liner Diameter (in) wells please submit required yield Length _____(ft) from _____(ft) and drawdown tests. to (ft) WELL HEAD COMPLETION SCREEN RECORD Casing height above grade 2 (ft) Not Installed X Installed Type Of Well Cap Material: Bronze XXXXXXX Installed: Baker Pitless Diameter of screen 16 (in) VARIANCE ISSUED Yes No Slot size 0.06 Length 15 (ft) from 63 (ft) Request Number to 78 (ft) COMMENTS BY INSTALLER: GRAVEL PACK RECORD Pump Test noted above Gravel Pack: X Yes No If additional space is needed, use was Step Test at: additional sheets and attach w/permit # at From 25 (ft) to 78 (ft) top. I hereby certify that this well has been constructed in accordance with state rules and in conformance with 317 gpm all conditions stated in the above captioned permit, and that the information presented herein is accurate 457 gpm and complete to the best of my knowledge. 616 gpm WV Contractor No. WV OOC Master Well Driller Certification No. Company Name Reynolds, Inc. WV Contractor No. WV 000825 682 gpm Business Registration No.___ Master Well Driller (print) John Workman ster 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)_____

Rev 3/08 DATE THE WELL FORM SW-258 STATE OF WAS COMPLETED THIS REPORT MUST BE WEST VIRGINIA ST/CO USE ONLY MM- DD YY SUBMITTED WITHIN 30 DAYS WATER WELL ATE RECEIVED 12 12 08 AFTER WELL IS COMPLETED COMPLETION FILL IN THIS FORM PERMIT NO. REPORT MM DD YY COMPLETELY DW-PLEASE PRINT OR TYPE LOCATION OF WELL Mixximum Mountaineer Plant Well Owner: Last Name American Electric Power Street/Road Route 62, New Haven Zip Code 26265-0419 County Mason TYPE OF WELL: AREA NAME/LOCATION: Deg ____ Min__ Latitude: Potable Public Water Supply FGD East Well Longitude: ____ Deg _ Min Geothermal X Industrial Acquired By: XX GPS Topo Other Commercial Dewatering ☐ Irrigation ☐ Test/Exploratory Other WELL LOG DRILLING METHOD GROUTING RECORD X Cable Tool Rotary Grouting Material: Rotary Hammer Other X Cement Bentonite Clay State the kind of formation Depth Other penetrated, their color, caves, Hole Diameter 30 No. of Bags: Bulk and if water bearing with From Τo Total depth 78 (ft) Installation Method: estimate flow (GPM). (ft.) (ft.) CASINGS RECORD MAIN CASING TYPE PUMP INSTALLED X Steel Plastic By Driller X Yes No 0 12 Fill (sand and gravel) Other ESTIMATED WELL YIELD Casing Diameter 16 (in) Estimated at 900 G.P.M 12 49 Sand, Little gravel Wall Thickness 0.375 (in) Static Water Level 45.38 (ft) Casing Length 63 (
Other Casing or Liner Used *Pumping level below land surface 49 78 Med -coarse sand and 61.44 (ft) after 4 hrs. at gravel Type Steel Plastic 1000 G.P.M. (Estimated) Other 78 *Note: For Public Water Supply Clay Casing/Liner Diameter (in) wells please submit required yield Length (ft) from (ft) and drawdown tests. (ft) WELL HEAD COMPLETION SCREEN RECORD Casing height above grade 2 (ft) Not Installed Installed Type Of Well Cap Material: Bronze X: SS Installed: Baker Pitless Diameter of screen 16" VARIANCE ISSUED Yes No Slot size 0.06" Length 15 (ft) from 63 (ft) Request Number to 78 (ft) COMMENTS BY INSTALLER: GRAVEL PACK RECORD Pump West noted above was Gravel Pack: XX Yes No If additional space is needed, use Step Test at: additional sheets and attach w/permit # at From (ft) to 78 (ft) ton. I hereby certify that this well has been constructed in accordance with state rules and in conformance with 278 qpm all conditions stated in the above captioned permit, and that the information presented herein is accurate 403 gpm and complete to the best of my knowledge. 603 gpm WV Contractor No. WV 000825 Company Name Reynolds, Inc. 802 gpm Master Well Driller Certification No. Business Registration No. 902 gpm er Well Driller (print) John Workman 1000 apm Nuster 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

		TERRACON	N PROJECT N	0. <u>N2095020</u>	
PROJECT MOUNTAINEER BOTTOM ASH POND COMPLEX	-			RY ELEVATIONS	
COORDINATES	NGVD29 WV S)		(1	T. NGVD)	
DATE INSTALLED 02/17/09			PIEZOME	TER NO. PZ-0	9-03
REF. DATUM P' TOP OF PROTECTIV VAULT/GROUND SURFAC	/E		REF. D	ATUM PT	
GROUND SURFACE/TOP OF PAD				GRADE0' (6	21.6')
	0.5'			TOD 05	(ELEV.)
			BENTO	NITE SEAL 1.0'	(620.6')
			T GRAVEL	OP OF 2.0' (6	319.6')
1 GROUT SEAL CEMENT BENTONITE MATERIAL:	6	_			
2 BENTONITE SEAL BENTONITE CHIPS	7 2		TOD O	r	
3 SCREEN 0.010" SLOT				N 5.0 (616.6)	
4 GRAVEL PACK #5 QUARTZ SAND MATERIAL: #5 QUARTZ SAND			BOTTOM O SCREE	N50.4' (571.2	<u>') </u>
5 BOREHOLE DIAMETER 7" 6" MIN.	3'				
6 1.92" DIA. PVC CASING (O.D.)	3)		BOTTO BLANK	M OF SEC. N/A	
7 CONCRETE PAD 3'x3'x8" THICK (MIN.) DIMENSIONS:3'x3'x8" THICK (MIN.)			BOTTO GRAVEL	M OF PACK 50.4' (571.2')
8 PROTECTIVE STEEL H2 RATED VAULT COVER	4		DOTTO		1.2')
		– L PACK SCREEN			
NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VA	ULT/GROUND SURFACE			SCALE: N	ITS
GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD		REVISION	0	OBSERVA	
APP'D.	DR.	с.к.	DATE	WEL	L
AMERICAN ELECTRIC POWER SERVICE CORP.				CDS-04A	SH.
			EOLOGIST /F	MONIEED	<u> </u>

AMERICAN ELECTRIC POWER MOUNTAINEER BOTTOM ASH POND COMPLEX

GEOLOGIST/ENGINEER:

TODD GRIFFITH H.C. NUTTING CO.

			TERRACO	ON PROJECT N	o. <u>N2095020</u>	
PROJECT MOUNTAINEER BOTTOM ASH POND COMPLEX	-				RY ELEVATIONS T. NGVD)	
COORDINATES	NGVD29 WV S)	 -		(1	1. NGVD)	
DATE INSTALLED <u>02/19/09</u>				PIEZOME	TER NO. PZ-	09-04
REF. DATUM PT. TOP OF PROTECTIVI VAULT/GROUND SURFAC	Ε			REF. D	ATUM PT	
GROUND SURFACE/TOP OF PAD					GRADE 0' (597.1')
	0.5'		-8	•	DEPTH TOP OF NITE SEAL1.0	(ELEV.)
(5)	1	d mary sing the	-	_	TOP OF 2.0' (
1 GROUT SEAL CEMENT BENTONITE MATERIAL:	6					
2 BENTONITE SEAL BENTONITE CHIPS 3 SCREEN SIZE: 0.010" SLOT				BATTO! (A	N 5.0 (592.1	
4 GRAVEL PACK #5 QUARTZ SAND 5 BOREHOLE DIAMETER 7"		3'		SCREE	24.8' (572.	3')
6" MIN	3)			BOTTO BLANK	M OF N/A	
7 CONCRETE PAD 3'x3'x8" THICK (MIN.) DIMENSIONS:				BOTTO GRAVEL	OM OF 25.0'	(572.1')
8 PROTECTIVE STEEL H2 RATED VAULT COVER	4					72.1')
						:
		GRAVEL BELOW	- PACK SCREEN			
NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VAL	JLT/GROUND SI	JRFACE			SCALE:	NTS
GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD	,		REVISION	0	OBSERV	
APP'D.	DR.		C.K.	DATE	WEI	L
AMERICAN ELECTRIC POWER SERVICE CORP.				J	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
COORDINATES 718480.58 N/1734992.79 E (NAD 27)(NGVD29 W	V S) (FT. NGVD)
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 <u>0' (611.7')</u>
1.0'	DEPTH (ELEV.)
	TOP OF BENTONITE SEAL 1.0' (610.7')
	TOP OF GRAVEL PACK _2.0' (609.7')
(5)	
1 GROUT SEAL CEMENT BENTONITE 2 BENTONITE SEAL BENTONITE CHIPS MATERIAL:	
3 SCREEN 0.010" SLOT	TOP OF 5.0' (606.7')
SIZE: U.S. O. S. O	BOTTOM OF SCREEN 50.2' (561.5')
5 BOREHOLE DIAMETER 7" 6" MIN.	3'
6 1.92" DIA, PVC CASING (O.D.)	BOTTOM OF BLANK SEC. N/A
7 CONCRETE PAD 3'x3'x8" THICK (MIN.) DIMENSIONS:	BOTTOM OF CRAVEL PACK 50.2' (561.5')
8 PROTECTIVE STEEL H2 RATED VAULT COVER (4)	GRAVEL PACK 50.2 (381.3)
	BOTTOM OF BOREHOLE 50.2' (561.5')
	GRAVEL PACK BELOW SCREEN
NOTE: DEPTHS OF MATERIALS ARE TAKEN FROM TOP OF VAULT/GROUN	D SURFACE SCALE: NTS REVISION
GEOTECHNICAL ENGINEERING SECTION CIVIL DESIGN STANDARD	0 OBSERVATION WELL
APP'D. DR. AMERICAN ELECTRIC POWER SERVICE CORP.	C.K. CDS-04A SH.
AMERICAN ELECTRIC POWER SERVICE CORF.	003-04A 311.
AMERICAN ELECTRIC POWER MOUNTAINEER BOTTOM ASH POND COMPLEX	GEOLOGIST/ENGINEER:

AEPMTP-000160

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

\bigcap	LOG OF BORIN	IG N	0.	B-0	9-0	1				Pa	age 1 of 2
CLI	ENT American Electric Power										
SIT		PRO	JEC								
	New Haven, West Virginia							m Ash	Por	nd Comp	olex
	Boring Location: 719673.518, 1733588.509				SAN	1PLES	S			TESTS	
GRAPHIC LOG	DESCRIPTION Approx. Surface Flow: 621.5 ft	DEPTH, ft.	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 FILL, gravel base for roadway 620.5		GP	1	SS	18	27	> 0	<u> </u>	,,,,	
	FILL, poorly graded sand, some gravel	=		·							
	and silt, fine grained, brown, medium dense to dense, moist		SP	2	SS	18	35	5			
		5	SP	3	SS	18	29				
			SP	4	SS	18	32				
	`										
		10	SP	5	SS	18	38	11			
	12.5 609 FILL, silty sand, grayish brown to brown, very dense to dense, moist to wet		SM	6	SS	18	53				
		15—	SM	7	SS	18	51	8			
	,	=======================================	SM	8	SS	18	48				
		20-	SM	9	SS	18	49				
	22.5 <u>Y</u> 599 <u>FILL</u> , poorly graded sand, some gravel		SP	10	SS	18	44				
	and silt, fine grained, brown to light brown, dense, saturated									1	
		25	SP	11	SS	18	38	14			
	SILTY SAND, very fine to fine grained, some thin sandy silt seams, brown to light		SM	12	SS	18	12				
	brown, medium dense to loose, wet to moist	30-	SM	13	SS	18	9				
The	Continued Next Page	88 J. P. M. B. B. B. B. B. B. B. B. B. B. B. B. B.						**^^^	404	ODT cuton	Lie hammar
bet	e stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.							**CIVIE	140m	SP1 auton	natic hammer
W.	ATER LEVEL OBSERVATIONS, ft					BOR	ING S	TARTE	D		2-16-09
WL	. ¥ 22.5 WD ¥ AB				_		ING C	OMPL	ETE)	2-16-09
WL	22.0 2411001	Cال				RIG				FOREMA	WL NA
∄ WL					ı	LOG	GED	TA	۱ AG	JOB #	N2095020

\bigcap	LOG OF BORIN	IG N	O.	B-()9-()1				P	age 2 of 2
CL	ENT American Electric Power			,							
SIT		PR(JEC	T						,	
	New Haven, West Virginia		1	Mo		ineei MPLES		m Asl	h Por	nd Comp	olex
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT	UNCONFINED STRENGTH, psf	
	SILTY SAND, very fine to fine grained,	-	SM	14	SS	18	9				
	some thin sandy silt seams, brown to light brown, medium dense to loose, wet to moist	35-	SM	15	SS	18	9				
		-	SM	16	SS	18	11	14			
		40-	SM	17	SS	18	8				
		_	SM	18	SS	18	10				
	45 576.5	45-									
	POORLY GRADED SAND with SILT, brown to dark brown, medium dense to dense, moist to wet	-	SP SM	19	SS	18	25				
	dense, moist to wet	-	SP SM	20	SS	18	27	8			
	51.5 570 BORING COMPLETED	50-	SP SM	21	SS	18	54				
The bet	stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.						,	**CME	140H	SPT autor	natic hammer
2	ATER LEVEL OBSERVATIONS, ft	eriognosi +rene grajio					ING S			The Committee of the Co	2-16-09
WL	∑ 22.5 WD ¥ AB ¥ 22.0 24 hour ¥	7		77	ا و	BOR RIG	ING C			O FOREMA	2-16-09
WL	- 22.0 24 HOUL -		de Care	# 2			GED			JOB #	N2095020

\bigcap	LOG OF BORIN	G N	0.	B-0	9-0	2				Pa	age 1 of 1
CLI	ENT Paris Paris				• "						
SIT	American Electric Power	PRC	JEC.	T							
OI I	New Haven, West Virginia				untai	ineer	Botto	m As	h Pon	id Comp	olex
	Boring Location: 719744.754, 1733658.992				SAN	/PLES	5		I	TESTS	
िन दिन दिन	DESCRIPTION Approx. Surface Elev.: 594.5 ft TOPSOIL, lean clay, high organic content,	DEРТН, ft.	D USCS SYMBOL	1 NUMBER	S ТҮРЕ	RECOVERY, in.	SPT - N** BLOWS / ft.	water Content, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
1/ 1//	dark brown, very soft, saturated (possible	_		'	33	10		13			
	seepage from dike) SANDY SILT, fine grained, brown, loose, wet to moist		ML	2	SS	18	9	19			
		5-	ML	3	SS	18	7				
		-	ML	4	SS	18	5				
		10-	ML	5	SS	18	6				
		-									
			ML	6	SS	14	6				
	16 578.5 POORLY GRADED SAND with SILT and	15 	SP SM	7	SS	18	9				
	GRAVEL, light to dark brown, medium dense to dense, moist	- - -	SP SM	8	SS	18	22	6			
		20-	SP SM	9	SS	18	14				
			SP SM	10	SS	15	19				
	26.5 BORING COMPLETED \$\frac{\mathbf{Y}}{268}\$	25 —	SP SM	11	SS	18	30				
	BONING COMPLETED										
The bet	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.							**CME	140H \$	SPT autor	matic hammer
WA	ATER LEVEL OBSERVATIONS, ft	atani kali	Ac the re-	Nistra Justi		BOR	ING S	TART	ED	ere gen sarages	2-18-09
WL			ی س	4	,		ING C	OMPL	ETE)	2-18-09
WL	ā ī	ال	_L			RIG				OREMA	
WL				i-New inte		LOG	GED	T,	AG د	JOB #	N2095020

\bigcap	LOG OF I	BORING	G NO). I	PZ-	09-	03				Pa	ige 1 of 2
CLI	ENT										*******	
SIT	American Electric Power		PRO	JEC								
311	New Haven, West Virginia		1110	020		unta	ineeı	Botto	m As	h Pon	d Comp	lex
	Boring Location: 719441.213, 1733850.227					SAN	MPLES	3			TESTS	
GRAPHIC LOG	DESCRIPTION Approx. Surface Elev.: 621.5 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT	UNCONFINED STRENGTH, psf	
	1 FILL, gravel base for roadway	620.5		SP	1	SS	18	26				
	FILL, poorly graded sand with silt, some gravel, brown, medium dense to dense, moist			SM 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			
		Ā	15	SP SM	7	SS	18	39				
	17.5 FILL, poorly graded sand, some gravel and silt, fine grained, brown, dense,	<u>∇</u> 604		SP	8	SS	18	38				
	saturated	Ā	20-	SP	9	SS	18	42				
	22.5 CLAYEY GRAVEL with SAND, fine sand with rounded gravel, dark gray, medium	599 597.5		SC	10	SS	18	11		!		
	\dense, moist to wet LEAN CLAY with SAND, brown to light brown, stiff, moist		25— —	CL	11	SS	18	12	19		4500*	LL = 29 Pl = 10
				CL	12	SS	18	13			3500*	
	SILTY CLAY with sand, brown to light brown, stiff, moist	591.5	30 -	CL ML CL	13	SS	18	11	20		4500*	LL = 25 PI = 5 LL = 25
	Continued Next Page				'		~~	ļ				LL = 25
The betv	stratification lines represent the approximate boundary lin veen soil and rock types: in-situ, the transition may be gra	es dual	es tempo se					,				natic hammer Penetrometer
·	TER LEVEL OBSERVATIONS, ft						BOR	ING S	TART	ED		2-16-09
WL	¥ 17.5 WD ¥ 20.2 72	211	7		7 F	. [ING C				2-17-09
WL WL	¥ 15.8 2/25 ¥		U		JI		RIG LOG	GED			OREMA	N JW N2095020

\bigcap	LOG OF BORIN	G NO). I	PZ-	09-	03				Pá	age 2 of 2
CLI	ENT	1									197
SIT	American Electric Power	PRC	JEC	Т							
<u> </u>	New Haven, West Virginia							m As	h Pon	d Comp	olex
					SAN	/PLES	3			TESTS	
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT	UNCONFINED STRENGTH, psf	
	34 587.5	_	ML	1.4		4.4	10				PI = 7
XXXX	SILTY SAND, very fine grained, trace gravel, many thin sandy silt seams, brown to light brown, loose to medium dense,	35 -	SM	14 15	SS	14	10				
	moist		SM	16	SS	18	8	13			
		40-	SM	17	SS	18	7				
			SM	18	SS	18	8				
		45 — -	SM	19	SS	18	10				
	48.5 573	- - -	SM	20	SS	18	12				
	brown, loose to medium dense, wet	50-	GP	21	SS	18	8	8			
<u> </u>	BORING COMPLETED 570	_									
200											
1 0 10 10 10 10 10 10 10 10 10 10 10 10											
100											
The bet	e stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.						,	**CME *(140H S Calibrat	SPT autor ed Hand	natic hammer Penetrometer
3 W/	ATER LEVEL OBSERVATIONS, ft		arek er i kasin, ka	and managing in		BOR	ING S	TART	ED	4:5	2-16-09
WL	▼ 17.5 WD ▼ 20.2 72		دور سد				ING C	OMPL	ETED		2-17-09
WL.		Cا				RIG				OREMA	
WL					1	LOG	GED	T.	AG J	OB#	N2095020

\bigcap	LOG OF BORIN	G NO). I	PZ-	09-	04				Pa	age 1 of 1
CL	IENT American Electric Power										
SIT		PRC	JEC	Т	·						
	New Haven, West Virginia			Мо				m As	h Pon	d Comp	olex
	Boring Location: 719506.02, 1733919.514				SAN	/PLES	•			TESTS	
SE GRAPHIC LOG	DESCRIPTION Approx. Surface Elev.: 597 ft	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT	UNCONFINED STRENGTH, psf	
1 - 7 1 5 1 7	TOPSOIL, saturated		CL	1	SS	11	9				
	SANDY SILT, 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				
		10—	241	4	00	40					
			ML	4	SS	18	5				
			ML	5	SS	18	6	23			
		15-	ML	6	SS	18	5				-
			ML	7	SS	18	7				
	21.4 575.5	20 -	ML	8	SS	18	13				
	POORLY GRADED GRAVEL with SILT and SAND, subrounded gravel, brown with gray, medium dense to dense, very moist		GP GM	9	SS	12	19	6			
	⊻ 26.5 570.5	25-	GP GM	10	SS	18	43				
	BORING COMPLETE	_									
HAN BOLLON											
The bet	e stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.						,	**CME	140H S	SPT auton	natic hammer
·	ATER LEVEL OBSERVATIONS, ft				- 1		ING S				2-19-09
≾ !	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		m gr	77	۱		ING C				2-19-09
WL WL	¥ N/E 48 ¥ 25.5 2/25			JI		RIG LOG	GED			OREMA	N2095020

	LOG OF BORIN	G N	O. I	PZ-(09-(05				Pa	age 1 of 2
CLII					******					-	
SITI	American Electric Power	PRC	DJEC								
3111	New Haven, West Virginia							m As	h Pon	d Com	olex
T	Boring Location: 718483.249, 1734990.193				SAM	1PLES	<u> </u>		7	TESTS	
GRAPHIC LOG	DESCRIPTION Approx. Surface Elev.: 611.5 ft	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	0.3 TOPSOIL 61	T -	SP	1	SS	18	20				
	FILL , poorly graded sand, some silt and trace fine gravel, fine to medium grained sand, brown, dense, moist	-	SP	2	SS	18	30	4			
	5 606.5 POORLY GRADED SAND trace silt, fine grained, brown, loose to very loose, moist	5 -	SP	3	SS	18	10				
	g.a	-	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				
	20 591. POORLY GRADED SAND, trace silt, fine grained, brown, very loose to loose, moist	5 20	SP	9	SS	18	5				
60/6/0			SP	10	SS	18	3	6			
The betty WL		25-	SP	11	SS	18	6				
	29 582.	5	SP	12	SS	18	5				
	POORLY GRADED GRAVEL with SAND, subrounded gravel with fine to coarse sand, brown to dark brown, loose to medium dense, moist	30-	GF	13	SS	18	10				
	Continued Next Page	_	+-	-	-		ļ				
The	e stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual.						L.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	**CME	140H S	SPT auto	matic hammer
W A	ATER LEVEL OBSERVATIONS, ft	Section 6				BOF	RING S	TART	ED		2-18-09
WL.			-				RING C)	2-18-09
WL	¥ N/E WD ¥ N/E AB ▼ N/E 72 ▼ N/E 2/25	9				RIG				OREM	
Mr Mr					_	LOG	GED	Т	AG J	IOB #	N2095020

\bigcap	LOG OF BORIN	G N	D . I	PZ-(09-(05				Pa	age 2 of 2
CLI	IENT American Electric Power										
SIT		PRO	JEC	Т							
	New Haven, West Virginia			Mot				m Asl	h Pon	d Comp	olex
					SAN	1PLES	3			TESTS	
Çd GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
000		-	GP	14	SS	18	19				
	35 576.9 POORLY GRADED SAND, some gravel,	35	- SP	15	SS	18	10				
	fine to coarse sand, brown, loose to medium dense, moist										
	medium dense, moist		SP	16	SS	18	13				
	POORLY GRADED SAND with GRAVEL brown, dense to medium dense, moist	40-	SP	17	SS	18	30	3			
	Brown, derive to modium derive, motes	-	_								
			SP	18	SS	18	20				
		45	SP	19	SS	18	21				
	47.5 56	4 -	_								
	POORLY GRADED SAND, some gravel, fine to medium grained sand, brown to light brown, medium dense, moist	-	SP	20	SS	18	14	7			
	prown, medium dense, moist	50	- SP	21	SS	18	13	1			
	51.5 56 BORING COMPLETED	0									
AND THE PLANT BOLLOM ASHIGHT SAME SAME AND THE PLANT SAME ASHIGHT SAME				The state of the s							
The	e stratification lines represent the approximate boundary lines							**CME	140H S	SPT autor	matic hamme
s bet W	tween soil and rock types: in-situ, the transition may be gradual. ATER LEVEL OBSERVATIONS, ft	e og grandska				BOF	RING S	TART	ED	ay end y ay have end di	2-18-09
WL				_			RING C).	2-18-09
WL		1			"]	RIG				OREM	
WL					-		GED			OB#	N2095020

	LOG OF BORIN	IG N	0.	B -0	9-0	6				Pa	ige 1 of 1
CLI	ENT Pours										
SIT	American Electric Power	PRO	JEC	T			 				
	New Haven, West Virginia		1					m As	h Pon	d Comp	lex
	Boring Location: 718535.672, 1735062.716			·	SAN	1PLES	<u> </u>			TESTS	
GRAPHIC LOG	DESCRIPTION Approx. Surface Elev.: 594.5 ft	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT	UNCONFINED STRENGTH, psf	
	0.3 TOPSOIL 594	_	SC	1	SS	14	11				
	FILL, clayey sand, fine to medium grained, organics such as roots fragments throughout, brown, medium dense to loose, moist to wet		SC	2	SS	18	5			2000*	
	SILTY CLAY with SAND, fine sand, light brown, medium stiff, moist	5-	ML	1	31	24					
			CL	3	SS	18	7	23		2000*	LL = 25 PI = 6
			ML CL	4	SS	18	7	23		2500*	LL = 26
		-	ML								PI = 6
	10.5 584 POORLY GRADED SAND with GRAVEL	10-	SP	5	SS	18	13				
	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				
		_		,		17					
			SP	8	SS	14	5				
		_	ļ		-						
		20-	SP	9	SS	14	11				
8)/8/ 11	22.5 572										
	POORLY GRADED SAND with SILT, brown, medium dense, moist	_	SP SM	10	SS	18	19	4			
0000		25—	SP	11	SS	18	14				
<u> </u>	26.5 568 BORING COMPLETED	_	SM			10	17				
7.05 A.	BORING COMPLETED										
OM AS											
BOLLO											
REVISED BORING LOGS MINEER PLAN BO LOM ASH GPO LEHRACON GED ASH GPO LOGS MINEER PLAN BO LOM ASH GPO LEHRACON GED ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOW ASH GPO LOGS MINEER PLAN BO LOGS MINEER PLAN											
VEE H			(Apren Herman)	1,520,550,550							
The bet	stratification lines represent the approximate boundary lines ween soil and rock types: in-situ, the transition may be gradual										natic hammer Penetrometer
Σ W.	ATER LEVEL OBSERVATIONS, ft					BOR	ING S	TART	ED		2-18-09
WL		7	- p	7 F	4		ING C				2-18-09
JW WED	¥ 24 hour ¥	ul		JI		RIG	055			OREMA	
∯ WL						LUG	GED	Γ.	AG J	OB#	N2095020



Arcadis 2016

Boring Logs

SB-1601, MW-1601A to MW-1608

ОВ	NUM	BER	OH01	5976.0009				LOG	3 OI	OF BORING	
				n Electric Pow	er				во	DRING NO. <u>SB-1601</u> DATE <u>10/05/16</u> SHEET <u>1</u> OF	4
				eer Plant					ВО	DRING START <u>05/05/16</u> BORING FINISH <u>05/06/16</u>	
				Surveyed			_			EZOMETER TYPE NA WELL TYPE NA	
3RO	UND	ELEVA	ATION_I	NA SY	'STEM		A			GT. RISER ABOVE GROUND NA DIA NA	
Vate	er Lev	/el, ft	<u> </u>	7.0		$ar{ar{A}}$	<u>, </u>			EPTH TO TOP OF WELL SCREEN NA BOTTOM NA	
ГІМЕ										ELL DEVELOPMENT NA BACKFILL Grout	A
DAT	E		5/6/2	2016					FIE	ELD PARTY NA RIG Hollow Stem	Auge
пК	Щ		MPLE	STANDARD	ıπĶ	RQD	DEPTH IN FEET	<u>o</u>	S		
SAMPLE	SAMPLE		PTH EET	STANDARD PENETRATION RESISTANCE	ESPS STAN	٥,	IN	APH OG	S C	SOIL / ROCK ☐ DRILLER IDENTIFICATION > NOTES	
ξĒ	SAI	FROM		BLOWS / 6"		%	FEET	GR/	ñ	IDENTIFICATION ≥ NOTES	
0	NR	0.0	8.0	BLOW370				+ +		No recovery, boring was pre-drilled for utility	
										clearance; no samples were taken.	
							_				
							-				
							5 -				
							-	1			
							-]			
			400				_				
1	SH	8.0	10.0	0-3-3-1	12					Sand, fine to coarse; some silt; little fine gravel, angular to subrounded; trace medium	
							-			subangular gravel; wet; dark yellowish brown	
							40			\(\(\(\)(10YR 4/2).\) Silt with clay with fine sand; moist; soft;	
2	SS	10.0	12.0	1-1-1	12		10 –			non-plastic; very dark gray (N 3/).	
							_	\bowtie		Silt, some clay, some fine sand, trace coal	
										fragments; moist; soft.	
3	SS	12.0	14.0	0-0-1-1	18		-	₩			
							-				
							_				
4	SS	14.0	16.0	1-1-2-2	18						
							15 –	₩			
5	SS	16.0	18.0	2-1-1-2	18] -				
] _				
		T) (D		1401110 11050						0 (1 11 12	
				ASING USED						Continued Next Page	
NA			OCK CO	DKE						PE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC	
NA NA		9" x 6.2	5 HSA	DVANCER	4"						
NΑ		NW CA	SING	PAUNOFU	3"		WELL T	YPE:	O\	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON	
NA NA		<u>SW CA</u> AIR HA	SING MMER		6" 8"					RECORDER <u>J. Wanner</u>	
	-										

 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

					er Piani						RING START BORING FINISH		
CAMPIE	NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	uscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	6	SS	18.0	20.0	1-1-1-1	19		_					
	7	SS	20.0	22.0	1-1-2-1	48		20 -					
EP MOUNTAINEE	8	SS	22.0	24.0	0-1-3-7	21		-		SM	Silty sand, fine to coarse; moist; loose;		
LOGS 9-2016VAL	9	SS	24.0	26.0	4-5-4-5	21		25 –		ML	yellowish brown (10YR 5/4). Silt, some very fine sand; dry; rapid dilatancy;		
AINEER BORING	10	SS	26.0	28.0	1-1-3-3	18		-	-	ML	stratified; gray (5Y 6/1) with 30% iron staining as dark as dusky red (7.5R 3/3). Silt, trace clay; wet; soft; rapid dilatancy; stratified.		
ENCE/AEP MOUNT	11	SS	28.0	30.0	1-1-2-2	22		-	-		Note: Very finely stratified from 27.8 to 28 feet. Note: Color grades to yellowish brown (10YR		
EFERE	12	SS	30.0	32.0	1-1-3-9	19		30 -	-		5/6) from 29 to 31 feet.		
BUS SERVER USE FOR		SS	32.0	34.0	2-2-3-4	17		- - -		SP	Note: Color change to gray (N 5/) abrupt upper and lower boundaries from 31 to 31.1 feet. Sand with silt, some clay; moist; loose; brown (7.5YR 4.3); sand is fine to coarse. Sand, little to some silt; moist; yellowish brown (10YR 5/4); loose; sand is fine to coarse.		
IT SAVED TO CO	14	SS	34.0	36.0	2-4-7-7	12		35 –			Note: Dry from 34 to 36 feet.		
AEP.GDT - 10/05/16 15:21 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUM	15	SS	36.0	38.0	5-7-8-7	12		-			Note: Dry grades to moist from 36 to 38 feet.		
05/16 15:21 - C:\CHE	16	SS	38.0	40.0	2-4-5-6	19		-			Note: Moist from 38 to 44 feet.		
AEP.GDT - 10/	17	SS	40.0	42.0	5-5-6-5	19		40 -					

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

				er Piani						RING START US/US/16 BORING FINIS		
SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
18	SS	42.0	44.0	1-4-5-5	17		-					
19 <u>[</u>	SS	44.0	46.0	2-4-6-7	13		- 45 —			Note: Slight increase in silt content from 43 to 44 feet.		
GP MOUNTAINEER	SS	46.0	48.0	5-5-7-7	17		45 - -					
BUS SERVER USE FOR REFERENCEAEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GFU 5	SS	48.0	50.0	8-10-10-10	18		-			Note: Weakly stratified from 48.5 to 50 feet.		
NTAINEER BOR	SS	50.0	52.0	6-6-7-8	16		50 —					
ERENCE/AEP MOUI	SS	52.0	54.0	2-3-8-8	18		-					
24 24	SS	54.0	56.0	4-4-5-6	13		- 55 —					
SOLUMBUS SERVER	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. Note: Trace subrounded coal (250 mm	∑	
AEP.GDT - 10/05/16 15:21 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUM 6 8 2 2 9 9 99	SS	58.0	60.0	2-4-6-4	13		_			diameter, readily disaggregate; broken apart; internal coal appearance is well preserved) at 56.1 feet. Note: Includes little amount of fine subangular gravel from 57.5 to 58 feet. Note: Weakly stratified from 59 to 59.5 feet.		
ERYL/PROJEC	SS	60.0	62.0	2-4-4-6	14		60 —					
3/16 15:21 - C:\CH	SS	62.0	64.0	4-4-4-5	18		_		65	Cond. for the section 1991.		
AEP.GDT - 10/05 62	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).		

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. SB-1601

DATE 10/05/16

SHEET 4 OF 4

PROBING START 05/05/16

BORING FINISH 05/06/16

PRO.	JECT	Mou		er Plant			_			RING NO. <u>56-1601 </u>		
1100	0001		incanic	JOI I IUIIL					ВО	TAINS OTAIN OF THE BORING FINISH	·	0/00/10
SAMPLE NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %		GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	SS	66.0	68.0 70.0	5-6-7-8 6-6-5-7	17		65 - - -		CD	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.		
AEP.GDT - 10/05/16 15:21 - C.ICHERYLPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE\AEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPU R C C C C C C C C C C C C	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.		

JOB	NUM	IBER	OH01	5976.00	009				LO	GΟ	F BORING			
COM	/IPAN	Y Ar	nericar	n Electr	ic Pow	er				ВС	RING NO. <u>MW-1601A</u> DATE <u>10/05/16</u>	SHE	ET_	1 OF 4
PRO	JECT	г Мо	untain	eer Pla	nt						RING START 06/08/16 BORING			
coc	RDIN	NATES	N 717	7,305.0	E 1,73	34,094	l.2			PIE	ZOMETER TYPE NA WEL	L TYPE	OV	V
GRC	UND	ELEVA	_NOITA	607.5	SY	STEM	N/	ND 1927		HG	T. RISER ABOVE GROUND 3.19	DIA	2"	
Wat	er Le	vel, ft	<u> </u>	3.0	lacksquare		Ā			DE	PTH TO TOP OF WELL SCREEN 67.0 BO	МОТТС	77.	.0
TIMI		,			_		+			WE	ELL DEVELOPMENT NA BA	CKFILL	Gr	out
DAT			6/8/	2016							ELD PARTY NA	RIG	Ho	llow Stem Aug
			1	1										
出品	Щ		MPLE EPTH		IDARD RATION	THE REP	RQD	DEPTH IN FEET	2 €	S	SOIL / ROCK		_	DRILLER'S
SAMPLE NUMBER	SAMPLE		FEET	RESIS	RATION TANCE	NOS NOS NOS	%	IN	ZAPI COC	S	IDENTIFICATION		WELL	NOTES
ώΞ	Ś	FROM	1 то	BLOV	VS / 6"	Lañ	70	FEET	9		BENTH IS THE			110120
0	NR	0.0	10.0			0					Straight drill to 10 feet, boring was pre-drille			
									-		for utility clearance; no samples were taker	١.		
									1					
									1					
									-					
								5 -						
								5						
									-					
									7					
									-					
									1					
								10 -	<u> </u>					
1	SS	10.0	12.0	1-2	-4-5	13		10		ML	Silt, some clay, little sand;, dry; firm; massi 10YR 4/4 to 4/3.	ve;		
									-					
2	SS	12.0	14.0	3-4	-5-5	16								
									-					
										CL	Silt with clay and sand; moist; soft.			
3	ss	14.0	16.0	4-5	-4-7	13			TYPE TO THE	ML	Interbedded sand and clay; dry; loose and			
								15 -		SM	sands are fine to coarse; 10YR 4/4; silt/clay			
											layers are silt with clay, some fine sand, dry soft, black (10YR 2/1).	y,		
4	ss	16.0	18.0	3-4	-6-5	14			111	:	· · · · · ·			
										SW	Sand, fine to coarse, little silt, trace fine gra	ivel;		
											moist; loose; 10YR 5/4 to 4/4; instratified.			
5	SS	18.0	20.0	2-2	-2-3	16			\``^\\		Note: Dry from 18 to 19 feet.			
٥		.5.5	23.5			.					2.7 10 10 10 1000			
									7	SP	Note: Abrupt boundary at 19 feet.			
							Т			1				
		TYP	E OF C	ASING	USED						Continued Next Page			
.			ROCK CO	ORE							PE: PT = OPEN TUBE POROUS TI		OP	EN TUBE
NA NA		9" x 6.2	25 HSA 25 HSA					SL	OTTI	ED S	SCREEN, G = GEONOR, P = PNEU	MATIC		
NA		HW CA	ASING A	DVANCE	R	4" 3"	=	WELL T	YPE:	O۱	W = OPEN TUBE SLOTTED SCREE	EN, GN	1 = G	SEOMON
NA NA	4	NW CA	ASING			6"	\equiv				RECORDER J. Wanner			
NA			MMER	· ·	· ·	8"					NEOGNOEIN O. HAIIIIGI			

JOB NUMBER OH015976.0009

COMPANY American Flectric Power ROPING NO. MW.1601A DATE 10/05/16 SHEET

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 SAMPLE STANDARD PENETRATION RESISTANCE BLOWS / 6" **STANDARD** RQD SAMPLE NUMBER DEPTH SAMPLE **DEPTH** SOIL / ROCK DRILLER'S SCS LOG WELL IN FEET % **IDENTIFICATION NOTES FEET FROM** BLOWS / 6" TO SS 20.0 22.0 2-2-2-4 17 Fine sand, some silt, dry; loose; 10YR 5/4. 6 SW SW Silty sand; moist; soft; 10YR 4/4. Sand, fine to coarse, little to some silt, trace fine to medium gravel; dry; loose; 10YR 5/4 to 7 SS 22.0 24.0 1-3-3-3 13 Note: Gravel fraction is subrounded sedimentary and chert, both fine in size from 22 to 26 feet. AEP.GDT - 10/05/16 15:32 - C.;CHERYL,PROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ SS 26.0 16 24.0 3-6-8-7 25 SS 26.0 28.0 14 3-5-4-5 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 30 11 SS 30.0 32.0 4-4-5-6 14 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. 35 SS 17 14 36.0 38.0 3-8-12-12 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 Note: Moist from 38 to 38.5 feet. 38.0 40.0 6-8-6-8 18 40 16 SS 40.0 42.0 8-12-17-20 17 SW Sand, fine, with silt; dry; loose; brown. SW 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

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1601A DATE 10/05/16 SHEET 3 OF 4

PROPING START 06/08/16 PORING FINISH 06/08/16

PROJ	IECT	_ Mou	ıntaine	er Plant					ВО	RING START <u>06/08/16</u> BORING FINISI	⊣ <u>0</u> 6	5/08/16
				T	, ,						, ,	
SAMPLE NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE	FOTAL ENGTH COVER	RQD %	DEPTH IN	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
o z	0)	FROM	TO	BLOWS / 6"	, 그밂		FEET	9				
20	88	48.0	50.0	12-12-15-20 12-12-10-12	17		-			Note: Igneous and sedimentary rock types from 46 to 52 feet. 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		55 -			Note: Includes trace coarse gravel (subangular igneous, and subrounded sedimentary. from 54 to 56 feet.		
24	SS	56.0 58.0	58.0 60.0	9-12-14-24 14-15-20-15	17		-			Note: Includes trace coarse subrounded gravel from 56 to 60 feet.		
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		- -		SW	Note: Moist from 62 to 62.5 feet. Sand some silt, little fine to medium gravel;	V	
28	SS	64.0	66.0	7-9-7-8	14		65 –			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.		
21 22 23 24 25 26 27 28 29 30 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.		

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1601A DATE 10/05/16 SHEET 4 OF 4

PROBING START 06/08/16 ROPING FINISH 06/08/16

PR	ROJECT Mountaineer Plant									во	RING START <u>06/08/16</u> BORING FINISI	⊣ <u>0</u> €	6/08/16
SAMPLE	NOMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	2	SS	72.0	74.0	NM-NM-NM-NM	0					No sample attempted; heaving sands from 72		
33	3	SS	74.0	76.0	9-12-13-12	0		- 75 —			to 76 feet.		
OUNTAINEER.GPJ	1	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 9-2016VAEP MG	5	SS	78.0	80.0	9-13-22-23	0.6		- 80 —	,,,,,				
07 9 9 19 19								80 -			End of boring at 80 feet.		
- AEP.GDT - 10/05/16 15:32 - C.)CHERYLIPROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GFJ											See well construction log for development information.		

JOB NUMBER <u>OH015976.0009</u>	OG OF BORING	
COMPANY American Electric Power	BORING NO. <u>MW-1602</u> DATE <u>10/05/16</u> SHE	ET_1_ OF3
PROJECT Mountaineer Plant	BORING START <u>05/09/16</u> BORING FINISH	05/10/16
COORDINATES N 717,671.9 E 1,733,519.1	PIEZOMETER TYPE NA WELL TYPE	OW
GROUND ELEVATION 602.4 SYSTEM NAD 1927	HGT. RISER ABOVE GROUND 2.75 DIA	2"
Water Level, ft ▼ 57.0 ▼	DEPTH TO TOP OF WELL SCREEN 61.0 BOTTOM	71.0
TIME	WELL DEVELOPMENT NA BACKFILL	Grout
DATE 5/9/2016	FIELD PARTY NA RIG	Hollow Stem Auger

			'										
	SAMPLE NUMBER		SAM DEF IN F	PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
3	0	NR	0.0	10.0		0					Straight drill to 10 feet, boring was pre-drilled		
16 15:36 - C.ICHERYLIPROJECTSIGINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEIAEP MOUNTAINEER BORING LOGS 9-2016IAEP MOUNTAINEER.GPJ								- - - 5 — -			for utility clearance; no samples were taken.		
FRENCE/AEP MOUNTA	1	SS	10.0	12.0	1-0-0-1	18		10 -		ML	Silt, trace clay; wet; soft; rapid dilatancy; dark yellowish brown (10YR 4/4).		
RVER USE FOR REI	2	SS	12.0	14.0	0-3-5-2	18		-	-		Note: From 12 to 13 feet wet. Note: From 13 to 15 feet coarsely interbedded with sand, little silt, loose.		
JS SE	3	SS	14.0	16.0	0-3-3-4	18		-	1				
INT SAVED TO COLUMBI	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). Note: From 16 to 26.5 feet dry.		
PROJECTS\G	5	SS	18.0	20.0	3-2-3-3	17		-					
6 - C:\CHERYL\	6	SS	20.0	22.0	3-3-5-6	17		20 -			Note: At 21 feet trace fine gravel.		
16 15:3	TYPE OF CASING USED							Continued Next Page					

TYPE OF CASING USED - AEP.GDT - 10/05/16 15 NQ-2 ROCK CORE NA 6" x 3.25 HSA NA 9" x 6.25 HSA 4" NA **HW CASING ADVANCER** 3" NW CASING NA NA SW CASING 6" NA NA 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 J. Wanner

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

SAMPLE STANDARD FROM TO BLOWS / 6"	PROJECT WOUTHAINEER Plant										ь	RING START US/US/16 BORING FINISH	·	סו וטו וס
8 SS 24.0 26.0 3.7-10-14 17 9 SS 26.0 28.0 7-10-10-13 17 10 SS 28.0 30.0 2-3-7-10 17 11 SS 30.0 32.0 2-5-5-8 14 12 SS 32.0 34.0 4-7-7-10 13 13 SS 34.0 36.0 7-11-11-11 18 35 SP Sand, little to some silt; dry; loose; gravel is fine to medium, angular to subrounded; sand is fine to coarse. SP Sand, little to some silt; dry; loose; gravel is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; gravel, igneous. Note: At 39 feet, trace coarse rounded gravel, igneous.	SAMPLE	NUMBER	SAMPLE	DEF IN F	PTH EET	PENETRATION RESISTANCE	OTAL		DEPTH IN FEET	GRAPHIC LOG	uscs		WELL	
8 SS 24.0 26.0 3.7-10-14 17 9 SS 26.0 28.0 7-10-10-13 17 10 SS 28.0 30.0 2-3-7-10 17 11 SS 30.0 32.0 2-5-5-8 14 12 SS 32.0 34.0 4-7-7-10 13 13 SS 34.0 36.0 7-11-11-11 18 35 SP Sand, little to some silt; dry; loose; gravel is fine to medium, angular to subrounded; sand is fine to coarse. SP Sand, little to some silt; dry; loose; gravel is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to medium. SP Sand, fine to coarse, little to some silt; dry; loose; gravel, igneous. Note: At 39 feet, trace coarse rounded gravel, igneous.	7	7	SS	22.0	24.0	1-2-3-5	17					Note: At 22 feet little amount of fine gravel.		
SP Sand, little to some silt, little gravet; dry; loose; gravel is fine to medium, angular to subrounded; sand is fine to coarse. SP Sand, little to some silt; dry; loose; sand is fine to medium, angular to subrounded; sand is fine to coarse. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose; sand is fine to medium. SP Sand, little to some silt; dry; loose. SP Sand, little to some silt; dry; loose. SP Sand, little to	8	3	SS	24.0	26.0	3-7-10-14	17		- - 25			Note: At 24 feet trace medium subrounded gravel.		
Series, fine to solve still, titled gravet, and is fine to coarse. SP Sand, fine to coarse, little to some silt; dry; loose; sand is fine to coarse.		1	55	26.0	28.0	7-10-10-13	17			[1	CD			
SP Sand, little to some silt; dry; loose; sand is fine to medium; dry; loose; sand is fine to medium; dry; loose; sand is fine to medium; dry; loose; sand is fine to medium; dry; loose; sand is fine to medium; dry; loose; sand; sand; little fine gravel, trace medium; gravel; dry; loose; Note: From 32 to 34 feet trace coarse rounded gravel, igneous. SP Sand, little to some silt; dry; loose; sand is fine to medium; dry; loose; sand is fine to sell, dry; loose; sand is fine to sell, dry; loose; sand is fine to sell, dry; l	9-2016/AEP MOUNTAINEE								- - 30 —		SP	gravel is fine to medium, angular to		
to medium. SP Sand, fine to coarse, little to some silt, little fine gravel, trace medium gravel; dry; loose. Note: From 22 to 34 feet trace coarse rounded gravel, igneous. SS 34.0 36.0 7-11-11-11 18 35 35 35 35 35 35 35 3	. Ses	'	55	30.0	32.0	2-3-3-0	'-				SP	Sand little to some silt: dry: loose: sand is fine		
gravel, trace medium gravel; dry; loose. Note: From 32 to 34 feet trace coarse rounded gravel, igneous. 14 SS 36.0 38.0 7-10-13-16 17	R BORING LO	2	SS	32.0	34.0	4-7-7-10	13		- - -			to medium. Sand, fine to coarse, little to some silt, little fine		
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 17 SS 42.0 44.0 6-10-11-14 19 18 SS 44.0 46.0 8-10-12-15 14 45 — 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 50 — Note: At 39 feet, trace coarse rounded gravel, igneous. Note: At 41 feet, trace coarse rounded gravel, igneous.	T MOUNTAINEE	3	SS	34.0	36.0	7-11-11-11	18					Note: From 32 to 34 feet trace coarse rounded		
15 SS 38.0 40.0 7-10-13-17 17 16 SS 40.0 42.0 10-11-13-13 13 17 SS 42.0 44.0 6-10-11-14 19 18 SS 44.0 46.0 8-10-12-15 14 45 - 20 SS 48.0 50.0 6-10-13-16 18 21 SS 50.0 52.0 9-11-21-27 18 50 -	OR REFERENCE/	4	SS	36.0	38.0	7-10-13-16	17							
16 SS 40.0 42.0 10-11-13-13 13	SERVER USE FO	5	SS	38.0	40.0	7-10-13-17	17							
Note: At 41 feet, trace coarse rounded gravel, igneous. 17	S 1	6	SS	40.0	42 0	10-11-13-13	13			-		igrieous.		
18 SS 44.0 46.0 8-10-12-15 14 45 — 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	SAVED TO COLUMP													
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 50 -	ROJECTS/GINT	8	SS	44.0	46.0	8-10-12-15	14		- 45 —					
20 SS 48.0 50.0 6-10-13-16 18 50 50.0 52.0 9-11-21-27 18 50 50 50.0 52.0 9-11-21-27 18 50 50 50 50 50 50 50 50 50 50 50 50 50	- C:\CHERYL\PI	9	ss	46.0	48.0	6-9-11-14	16		4 0 -					
21 SS 50.0 52.0 9-11-21-27 18 50 -	- 10/05/16 15:36	0	SS	48.0	50.0	6-10-13-16	18		-					
[21 SS 50.0 52.0 9-11-21-27 18									50 -					
	2 إِنَّ	1	SS	50.0	52.0	9-11-21-27	18							

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1602

DATE 10/05/16

SHEET 3 OF 3

PF	ROJ	IECT	_ Mou	ıntaine	er Plant					ВС	ORING START <u>05/09/16</u> BORING FINISI	⊣ <u>0</u>	5/10/16
SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
2		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.		
OUNTAINEER.GPJ		ss ss	56.0	58.0	9-10-10-9 5-2-4-3	16		55 — -		SP	Sand, little to some silt, little to some fine gravel, trace medium to coarse gravel; dry; loose; sand is fine to coarse.	<u> </u>	
3 LOGS 9-2016/AEP M	5	SS	58.0	60.0	5-6-6-10	18		-			Note: From 57 to 58 feet wet.	+	
NEER BORING	6	SS	60.0	62.0	6-7-7-10	0.8		60 -					
AEP MOUNTA	7	SS	62.0	64.0	8-7-9-11	0		-	-		No recovery; driller said drilling conditions have not changed.		
2 Z	8	SS	64.0	66.0	7-9-13-18	0		65 –	-		Note: From 64 to 66 feet all baskets replaced.		
SERVER USE FOR		SS SS	66.0 68.0	68.0 70.0	8-8-10-12 6-9-8-11	12		-		SP	Sand, some silt, trace fine rounded gravel; wet; loose; sand is fine to coarse.		
D TO COLUMBUS		SS	70.0	89.0	3-4-46-50			70 –	-		Note: At 69.5 feet, subrounded gravel composed of coal (17 mm in size).		
AEP.GDT - 10/05/16 15:36 - C.:CHERYLIPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE\AEP MOUNTAINEER.GPJ								-			\Bedrock, competent. End of boring at 71.6 feet. See well construction log for development information.		
EP.GDT - 10/05/16 15:36 - C													

IOR	NUM	BER	OH01!	5976.0009			LC	G (OF BORING
		_		Electric Pov	/er			В	ORING NO. MW-1603 DATE 10/05/16 SHEET 1 OF 4
PROJECT Mountaineer Plant									ORING START
000	RDIN	IATES	N 719	,516.2 E 1,7	32,495.	0		Р	IEZOMETER TYPE NA WELL TYPE OW
€RO	UND	ELEVA	ATION_	602.9 S	YSTEM _	NAD 1	927	. н	GT. RISER ABOVE GROUND 3.38 DIA 2"
Water Level, ft ∇ 57.0 ∇						1		D	EPTH TO TOP OF WELL SCREEN 60.0 BOTTOM 75.0
	IME					=			/ELL DEVELOPMENT NA BACKFILL Grout
DATE 5/3/2016								l	ELD PARTY NA RIG Hollow Stem Auge
			01011			l .]	
'nК	щ		MPLE	STANDARD	.L _≖ ≿F	QD DEP	GRAPHIC HT	ြ	
SAMPLE	SAMPLE		PTH EET	PENETRATION RESISTANCE	NGTA NGTA	o, IN	APH S	SC	Ш
γN	SA	FROM		BLOWS / 6"	E E E	% FEE	ET 05 -	בֿ	IDENTIFICATION ≥ NOTES
0	NR	0.0	9.0	BLOW370	0				Straight drilled to 9.5 feet, boring was
							-		pre-drilled for utility clearance, no samples were taken.
							5 —		
							-		
1	SS	9.0	11.0	1-2-3-3	21		_	ML	Silt, trace clay; dry; rapid dilatancy; brown
2	SS	11.0	13.0	2-2-3-4	20	10	0 —	CL ML SF CL ML	(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;
3	SS	13.0	15.0	3-4-4-5	17		_	SF ML SF	Sand, fine to medium; dry; loose.
4	SS	15.0	17.0	2-2-2-6	18	15	5 —		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.
TYPE OF CASING USED									Continued Next Page
NQ-2 ROCK CORE NA 6" x 3.25 HSA									PE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
NA		HW CA	SING A	DVANCER	4"	WFI	L TYPF		W = OPEN TUBE SLOTTED SCREEN. GM = GEOMON
NA NA								. ~	
NA NA					8"				RECORDER J. Wanner
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"						\$		ED	PE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE

JOB NUMBER <u>OH015976.0009</u>

COMPANY American Electric Power BORING NO. MW-1603 DATE 10/05/16 SHEET 2 OF 4

PROJECT MOUNTaineer Plant BORING START 05/03/16 ROPING FINISH 05/04/16

PR	DJEC	⊤ <u> Μοι</u>	untaine	er Plant					ВО	RING START _	05/03/16	_ BORING FINISH	05	5/04/16
	_			T	, ,							T		
SAMPLE	SAMPLE	DE	MPLE PTH EEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	1	SOIL / ROCK	N	WELL	DRILLER'S NOTES
7	ss	21.0	23.0	3-2-4-4	18		-							
8	SS	23.0	25.0	2-5-8-8	17		-				.3 to 25 feet, incl nedium, subang			
9	SS	25.0	27.0	4-4-5-6	20		25 –	-		Note: From 25	to 27 feet no gra	avel; moist.		
10 11 12 13 14 15 16 17	SS	27.0	29.0	4-4-6-8	18		-			gravel, fine to n subrounded.	to 26.3 feet inclumedium, subang	ular to		
11	SS	29.0	31.0	2-6-7-7	20		-				eet trace very fin			
12	ss	31.0	33.0	4-4-5-7	20		30 -			Note: From 30 gravel.	to 30.9 feet inclu	udes some fine		
13	SS	33.0	35.0	6-5-7-11	21		-		SW		to 33.6 feet; mo silt; moist; loose i/4).			
14	SS	35.0	37.0	10-8-10-10	21		35 –		SP		little gravel; moi e; gravel is fine t			
15	ss	37.0	39.0	13-8-10-9	18		-		SP		ne fine gravel, tra is fine to coarse /4).			
		37.0	00.0	10-0-10-0	10		-	-			dry; loose; sand is fine to mediur subrounded.			
16	ss	39.0	41.0	5-7-10-10	20		-		SP		nedium, little silt;	dry; loose;		
17	ss	41.0	43.0	6-9-10-12	17		40 - - -							
18	SS	43.0	45.0	6-11-20-18	21		-			fine to medium	.6 to 42.9 feet in	ded.		
19	SS	45.0	47.0	9-12-14-14	20		45 -	_			to 44.8 feet incluvel; round to sub			

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

					er Plant	<u> </u>					RING NO. <u>MW-1603</u> DATE <u>10/05/16</u> SI RING START 05/03/16 BORING FINISI		
	1110	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		incanic	or r idire					Ъ	BONNOTANT OF THE PROPERTY OF T		304710
	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	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.		
R.GPJ	21	SS	49.0	51.0	6-7-10-14	18		- 50 —			Note: At 48 feet includes fine to medium gravel.		
MOUNTAINEE	22	SS	51.0	53.0	13-16-22-25	20		-			Note: From 50.5 to 51 feet slight increase in silt content.		
OGS 9-2016/AEF	23	SS	53.0	55.0	7-9-12-15	20		_			Note: At 52 feet trace coal fines. Note: At 53 feet moist.		
RINGL								55 —			Note: From 54.2 to 54.3 feet includes coal fines.		
SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ	25	SS	55.0	57.0 59.0	7-6-7-9	18		-		SM SP	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.	Ā	
E FOR REFE	26	SS	59.0	61.0	4-5-7-9	19		60 -	000		Gravelly sand; wet; loose; gravel is fine to medium, sand is fine to coarse; yellowish brown (10YR 5/4).		
	27	SS	61.0	63.0	9-13-15-19	0.9		-	0	SP	Sand, little silt; wet; loose; sand is fine to coarse.		
.GDT - 10/05/16 15:44 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS	28	SS	63.0	65.0	13-27-50/5	24		-			Note: From 64 to 65 feet heaving sands.		
JECTS/GINT S,	29	SS	65.0	67.0	10-6-6-9	12		65 — -		GP SP	Gravel, some coarse sand; wet; loose; gravel is fine to medium, subangular to subrounded		
CHERYLIPRO	30	SS	67.0	69.0	6-6-8-9	0.9		_		SP	dominant; washed. Sand, fine to medium, little silt; wet; loose; yellowish brown (10YR 5/4). Sand with fine gravel, little silt; wet; loose; sand		
5/16 15:44 - C	31	SS	69.0	71.0	6-8-7-8	0.8		70 –		SP	is fine to coarse. Sand with little fine gravel, little silt; wet; loose.		
AEP.GDT - 10/08	32	SS	71.0	73.0	4-5-4-5	0.9		-					

JOB	NUM	BER _	OH015	5976.0009		_		LO	GO	- BURING		
COM	1PAN	Y <u>Am</u>	erican	Electric Pow	er				ВС	RING NO. <u>MW-1603</u> DATE <u>10/05/16</u>	SHEET_	4 OF 4
PRO	JEC	_ Μοι	ıntaine	er Plant					ВС	RING START <u>05/03/16</u> BORING FINI	SH <u>05</u>	5/04/16
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
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.		

OB NUMBER <u>OH015976.0009</u>	G OF BORING	
COMPANY American Electric Power	BORING NO. <u>MW-1604D</u> DATE <u>10/05/16</u> SHE	ET_1_ OF4_
PROJECT Mountaineer Plant	BORING START <u>04/26/16</u> BORING FINISH	04/26/16
COORDINATES N 720,194.0 E 1,733,082.0	PIEZOMETER TYPE NA WELL TYPE	OW
GROUND ELEVATION 595.6 SYSTEM NAD 1927	HGT. RISER ABOVE GROUND 2.63 DIA	2"
Water Level, ft ✓ 51.0 ✓	DEPTH TO TOP OF WELL SCREEN 69.0 BOTTOM	79.0
TIME	WELL DEVELOPMENT NA BACKFILL	Grout
DATE 4/26/2016	FIELD PARTY NA RIG	Hollow Stem Auge

DAI			.,_0,	2010								
SAMPLE	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1 2 3 4 5 6	NR	0.0	8.8		0		5 - -			Straight drilled to 8.8 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1 2	SS	8.8	10.8	2-2-3-3	17		- 10 -		SM	Fine sand with silt, trace clay; dry; loose; yellowish brown (10YR 5/4).		
3	ss ss	12.0	14.0	3-1-5-10 9-9-8-9	0.9		-		ML SP	Silt, little clay, trace fine sand; moist; non-dilatant; non-plastic; yellowish brown (10YR 5/4). Sand, some gravel, little silt; dry; loose; gravel is fine to medium, subrounded to rounded, yellowish brown (10YR 5/4).		
5	SS	16.0	18.0	10-12-11-11 11-11-9-10	12		15 - - - -			yellowish brown (10YR 5/4).		
		TYPE	OF C	ASING USED			_			Continued Next Page		

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

RECORDER J. Wanner

NQ-2 ROCK CORE

HW CASING ADVANCER

3"

6"

8"

6" x 3.25 HSA

9" x 6.25 HSA

NW CASING

SW CASING

AIR HAMMER

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

	PRO	JECI	IVIOU	intaine	er Plant					ВО	RING START <u>04/26/16</u> BORING FINIS	H <u>U</u>	4/26/16
	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	7	SS	20.0	22.0	8-9-12-12	18							
	8	SS	22.0	24.0	5-10-12-13	16		- - -					
TAINEER.GP.	9	SS	24.0	26.0	7-10-13-14	12		- 25 —			Note: At 24 feet wet.		
AEP.GDT - 10/05/16 15:47 - C.I.CHERYLIPROJECTSIGINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAREP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ	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).	-	
EER BORING LOGS	11	SS	28.0	30.0	3-10-16-22	18		-					
P MOUNTAIN	12	SS	30.0	32.0	11-11-16-22	16		30 —					
REFERENCE\AE	13	SS	32.0	34.0	10-12-19-17	14		-			Note: At 32 feet dry.		
ER USE FOR	14	SS	34.0	36.0	6-11-16-18	18		35 —					
COLUMBUS SERV	15	SS	36.0	38.0	8-8-10-12	14		-					
GINT SAVED TO	16	SS	38.0	40.0	6-7-7-10	17		-					
SYL/PROJECTS	17	SS	40.0	42.0	7-11-10-19	19		40 —					
15:47 - C:\CHEF	18	SS	42.0	44.0	6-8-14-17	19		-					
JT - 10/05/16	19	SS	44.0	46.0	10-8-8-9	19		45 —					
AEP.G[_					

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

BORING NO. MW-1604D

BORING START 04/26/16

BORING FINISH 04/26/16

PRC	JECT	MOL	ıntaıne	eer Plant					ВС	RING START <u>04/26/16</u> BORING FINISH	⊣ <u>04</u>	/26/16
SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
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		50 -		SP	Sand, little silt; moist; loose; sand is very fine to medium; yellowish brown (10YR 5/4).		
22 23 24 25 26 27 28 29 30 31	SS	52.0	52.0 54.0	5-8-8-10 8-8-10-12	19		-			Note: From 51 to 54 feet wet.	∇	
24	ss	54.0	56.0	6-5-6-8	21		- - 55 —			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		60 —					
27	SS	62.0	64.0	7-10-12-18 9-10-15-16	18		- - -			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.		
29	SS	64.0	66.0	9-12-15-15	16		65 —					
30	SS	66.0	68.0	3-8-10-15	20		-					
31	SS	68.0	70.0	3-8-16-24	20		-			Note: At 60.2 foot color is very ded, grow (40VD)		
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).		

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 PENETRATION RESISTANCE BLOWS / 6" % **SAMPLE** SAMPLE NUMBER **DEPTH** GRAPHIC SAMPLE USCS **DEPTH** SOIL / ROCK DRILLER'S LOG WELL IN FEET **IDENTIFICATION NOTES FEET FROM** TO 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 SP Sand, some silt, trace clay; wet; loose; trace fine to medium gravel, subrounded, grayish 74.0 76.0 34 SS 9-14-14-19 17 brown (10YR 5/2). 75 AEP - AEP.GDT - 10/05/16 15:47 - C:/CHERYLIPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ 35 SS 76.0 78.0 4-10-11-18 14 SS 0.08 36 78.0 6-14-15-17 18 80 End of boring at 80 feet. See well construction log for development information.

SAMPLE STANDARD DEPTH DEPTH NFEET TO BLOWS / 6* 0 0 0 0 0 0 0 0 0	IOB	NII IM	DED	OH01	5976 00	na				LO	G O	OF BORING
BORRIGS TAND DATE TYPE FROM TO BIOWS / 8" 0 A9.0			_				er				BC	ORING NO MW-1604S DATE 10/05/16 SHEET 1 OF 3
COORDINATES N. 720, 193.8 E. 1,733,077.2 PIEZOMETER TYPE NA WELL TYPE OW							<u>. </u>					
Majer Level, ft V S1.0 V WELL SCREEN 49.0 BOTTOM S0.0 Grout							33,077	.2				
WELL DEVELOPMENT NA BACKFILL Grout FIELD PARTY NA RIG GOOD FOR NA 0.0 49.0 DEPTH RESISTANCE GOOD FEET NA FIELD PARTY NA RIG GOOD FEET NA FIELD PARTY NA RIG GOOD NA 0.0 49.0 DEPTH RESISTANCE GOOD NA FEET NA FIELD PARTY NA RIG GOOD NA 0.0 49.0 DEPTH NA RIG GOOD STEEN NA FEET NA F	GRO	UND	ELEVA	TION_	595.5	SY	STEM	NA	D 192	7	Н	GT. RISER ABOVE GROUND 2.59 DIA 2"
TIME 4/28/2016 WELL DEVELOPMENT NA BACKFILL Grout FIELD PARTY NA RIG Hollow Stem Auge SOIL / ROCK DEPTH PENETRATION 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Wat	er Lev	/el. ft	√ 51	1.0	lacksquare		T			DE	EPTH TO TOP OF WELL SCREEN 49.0 BOTTOM 59.0
SAMPLE STANDARD PROPERTY PROPERTY	-					_		+			W	VELL DEVELOPMENT NA BACKFILL Grout
TYPE OF CASING USED TYPE OF C	_			4/28/	2016						FII	IELD PARTY NA RIG Hollow Stem Auge
TYPE OF CASING USED Type OF C	[571]			-1,20,								
NR 0.0 49.0 0.0	ole SER	J.E		/IPLE PTH	STAN PENET	DARD RATION	AH LEN	RQD	DEPTH	S HC	S	SOIL / ROCK ☐ DRILLER'S
NR 0.0 49.0 0.0	AME	AME	IN F	EET	RESIS	TANCE		%	IN	RAG) S (IDENTIFICATION
TYPE OF CASING USED	ωz	S	FROM						FEET	g		
TYPE OF CASING USED TYPE OF CASING USED Continued Next Page NQ-2 ROCK CORE NA 6":x3.25 HSA NA 9":x6.25 HSA NA HW CASING ADVANCER 4" NA HW CASING ADVANCER 4" NA NW CASING S" WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON	RENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ	NR	0.0	49.0			0		- - -			descriptions adapted from the adjacent boring
NA NW CASING 3" NA SW CASING 6" RECORDER J. Wanner	- 10/05/16 15:51 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS SERVER U		NQ-2 R 6" x 3.2 9" x 6.2 HW CA	OCK CC 5 HSA 5 HSA SING AI	DRE				15 —	ITTC	ED S	PE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
d NA SW CASING 6" RECORDER J. Wanner	NA NA		NW CA	SING	VAINOE		3"	\Rightarrow	WELL T	YPE:	U	
₩ NA AIR HAMMER 8"	-						<u>6"</u> 8"	\dashv				RECORDER <u>J. Wanner</u>

JOB	NUM	BER _	OH015	5976.0009		_		LO	GO	FBORING		
COM	1PAN	Y <u>Am</u>	erican	Electric Pow	er				ВС	DRING NO. <u>MW-1604S</u> DATE <u>10/05/16</u> SI	HEET	2 OF 3
PRO	JECT	Mou	ıntaine	er Plant					ВС	DRING START <u>04/28/16</u> BORING FINISH	⊣ <u>0</u>	4/28/16
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM		BLOWS 7 0			25 —					
							30	-				
							35 - - -	-				
							40 — - - -					
							45 —	-				

JOB NUMBER				
COMPANY American Electric Power	BORING NO. MW-1604S	DATE 10/05/16	SHEET OF	3
PROJECT Mountaineer Plant	BORING START	8/16 BORING FIN	IISH 04/28/16	

					er Plant						RING START <u>04/28/16</u> BORING FINIS		
SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
JUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ	2 3	SAMPL SAMPL	IN F	EET	PENETRATION RESISTANCE BLOWS / 6" 4-7-10-13 6-6-11-10 3-10-25-50/3 12-15-20-28	17 20 24 24 24 24 24 24 24 24 24 24 24 24 24	%	IN FEET	GRAPH LOG	SP		MELL WELL	
AEP.GDT - 10/05/16 15:51 - C:\CHER 													

JOB	NUM	IBER	OH015	5976.00	009				LO	G O	F BORING		
		_			ic Pow	er				ВС	RING NO. <u>MW-1605D</u> DATE <u>10/05/16</u> SH	HEET.	1 OF 4
PRO	JECT	_ <u>Mo</u>	untaine	er Pla	nt					ВС	RING START <u>05/09/16</u> BORING FINISH	05	5/10/16
coo	RDIN	NATES	N 720	,117.3	E 1,73	33,468	3.6			PIE	ZOMETER TYPE NA WELL TYPE	_O	W
RO	UND	ELEVA	ATION_	588.5	SY	'STEM	N/	AD 192	7	HG	T. RISER ABOVE GROUND 2.50 DIA	<u>2'</u>	•
Mate	or I o	vel, ft	<u> </u>	١.٨	V		<u> </u>			DE	PTH TO TOP OF WELL SCREEN 69.0 BOTTOM	1 79	9.0
		vei, it	<u> </u>	F.U	-		+				ELL DEVELOPMENT NA BACKFILL		
TIME			=101	2010			+						ollow Stem Au
DAT	E		5/9/2	2016						1 11	LEDIANTI NIC	, <u></u>	onow otem At
SAMPLE NUMBER	SAMPLE	l .	MPLE :PTH	PENET	IDARD RATION	NE SE	RQD	DEPTH IN FEET	HIC G	c s	SOIL / ROCK	WELL	DRILLER'S
ÄΖ	ÄM	IN F	FEET	RESIS	TANCE		%	IIN	RAI	S D	IDENTIFICATION	WE	NOTES
0) Z	0)	FROM	ТО	BLOV	VS / 6"	LE REG		FEET	Ö				
0	NR	0.0	8.0			0					Straight Drilled to 8 feet, utility pre-clearance		
								-			straight drilled; no samples taken.		
								-					
								5 -					
								-					
								-					
1	ss	8.0	10.0	3-3	s-5-6	24		-		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	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	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).		
		TYP	E OF C	ASING	USED			1	P. F.T.	1	Continued Next Page		
NI A			OCK CC	DRE			$-\top$				PE: PT = OPEN TUBE POROUS TIP, SS		PEN TUBE
NA NA		6" x 3.2 9" x 6.2						SLC	TTC	ED S	SCREEN, G = GEONOR, P = PNEUMATION	3	
NA		HW CA	SING A	DVANCE	R	4"		WELL T	YPE:	O۱	W = OPEN TUBE SLOTTED SCREEN, G	M = 0	GEOMON
NA NA		NW CA SW CA				3" 6"	_	· · === ·		Ĭ		'	
NA NA	+	SVV CA	MMER			8"					RECORDER <u>T. Darmon</u>		

 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

				- Trainie	er Piani					ЪО	RING START BORING FINISH	' <u> </u>	סויוטויוס
Г	П		SAM	DIF	STANDARD	>	RQD						
Щ	NUMBER	밀	DEF		PENETRATION		תעט	DEPTH	GRAPHIC LOG	S	SOIL / ROCK	ا بـ	DRILLER'S
M	MB I	SAMPLE	IN F		PENETRATION RESISTANCE		%	IN	LOO	S C	IDENTIFICATION	WELL	NOTES
V.	키	\S	FROM	ТО	BLOWS / 6"		70	FEET	GR _	_	IDENTIFICATION	>	NOTES
-	7	SS	20.0	22.0	10-11-11-11	19							
	'	33	20.0	22.0	10-11-11-11	13							
								-					
	8	ss	22.0	24.0	7-10-12-10	14		-		SM	Sand, fine to coarse; little silt; little gravel,		
	١		22.0	24.0	7 10 12 10	'					small pebbles, subangular to subround; poorly		
								-			sorted; dry; brown (7.5Y 5/4).		
3											·		
FR.6	9	ss	24.0	26.0	10-7-7-9	16		-		SP	Sand, fine to coarse; trace silt; trace gravel,		
Ä			20	20.0		'				Ŭ.	small pebbles, subround; well sorted; dry;		
ξ								25 —			yellowish brown (10YR 5/4).		
ĮQ (
₽.	10	ss	26.0	28.0	4-5-12-7	17		-	****	SW	Sand, coarse, some gravel; small to medium		
6/A											pebbles, subangular to subround; poorly		
-201								-			sorted; dry; light yellowish brown (10YR 6/4).		
38 9									* * * *	SP	Sand, medium, subangular to subround; little		
ŏ,	11	ss	28.0	30.0	4-5-6-5	3		_		SP	\silt; poorly graded; dark brown (10YR 8/2).		
NG.											Sand, coarse; some gravel; small pebbles,		
BOR								-			subround; well sorted; dry; light gray (7.5Y 7/3).		
H													
BUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER, GPJ	12	SS	30.0	32.0	5-9-10-8	2		30 —		SP	Sand, medium to coarse, subangular to		
Ž.											subround; poorly graded; dry; brown (10YR		
MOL								_			5/3).		
ΑËΡ													
CEV	13	SS	32.0	34.0	3-4-9-6	17		_		SP	Sand, fine to medium, subround; poorly		
ZEN											graded; dry; yellowish brown (10YR 5/4).		
								_					
Ж Ж													
6	14	SS	34.0	36.0	2-6-7-6	18							
								35 —					
ÆR								33					
SER								_					
NS 8	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;		
SOLL											moderate to poorly graded; dry; yellowish brown (10YR 5/4).		
2								_			blowif (101K 3/4).		
<u>.</u>	16	SS	38.0	40.0	5-7-8-9	24							
SAV								_					
Ξ													
TS/G	4-7	00	40.0	40.0	5070	4-		40 —					
EC.	17	SS	40.0	42.0	5-6-7-8	17		. •					
Ŋ,								-					
YL/F													
用	10	60	42.0	440	5677	46		_					
D);;	18	SS	42.0	44.0	5-6-7-7	16							
) - 4								-					
15:6													
5/16	19	ss	44.0	46.0	4-5-6-5	23		_			Note: From 44 to 46 feet, moist.	$ \nabla $	
10/0	٠,٥	00	 ∪	- 0.0	7-0-0-0	23					Note. I form 77 to 70 leet, moist.		
AEP.GDT - 10/05/16 15:54 - C.\CHERYL\PROJECTS\GINT SAVED TO COLUM								45 —					
P.GI													
٩L					<u>I</u>				1-3-3				

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

_	-			eer Plant						RING START <u>05/09/16</u> BORING FINISH		-
SAMPLE	SAMPLE	1	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD D	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
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		55 -					
25	SS	56.0	58.0	7-10-10-9	20		-					
26	SS	58.0	60.0	9-15-10-11			60 -		014	Note: From 59 to 60 feet black discoloration from sand granules.		
27	SS	60.0	62.0	9-10-13-13	24		-		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		65 –		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		

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1605D DATE 10/05/16 SHEET 4 OF 4

PROPING START 05/09/16 PORING FINISH 05/10/16

PR	OJ	ECT	Mou	ıntaine	eer Plant	<u> </u>					RING START 05/09/16 BORING FINISI		
					,								
SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
33	3	SS	72.0	74.0	7-8-14-11	14		_	****				
34	1	ss	74.0	76.0	9-21-8-10	20		- - 75 –					
UNTAINEER.GPJ	5	SS	76.0	78.0	10-13-21-10	13		-		SP	Sand, medium, subround; well sorted; wet; light gray (10YR 7/2).		
38 9-2016/AEP MO	6	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).		
9019								80 –	*.*.*.		End of boring at 80 feet.		
- AEP.GDT - 10/05/16 15:54 - C.\CHERYLIPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GFU \$\mathbb{R}\$ \$\mathbb{R}\$ \$\mathbb{R}\$ \$\mathbb{R}\$ \$\mathbb{R}\$											See well construction log for development information.		

ОВ	NUM	BER _	OH015	5976.00	09		_		LO	00	FBORING				
				Electri		er									1 OF3
				er Plan						ВС	RING START	05/11/16	BORING FINIS	H <u>0</u>	5/12/16
													WELL TYP		
RO	UND	ELEVA	TION_	588.5	_ SY	STEM	_N	AD 192	7					IA <u>2</u> '	
Vate	er Lev	/el, ft	<u>V</u> 44	1.0	Ţ		$ar{ar{ar{A}}}$	-		DE	PTH TO TOP OF	F WELL SCR	een <u>49.0</u> botto	M <u>5</u>	9.0
IME	Ξ									WE	ELL DEVELOPM	ENT_NA_	BACKFIL		
DAT	E		5/11/	2016						FIE	LD PARTY N	A	RI	G <u>H</u>	ollow Stem Auge
		044	4DI E	OTANI			DOD	1							
SAMPLE	SAMPLE	DE IN F	MPLE PTH EEET	STANI PENETF RESIST BLOW	DARD RATION TANCE	TOTAL LENGTH ECOVERY	RQD %	DEPTH IN FEET	SRAPHIC LOG	nscs		SOIL / RO		WELL	DRILLER'S NOTES
0	NR	FROM 0.0	TO 48.0	BLOW	S / 6"	~		1 LL1			Straight drilled	f 0 t- 10	forth modernia		
								- 5 10					ne adjacent boring		
		T)/DI	5.05.0	4000	LIGER						0.5	-4i	4.0		
				ASING	USED							ntinued Nex			
NA		NQ-2 R 6" x 3.2	OCK CC 5 HSA	DRE									POROUS TIP, SS		PEN TUBE
NA		9" x 6.2	5 HSA					SLC	ווע	בט צ	CKEEN, G =	GEONOR	, P = PNEUMAT	IC	
NA NA		<u>HW CA</u> NW CA		OVANCE	₹	4" 3"		WELL T	YPE:	٥١	N = OPEN TU	JBE SLOT	TED SCREEN, C	= <u>M</u> E	GEOMON
NA NA		SW CA				6"					RECORDER	T Darme	on		
NA		AIR HA				8"					- ILOUINDER	, Darrin			

LOG OF BORING JOB NUMBER **OH015976.0009** COMPANY American Electric Power BORING NO. <u>MW-1605S</u> DATE <u>10/05/16</u> SHEET <u>2</u> OF <u>3</u> PROJECT Mountaineer Plant BORING START <u>05/11/16</u> BORING FINISH <u>05/12/16</u> PENETRATION RESISTANCE BLOWS / 6" RQD % SAMPLE SAMPLE NUMBER GRAPHIC LOG DEPTH USCS DEPTH SOIL / ROCK WELL DRILLER'S IN FEET **IDENTIFICATION NOTES** FEET FROM TO - AEP.GDT - 10/06/16 15:56 - C.Y.CHERYL/PROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ 25 30 35 40 ∇ 45

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

Р	RO	JECT	Mou	ıntaine	er Plant					ВС	RING START <u>05/11/16</u> BORING FINISH	<u> 0</u>	5/12/16
Z AMDI E	NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	1	SS	48.0	50.0	1-2-3-4	16		-		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).		
16VAEP MOUNTAINEER.G	3	SS SS	50.0 52.0	52.0 54.0	1-1-1-2 5-6-5-5	1 12		50 — - -		SP	Note: Poor recovery caused by drilling equipment failure at 51 feet. Sand, medium to coarse; trace to little gravel, small pebbles, subangular to subround; little		
ER BORING LOGS 9-20	4	SS	54.0	56.0	5-6-6-3	15		55 —			silt; moderate to poorly graded; wet; pale brown (10YR 6/3).		
ERENCE\AEP MOUNTAINE	5	SS SS	56.0	58.0 60.0	8-3-3-7 10-13-50/6	20		- - -					
AEP.GDT - 10/05/16 15:56 - C:/CHERYLIPROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ											End of boring at 59.5 feet spoon refusal. Note: Heaving sand. See well construction log for development information.		

10	D NII IN	/DED	OH01	5976.0009				LO	GΟ	F BORING		
		_		n Electric Pow	/er	-			ВС	DRING NO. <u>MW-1606D</u> DATE_ 10/05/16 S	HEET	1 OF 4
				eer Plant						PRING START <u>05/12/16</u> BORING FINIS		
CC	ORDII	NATES	N 719	9,653.7 E 1,7	33,935	.3			PIE	EZOMETER TYPE NA WELL TYF	'E <u>O</u>	W
GF	ROUNE	ELEVA	ATION_	587.3 S	YSTEM	NAI	D 1927	7	HG	GT. RISER ABOVE GROUND 2.85 D	IA <u>2</u> '	
W	ater Le	vel, ft	<u> </u>	3.0		T			DE	PTH TO TOP OF WELL SCREEN 65.0 BOTTO	M _ 7	5.0
-	ME			_					WI	ELL DEVELOPMENT NA BACKFII	_L <u>_</u> G	rout
D/	ATE		5/12/	/2016					FIE	ELD PARTY NA RI	G <u>H</u>	ollow Stem Auge
		T							1			<u> </u>
빌	E E		MPLE :PTH	STANDARD PENETRATION		RQD	DEPTH	⊇	S	SOIL / ROCK	بدا	DRILLER'S
SAMPLE	NUMBER SAMPLE		FEET	PENETRATION RESISTANCE		%	IN	GRAPHIC	SC	IDENTIFICATION	WELL	NOTES
Š	Z S	FROM	то ТО	BLOWS / 6"		/0	FEET	9		is a second seco		110120
2 0	NR	0.0	8.0							Straight drilled to 8 feet, boring was pre-drilled		
ISE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ							-			for utility clearance; no samples were taken.		
삙												
Ĭ												
Ž L							-					
6/AE												
9-201							-	+				
GS												
의 -							5 -	1				
Ž Ž												
R BC							-					
Ā												
			10.0	0.045	0.5		-	 	N 41	Oilt and and and are fire and all atting	-	
∑ 1	SS	8.0	10.0	3-3-4-5	25				ML	Silt and sand, very fine; non-plastic; non-plastic; no dilatancy; moist; soft; light		
SE/A							-	-		yellowish brown (10YR 6/4).		
REN												
	SS	10.0	12.0	1-3-5-4	22		10 -		SC	Sand, very fine; little silt; little clay; moist; light	1	
OR F							_		SM	yellowish brown (10YR 6/4).		
띴									:			
⊃ I							-		1			
ikve B	SS	12.0	14.0	3-7-14-21	22							
S							-		SW	Sand fine to coarse; little gravel, small to	4	
MBU									۷۷	Sand, fine to coarse; little gravel, small to medium pebbles; subround; trace to little silt;		
	ss	14.0	16.0	6-10-13-8	20		-			well graded; dry; yellowish brown (10YR 5/4).		
<u>၀</u>							4 -					
						$\neg \uparrow$	15 -	*****				
SAV							-					
[5	SS	16.0	18.0	10-13-10-10	17							
TS/(-					
SI 6	s	18.0	20.0	6-6-7-10	17		-					
		10.0	20.0	0-0-7-10	''							
빙							-					
Ö-												
- 10/05/16 15:59 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS SERVER.		TYP	E OF C	ASING USED)				•	Continued Next Page		
05/16			ROCK CO				DIEZON	,	7 7 7 7		<u> </u>	DENITUDE
N j	A	6" x 3.2	25 HSA	J. N.						PE: PT = OPEN TUBE POROUS TIP, S SCREEN, G = GEONOR, P = PNEUMAT		FEN IUDE
N GDI		9" x 6.2		DV/ANCED	4"							
AEP.GDT	A	NW CA		DVANCER	<u>4"</u> 3"	-	WELL T	YPE:	O/	W = OPEN TUBE SLOTTED SCREEN, OPEN TUBE SL	€M =	GEOMON
<u>.</u> N	Α	SW CA	SING		6"					RECORDER _ T. Darmon		
₩ _N	A	AIR HA	MMER		8"							

 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

					er Piani					ЪО	RING START BORING FINISH	·	5/13/16
			0414	D. F.	OTANDADD		D0D						
	щК	щ	SAM		STANDARD		RQD	DEPTH	ပ္	S	2011 / 2001/		DDII I EDIO
	SAMPLE NUMBER	SAMPLE	DEF		PENETRATION RESISTANCE	돌달빛		IN	GRAPHIC LOG	ပ	SOIL / ROCK	WELL	DRILLER'S
	₹5	Ą	IN F	EEI	RESISTANCE		%		R _A	S U	IDENTIFICATION	₹	NOTES
	ᇬᆯ	S	FROM	TO	BLOWS / 6"	, 그牊		FEET	g	_			
	7	SS	20.0	22.0	10-10-7-6	23			****				
	٠ ا	00	20.0		10 10 7 0	-			****				
								-	*****				

								_	****				
	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).		
GPJ													
E.	9	SS	24.0	26.0	6-8-9-8	24		_					
Ī													
ΨŢ								25 —		SP	Sand, medium to coarse; trace gravel, small		
Ś										01	pebbles, subround; poorly graded; dry;		
ž	4.0	00	00.0	00.0	5 4 0 4	40		_			brownish yellow (10YR 6/6).		
ΑE	10	SS	26.0	28.0	5-4-3-4	18					brownish yellow (101100).		
016								_					
BUS SERVER USE FOR REFERENCEVAEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPJ													
GS									****	SW	Sand, fine to coarse, subround; well graded;		
2	11	SS	28.0	30.0	4-5-4-4	22		_		SP	\setminus dry; light yellowish brown (10YR 6/4) with black Γ		
N											staining coal (10YR 2/1).		
õ								-			Sand, medium to coarse; trace to little gravel,		
띪											small pebbles, subround; moderate to poorly		
Ä	10	00	20.0	22.0	4-4-5-6	17		30 —		SP	¬ graded; yellowish brown (10YR 5/4). Note:		
Ι	12	SS	30.0	32.0	4-4-5-6	''				32	Stratified with a 1-inch layer of small pebbles.		
Ž								_			Sand, medium to coarse; trace gravel, small		
ĭ											pebbles, subround; poorly graded; dry;		
AEF								_			yellowish brown (10YR 5/4).		
CE	13	SS	32.0	34.0	2-2-5-5	24			****	SW	Sand, medium to coarse; trace gravel, small		
ÄEN									****		pebbles, subangular to subround; some coal,		
Ë								_			highly weathered; stratified; well graded; dry;		
R									*****		pale brown (10YR 6/3).		
-OR	14	SS	34.0	36.0	6-6-6	22		-	*****		paic brown (1011000).		
SE		00	0 1.0	00.0					****				
RU								35 —	****	SP	Sand, fine to coarse, subround; trace to little		
₹										32	silt; poorly graded; dry; yellowish brown (10YR		
SEF								_			5/4).		
S	15	SS	36.0	38.0	0-6-6-6	19					31 4).		
								_					
P.													
0													
	16	SS	38.0	40.0	2-3-3-2	20		_					
AVE													
S.								-					
AEP.GDT - 10/05/16 15:59 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUM													
TS)	17	SS	40.0	42.0	2-2-3-5	22		40 —					
띩	''	55	∓0.0	¬∠.U	2-2-0-0								
8								-					
Y.													
ER								_					
À	18	SS	42.0	44.0	1-3-5-6	24					Note: From 42 to 43 feet moist.		
ö												∇	
5:59								_			Note: At 43 feet wet.		
6 15													
12/1	19	ss	44.0	46.0	8-9-10-13	24		_		SP	Sand, medium to coarse, subround; trace to		
10/	-					'					little silt; poorly graded; wet; yellowish brown		
Ë								45 -			(10YR 5/4).		
GE.											Note: Recovered sample was all heaved		
AEF					<u> </u>						·		

JOB NUMBER **OH015976.0009**

COMPANY <u>American Electric Power</u> BORING NO. <u>MW-1606D</u> DATE <u>10/05/16</u> SHEET <u>3</u> OF <u>4</u>
PROJECT <u>Mountaineer Plant</u> BORING START <u>05/12/16</u> BORING FINISH <u>05/13/16</u>

$\overline{}$											
삑똢	щ	SAM		STANDARD PENETRATION RESISTANCE	_ _E RQ[DEPTH	ဍ	S	COIL / DOCK		DDILL EDIC
MPI	SAMPLE	DEF IN F		RESISTANCE		IN	GRAPHIC LOG	SC	SOIL / ROCK	WELL	DRILLER'S
SAMPLE NUMBER	SAI					FEET	GR/ L	õ	IDENTIFICATION	>	NOTES
20	SS	FROM 46.0	TO 48.0	BLOWS / 6" 10-15-23-23	29		2,505	SP	\sands.		
20	33	40.0	40.0	10-13-23-23	29			OI	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).		
						50 -					
22	SS	50.0	52.0	9-9-3-2	16	30		SP	Sand, medium to coarse; trace fine,		
						.			subangular to subround; poorly graded; wet;		
									yellowish brown (10YR 5/4).		
00	00	50.0	540	0.000	40			0.0	One de mandiage de la constant de la		
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).		
						1					
24	ss	54.0	56.0	3-9-13-30	24	1 -	1				
-		00	00.0								
						55 -					
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).		
								SP	Sand, medium to coarse, subround; poorly		
	00	60.0	62.0	7-12-15-10	40	60 -	-		graded; wet; yellowish brown (10YR 5/4).		
27	SS	60.0	62.0	7-12-15-10	16						
						-	-				
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;		
						-	1		wet; yellowish brown (10YR 5/4).		
29	SS	64.0	66.0	9-12-18-19	19						
						65 -					
						05 -					
						.					
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		
						1			gray (10YR 6/2).		
24	60	60.0	70.0	0 0 04 7	12] -					
31	SS	68.0	70.0	8-8-24-7	13	1					
						-		01.	│ │\ Note: At 60 feet 40% granules to small		
						1		SM	pebbles.		
32	SS	70.0	72.0	8-23-7-11	19	70 -		SP	Sand, fine to coarse; some silt; trace clay; well		
-		. 5.0		5 = 5 ,	.	1		٠.	graded; wet; yellowish brown (10YR 5/4).		
						1 -	1		Sand, medium to coarse, subround; poorly		
						1	****	SW	\graded; wet; yellowish brown (10YR 5/4).		
						-			<u>-</u>		

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606D

DATE 10/05/16

SHEET 4 OF 4

POPING START 05/12/16

ROPING EINISH 05/13/16

				Electric Powe	er					RING NO. <u>MW-1606D</u> DATE <u>10/05/16</u> SH		
PROJE	ECT	_ IVIOU	intaine	er Plant					во	RING START <u>05/12/16</u> BORING FINISH	-l _0:	5/13/16
SAMPLE	SAMPLE	SAM DEF IN F	PLE PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
33 5									SP	Sand and gravel, medium to coarse, small to		
33 8	SAMPLE SAMPLE	DEF	76.0	PENETRATION RESISTANCE BLOWS / 6" 13-20-22-23 14-13-10-10	TOTAL TOTAL 12 TOTAL 12 TOTAL 12 TOTAL 12 TOTAL 12 TOTAL 15 TOTAL 15 TECOVER	%	1N FEET	GRAPHIC CRAPHIC LOG	s c		WELL	
EP.GDT - 10/05/16 15:59 - C./CHERYL/PROJECTS/GINT SAVED TO COLUMBUS SEF												

JOB	NUM	IBER	OH01	5976.00	09		_		LO	GΟ	F BORING					
CON	/IPAN	Y A n	nerican	Electr	ic Pow	er				ВС	RING NO. MW-16	606S	_ DATE	10/05/16 s	HEET	OF
PRC	JEC ⁻	Г <u>Мо</u>	untaine	er Pla	nt					ВС	RING START _	05/17	7/16	_ BORING FINIS	н <u>0</u>	5/17/16
200	RDI	NATES	N 719	,649.2	E 1,73	33,939	.3			PIE	ZOMETER TYPE	<u> NA</u>		WELL TYP	E <u>0</u>	W
RC	UND	ELEVA	ATION_	587.3	SY	'STEM	N	DA 192	7	HG	T. RISER ABOVE	E GRO	UND 2.8	37 DI	A <u>2'</u>	•
Vat	er Le	vel, ft	<u> </u>	3.0	lacksquare		Ā			DE	PTH TO TOP OF	WELL	SCREE	N_49.0_BOTTO	м <u>5</u>	9.0
M		- , -			-		+-			WI	ELL DEVELOPME	ENT_ N	NΑ	BACKFIL	L <u>G</u>	rout
ΑT			5/17/	/2016						FIE	LD PARTY NA	١		RI	G <u>H</u>	ollow Stem Au
			.					T								
┦뚮	Щ		MPLE :PTH		DARD		RQD	DEPTH IN FEET	일	ဟ		80II	/ ROCK			DRILLER'S
SAMPLE	SAMPLE	1	FEET	RESIS	RATION TANCE	<->co>	%	IN	APP LOG	SC			FICATIO	N	WELL	NOTES
χZ	S/S		то То		VS / 6"		70	FEET	GR _	⊃	'	DENTI	FICATIO	IN	>	NOTES
0	NR		44.0								Straight drilled t	from 0	to 44 fee	t; geologic		
								_			descriptions add	apted f	rom the a	idjacent boring		
											IVIVV-1606D.					
								-								
								-								
								-								
								5 –								
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								15 –	-							
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								-	1							
								_								
							T							_		
				ASING	USED						Cont	tinued	l Next F	Page		
NI A		NQ-2 F	ROCK CO	DRE			=							ROUS TIP, SS		PEN TUBE
NA NA		6" x 3.2 9" x 6.2	25 HSA					SLC	OTTE	ED S	CREEN, G =	GEO	NOR, P	= PNEUMATI	С	
NA		HW CA	SING A	DVANCE	R	4" 3"	\Box	WELL T	YPE:	O	W = OPEN TU	JBE S	LOTTE	D SCREEN, G	6M =	GEOMON
NA NA		NW CA				3" 6"					RECORDER			·		
NA			MMER			8"					NECONDER .	ט . ו	arrion			

JOB	NUM	BER _	OH015	5976.0009		_		LU	G O	- BORING		
COM	1PAN	Y <u>Am</u>	erican	Electric Pow	er				во	RING NO. <u>MW-1606S</u> DATE <u>10/05/16</u> SI	HEET	2 OF 3
PRO	JECT	Mou	ıntaine	er Plant					во	RING START <u>05/17/16</u> BORING FINISH	⊣ <u>0</u>	5/17/16
SAMPLE NUMBER	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
							 25 					
							30					
							35					
							40				Ā	
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).		

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1606S DATE 10/05/16 SHEET 3 OF 3

PROPING START 05/17/16 PORING FINISH 05/17/16

F	PRO	JECT	Mou	ıntaine	er Plant					RING START BORING FINIS	H <u>0</u>	5/17/16
1	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM 46.0	PLE PTH EET TO 48.0	STANDARD PENETRATION RESISTANCE BLOWS / 6" 2-2-5-5	10TAL LENGTH RECOVERY	QD DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
PJ	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).		
MOUNTAINEER.G		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).		
OGS 9-2016/AEP		SS	52.0 54.0	54.0 56.0	5-5-4-4 10-22-15-22	18	-		SP	Sand, fine to coarse; trace silt; trace gravel, small pebbles, subround; poorly graded; wet; yellowish brown (10YR 5/4).		
AEP.GDT - 10/05/16 16:01 - C.:CHERYLIPROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ		-	34.0	30.0	10-22-13-22	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.		
FOR REFERENCE/AEF										illiomation.		
MBUS SERVER USE												
AT SAVED TO COLU												
RYL/PROJECTS/GIN												
15/16 16:01 - C:\CHE												
AEP.GDT - 10/0												

IOB	OB NUMBER OH015976.0009								LO	GΟ	F BORING			
		_		Electr		er				ВС	ORING NO. <u>MW-1607D</u> DATE <u>10</u>	// 05/16 S⊢	IEET _	1 OF 4
PRO	JECT	Mo	untaine	er Pla	nt			_			PRING START 05/18/16 B			
coo	RDIN	IATES	N 719	,235.7	E 1,73	34,361	.8			PIE	EZOMETER TYPE NA	WELL TYPE	O'	W
			TION_					AD 192	7	HG	ST. RISER ABOVE GROUND 3.18	DIA	2"	•
Wate	r I ev	/el, ft	<u> </u>	6.0	lacksquare		V				PTH TO TOP OF WELL SCREEN_		80).0
TIME		voi, it	<u>+</u> +0).U	-		+	•			ELL DEVELOPMENT NA			
DAT			5/19/	2016			+				ELD PARTY NA			ollow Stem Auge
ואט	-		3/10/	2010										
ш қ	щ		MPLE		DARD		RQD	DEPTH	೨	တ				
SAMPLE NUMBER	SAMPLE		PTH EET	PENET	RATION TANCE	E P S S	0.1	DEPTH IN FEET	APH LOG	SC	SOIL / ROCK		WELL	DRILLER'S
žΞ	SA	FROM			/S / 6"	F글잂	%	FEET	GR	Š	IDENTIFICATION		>	NOTES
0	NR	0.0	8.0	BLOV	V3/0	0					Straight drill boring to 8 feet, boring	was		
									-		pre-drilled for utility clearance; no s were taken.			
								5 -						
1	SS	8.0	10.0	1-2	-3-4	24			_	ML	Silt, trace to little clay, non-plastic, dilatancy; trace sand, very fine; mo 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 well graded; moist; light yellowish b 6/4).			
3	SS	12.0	14.0	2-4	-5-5	20				CL	Clay; little silt; medium to high plass to little very fine to fine sand; moist; 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 yellowish brown (10YR 5/4).	graded; dry;		
5	SS	16.0	18.0	6-9-	10-8	18				SW	Sand, medium to coarse; some gra medium pebbles, little fine, subang subround; well graded; dry; yellowis (10YR 5/4).	ular to		
6	SS	18.0	20.0	6-9-	8-11	14					Note: At 19.5 feet coal fines presen	ıt.		
		TVP		ACINIO	HOED				<u> •´•`•</u>	l				
				ASING	USED						Continued Next Pag			
NA	NQ-2 ROCK CORE IA 6" x 3.25 HSA										PE: PT = OPEN TUBE PORO			PEN TUBE
NA		9" x 6.2	5 HSA		_			SL(ווע	בט צ	SCREEN, G = GEONOR, P = 1	PNEUMATI(ز	
NA NA		<u>HW CA</u> NW CA		DVANCE	R	<u>4"</u> 3"	$-\!$	WELL T	YPE:	O/	W = OPEN TUBE SLOTTED S	SCREEN, GI	M = (GEOMON
NA		SW CA	SING			6"					RECORDER T. Darmon			
NA		<u>AIR HA</u>	MMER			8"								

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

	- NO	JLCI	_ IVIOU	IIItaiiie	er Plant					ьо	RING START <u>05/18/16</u> BORING FINISH	· _0.	<i>5/10/10</i>
	SAMPLE	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
ŀ	7	SS	20.0	22.0	9-13-13-6	24				SM	Sand and silt; fine to coarse; little to some		
	8	SS	22.0	24.0	5-5-9-10	19		-			gravel, small to medium pebbles, subangular to subround; trace clay; well graded; moist; yellowish brown (10YR 5/4).		
R.GPJ								-		SP	Sand, medium to coarse; trace silt; subround; poorly graded; dry; yellowish brown (10YR 5/4).		
ITAINEEF	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).		
EP MOUN	10	SS	26.0	28.0	6-5-6-5	24		-		SW	Sand, fine to coarse; some gravel, angular to		
GS 9-2016/AF								-			subround; trace silt; well graded; dry; yellowish brown (10YR 5/4).		
RORING LC	11	SS	28.0	30.0	5-6-6-5	22		-					
TAINEE	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).		
EP MOU								-			posity graded, aty, stemit (1011100).		
AEP.GDT - 10/05/16 16:03 - CACHERYLIPROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAREP MOUNTAINEER GRA	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).		
ER USE FOR R	14	SS	34.0	36.0	5-7-9-4	24		35 —					
IS SERVE	15	SS	36.0	38.0	5-6-6-9	21		-	*****	SW	Note: From 35.8 to 36 feet includes coal.		
TO COLUMBL								-			Sand, fine to coarse; trace gravel; small pebbles, subangular to subround; well graded; satinfin <1" thick, pale brown (10YR 6/3).		
GINT SAVED	16	SS	38.0	40.0	4-6-8-8	18		-			Note: From 26 to 39 feet includes trace to little amount of coal fragments.		
/L/PROJECTS	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).		
03 - C:\CHER\	18	SS	42.0	44.0	3-6-8-8	20		-					
- 10/05/16 16:	19	SS	44.0	46.0	4-6-7-8	24		45 -					
VEP.GDT								-			Note: At 46 feet, saturated.	∇	
_											Continued Next Page	-	

JOB NUMBER OH015976.0009

COMPANY American Electric Power

PROJECT Mountaineer Plant

BORING NO. MW-1607D

BORING START 05/18/16

BORING FINISH 05/18/16

PRO	JECI	_ IVIOL	intaine	er Plant				ВС	RING START <u>05/18/16</u> BORING FINISI	H <u>05</u>	/18/16
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD DEPTH	GRAPHIC	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
20	SS SS	46.0	48.0 50.0	1-2-2-8 NM	0			SW	Sand, fine to coarse, subround; well graded; wet; yellowish brown (10YR 5/4). 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	58.0	7-9-14-15 7-10-10-13	15	55		SW	Sand, fine to coarse; little gravel, small pebbles; subround; medium to well graved, dark brown (10YR 7/4). Sand, fine to coarse; trace to little small		
26	SS	58.0	60.0	5-6-10-11	14				pebbles, subround; well graded; wet; pale brown (10YR 7/4).		
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	65		SP	Sand, medium to coarse; trace fine; trace silt; trace gravel; small to medium pebbles, subround, poorly graded; wet; yellowish brown (10YR 5/4).		
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	70		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					

JOB NUMBER <u>OH015976.0009</u>			
COMPANY American Electric Power	BORING NO. MW-1607D	DATE 10/05/16 SHE	ET 4 OF 4
PROJECT Mountaineer Plant	BORING START	BORING FINISH	05/18/16

	PROJECT Mountaineer Plant										RING START 05/18/16 BORING FINIS		
_													
1	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	33	SS	72.0	74.0	10-15-18-18	12			****				
	34	SS	74.0	76.0	9-12-12-7	11		- - 75 –					
JNTAINEER.GPJ	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).		
S 9-2016\AEP MOL	36	SS	78.0	80.0	20-30-22-11	24		-					
- LG								80 –			End of boring at 80 feet.	-	
SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ											See well construction log for development information.		
- AEP.GDT - 10/05/16 16:03 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS													
AEP.GDT - 10/C													

	JOB	OB NUMBER										F BORING					
(СОМ	PAN	Y A m	nerican	Electr	ic Pow	er				ВС	DRING NO. MW-	-1607S	DATE_ 1	0/05/16 SH	IEET	_1 OF3
F	PRO	JEC1	<u> Μοι</u>	untaine	er Pla	nt					ВС	ORING START	_05/26/	16	BORING FINISH	<u>0</u>	5/26/16
(000	RDIN	NATES _	N 719	9,232.0						PI	EZOMETER TY	PE <u>NA</u>		WELL TYPE	0	W
(GRO	UND	ELEVA	TION_	590.8	SY	STEM	NA	D 1927	<u>'</u>	Н	GT. RISER ABO	VE GROU	ND 3.20	DI <i>A</i>	<u>2</u> '	"
Ī	Wate	er Le	vel, ft	<u> </u>	6.0	lacksquare		Ā			DE	EPTH TO TOP C	OF WELL S	SCREEN_	50 BOTTOM	1 6	0
H	TIME		,			_		+-			W	ELL DEVELOPN	MENT_N	A	BACKFILL	_ <u>G</u>	irout
ŀ	DAT			5/26/	/2016						FII	ELD PARTY N	IA AI		RIG	<u>H</u>	ollow Stem Auger
L				0.20.											1		I
ŀ	O SAMPLE NUMBER	SAMPLE	DEI	MPLE PTH EET TO 50.0	PENET RESIS	DARD RATION TANCE VS / 6"	O LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	Straight drill b	IDENTIF	0 feet, bori	-	WELL	DRILLER'S NOTES
AEP - AEP.GDT - 10/05/16 16:06 - C.\CHERYLIPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAEP MOUNTAINEER BORING LOGS 9-2016\AEP MOUNTAINEER.GPJ	0								5 —			pre-drilled for were taken.	-		-		
- C:\CHERYL\PROJECTS\GINT SAVED TO COL									15 — - - -	-							
3 16:06			TYPE	OF C	ASING	USED						Со	ntinued	Next Pa	 ge		
/05/16			NQ-2 R	OCK CC	DRE				PIF7∩M	FTFF	R TYI				OUS TIP, SS	= 0	PEN TURF
T- 10	NA 6" x 3.25 HSA S S NA 9" x 6.25 HSA													PNEUMATION			
GD.	NA NA		HW CA	SING A	DVANCE	:R	4"		WELL T	YPF.	\circ	W = OPFN T	UBF SI	OTTED	SCREEN, G	M =	GEOMON
-AEF	NA		NW CA	SING			3"		VVLLL I	ii'Œ.					JOINELIN, G	.v	CLOIVIOIN
AEP.	NA NA		SW CAS				6" 8"			_	_	RECORDER	≀ <u>T. Da</u>	rmon			
	NA AIR HAMMER 8"																

JOB	NUM	BER _	OH015	5976.0009		_		LU	G OI	FBORING		
COM	IPAN	Y <u>Am</u>	erican	Electric Pow	er				во	RING NO. <u>MW-1607S</u> DATE <u>10/05/16</u> SH	HEET	2 OF 3
PRO	JECT	Mou	ıntaine	er Plant					ВО	RING START <u>05/26/16</u> BORING FINISH	1 <u>0</u>	5/26/16
SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	10	BLOWS 76*			25 -					
							- - 35 — -					
							40					
							45 —				∇	

	AEF CIVIL ENGINEERING LADORATORT													
JC	B NU	MBER	OH015	5976.0009				LO	GΟ	F BORING				
C	OMPA	NY Am	erican	Electric Power	er				ВС	RING NO. MW-1607S DATE 10/05/16 SI	HEET	3 OF 3		
PF	ROJE	T_ Mοι	ıntaine	er Plant					ВС	RING START <u>05/26/16</u> BORING FINISH	- <u>05</u>	5/26/16		
Ш		SAM	IPLE PTH	STANDARD PENETRATION	TH	RQD	DEPTH	2	S	SOIL / ROCK		DRILLER'S		
SAMPLE	UMBER	IN F	EET			%	DEPTH IN	RAPH LOG	SC	IDENTIFICATION	WELL	NOTES		
Š	Z S	FROM	ТО	BLOWS / 6"	RESO TO	/0	FEET	Ģ.	n	BENTHION		NOTES		
							-							
							_							
							_	1						
IEER.GPJ							50 -							
	I S	50.0	52.0	NA	0		50			Augers dropped 4 foot into hole due to heaving				

sands, no samples collected. AEP - AEP.GDT - 10/05/16 16:06 - C./CHERYL/PROJECTS/GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINE SS 52.0 54.0 NA 0 SS 54.0 56.0 WOH-WOH-2-2 No sample collected, no recovery, attempted resample but auger dropped additional 2 feet 55 due to heaving sands. SS 56.0 Sand; fine to coarse; trace to little gravel; small 58.0 4-5-6-10 15 pebbles; subround; moderate to well graded; wet; pale brown (10YR 7/4). SS 58.0 60.0 5-5 20 60 End of boring at 60 feet. See well construction log for development information.

		_		5976.0009		-						
				Electric P	ower					RING NO. <u>MW-1608</u> DATE <u>10/05/16</u> S		
				er Plant	1 720 644					RING START 06/02/16 BORING FINE		
				5,642.8 E 1 587.3	SYSTEM		D 1927			ZOMETER TYPE NA WELL TYPE T. RISER ABOVE GROUND 3.39	IA 2	
					STSTEIN					PTH TO TOP OF WELL SCREEN_46.0 BOTTO		
		el, ft	¥ 48	3.0		Ā	-			ELL DEVELOPMENT NA BACKFI BACKFI		
TIME			CIOI	2046								Hollow Stem Auge
DAT	<u> </u>		6/2/2	2016							. <u>.</u>	Tonow Otom Aug
SAMPLE NUMBER	SAMPLE	DE	MPLE PTH EEET	STANDAR PENETRATI RESISTAN BLOWS / (DO DO DO TO TOTAL ENGTH	RQD %	DEPTH IN FEET	RAPHIC	nscs	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM		BLOWS / 6			FEET	o .				
0	NR	0.0	12.0		0		5 - 5 - 10 -			Straighted drilled to 12 feet, boring was pre-drilled for utility clearance; no samples were taken.		
1	SS	12.0	14.0	5-4-5-5 3-1-1-2	24		-		ML	Silt; little clay; trace fine sand; dry; slow dilatancy; (10YR 4/5). Sand, fine to very fine; loose; dry.		
4	33	14.0	16.0	3-1-1-2	21					, 10 . 10. j j j j j j j j j		
5	ss	16.0	18.0	1-1-1-3	21		- 15 - - -					
6	SS	18.0	20.0	1-2-4-3	21		-					
	ı	TYP	E OF C	ASING US	ED		·	1000	4	Continued Next Page		
NA		6" x 3.2	OCK CC 5 HSA 5 HSA							E: PT = OPEN TUBE POROUS TIP, S CREEN, G = GEONOR, P = PNEUMAT		PEN TUBE
NA		H\\\\ \C ^	SING AT	JVANICED	Λ"	- 1				ODEN TUBE OF OTTER CORE	~ · ·	05014011
		HW CA NW CA SW CA	SING	OVANCER	4" 3" 6"		WELL T	YPE:	0\	V = OPEN TUBE SLOTTED SCREEN, O	GM =	GEOMON

JOB NUMBER OH015976.0009

COMPANY American Electric Power

BORING NO. MW-1608

BORING START 06/02/16

BORING FINISH 06/07/16

	PRO	JECI	IVIOL	ıntaıne	er Plant					ВО	RING START <u>06/02/16</u> BORING FINISH	1 06	/0//16
	SAMPLE NUMBER	SAMPLE	SAM DEF IN F	PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	7	SS	FROM 20.0	TO 22.0	14	14			0000				
GPJ	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).		
ER.	9	SS	24.0	26.0	10-16-14-11	13		_					
- 10/05/16 16:08 - C:\CHERYLIPROJECTS\GINT SAVED TO COLUMBUS SERVER USE FOR REFERENCEAEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER. GPJ	10	SS SS	26.0	28.0	8-12-12-14 9-15-12-14	17		25 — - -		SW	Note: At 25 feet trace coal and gravel (metamorphic; rounded); foliated. Sand; some gravel, fine to medium; angular; dominant; little silt; dry; loose; unstratified; gravel is igneous dominant; (10YR 4/3).		
DUNTAINEER BORING	12	SS	30.0	32.0	6-8-9-17	18		30 —					
REFERENCE/AEP MO	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).		
USE FOF	14	SS	34.0	36.0	7-10-12-9	24		35 —		SW	Sand, fine to coarse; little to some silt; little to some gravel, fine to medium dominant;		
COLUMBUS SERVER	15	SS	36.0	38.0	10-8-5-6	16		-			igneous, sedimentary and metamorphic; rounded dominant; dry; loose; unstratified; (10YR 4/3).		
SINT SAVED TO	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).		
LIPROJECTSIC	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).		
6:08 - C:\CHERY.	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		
DT - 10/05/16 10	19	SS	44.0	46.0	2-3-5-3	19		45 —			4/3). Note: From 44 to 46 feet wet; trace coarse gravel, rounded, igneous.		
AEP.GDT											Note: Heaving sands.		
ı.											Continued Next Page		

JOB NUMBER OH015976.0009

COMPANY American Electric Power BORING NO. MW-1608 DATE 10/05/16 SHEET 3 OF 3

PROJECT MOUNTAINOUR Plant

PORING START 06/03/16 RORING FINISH 06/07/16

F	PRO	ROJECT Mountaineer Plant									FING START 06/02/16 BORING FINISH	_	
_					1				_				
	SAMPLE	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
3PJ		SS SS	46.0	50.0	4-4-5-4	17		-		SW	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.	∇	
SERVER USE FOR REFERENCE/AEP MOUNTAINEER BORING LOGS 9-2016/AEP MOUNTAINEER.GPJ		SS	50.0	52.0	6-8-11-9	16		50 -			Silty sand; wet; loose; unstratified; sand is fine to medium; brown. Note: From 50 to 52 feet wet; incluse 20% coal material, fragments up to 3cm in size.		
GS 9-2016/AEP	23	SS	52.0	54.0	5-7-7-10	13		-		SW	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		
ER BORING LO	24	SS	54.0	56.0	8-11-15-17	13		55 –			size. Note: From 54 to 56 feet wet; no coal fragments.		
EP MOUNTAINE	25	SS	56.0	58.0	11-15-16-13	14		-		SM	Silt and sand; wet; loose; sand is fine to medium; brown.		
REFERENCE/A	26	SS	58.0	60.0	8-15-18-13	16				SW	Sand with silt; trace gravel; wet; loose; unstratified; sand is fine to coarse; gravel is medium to coarse, subrounded; brown.		
	27	SS SS	62.0	62.0 64.0	9-14-16-20 2-12-40-50/2	14		60 -		SW	Silty sand; trace fine gravel; wet; loose; unstratified; sand is fine to coarse; (10YR 4/3).		
VED TO COLUMBL	29	SS	64.0	66.0	20-50/4	24		-		SW	Recovery was all heaved sand.		
OJECTS/GINT SA	30	SS	66.0	68.0	12-20-25-30	0.9		65 – -		SP	Fine sand with silt; wet; loose; sand is very fine to fine dominant; bottom of recovery includes		
AEP.GDT - 10/05/16 16:08 - C:\CHERYL\PROJECTS\GINT SAVED TO COLUMBUS	31	SS	68.0	70.0	12-15-20-20	17		- - -		SW (SP) SP	coarse gravel (chert), subangular; (10YR 5/2). Note: At 68 feet coursing with depth. Sand and gravel; trace silt; clean-washed interval; wet; loose.		
AEP.GDT - 10/05/16 16								70 -			Sand with silt; little fine; gravel; wet; loose. 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)

[3.0' (Pro-Cover stick-up)			
		↓ LAND SURFACE	Project <u>AEP - Mo</u>	ountaineer	WellMW-1601A_
	7 7		Town/City	New Haven	
	2 E		County	Mason County	_State _WV
ŀ		8inch diameter	Permit No.	N/A	
	1 K	drilled hole	Land-Surface (LS) E	levation and Datum:	
			LS: 607.47; TOC: 610	0.66 feet	X Surveyed
	2 P	— Well casing.		.551	☐ Estimated
	2 P	3,	Installation Data(a)	6/0/00	
	2 K	2 inch diameter, Schedule 40	Installation Date(s)	6/9/20	
		Backfill	Drilling Method	Hollow Stem	Auger
		ズGrout 270 gallons	Drilling Contractor	DLZ Ohio, Inc	D.
			Drilling Fluid	None	
	7 P	58 ft* Top of pellets	2ga.a		
	4 6				
		Top of secondary Bentonite Slurry			
		X pellets 62 ft* Top of Global #6 secondary filter pack	•	ment Technique(s) an sible Impeller Pump (6	, ,
		63 ft* Top of Global #5 primary filter pack	Submers	sible impelier Fump (o	(13/10)
		Top of Primary			
		07.0 ()+	Fluid Loss During Dri	illing N/A	gallons
	Н	67.0 ft* (Top of screen)	Water Removed Dur	ing Development	30gallons
	1		Static Depth to Wate	er 65.81	feet below M.P.
		Well Screen.	Dumping Donth to W	ater 80	foot bolow M.D.
		inch diameter PVC ,0.10slot	Pumping Depth to W		
		Total screen length 9.6'	Pumping Duration	NMhours	8
			Yield N//	A gpm	Date 6/15/2016
		Gravel Pack	Specific Capacity	N/A gpm/	ft
	1	x Sand Pack			
			Mall Dumass	Manitarina	.II
		Formation Collapse	Well Purpose	Monitoring we	<u> </u>
		**			
		ft*	Remarks Well Inst	alled in the alternate #	‡1 boring at
		78 ft*	this locat	tion.	
		86 ft Natural collapse from 78 to 86 ft			
		Measuring Point is Top of Well Casing			
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared by	Judd Wanner	
		•			



		3.0' (Pro-Cover stick-up)				
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	WellMW-1602
	7	150 pounds of hole plug were used after grout subsided	Town/City		New Haven	
	2 B	and grout subsided	County	-	Mason County	_State WV
	2 B	8 inch diameter	Permit No.		N/A	
	<i>a</i> n	drilled hole	Land-Surfa	ace (LS) El	evation and Datum:	
	$A \ B$		LS: 602.37	7; TOC: 605	5.12 feet	X Surveyed
	A 11	Well casing,				Estimated
	1 N	2inch diameter,	Installation	n Date(s)	5/10/2	016
	1 B	Schedule 40	Drilling Me	ethod	Hollow Stem	Auger
-		Backfill				
		X Grout 378 gallons	Drilling Co	ontractor	DLZ Ohio, Inc	0.
	<i>a a</i>		Drilling Flu	uid	None	
	44	52ft* Top of pellets	-			
	•	Top of secondary Bentonite Slurry				
		Bentonite slurry X pellets (100 pounds)		Developn	ment Technique(s) an	d Date(s)
		 57 ft* Top of global #6 secondary filter pack (50 58 ft* Top of global #5 primary filter pack (100 pc 	,	Waterra ((6/7/16)	
			,	Submers	ible Impeller Pump (6/15/16)
		Top of Primary				
		04.0	Fluid Loss	During Dri	illing N/A	gallons
		61.0 ft* (Top of screen)	Water Rer	moved Duri	ing Development	37.9gallons
		_	Static Dep	th to Water	r <u>59.82</u>	feet below M.P.
		`—Well Screen. 2 inch diameter	Pumping [Depth to Wa	ater 70	feet below M.P.
		PVC , 0.10 slot Total screen length 9.6'	Pumping [•	NM hour	
		, e.a. esi eei i esi gai ei e	Yield		4gpm	Date _ 6/15/2016
		/ Gravel Pack	Specific C		N/A gpm/	
		/ 🖰	Specific C	арасну	gpm/	TI.
		X Sand Pack				
		Formation Collapse	Well Purpo	ose	Monitoring we	ell
		ft*	Remarks			
		Measuring Point is Top of Well Casing				
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared l	by	Judd Wanner	-



	3.0' (Pro-Cover stick-up)					
	↓ LAND SURFACE	Project	AEP - Mour	ntaineer	_Well	MW-1603
7 7	350 pounds of hole plug were used	Town/City	N	lew Haven		
	after grout subsided	County		Mason County	State	WV
	8 inch diameter	Permit No	. <u> </u>	I/A		
1 V	drilled hole	Land-Surfa	ace (LS) Elev	ation and Datum:		
		LS: 602.92	2; TOC: 606.3	0 feet	X Sur	veyed
	— Well casing,					imated
	2 inch diameter,	Installation	n Date(s)	5/4/20	16	
	Schedule 40	Drilling Me	_	Hollow Stem		
	☐Backfill	3	_			
	X Grout 459 gallons	Drilling Co	ontractor _	DLZ Ohio, Inc	i	
		Drilling Flu	uid _	None		
2 2	53ft* Top of pellets					
•	Top of secondary					
	Bentonite slurry X pellets (75 pounds)		Developme	nt Technique(s) and	d Date(s)
	56 ft* Top of global #6 secondary filter pack (50 ft* Top of global #5 primary filter pack (250 pc	. ,	Waterra (6/	10/16)		
	10p of global #3 printary liner pack (230 pc	Julius)	Submersible	e Impeller Pump (6	/15/16)	
	Top of Primary					
		Fluid Loss	During Drillin	ng N/A		_gallons
Н	60.0ft* (Top of screen)	Water Rer	moved During	Development	47.5	gallons
N		Static Dep	oth to Water	61.35	feet	below M.P.
	Well Screen. 2 inch diameter	Pumning [Depth to Wate	er 79	feet	below M.P.
	PVC , 0.10 slot Total screen length 9.6'		•			below W.I .
	rotal screen length 9.6	Pumping [_			- 0/45/0040
				gpm		e <u>6/15/2016</u>
	Gravel Pack	Specific C	apacity	N/A gpm/	ft	
•	X Sand Pack					
	Formation Collapse	Well Purpo	ose _	Monitoring we	·II	
		_				
	ft*	Remarks				
		Nomaliks				
	Measuring Point is Top of Well Casing					
	Unless Otherwise Noted.					
	* Depth Below Land Surface	Prepared I	by _	Judd Wanner		



ſ]	3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	_Well	MW-1604D
	7 7	175 pounds of hole plug were used after grout subsided	Town/City		New Haven		
	2 B	and grout substitut	County		Mason County	State	WV
	2 B	8 inch diameter	Permit No.		N/A		
	A 11	drilled hole	Land-Surfa	ace (LS) El	evation and Datum:		
	/ X		LS: 595.59); TOC: 598	8.22 feet	X Sur	veyed
	1 H	Well casing,				☐ Est	imated
-	1 B	2 inch diameter,	Installation	Date(s)	5/4/20	— 16	
-	1 B	Schedule 40	Drilling Me	thod	Hollow Stem	Auger	_
ŀ		Backfill	J				
		X Grout 270 gallons	Drilling Co	ntractor	DLZ Ohio, Inc).	
	A B		Drilling Flu	iid	None		
	44	62 ft* Top of pellets					
	•	Top of secondary					
		Bentonite slurry X pellets (50 pounds)			nent Technique(s) an		
		 65 ft* Top of global #6 secondary filter pack (50 ft* Top of global #5 primary filter pack (250 pc 		Waterra a	and Submersible Pun	np (6/9/16	6)
			,				
		Top of Primary					
		CO O 44*	Fluid Loss	During Dri	lling N/A		_gallons
		69.0 ft* (Top of screen)	Water Ren	noved Duri	ing Development	45.1	_gallons
		\	Static Dept	th to Wate	54.56	feet	below M.P.
		`_Well Screen. 2 inch diameter	Pumping D	Depth to Wa	ater NM	feet	below M.P.
		PVC , 0.10 slot Total screen length 9.6'	Pumping D	Ouration	NM hours		
		, casa conconnongan ord	Yield	NN			e 6/9/2016
		(Convet Book			<u></u> 5.		0/3/2010
		Gravel Pack	Specific Ca	араспу	NMgpm/	IL	
	1	Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring we	ell	
		ft*	Remarks	Primary f	ilter pack is #5 global	sand; se	condary
		80ft*			c is global #6 sand.		
		Measuring Point is Top of Well Casing					
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared b	DV	Judd Wanner		
		•	,	,			



[3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	Well	MW-1604S
	7 7	125 pounds of hole plug were used after grout subsided	Town/City		New Haven		
	2 K	alter grout subsided	County		Mason County	State	WV
	2 Z	8 inch diameter	Permit No		N/A		
	16	drilled hole	Land-Surfa	ace (LS) El	evation and Datum:		
	1 K		LS: 595.48	3; TOC: 598	8.07 feet	X Sur	veyed
ļ	<i>1</i> /	Well casing,				Est	imated
ŀ	1 V	2inch diameter,	Installation	n Date(s)	5/2/2	016	
	1 V	Schedule 40	Drilling Me	ethod	Hollow Stem	Auger	
		☐Backfill				-	
		☐ Grout 162 gallons	Drilling Co	ntractor	DLZ Ohio, In	C.	
			Drilling Flu	uid	None		
ĺ	4 2	. 42 ft* Top of pellets					
	•	Top of secondary					
		Slurry X pellets (75 pounds)		Developn	nent Technique(s) ar	nd Date(s))
		45 ft* Top of global #6 secondary filter pack (50 ft* Top of global #5 primary filter pack (500 pc	. ,	Waterra ((6/9/16)		
		1 Top or global we printerly litter pack (000 pt	Junu3)	Submers	ible Impeller Pump (6/16/16)	
		Top of Primary					
			Fluid Loss	During Dri	lling N/A		_gallons
		49.0 ft* (Top of screen)	Water Rer	moved Duri	ing Development	30.8	gallons
	١		Static Dep	th to Water	r 54.49	feet	below M.P.
		Well Screen. 2 inch diameter	Pumpina [Depth to Wa	ater 62	feet	below M.P.
		PVC , 0.10 slot		•			DCIOW IVI.I .
		Total screen length 9.6'	Pumping [NMhoui		
			Yield	N/A	A gpm	Date	e <u>6/16/2016</u>
		Gravel Pack	Specific C	apacity	N/A gpm	/ft	
	-	x Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring w	ell	
		ft*	Domorko				
		60ft*	Remarks				
		Measuring Point is					
		Top of Well Casing Unless Otherwise Noted.	_				
		* Depth Below Land Surface	Prepared I	by	Judd Wanne	r	



	_	3.0' (Pro-Cover stick-up)			
		↓ LAND SURFACE	Project <u>AEP - M</u>	lountaineer	WellMW-1605D
	7 7	200 pounds of hole plug were used after grout subsided	Town/City	New Haven	
	7 /	g	County	Mason County	_State _WV
	<i>a a</i>	8.25 inch diameter	Permit No.	N/A	
ŀ	<i>A</i>	drilled hole	Land-Surface (LS) E	Elevation and Datum:	
	1 K		LS: 588.51; TOC: 59	91.01 feet	X Surveyed
		Well casing.			☐ Estimated
	7 /	2 inch diameter,	Installation Date(s)	5-9-16	
	2 B	Schedule 40		•	
	2 2	Backfill	Drilling Method	Hollow Stem	Auger
ŀ		X Grout 419 gallons	Drilling Contractor	DLZ Ohio, Inc	o
	1 D		Drilling Fluid	Potable water	r
		62 ft* Top of pellets	-		
		✓ Top of secondary			
		Bentonite slurry			
		X pellets (75 pounds) 65 ft* Top of global #6 secondary filter pack (50		ment Technique(s) an and Submersible Pun	, ,
		66 ft* Top of global #5 primary filter pack (200 p			
		Top of Primary			
		69.0 ft*	Fluid Loss During Dr	rilling 400	gallons
		(Top of screen)	Water Removed Du	ring Development	65 gallons
		\	Static Depth to Water	er <u>47.51</u>	feet below M.P.
		`_Well Screen. 2 inch diameter	Pumping Depth to W	Vater NM	feet below M.P.
		PVC , 0.10 slot Total screen length 9.6'	Pumping Duration		
		Total Screen length 9.0			
			Yield N/	<u>/A</u> gpm	Date <u>6/8/2016</u>
		Gravel Pack	Specific Capacity	N/A gpm/	/ft
	-	x Sand Pack			
		Formation Collapse	Well Purpose	Monitoring we	ell
		79 ft*			
		80 ft*	Remarks		
l		. <u> </u>			
		Measuring Point is			
		Top of Well Casing			
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared by	Tom Darmon	



[3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	_Well	MW-1605S
	7 7	350 pounds of hole plug were used after grout subsided	Town/City		New Haven		
	2 B	allel grout subsided	County		Mason County	State	WV
	2 B	8.25 inch diameter	Permit No.		N/A		
ŀ	A 11	drilled hole	Land-Surfa	ace (LS) E	levation and Datum:		
ŀ	1 X		LS: 588.51	1; TOC: 59	0.86 feet	X Sur	veyed
	1 N	Well casing,				☐ Est	imated
	1 B	2 inch diameter,	Installation	n Date(s)	5/1:	<u> </u>	
	<i>a</i>	Schedule 40	Drilling Me	ethod	Hollow Stem	Auger	
		Backfill	Ü				
ľ		X Grout 162 gallons	Drilling Co	ntractor	DLZ Ohio, Inc).	
	<i>a a</i>		Drilling Flu	uid	Potable water		
	44	42 ft* Top of pellets					
	•	Top of secondary					
		Bentonite Slurry X pellets (150 pounds)		Developr	ment Technique(s) an	d Date(s))
		45 ft* Top of global #6 secondary filter pack (75 ft* Top of global #5 primary filter pack (250 pc	. ,	Waterra	(6/8/16)		
		10p of global #3 primary liner pack (230 pc	Julius)	Submers	sible Impeller Pump (6	/16/16)	
		Top of Primary					
			Fluid Loss	During Dr	illing 200		_gallons
	Н	ft* (Top of screen)	Water Rer	moved Dur	ing Development	36.1	gallons
			Static Dep	th to Wate	r 47.36	•	below M.P.
		Well Screen. 2 inch diameter	Pumping [below M.P.
		PVC , 0.10 slot		•			below M.F.
		Total screen length 9.6'	Pumping [NMhours		
		_	Yield	N/	Agpm	Date	e <u>6/16/2016</u>
		Gravel Pack	Specific C	apacity	N/Agpm/	ft	
	1	x Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring we	ell	
		59ft*					
		60ft*	Remarks		s due to heaving sand ed water could not be o		
				out auge		_l uantine(ı io ciean
		Measuring Point is		out auge	10.		
		Top of Well Casing Unless Otherwise Noted.					
		* Depth Below Land Surface	Prepared I	by	Tom Darmon		



		3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	_Well	MW-1606D
	7 7	100 pounds of hole plug were used	Town/City		New Haven		
ļ	26	after grout subsided	County		Mason County	_State	WV
ţ	12	8.25 inch diameter	Permit No.		N/A		,
ţ	1/2	drilled hole	Land-Surfa	ace (LS) El	evation and Datum:		
ţ	1 K		LS: 587.25	5; TOC: 590	0.10 feet	X Sur	veyed
Ł	1 V	Well casing,				Esti	mated
Ł	1 V	2 inch diameter,	Installation	n Date(s)	5-16-16	to 5-17-1	16
Ł	1 V	Schedule 40	Drilling Me	ethod	Hollow Stem	Auger	
		☐Backfill					
		☐ Grout 297 gallons	Drilling Co	ntractor	DLZ Ohio, Inc).	
F			Drilling Flu	ıid	Potable water	-	
ľ	4 2	58ft* Top of pellets	-				
	•	Top of secondary					
		slurry X pellets (75 pounds)		Developn	nent Technique(s) an	d Date(s)	
		Fit* Top of global #6 secondary filter pack (25 ft* Top of global #5 primary filter pack (200 pc	. ,	Waterra a	and Submersible Pun	np (6/9/16	5)
		1 Top or global #0 printery lines pack (200 pc	odildo)	Submers	ible Impeller Pump (6	/15/16)	
		Top of Primary					
			Fluid Loss	During Dri	lling250		_gallons
	Н	65ft* (Top of screen)	Water Rer	noved Duri	ng Development	67	_gallons
			Static Dep	th to Water	46.03	feet	below M.P.
		Well Screen. 2 inch diameter	Pumping Γ	Depth to Wa	ater 77.5	feet	below M.P.
		PVC , 0.10 slot		•			bolow Will .
		Total screen length 9.6'	Pumping [NM hours		C/4E/2046
			Yield		A gpm		6/15/2016
		Gravel Pack	Specific C	apacity	N/Agpm/	ft	
	-	──x Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring we	ell	
							_
		ft*	Remarks				
			Romano				
		Measuring Point is Top of Well Casing					
		Unless Otherwise Noted.	Droporod	by	Tom Dorman		
		* Depth Below Land Surface	Prepared I	Uy	Tom Darmon		



ſ		3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project	AEP - Mo	ountaineer	WellMW-1606S	<u>}</u>
	7 7	100 pounds of hole plug were used after grout subsided	Town/City		New Haven		_
	2 B	and grout subsided	County	-	Mason County	_State _WV	_
	2 B	8.25 inch diameter	Permit No.		N/A		_
	<i>a</i>	drilled hole	Land-Surfa	ace (LS) El	evation and Datum:		
	$A \aleph$		LS: 587.28	3; TOC: 590	0.15 feet	X Surveyed	
	1 N	Well casing,				Estimated	
	1 N	2inch diameter,	Installation	n Date(s)	5/17/16	6 - 5/18/16	
	1 B	Schedule 40	Drilling Me	ethod	Hollow Stem	Auger	
-		Backfill					_
		X Grout 108 gallons	Drilling Co	ntractor	DLZ Ohio, Inc).	_
			Drilling Flu	ıid	None		_
	44	38ft* Top of pellets					_
	•	Top of secondary Bentonite Slurry					_
		X pellets (100 pounds)		Developn	ment Technique(s) an	d Date(s)	
		4 1 ft* Top of global #6 secondary filter pack (100 42 ft* Top of global #5 primary filter pack (250 pc	'	Waterra ((6/8/16)		_
			,	Submersi	ible Impeller Pump (6	/15/16)	_
		Top of Primary					_
		45 04	Fluid Loss	During Dri	lling 0	gallons	
		45 ft* (Top of screen)	Water Rer	noved Duri	ing Development	29.5 gallons	
		_	Static Dep	th to Water	r 46.02	feet below M.P.	
		`—Well Screen. 2 inch diameter	Pumping [Depth to Wa	ater 57	feet below M.P.	
		PVC , 0.10 slot Total screen length 9.6'	Pumping [•	NM hours		
		Total Sciedificing 1 5.5	Yield			Date _6/15/2016	
		(Convert Break			<u></u> 5.		<u>'</u>
		Gravel Pack	Specific C	apacity	N/Agpm/	π	
		X Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring we	ell	_
							_
		<u>55</u> ft*	Remarks				_
		ft*					_
							_
		Measuring Point is Top of Well Casing					
		Unless Otherwise Noted. * Depth Below Land Surface	Prepared I	by	Tom Darmon		_
		·	•	-			_



		3.0' (Pro-Cover stick-up)					
		↓ LAND SURFACE	Project AE	EP - Mou	ıntaineer	_Well	MW-1607D
ļ	7 7	100 pounds of hole plug were used after grout subsided	Town/City		New Haven		
	2 B	alter grout subsided	County		Mason County	_State	WV
ŀ	ЯИ	8.25 inch diameter	Permit No.		N/A		
	1 B	drilled hole	Land-Surface	(LS) Elev	vation and Datum:		
			LS: 590 75: TO	` ′ ∩C: 593 !	93 feet	X Sur	veved
	7 B	— Well casing.	20.000.70, 10	00.000.	1000		imated
	7 N	3 ,					imated
ŀ	ЯИ	2 inch diameter, Schedule 40	Installation Da	ate(s)	5/19	9/2016	
	1 B	Backfill	Drilling Method	d _	Hollow Stem /	Auger	
		□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	Drilling Contra	actor	DLZ Ohio, Inc		
	<i>a</i> a		-	_			
	2 B		Drilling Fluid	-	Portable wate	r	
	4 K	63 ft* Top of pellets					
	•	Top of secondary Bentonite Slurry					
		X pellets (100 pounds)			ent Technique(s) and)
		66 ft* Top of global #6 secondary filter sand (50 ft* Top of global #5 primary filter sand (250 pc		ubmersib	le Impeller Pump (6	/15/16)	
			_				
		Top of Primary					
			Fluid Loss Dur	ring Drilli	ing300		_gallons
	\mathbb{H}	70_ft* (Top of screen)	Water Remove	ed Durin	g Development	8.5	gallons
	N	,	Static Depth to		- '		below M.P.
		Well Screen.	•				DOIOW WIT.
		2 inch diameter PVC , 0.10 slot	Pumping Dept	th to Wat	ter <u>80</u>	feet	below M.P.
		Total screen length 9.6'	Pumping Dura	ation _	NM hours	3	
			Yield	N/A	gpm	Date	e <u>6/15/2016</u>
		Gravel Pack	Specific Capac	city	N/A gpm/	ft	
		/ — —x Sand Pack		_			
		A Sand Fack					
		Formation Collapse	Well Purpose	-	Monitoring we	·II	
		80ft*	Remarks Flu	uid loss d	due to heaving sand	estimate	ed.
		<u>81</u> ft*			water could not be o		
				ıt augers			
		Measuring Point is Top of Well Casing					
		Unless Otherwise Noted.			- -		
		* Depth Below Land Surface	Prepared by	_	Tom Darmon		



[3.0' (Pro-Cover stick-up)					
	П	↓ LAND SURFACE	Project	AEP - M	ountaineer	_Well	MW-1607S
	7 7	V END CONTROL	Town/City		New Haven		
	$2 \ 2$		County		Mason County	State	WV
ŀ		8.25 inch diameter	Permit No		N/A		
	11	drilled hole	Land-Surfa	ace (LS) E	levation and Datum:		
			LS: 590.79	9: TOC: 59	3.99 feet	X Sur	veved
	7 7	— Well casing,		5, 100.00			imated
	<i>a a</i>	•	lmatallatia	- D-t-(-)	E/06/4/	_	
		2 inch diameter, Schedule 40	Installation	. ,		6 - 5/27/1	0
ŀ		Backfill	Drilling Me	ethod	Hollow Stem	Auger	
		X Grout 216 gallons	Drilling Co	ontractor	DLZ Ohio, Inc).	
			Drilling Flu	uid	Portable water	r	
		43 ft* Top of pellets	· ·				
		Top of secondary	_				
		Bentonite slurry					
		X pellets (125 pounds) 46 ft* Top of global #6 secondary filter sand (150) pounds)		ment Technique(s) an sible Impeller Pump (6	` ')
		47 ft* Top of global #5 primary filter sand (150 po			1 (2		
		Top of Primary					
		50 ft*	Fluid Loss	During Dr	illing 400		gallons
		(Top of screen)	Water Rer	moved Dur	ring Development	8.5	_gallons
			Static Dep	th to Wate	er 46.56	feet	below M.P.
		`—Well Screen2 inch diameter	Pumping [Depth to W	/ater60	feet	below M.P.
		PVC , 0.10 slot Total screen length 9.6'	Pumping [Duration	NM hours	3	
		· ·	Yield	N/.	 Agpm	Date	e _6/15/2016_
		∕ Gravel Pack	Specific C		N/A gpm/		
			Specific C	арасну	gpiii/	11	
	1	X Sand Pack					
		Formation Collapse	Well Purpo	ose	Monitoring we	ell	
		60ft*	Remarks	Eluid loo	e due to beguing cand	octimate	
		61ft*	Acmaiks		s due to heaving sand ed water could not be		
				out auge		144111111111111111111111111111111111111	a to oldali
		Measuring Point is		out dage			
		Top of Well Casing Unless Otherwise Noted.					
		* Depth Below Land Surface	Prepared I	by	Tom Darmon		



		3.0' (Pro-Cover stick-up)			
		↓ LAND SURFACE	Project <u>AEP - Mo</u>	ountaineer	_Well <u>MW-1608</u>
	7 7	125 pounds of hole plug were used after grout subsided	Town/City	New Haven	
	2 K	arter grout subsided	County	Mason County	State WV
	/ K	8inch diameter	Permit No	N/A	
	1 K	drilled hole	Land-Surface (LS) E	levation and Datum:	
	1 K		LS: 587.26; TOC: 59	0.65 feet	X Surveyed
		— Well casing,			Estimated
	<i>a</i> 1	2 inch diameter,	Installation Date(s)	6/9/16 - 6/	
	2 P	Schedule 40	, ,		
		☐Backfill	Drilling Method	Hollow Stem A	Augei
		XGrout 189 gallons	Drilling Contractor	DLZ Ohio, Inc	
	1 V		Drilling Fluid	None	
	1 K	39 ft* Top of pellets			
		Bentonite slurry	Dovelope	ment Technique(s) en	d Data(a)
		X pellets (150 pounds) 42 ft* Top of global #6 secondary filter sand (50	·	ment Technique(s) and sible Impeller Pump (6/	
		43ft* Top of global #5 primary filter sand (300 p	ounds)		
		Top of Primary			
		,	Fluid Loss During Dr	illing N/A	gallons
	Ш				
		(Top of screen)	Water Removed Dur	ing Development	33gallons
		Well Screen.	Static Depth to Wate	er <u>47.66</u>	feet below M.P.
		2 inch diameter	Pumping Depth to W	/ater60	feet below M.P.
		PVC,0.10slot Total screen length 9.6'	Pumping Duration	NMhours	
			Yield N//	A gpm	Date 6/17/2016
		∕ Gravel Pack	Specific Capacity	N/A gpm/i	
		/ _	, and a suppose		
	•	X Sand Pack			
		Formation Collapse	Well Purpose	Monitoring we	II
		<u>56</u> ft*	Remarks		
		ft*			
l		tt* Natural Collapse from 57 to 70 ft			
		Measuring Point is Top of Well Casing			
		Unless Otherwise Noted.	Duamanad by	1,,,,1,1,1,1,1,1,	
		* Depth Below Land Surface	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 Invent MOUNTAINEER PLANT 1347 GRAHAM STATIC

AEP Water Well Inventory

1347 GRAHAM STATION ROAD

NEW HAVEN, WV

MASON County

PO #: OH015976.0004

ES-112028

Monday, September 08, 2014

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Disclaimer				

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

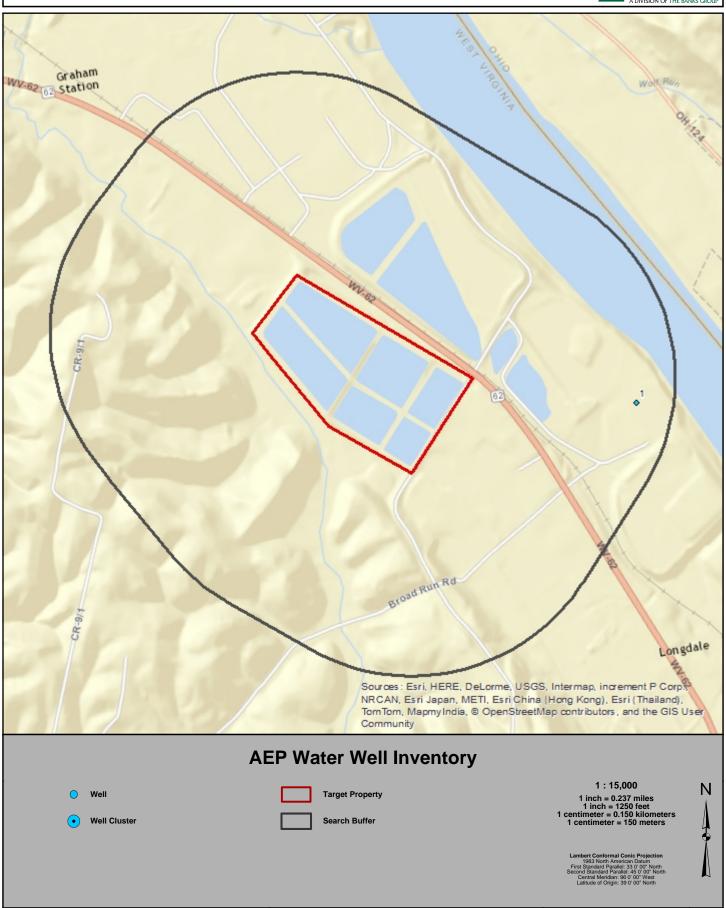
Elevation	
NA	

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)

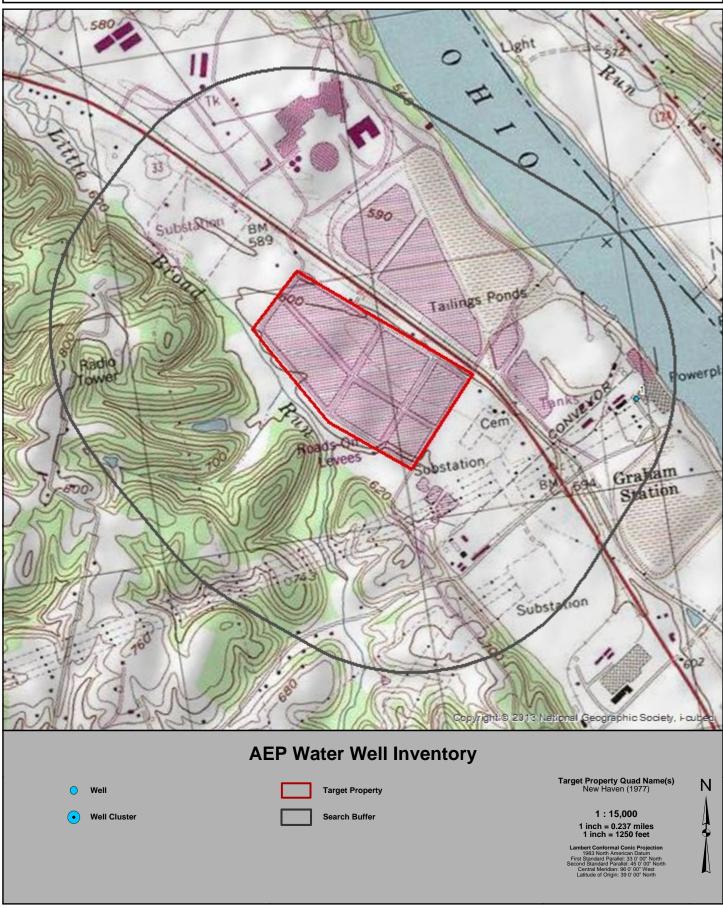
Summary Map - 0.5 Mile Buffer





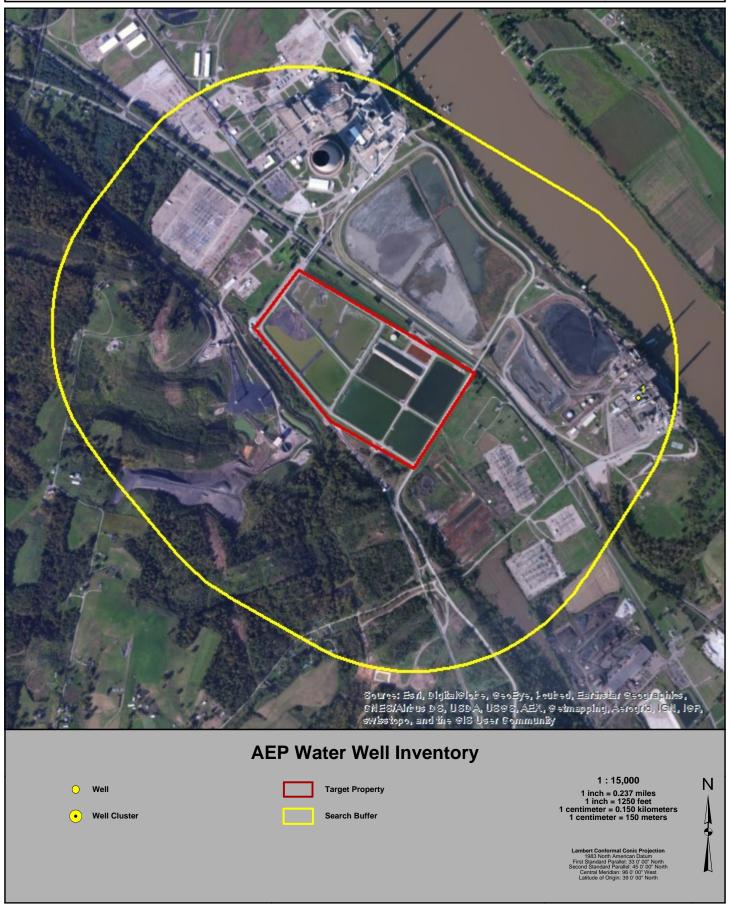
Topographic Overlay Map - 0.5 Mile Buffer





Current Imagery Overlay Map - 0.5 Mile Buffer





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- 385802081 552602	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
Total Count	1

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 Groundwater Modeling Supporting Information



APPENDIX C – SUPPORTING INFORMATION FOR WELLHEAD ANALYTICAL ELEMENTS MODEL (WHAEM 2000) APPLICATION

Background

The AEP Mountaineer Plant (Plant) has several production wells that extract water from the unconsolidated sand and gravel aquifer system. The extraction of water from these wells depresses groundwater elevations near the wells and affects the groundwater flow patterns in the vicinity of the Mountaineer bottom ash ponds (BAPs). However, the effect of the operation of the production wells on flow patterns in the vicinity of the BAPs was not well understood. To improve the understanding of the effect of the production wells, a groundwater flow modeling study of the area was performed as described in the following sections.

Production Wells

There are currently five active production wells associated with the AEP Mountaineer Plant (**Figure C-1**). Two of the wells (West 1, East 1) are the most used and are pumped for process water. West 1 and East 1 are located approximately 450 feet and 825 feet north east of the Plant cooling tower, respectively. There are also two production wells (Wells 5 and 6) that are used to fill two fire water tanks used for emergency fire suppression and other low-volume water uses. Well 5 is located immediately west of the Plant cooling tower, and Well 6 is located approximately 750 feet northwest of the Plant cooling tower. A fifth well (Well 4) is used in the plant's wastewater system and is located approximately 950 feet east of the Plant cooling tower.

When active, East 1 currently pumps at an approximate rate 150 gallons per minute (gpm), and West 1 currently pumps at rate of approximately 750 gallons per minute (gpm). Average water use may be less when the wells are not pumped continuously. Wells 5 and 6 are not metered and likely pump intermittently for short periods of time as needed. Water use from Well 4 is not recorded and was assumed to be inactive. A plot of recent estimated daily water use (August and September shown on Figure C-2.

Groundwater Flow Model

Model Code

The one-dimensional analytical element model, WhAEM2000 (Kraemer et al., 2007) was used to simulate groundwater flow in the vicinity of the Mountaineer Plant. WhAEM2000 uses the principle of superposition of analytic functions to simulate complex hydrologic features such as wells, rivers, recharge zones, and impermeable boundaries. WhAEM2000 was selected because of the ability to simulate these features while still providing the streamlined level of analysis desired for this study.



Model Boundaries

The western and eastern boundaries of the model correspond to the edge of the unconsolidated sand and gravel aquifer extending along the Ohio River (**Figure C-1**). The bedrock surrounding the valley is low-yielding, and the quantities of water moving through the bedrock units are assumed to be insignificant relative to the large quantities of water moving through the sand and gravel aquifer. The northern and southern boundaries of the model were established approximately 13,000 and 17,000 feet from the Mountaineer BAPs, respectively and represent flow lines across which movement of groundwater generally does not occur under natural conditions. Horizontal flow barriers were assigned along the edges of the model to prevent the movement of water into or out of the active model domain.

The bottom of the model was assumed to be at elevation 508 above mean sea level (amsl). This corresponds to the approximate average bottom elevation of the unconsolidated valley-fill sediments as depicted on site geologic cross sections from the Mountaineer and Sporn Plants (EPRI, 1999). The thickness of the aquifer was assumed to be 60 feet based on the position of the lower permeability silt and clay sediments overlying the sand and gravel aquifer near the production wells. Over most of the area of the Mountaineer and Sporn Plants, groundwater elevations are below the overlying silt and clay sediments, and the sand and gravel aquifer is unconfined. The exception is a small area along the Ohio River and beneath the Sporn Plant, where the silt and clay unit thickens and the aquifer becomes confined (EPRI, 1999).

Streams

The Ohio River and its perennial tributaries were simulated using line sinks. The Ohio River was simulated with a line sink with a low resistance (high riverbed conductivity) to simulate a strong connection between the river and the aquifer. A low resistance was assigned to allow substantial quantities of water to flow into and out of the river proportional to the hydraulic gradients between the aquifer and the river. The tributaries, which include Broad Run, Little Broad Run, and West Creek, were simulated with line sinks with a high resistance (low riverbed conductivity), because these streams flow over the top of the silt and clay unit and the connection between the streams and aquifer is much less. The resistance values were adjusted during calibration, and final assigned values were 0.1 feet / feet per day for the Ohio River and 30 feet / feet per day for the Ohio River tributaries. Surface water elevations for the Ohio River were based on site gauging data provided by American Electric Power. Surface water elevations for the tributaries were estimated from United States Geological Survey (USGS) topographic maps and assuming a stream depth of 2 feet. The Ohio River was assigned a water depth of 21 feet based on profiles of the river (EPRI, 1999). The width of the line sinks was based on the width of the streams measured from aerial photographs and according to the guidance provided in Haitjema (2005).

Hydraulic Conductivity

The model was originally assigned a single hydraulic conductivity zone based on the results of two short variable rate tests conducted on the Plant production wells, East 1 and West 1. The variable rate test data were analyzed for hydraulic conductivity using the Nueman (1974) method for unconfined aquifers. An additional estimate of the hydraulic conductivity was made from the specific capacities measured for the wells using methods described in Walton (1962). The hydraulic conductivities estimated from the East 1 and West 1 wells ranged from 346 to 454 feet per day as summarized in **Table C-1**.



Additional hydraulic conductivity information was available in the form of slug tests performed on monitoring wells at both the Mountaineer and Sporn Plants. The slug tests were categorized based on whether the tested monitoring well was screened in a predominantly sand zone or gravelly zone. Hydraulic conductivity ranges estimated from the slug tests are also summarized in **Table C-1**.

During the calibration process, it was necessary to divide the model domain into zones of varying hydraulic conductivity. The first zone encompasses areas where Plant borings indicate the aquifer is gravelly. This zone includes the area around the production wells. The second zone encompasses areas where the aquifer is predominantly sand. This zone includes the area around the Mountaineer and Sporn Plant ponds and a second small area surrounding the Mountaineer Plant coal piles. These areas were assigned a lower hydraulic conductivity to simulate the less permeable nature of the sands relative to the gravelly sediments. The remaining areas of the model were assigned a hydraulic conductivity mid-range of the sand and the gravelly zone hydraulic conductivities. This zone predominantly represents far-field conditions where little information on sediment type or hydraulic conductivities is available. The variable hydraulic conductivity zones were added to the model by creating inhomogeneity zones in the model with unique hydraulic conductivity properties. The final hydraulic conductivities assigned to the model following calibration are depicted on **Figure C-1**.

Recharge

Recharge was also added to the model domain to simulate the infiltration of precipitation into the aquifer. Recharge was added to all areas of the model domain not overlain by the Ohio River. Recharge rates estimated for the lower terraces of the valley fill aquifers along the Ohio River are estimated to range from 6 to 12 inches per year (Kozar and McCoy, 2004). The final calibrated recharge rate used to represent infiltration of precipitation was 12 inches per year.

Zones of enhanced recharge were also added to wetted pond areas at the Mountaineer and Sporn Plants to simulate seepage through the bottom of the ponds. Pond seepage was applied to the model by creating additional inhomogeneities corresponding to the wetted extent of the ponds with unique recharge properties. The pond areas that were assigned unique recharge rates include;

- Mountaineer West BAP
- Mountaineer East BAP
- Mountaineer West Wastewater Pond
- Mountaineer East Wastewater Pond
- Mountaineer Reclaim Water Pond
- Mountaineer Clear Water Pond
- Sporn Wastewater and Fly Ash Pond

Mountaineer and Sporn Plant Ponds

The Mountaineer BAPs typically receive more than 9 million gallons per day (mgd) of water (AEP, 2012). The water exits the BAPs and passes into to the Wastewater Treatment Ponds where it is combined with



additional water from the plant. Water exiting the Wastewater Treatment Ponds passes into to the Reclaim Water Pond. Much of the water in the Reclaim Water Pond is recycled, with the remainder passing through to the Clearwater Pond and then being discharged to the Ohio River. Of the more than 13 mgd that enters the Reclaim Water Pond, approximately 4 to 6 mgd is discharged from the Clearwater Pond into the Ohio River on a typical monthly basis.

The Sporn Fly Ash Pond historically received more than 11 mgd of water (AEP, 2005). Water exiting the pond was discharged into the Ohio River. The pond is no longer actively receiving water due to closure of the Sporn plant, but a small portion of the pond remains filled with water. The Sporn Bottom Ash and Clear Water Ponds historically received more than 2 mgd of water. Water exiting these ponds was also discharged to the Ohio River. These ponds are also no longer active due to the closure of the Sporn plant.

Estimated Pond Seepage

Seepage through the base of the Mountaineer and Sporn ponds was estimated by performing a flow calculation through the low permeability materials at the base of the ponds. Seepage was estimated using the following equation:

$$Q = K \frac{h_s - h_b}{h} A$$

where Q is the flow rate through the bottom of the pond, K is the hydraulic conductivity of the low permeability sediments at the base of the pond, h_s is the water surface elevation of the pond, h_b is the elevation of the bottom of the pond, b is the thickness of the low permeability sediments at the base of the pond, and A is the area of the pond.

The water surface elevations in the ponds were based on measured pond elevations from AEP monthly pond inspection reports. The pond bottom elevations were determined from pond construction drawings and site cross-sections. Construction records (Casagrande Consultants, 1977) indicate that Mountaineer Ponds were constructed with an underlying liner three feet thick and had a design hydraulic conductivity of 6.24 x 10⁻⁵ feet per day (2.2 x 10⁻⁸ cm/sec). In-situ hydraulic conductivity of the liner material following placement is likely somewhat higher (Woodward-Clye Consultants, 1985). The Sporn Wastewater and Fly Ash Ponds are underlain by a large thickness of ash. The bottom of ash was estimated to be at elevation 561 feet above mean sea level (ft-amsl) from plant geologic cross-sections (EPRI, 1999). For modeling purposes, it was assumed that the ash materials controlled the rate of seepage from the Fly Ash Ponds to the sand and gravel aquifer beneath.

The final hydraulic conductivities assigned to the materials underlying the Mountaineer ponds and the Sporn Fly Ash Pond were based on calibration. The hydraulic conductivities were adjusted within reasonable ranges until the groundwater elevations in monitoring wells near the ponds were approximately reproduced. The calibrated hydraulic conductivities were 3.12 x 10⁻³ feet per day (1.1 x 10⁻⁶ cm/sec) for the liners beneath the Mountaineer ponds and 0.05 feet per day (1.8 x 10⁻⁵ cm/sec) for the ash materials beneath the Sporn Fly Ash pond.



The zones of enhanced recharge representing the Mountaineer ponds and the Sporn Fly Ash pond were defined by creating inhomogeneities in the model domain with unique recharge properties. Using the calibrated hydraulic conductivites, the recharge rates assigned to the Mountaineer and Sporn ponds were calculated for the September 2016 model calibration period as summarized in **Table C-2**.

Model Calibration

The model was qualitatively calibrated to a historical groundwater elevation data set to ensure the model is able to accurately simulate groundwater flow conditions. A December 2014 dataset was selected for calibration because the stage of the Ohio River had been stable (i.e. lack of high stage events) for a relatively long period of time prior to the measurement event. Monthly production well flow rates and pond inspection reports were also compiled for this period to define the extraction rates from the production wells and the seepage rates from the Mountaineer and Sporn ponds. The model parameter values discussed in the previous section were adjusted within reasonable ranges until the groundwater elevations were approximately reproduced.

The December 2014 groundwater elevation dataset included water levels from monitoring wells from both the Mountaineer and Sporn Plants. However, data from monitoring wells screened in the silt and clay unit overlying the aquifer and data from the shallow piezometers affected by unsaturated flow were excluded from the calibration simulation. The simulated groundwater elevations from the calibration scenario are depicted on **Figure C-3**.

Simulated groundwater elevations closely approximated measured groundwater elevations. The residuals (difference between the simulation and measured groundwater elevations) were less than one-half of one foot for most monitoring well locations (also depicted on **Figure C-3**), and the number of elevations that were over-simulated (simulated elevations that are greater than measured elevations) is similar to the number of elevation that were under-simulated (simulated elevations are less than measured elevations). The exception was two monitoring wells (MW-009 and MW-011) that have locations and ground surface elevations that are uncertain. Data from these monitoring wells were not used for calibration.

The calculated seepage rates for the ponds under the calibration scenario were relatively small. The seepage rates for all ponds were less than 0.1 mgd, and represent a small fracture of the total volume of flow passing through the ponds. The calibration simulation suggests that groundwater elevations are mounded beneath the Mountaineer ponds. Groundwater flows from the ponds to the cone-of-depression surrounding the East 1 and West 1 production wells. There is also a general component of flow from the boundary with the bedrock surrounding the valley-fill aquifer toward the Ohio River. The exception is near the East 1 and West 1 production wells where the model predicts that the wells induce flow from the Ohio River into the aquifer.

Near Future Groundwater Flow Simulation

Following calibration, a simulation was performed to predict the groundwater flow patterns in the sand and gravel aquifer at the Mountaineer and Sporn under a current or near future normal operating condition. Pertinent assumptions made for the simulation are summarized below;



- The East 1 and West 1 Production Wells are each pumping continuously at 370 gpm each (The East 1 production well pump is planned to be up-graded to have a capacity similar to West 1).
- The Firewater Production Wells (Well 5 and Well 6) will pump at a long-term average rate of 20 gpm each (based on historical average monthly pumping rates).
- The Mountaineer pond water surface elevations are at their normal operating level.
- The Sporn ponds are inactive due to closure of Sporn plant and are completely dry.
- The stage of the Ohio River is similar to the September 26, 2016 stage.

The simulated groundwater elevations under the current or near future condition are depicted on **Figure C-4**. Groundwater flow directions are generally similar to the calibration simulation, though groundwater elevations are somewhat lower in the vicinity of the production wells (due to the greater simulated rate of pumping) and slightly higher in the vicinity of the Mountaineer Ponds (due to the East BAP being full under the near future condition). The flow directions in the vicinity of the Sporn Fly Ash Pond are somewhat more toward the Ohio River, reflecting the closure of the Fly Ash Pond.

The calculated seepage rates for the Mountaineer ponds are in the same range as the calibration simulation, but are slightly different for those ponds that had water levels that were not at the normal operating level during the calibration period. The East BAP was also assumed to be operating during the current or near future condition, whereas this pond was inactive during the calibration simulation. The calculated seepage rates under the current or near future condition are summarized in **Table C-3**.

Similar to the calibration simulation, the model suggests a pattern of diverging flow away from the Mountaineer ponds, with flow being directed towards the Ohio River and the cone-of-depression surrounding the East 1 and West 1 production wells. The groundwater flow directions predicted by this simulation was used to assist in the selection of new monitoring well locations for monitoring of the Mountaineer Plant BAPs. A discussion of the selection of the new monitoring well locations is provided in the main report.



References

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 American Electric Power Service Corporation.

TABLES





	Transmissivity gpd/ft	Hydraulic Conductivity ft/day	Hydraulic Conductivity cm/sec					
Variable Rate Tests								
FGD East 1 (Neuman, 1974)	90,514	367	1.3E-01					
FGD East 1 (Walton, 1962)	85,400	346	1.2E-01					
FGD West 1 (Neuman, 1974)	106,200	430	1.5E-01					
FGD West 1 (Walton, 1962)	112,100	454	1.6E-01					
Slug Tests (EPRI, 1999)								
Sporn Plant Slug tests (Sand Zone)		1.2 - 5.7	4.1E-04 - 1.9E-03					
Sporn Plant Slug tests (Gravelly Zone)		20 - 333	7.1E-03 - 1.2E-01					
Mountaineer Plant Slug tests (Sand Zone)		51- 286	1.8E-02 - 1.0E-01					
Mountaineer Plant Slug tests (Gravelly Zone)		772	2.70E-01					
Slug Tests (Mountaineer Bottom Ash Pond CCR Monitoring Network Evaluation)								
Mountaineer Plant Slug tests (Sand Zone)		147 - 213	5.2E-02 - 7.5E-02					

Notes:

cm/sec - centimeters per second

ft/day - feet per day

gpd/ft - gallons per day per foot

Table C-2
Calculated Pond Seepage Rates - Calibration Simulation
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia



Plant		Mountaineer					Sporn			
Pond Identification	Bottom Ash Pond West	Bottom Ash Pond East	Wastewater Pond West	Wastewater Pond East	Reclaim Pond	Clearwater Pond	Fly Ash Pond North Basin	Fly Ash Pond South Basin	Clearwater Pond	Bottom Ash Pond
Pond Water Surface Elevation (ft-amsl) ^a	612.8	605.8	609.1	606.1	603.3	603.2	601	601		
Pond Bottom Surface Elevation (ft-amsl) ^b	598	598	592	594.5	592	594	599	599		
Thickness of Low-Permeability Liner Sediments c,d	3	3	3	3	3	3	27	27		
Hydraulic Conductivity of Low-Permeability Liner Sediments (ft/day) e	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	5.00E-02	5.00E-02		
Hydraulic Conductivity of Low-Permeability Liner Sediments (cm/sec)	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.76E-05	1.76E-05	2	Dry
Approximate Wetted Surface Area of Pond (ft²) f	433,700	580,000	367,200	259,900	225,900	312,500	103,300	328,600		Δ
Calculated Seepage Rate (ft ³ /day)	6,676	4,705	6,530	3,135	2,655	2,990	383	1,217		
Calculated Seepage Rate (mgd)	0.050	0.035	0.049	0.023	0.020	0.022	0.003	0.009		
Calculated Seepage Rate per ft ² of lakebed (ft/day)	0.0154	0.0081	0.0178	0.0121	0.0118	0.0096	0.0037	0.0037		
Calculated Seepage Rate per ft ² of lakebed (inches/year)	67.5	35.6	77.9	52.9	51.5	41.9	16.2	16.2		

Notes:

- a. Pond water surface elevations are from Mountaineer and Sporn Plant Monthly Dike Inspection Reports.
- b. Pond Bottom surface elevations are from pond design documents and cross-sections (Casagrande Consultants, 1977; EPRI, 1999; Dewberry, 2009).
- c. Mountaineer Ash Pond liner thicknesses was designed to be a minimum of 3 feet thick (Casagrande Consultants, 1977).
- d. Sporn Fly Ash Pond ash thickness estimated from pond and dike subsurface cross-sections in EPRI, 1999 and Dewberry, 1999.
- e. Hydraulic conductivities of low-permeability sediments underlying the ponds was assigned through calibration.
- f. Wetted area of ponds estimated from aerial photographs.

cm/sec - centimeters per second

ft-amsl - feet above mean sea level

ft/day - feet per day

ft² - square feet

ft³/day - cubic feet per day

mgd - million gallons per day

Table C-3
Calculated Pond Seepage Rates - Current or Near Future Condition
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia



Plant		Mountaineer					Sporn											
Pond Identification	Bottom Ash Pond West	Bottom Ash Pond East	Wastewater Pond West	Wastewater Pond East	Reclaim Pond	Clearwater Pond	Fly Ash Pond North Basin	Fly Ash Pond South Basin	Clearwater Pond	Bottom Ash Pond								
Pond Water Surface Elevation (ft-amsl) ^a	612	612	609	609	603	603												
Pond Bottom Surface Elevation (ft-amsl) b	598	598	592	594.5	592	594												
Thickness of Low-Permeability Liner Sediments ^c	3	3	3	3	3	3												
Hydraulic Conductivity of Low-Permeability Liner Sediments (ft/day) d	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	2	2	λ.									
Hydraulic Conductivity of Low-Permeability Liner Sediments (cm/sec)	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06				<u> -</u>	2	2	_ ≥	_ ≥		_ ≥		Dry
Approximate Wetted Surface Area of Pond (ft²) e	571,600	367,200	367,200	259,900	225,900	312,500	Δ	۵	Ω	Dry								
Calculated Seepage Rate (ft³/day)	8,322	5,346	6,492	3,919	2,584	2,925												
Calculated Seepage Rate (mgd)	0.062	0.040	0.049	0.029	0.019	0.022												
Calculated Seepage Rate per ft ² of lakebed (ft/day)	0.015	0.015	0.018	0.015	0.011	0.009												
Calculated Seepage Rate per ft ² of lakebed (inches/year)	63.8	63.8	77.5	66.1	50.1	41.0												

Notes:

- a. Normal operating elevation.
- b. Pond Bottom surface elevations are from pond design documents and cross-sections (Casagrande Consultants, 1977; EPRI, 1999).
- c. Mountaineer Ash Pond liner thicknesses was designed to be a minimum of 3 feet thick (Casagrande Consultants, 1977).
- d. Hydraulic conductivities of low-permeability sediments underlying the ponds was assigned through calibration.
- e. Wetted area of ponds estimated from aerial photographs.

cm/sec - centimeters per second

ft-amsl - feet above mean sea level

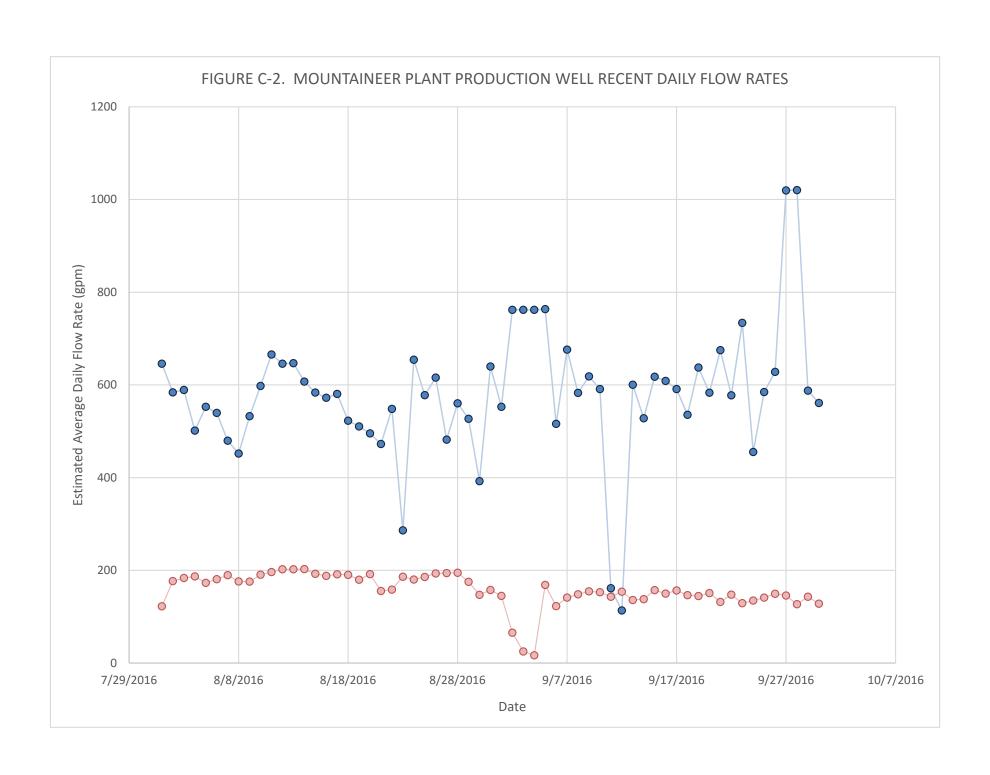
ft/day - feet per day

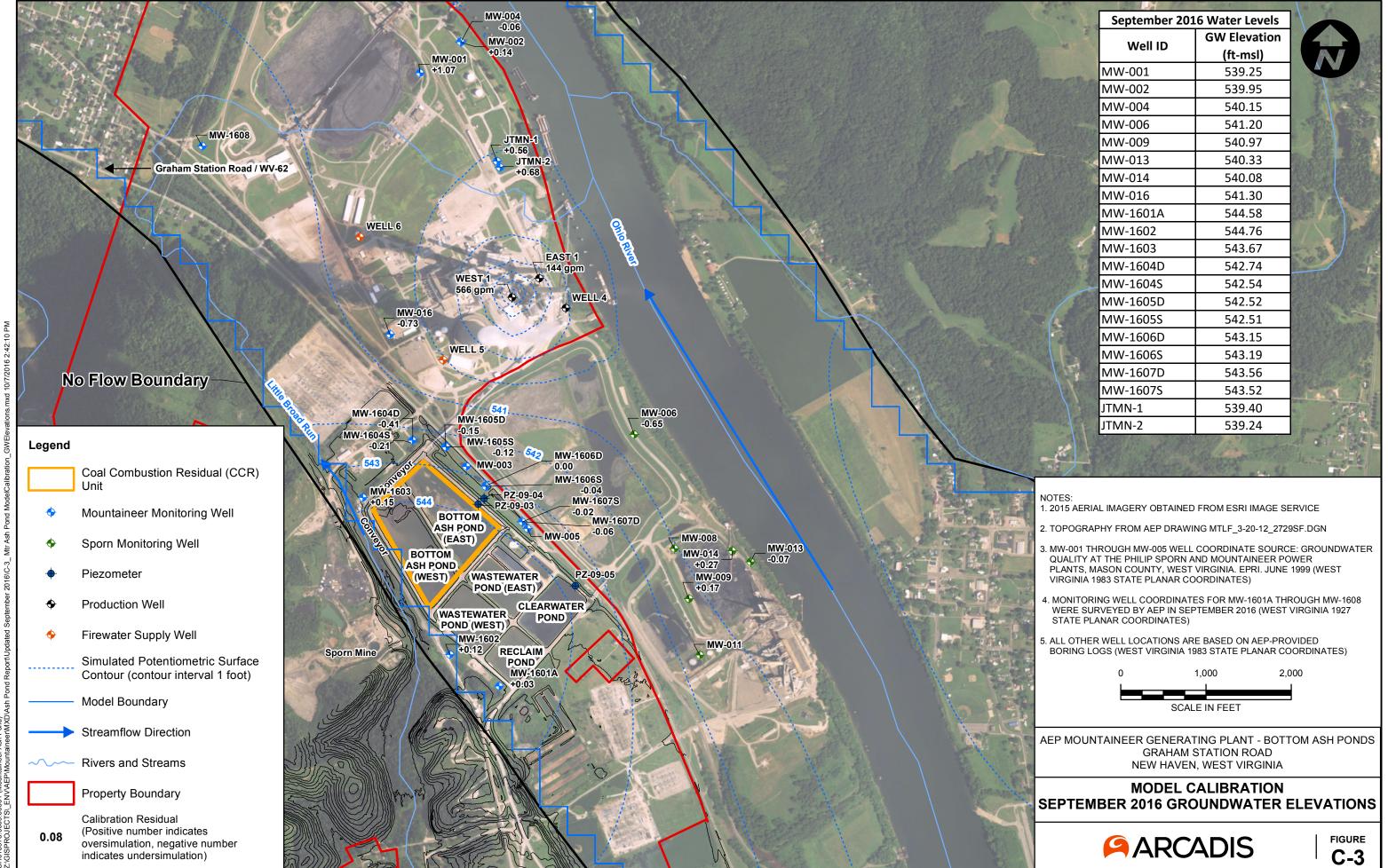
ft² - square feet

ft³/day - cubic feet per day

mgd - million gallons per day

FIGURES



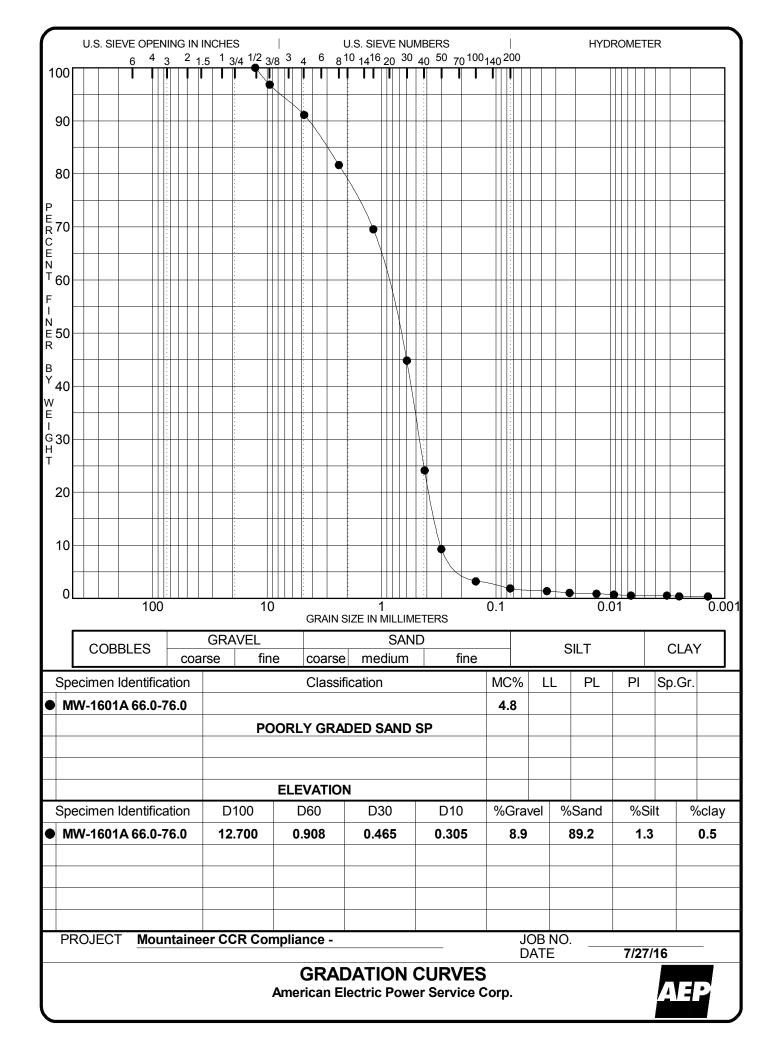


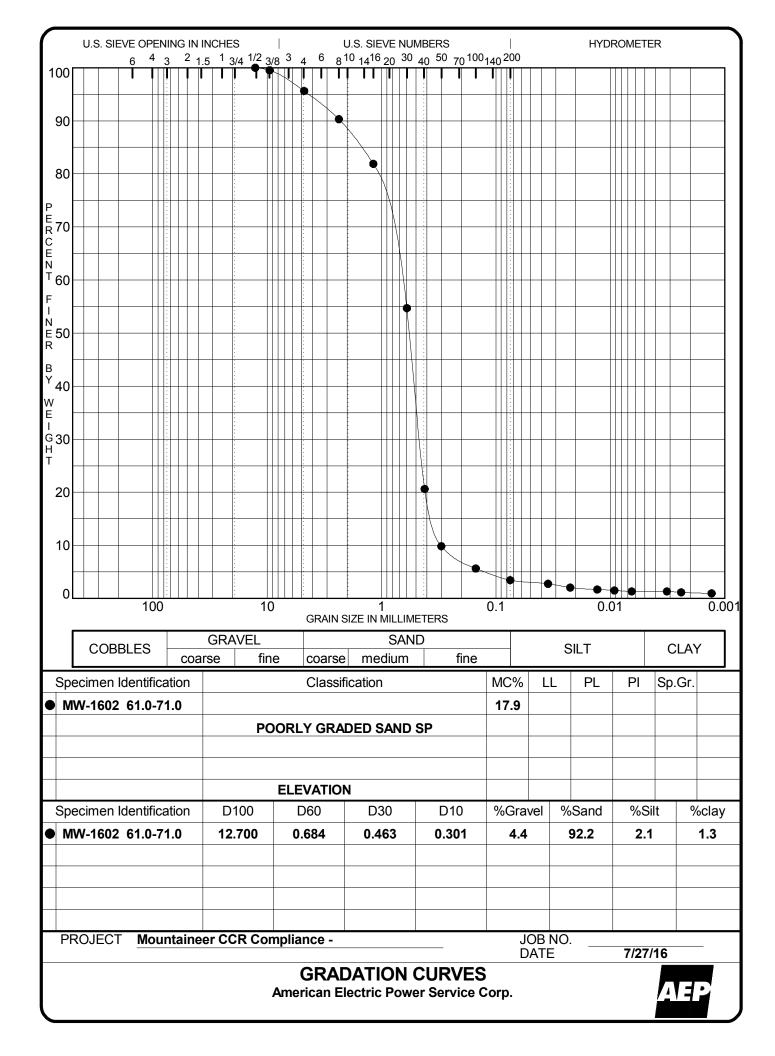
City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OHM 5078 0009 00001 Majoritaineer Ash Pond

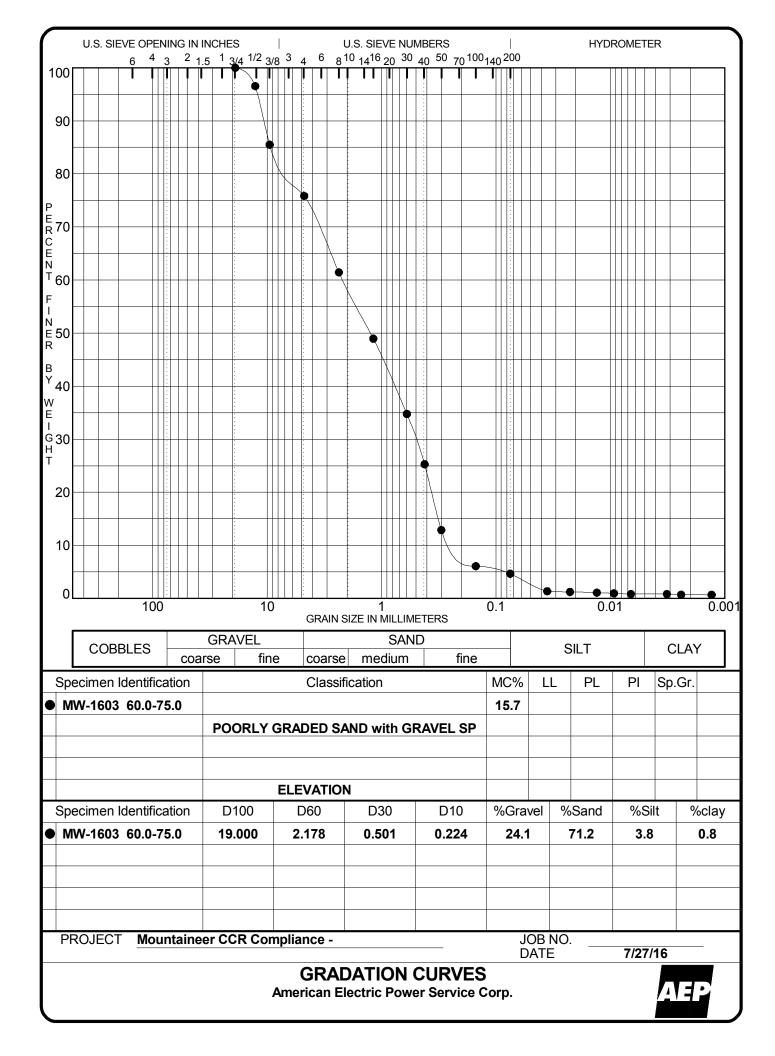
City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb OH015976.0009.00001 (Mountaineer Ash Pond)

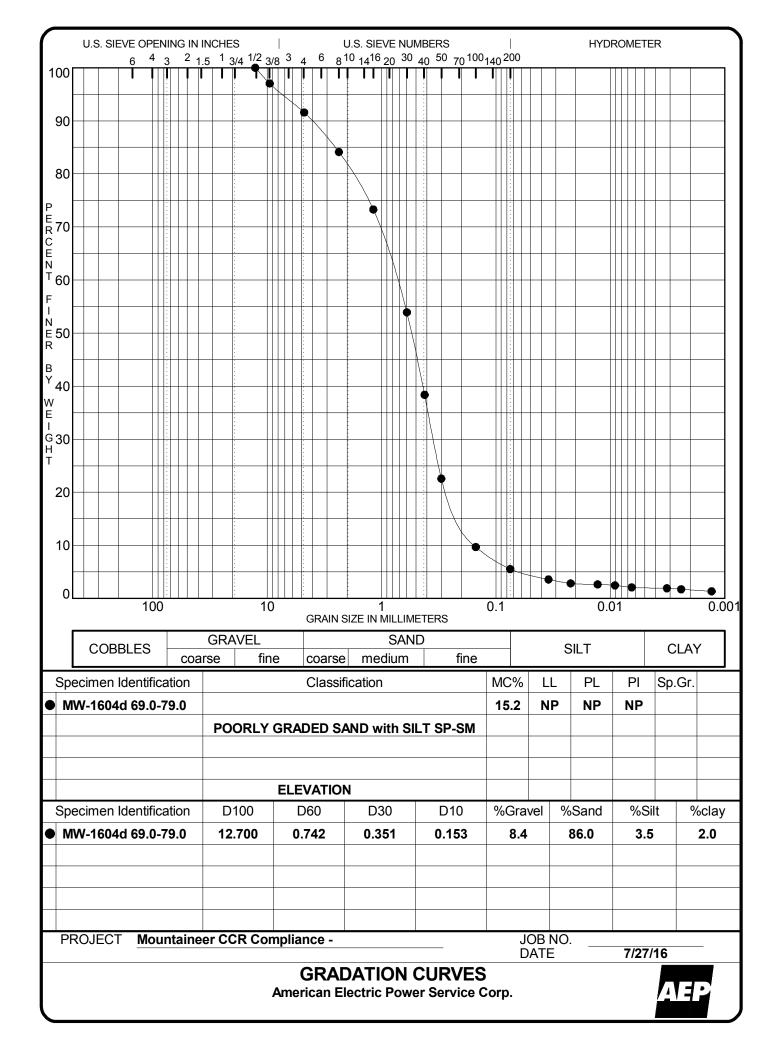
APPENDIX D

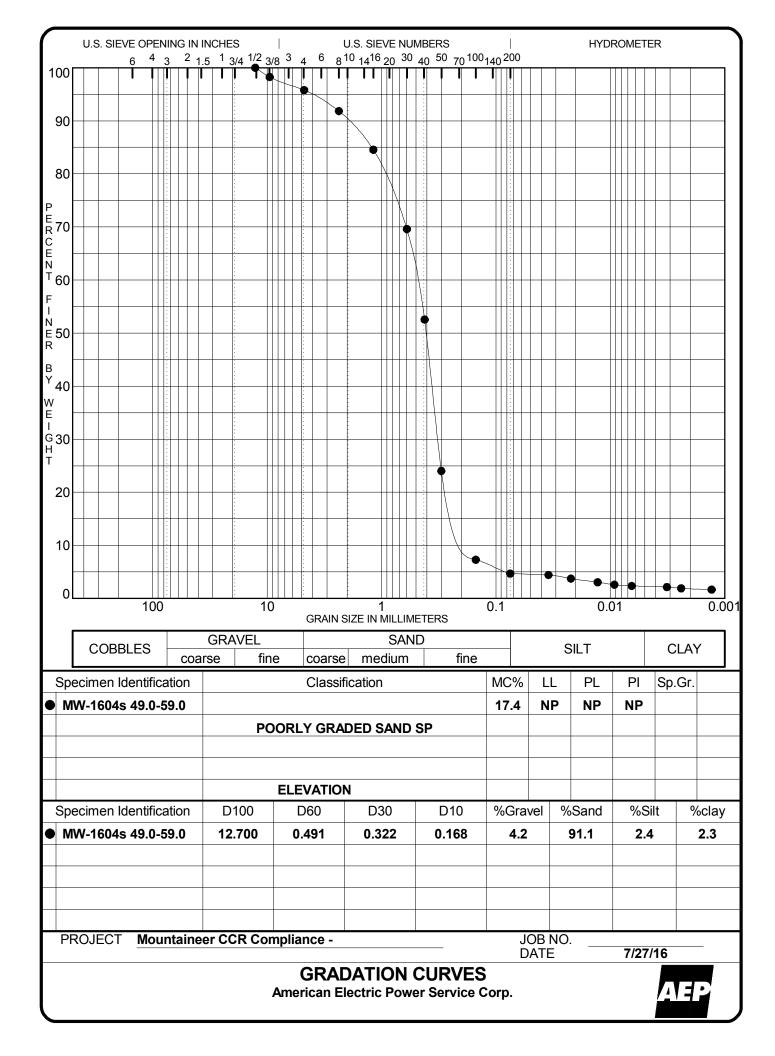
Soil Property Testing

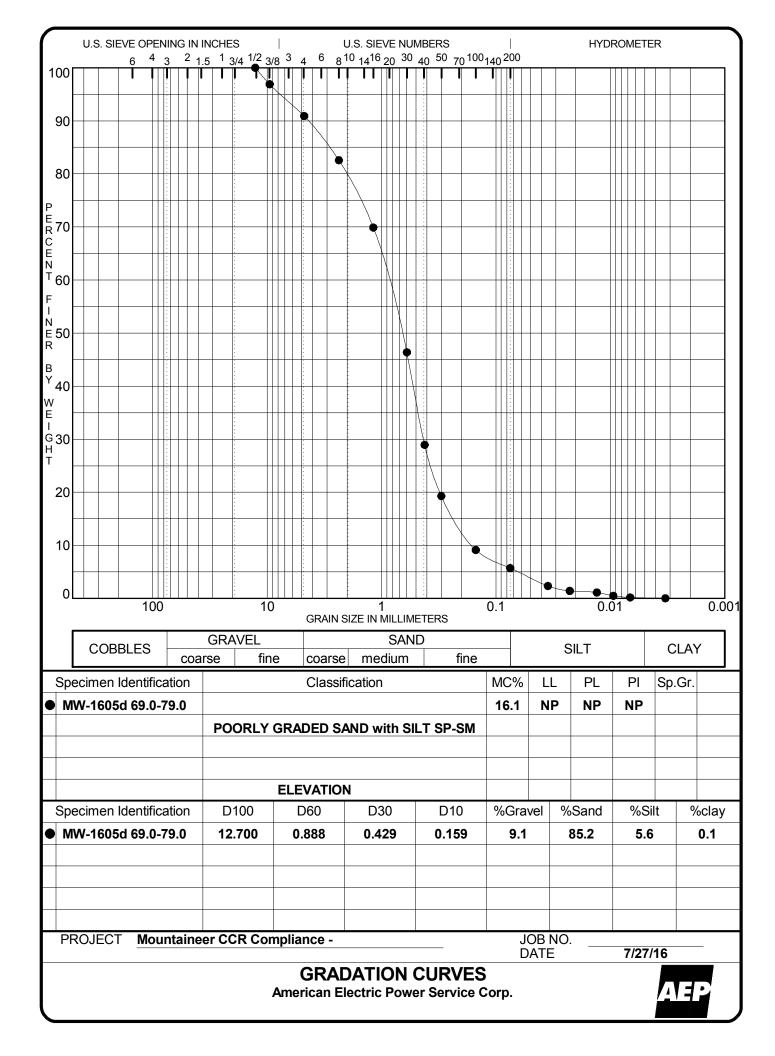


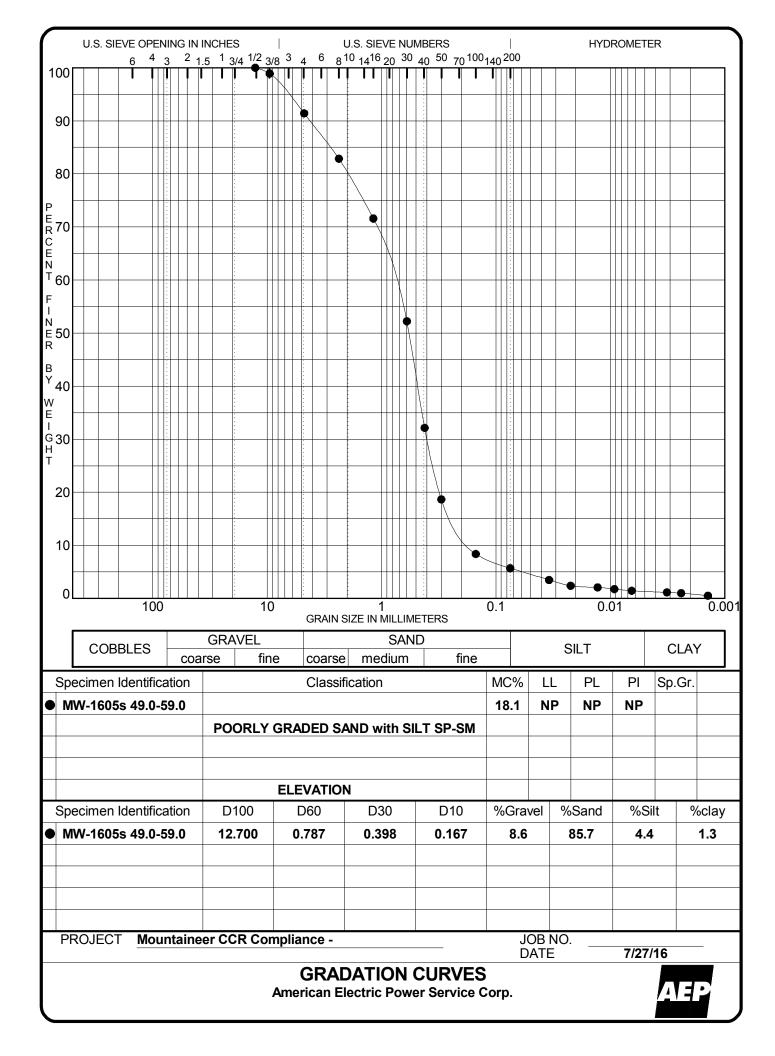


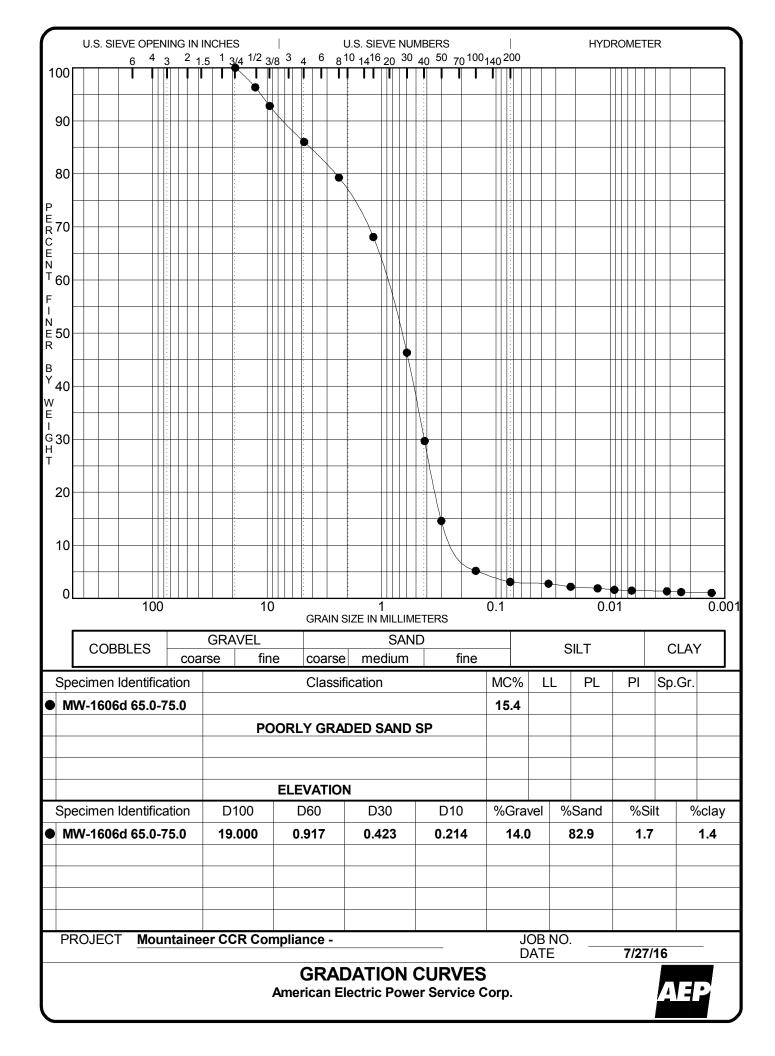


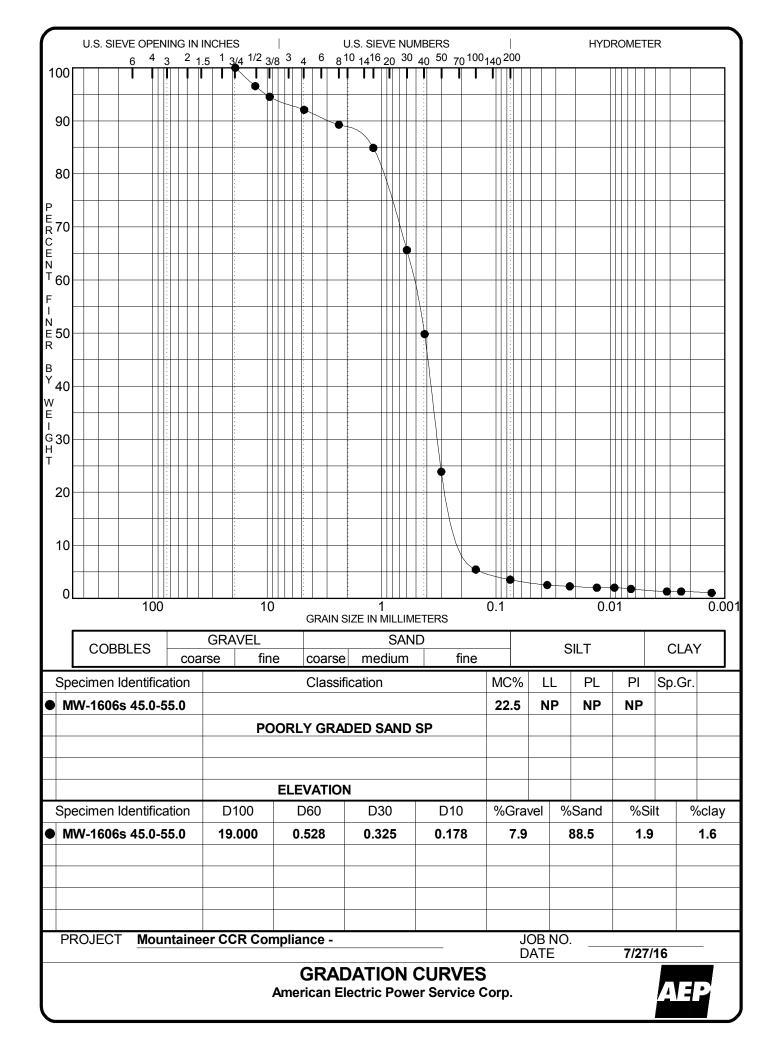


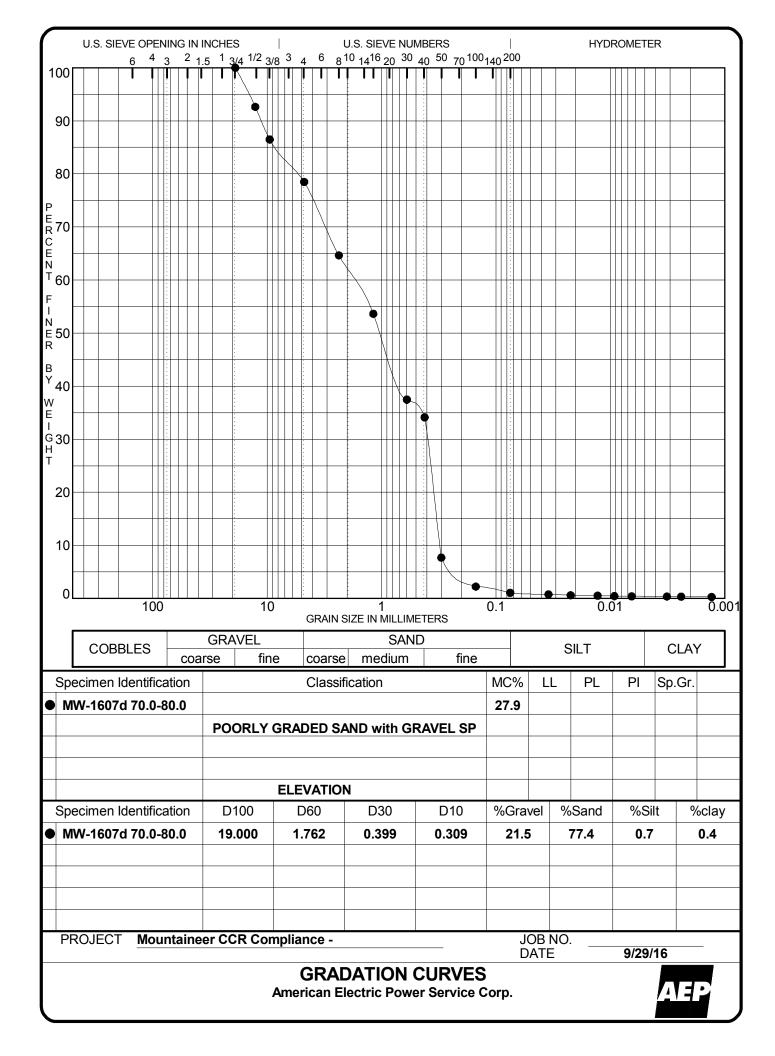


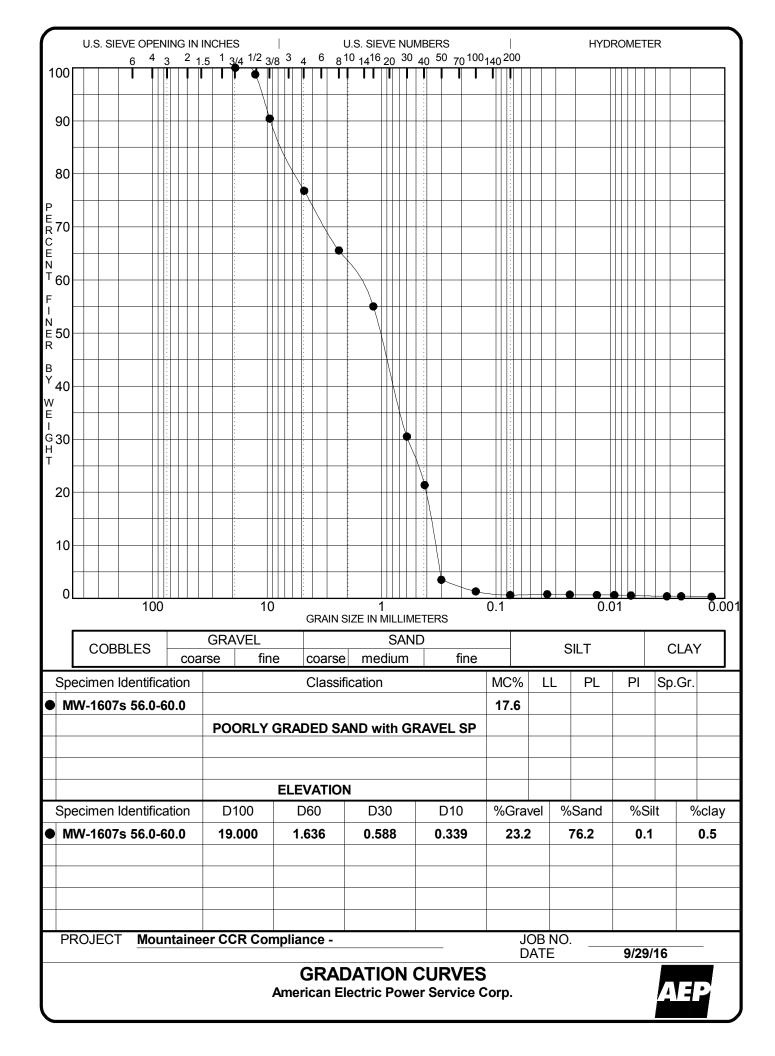


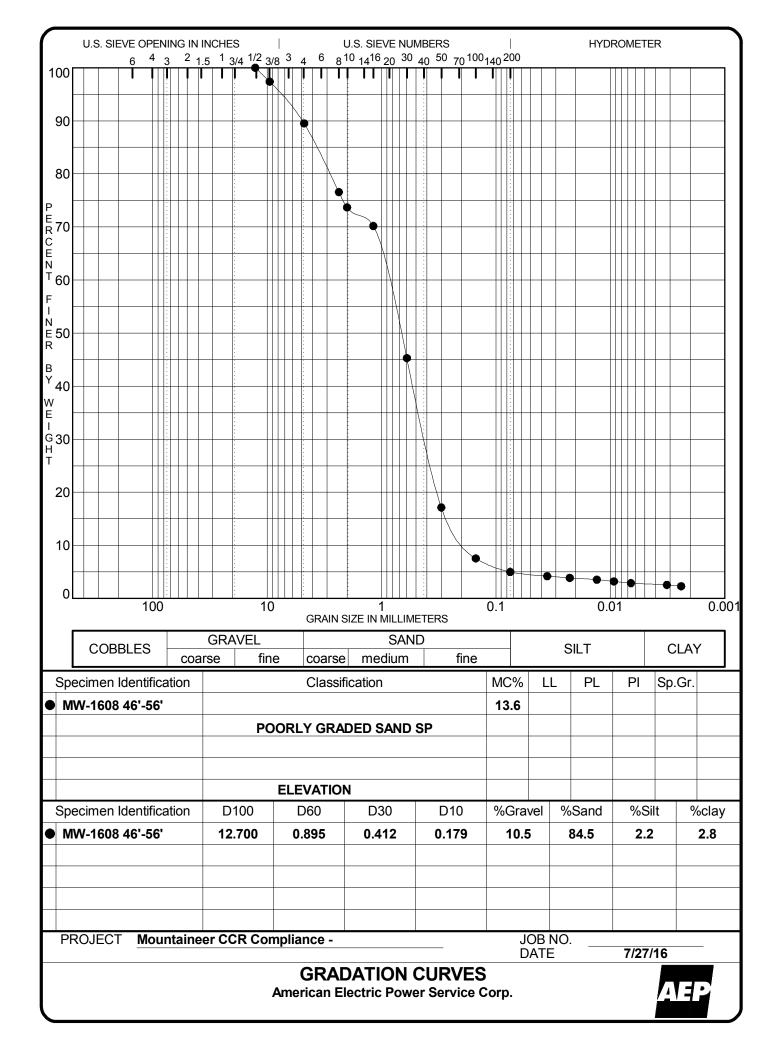








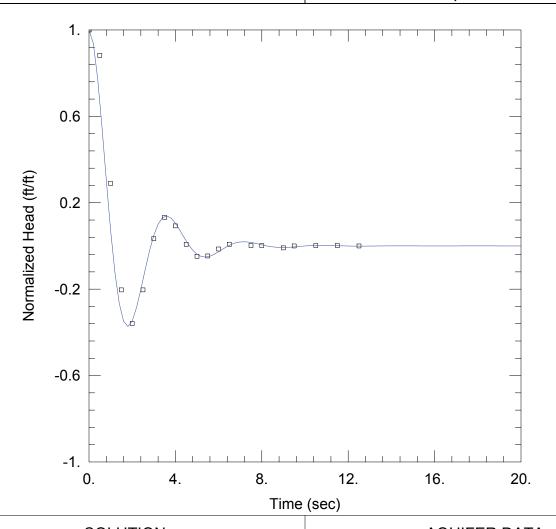




APPENDIX E

Slug Testing Results

MW-1601A Test 3 Prepared For: Prepared By: **AEP ARCADIS** Location: Project: OH015976.0009 Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.075 cm/secLe = 9.516 ft

AQUIFER DATA

Saturated Thickness: 16.5 ft

WELL DATA (MW-1601A Test 3)

Initial Displacement: 0.56 ft

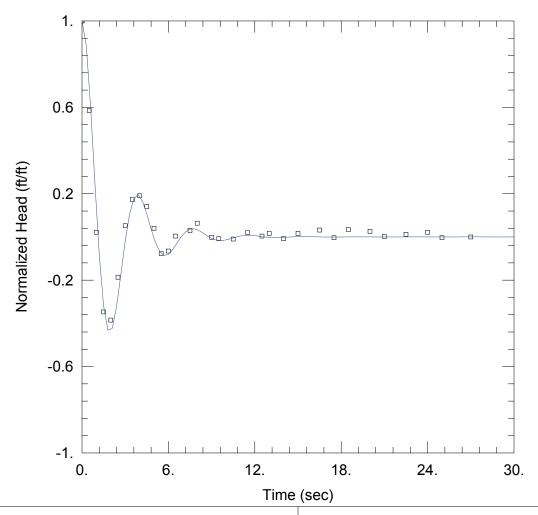
Static Water Column Height: 11.5 ft Total Well Penetration Depth: 11.5 ft

Screen Length: 10. ft Casing Radius: $\overline{0.0833}$ ft Well Radius: 0.3437 ft



MW-1603 Test 1 Prepared For: AEP Location:

Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Prepared By:

Project:

ARCADIS

OH015976.0009

Solution Method: Springer-Gelhar

K = 0.071 cm/sec Le = 11.3 ft

AQUIFER DATA

Saturated Thickness: 17.9 ft

WELL DATA (MW-1603 Test 1)

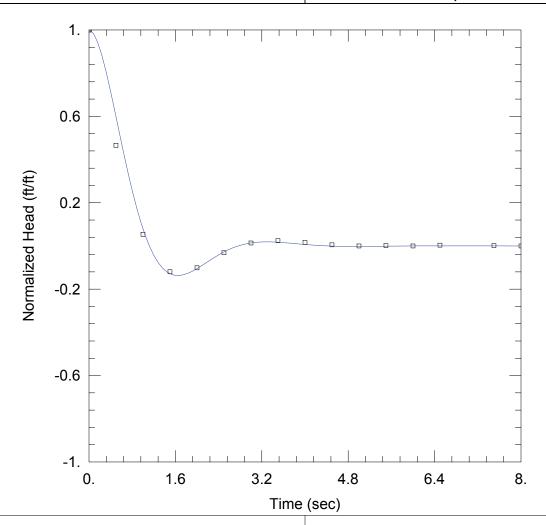
Initial Displacement: 0.504 ft

Static Water Column Height: 17.9 ft
Total Well Penetration Depth: 17.9 ft

Screen Length: 15. ft Casing Radius: 0.0833 ft Well Radius: 0.3437 ft



MW-1605S Test 3 Prepared By: ARCADIS Project: OH015976.0009 Prepared For: AEP Location: Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.052 cm/sec Le = 6.301 ft

AQUIFER DATA

Saturated Thickness: 37. ft

WELL DATA (MW-1605S Test 3)

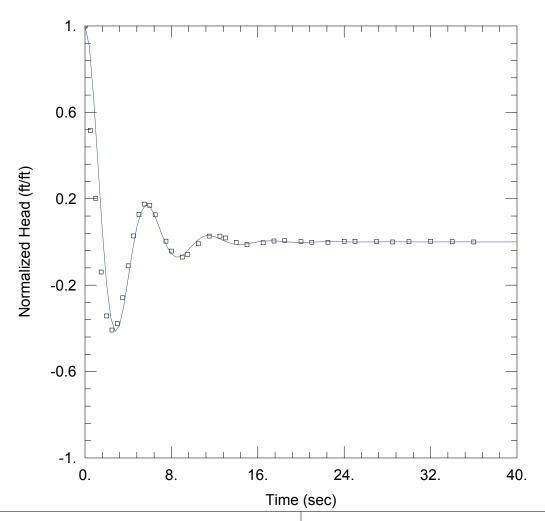
Initial Displacement: 0.82 ft

Static Water Column Height: 14.9 ft Total Well Penetration Depth: 14.9 ft

Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.3437 ft



MW-1605D Test 3 Prepared By: ARCADIS Project: OH015976.0009 Prepared For: AEP Location: Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.067 cm/sec Le = 24.68 ft

AQUIFER DATA

Saturated Thickness: 37. ft

WELL DATA (MW-1605D Test 3)

Initial Displacement: 1.155 ft

Static Water Column Height: 35.32 ft Total Well Penetration Depth: 35.32 ft

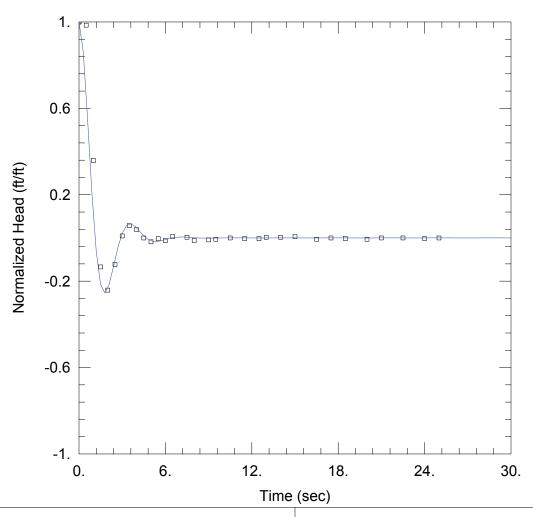
Screen Length: 10. ft Casing Radius: 0.0833 ft Well Radius: 0.3437 ft



MW-1607S Test 1

Prepared For: Prepared By: **AEP ARCADIS** Location: Project:

OH015976.0009 Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.066 cm/secLe = 8.612 ft

AQUIFER DATA

Saturated Thickness: 37. ft

WELL DATA (MW-1607S Test 1)

Initial Displacement: 0.335 ft

Static Water Column Height: 23.2 ft Total Well Penetration Depth: 23.2 ft

Screen Length: 10. ft Casing Radius: $\overline{0.0833}$ ft Well Radius: 0.3437 ft



MW-1607D Test 3 Prepared For: AEP

Location:

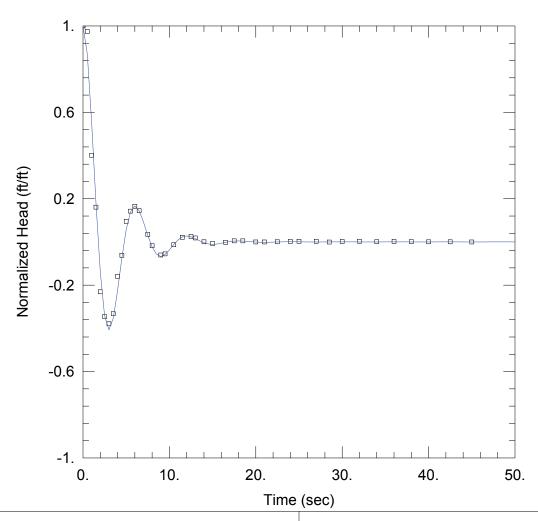
Project:

ARCADIS

Prepared By:

OH015976.0009

Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.059 cm/sec Le = 27.11 ft

AQUIFER DATA

Saturated Thickness: 37. ft

WELL DATA (MW-1607D Test 3)

Initial Displacement: 1.356 ft

Static Water Column Height: 32.81 ft Total Well Penetration Depth: 32.03 ft

Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.3437 ft



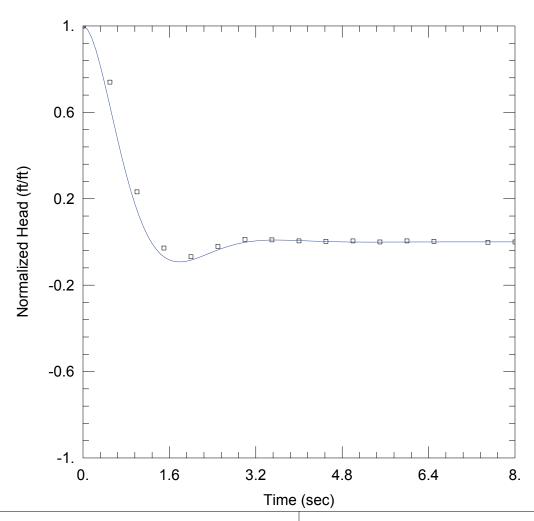
MW-1608 Test 2 Prepared For: AEP Location:

Project: OH015976.0009

Prepared By:

ARCADIS

Mountaineer, WV



SOLUTION

Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.072 cm/sec Le = 6.607 ft

AQUIFER DATA

Saturated Thickness: 60. ft

WELL DATA (MW-1608 Test 2)

Initial Displacement: <u>0.423</u> ft Static Water Column Height: <u>60.</u> ft Total Well Penetration Depth: <u>60.</u> ft

Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.3437 ft



APPENDIX F

Field Methodology



APPENDIX F - FIELD METHODOLOGY

Based on the recommended well network modifications, the following generalized tasks were completed:

- Installation of 13 unconsolidated borings
- Installation and development of 12 new monitoring wells
- The redevelopment of 6 existing monitoring wells

Arcadis provided oversight for drilling of 13 unconsolidated borings that resulted in installation of 12 monitoring wells by a licensed drilling company (DLZ). One unconsolidated borings was sealed due to not encountering groundwater before reaching refusal at the soil-rock interface (SB-1601). Implementation of the field activities began with utility clearance activities beginning April 18, 2016. Additional utility location was completed on May 16, 2016 and May 24, 2016. Drilling operations began on April 25, 2016 and ended on June 10, 2016.

Staking, Surveying, and Utilities Clearance

All proposed new monitoring well locations were staked by an AEP surveyor prior to drilling. AEP surveyed the spatial northing and easting coordinates as well as the ground surface elevation of each staked monitoring well location prior to drilling. The accuracy of elevation measurements was at least to the nearest 0.01 foot. An Arcadis representative contacted 8-1-1 to assess the presence of underground utilities near the new monitoring well and boring locations prior to drilling activities. AEP completed a plant dig permit, which identified private plant utilities near the new monitoring well and borings locations. Arcadis retained the services of a utility locating subcontractor to perform a geophysical survey (e.g. ground penetrating radar, electromagnetic survey, etc.) over an area of 25 feet by 25 to locate utilities at each new monitoring well location. An Arcadis representative will completed a visual inspection of the proposed well sites prior to drilling to assess the presence of any previously unidentified subsurface utilities. Prior to drilling, the new monitoring well locations were soft cleared using hand augering or air knife techniques to a diameter at least 10 percent larger than the largest diameter tooling to be used during drilling. Soft digging was completed to a minimum depth of 8 feet below ground surface (bgs).

Decontamination

All down-hole tools or equipment were decontaminated in accordance with ASTM D5088 prior to the start of drilling and between each borehole location. At a minimum, the tooling was washed with detergent solution followed by a potable water rinse within the decontamination pad. The use of a pressure washer was used when possible. A decontamination pad was constructed for decontamination of the down-hole tools. Containerization was not required for decontamination water, if directed to the leachate system. Water for decontamination or drilling was potable and obtained from the AEP Mountaineer Plant.

Borehole Advancement and Stratigraphy/Lithology

Unconsolidated boreholes were drilled using standard hollow-stem auger methods with a minimum 4.25" inner diameter auger in accordance with ASTM D5784 until the soil-rock interface was encountered, or until the pre-determined termination depth was reached, whichever was shallowest. Continuous spit-spoon

sampling and standard penetration testing was performed in accordance with ASTM D1586 until the termination depth.

Arcadis logged all geologic samples collected during the drilling process. Field logging of the soil samples were performed in accordance with ASTM D5434-12, and were classified under the Unified Soil Classification System (USCS). Boring logs and well construction details for all installations completed during this scope of work are provided in **Appendix A**. Unconsolidated soil samples were collected continuously using 2-inch diameter by 2-foot long split spoon samplers. For each new monitoring well location, the selected split spoon samples from the screened interval were composited into a sample container. These containers were appropriately labeled according to the monitoring well identification number and were transported to the AEP Dolan Civil Engineering Laboratory in Groveport, Ohio for particle-size analysis.

Monitoring Well Installation and Construction

Monitoring well installation and construction was completed in accordance with the AEP- approved work plan prepared by Arcadis following an initial review of the Site monitoring well network. The work plan was prepared using West Virginia Department of Environmental Protection Title 47 Series 60 Monitoring Well Design Standards dated June 21, 2011 and American Society of Testing Material (ASTM) standards, where referenced, as guidance. Arcadis directed the drilling and installation of the identified up and down gradient monitoring wells. DLZ was the drilling company that installed the wells and was directly contracted through AEP. Drilling activities began on April 25, 2016. Prior to beginning work, daily health and safety meetings were held each morning, including a thorough discussion of the day's scope of work, identified hazards, hazard mitigation, and completion of the AEP Job Safety Analysis documentation in the presence of AEP staff. Health and safety documentation was retained by both Arcadis and AEP.

Based on the field conditions, Arcadis directed DLZ regarding the total drilling and well completion depths, well construction configuration, and well materials to be used. Screened intervals for unconsolidated monitoring wells targeted saturated alluvial sand and gravel. Final well depths and screened intervals are included in **Table 2**.

All monitoring wells were constructed in general accordance with West Virginia Department of Environmental Protection Title 47 Series 60 Monitoring Well Design Standards dated June 21, 2011.

Unconsolidated monitoring wells_were constructed of 2-inch Schedule 40 PVC risers and screens. Well screens were constructed of 10 slot (0.010 ft screen openings) PVC. A primary filter pack of Global® #5 sand was placed across the screened interval, followed by approximately 2 feet of secondary (finer gradation) filter pack composed of Global® #6 sand.

Boring logs and well construction diagrams are provided in **Appendix A**. **Table 2** provides a summary of the well construction details of all wells in the current monitoring well network.

Monitoring Well Development

Well development was completed at all newly-installed wells, as well as 6 existing wells to be retained in the monitoring well network. At existing wells, the wells were purged with a pump or by air-lifting to remove

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dislodged material from the well. Well development at new wells was performed a minimum of 48 hours after the completion of well construction. The static water level was measured in the well prior to initiation of development. All wells were developed through a pump and surge method in accordance with West Virginia Department of Environmental Protection Title 47 Series 60 Monitoring Well Design Standards dated June 21, 2011. The well was initially purged with a pump to remove loose material and fines from the well. A surge cycle was then performed across the screen using a surge block. A second pumping cycle shall be performed until the discharge water has good visual clarity, followed by second surge cycle with the double disk surge block.

A final pumping cycle was performed to the following criteria: 1) a minimum of 10 casing volumes were purged from the well, and 2) field water quality parameters including temperature, pH, conductivity, oxidation-reduction potential, and turbidity were stable within applicable criteria (temperature stabilizes within ± 0.50 C, pH stabilizes within ± 0.2 units, conductivity stabilizes within ± 3 percent, and turbidity is less than 10 nephelometric turbidity units). Well development logs are included as an attachment to **Appendix F**.

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Well Development Logs



Site/Well No.	MW-00	1		-								
Project	AEP Mo	ountaineer Pl	ant	Project No.	OHO1597	76.0009		Page	1of	1	1	
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/28/2016			
Weather	Sunny,	~73 F		Develo	opment Time Be	gin6/28	/16 8:10		End	6/28/	16 8:48	
Evacuation Da	ta											
	Meas	uring Point		TOC	Pump I	ntake Setting (~34				
	MP E	levation (ft)		571.32	Pumping Rate (gpm)							
Land		levation (ft)						Submersible Pump				
				39.17								
				39.17 Volumes Purged								
						Field Paran	notore					
						i leiu Faiaii						
Water Column in Well (ft)				-					Light brown			
Casing Diameter/Type												
	Gal	lons in Well		1.53		Appe	arance		slightly to	ırbid		
		Volume	l	Conductivity					Dissolved			
Time	Depth to Water (ft btoc)	VA (24)	Well Volumes Removed	(mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks	
6/28/16 8:15	29.60	0.65	0.42	0.745	163.0	16.62	6.66	NM	7.33	0.132		
6/28/16 8:20	29.89	1.30	0.85	0.758	92.4	16.88	6.51	NM	6.64	0.132		
6/28/16 8:25	29.90	1.95	1.27	0.766	73.9	17.17	6.57	NM	6.40	0.132		
6/28/16 8:30 6/28/16 8:35	29.90	2.60 3.25	1.70 2.12	0.773 0.770	19.3 10.8	17.49 17.33	6.64 6.71	NM NM	6.31 6.26	0.132 0.132		
6/28/16 8:40	29.90	3.90	2.55	0.769	9.3	17.33	6.74	NM	6.24	0.132		
6/28/16 8:45	29.90	4.55	2.97	0.768	6.54	17.16	6.75	NM	6.21	0.132		
	_											
	+											
Development P	orooppol:				т	Darmon						
Notes:	ersonnei.				1.	Darmon						
				Well Casing	Volumes (gallon/f	feet)						
				2" = 0.16	3" =	0.37		4" = 0.6				
	1-1/2" =	0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	17			
bmp below m °C Degrees	easuring po	int	ml mS/cm	mililiter Milisiemens per centimete	NTU er PVC	Nephelometric Polyvinyl chlor		Units	ORP	Oxidation Potential	n-Reduction	
ft feet	Ocioido		msl	mean sea-level	s.u.	Standard units				r oternial		
•	m Gallons per minute N/A		Not Applicable Not Measured	umhos/cm VOC	n Micromhos pe Volatile Orgar			mV BPI	millivolts Below Pump Intake			



Site/Well No.	MW-002	2		=									
Project	AEP M	ountaineer Pl	ant	Project No.	OHO1597	76.0009		Page	1of	1			
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/30/2016				
Weather	Sunny,	~70s F		Devel	opment Time Begin 6/30/16 8:15					16 8:35			
Evacuation D	ata												
	Meas	uring Point		TOC	Pump I	ntake Setting (ft bmp)		~67.	5			
	MP E	levation (ft)		582.81	Pumping Rate (gpm)								
Land		Elevation (ft)			Evacuation I								
		pth (ft bmp)		•		Volumes							
				41.97									
Water-Level Elevation (ft)						Field Paran	neters						
Water Column in Well (ft)							Color		Light ye	llow			
Casing Diameter/Type													
Gallons in Well						Appe			None slightly turbid				
							•						
	Depth to Water (ft		Well Volumes	Conductivity (mS/cm or	Turbidity	Temperature	рН	ORP	Dissolved Oxygen	Rate			
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks		
6/30/16 8:20	NM	0.65	0.13	0.444	53.8	14.55	8.09	NM	7.28	0.132			
6/30/16 8:25 6/30/16 8:30	42.03 NM	1.30 1.95	0.26	0.572 0.587	158 127	14.54 14.51	7.74 7.69	NM NM	5.30 4.97	0.132			
6/30/16 8:35	42.06	2.60	0.53	0.591	117	14.61	7.67	NM	4.76	0.132			
5, 5 5, 1 5 5 5 5	1												
	-												
Development F	Personnel:				Т	Darmon							
Notes:	CISOIIICI.					Daimon							
				Well Casing	Volumes (gallon/	feet)							
	1-½" = 1-½" =			2'' = 0.16 $2^{-1/2}'' = 0.26$	3" =	0.37 = 0.50		4" = 0.6 6" = 1.4					
bmp below measuring point ml			mililiter Milisiemens per centimete	iter NTU Nephelometric Turbidity									
feet msl pm Gallons per minute N/A ng/L Miligrams per liter NM			Milisiemens per centimeter PVC mean sea-level s.u. Not Applicable umhos Not Measured VOC		Standard units os/cm Micromhos per centime			mV BPI	millivolts				



Site/Well No.	MW-004											
Project	AEP Mo	ountaineer Pl	ant	Project No.	. OHO1597	76.0009		Page	1of	1		
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/30/2016			
Weather	Sunny,	~70s F		Deve	elopment Time Be	gin 6/30	/16 9:40		End	6/30/1	6 10:00	
Evacuation Data	a											
	Meas	uring Point		тос	Pump I	ntake Setting (ft bmp)		~45.	5		
		levation (ft)			Pumping Rate (gpm)							
Land S		Elevation (ft)							Submersible Pump			
		pth (ft bmp)			Volumes Purged							
				42.11								
						Field Paran	neters					
		n in Well (ft)					Color					
Casing Diameter/Type												
Gallons in Well						Appe	arance					
	Depth to Water (ft	Volume Withdrawn	Well Volumes	Conductivity (mS/cm or	Turbidity	Temperature	рН	ORP	Dissolved Oxygen	Rate		
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks	
6/30/16 9:45	42.10	1	0.54	0.245	33.4	14.92	6.72	NM	3.57	0.132		
6/30/16 9:50 6/30/16 9:55	42.14 42.14	1.30 1.95	1.07 1.61	0.242 0.237	34.7 29.8	14.95 15.01	6.63 5.62	NM NM	3.20 2.57	0.132 0.132		
6/30/16 10:00	42.16	2.60	2.15	0.238	18.7	15.03	5.59	NM	2.10	0.132		
							0.00			0.1102		
	+											
										\vdash		
										\vdash		
Development Pe	rsonnel:				T.	Darmon						
Notes:												
				Wall Oakland	Valore de la compania	F 4\						
	1-1/4" =	0.06		2" = 0.16	g Volumes (gallon/f 3" =	•		4" = 0.6	65			
	1-1/2" =	0.09		2-1/2" = 0.26		= 0.50		6" = 1.47				
bmp below mea		int	ml	mililiter	NTU	Nephelometri	,	Units	ORP		n-Reduction	
°C Degrees C ft feet	eisius		mS/cm msl	•		Polyvinyl chlor Standard units			Potential			
gpm Gallons per minute N/A mg/L Miligrams per liter NM			Not Applicable Not Measured	umhos/cn VOC	n Micromhos pe Volatile Organ			mV BPI				



Site/Well No.	MW-016	6											
Project	AEP Mo	ountaineer Pla	ant	Project No.	OHO15976	6.0009	_	Page	1_of	1			
Site Location	1347 G	raham Statio	n Rd., New	/ Haven, WV 25253				Date	6/10/2016				
Weather	Cloudy,	~75 F		Devel	opment Time Beg	Begin 6/10/16 10:5		2 End		6/10/16 11:42			
Evacuation Da	ta												
	Meas	uring Point		TOC	Pump In	ntake Setting (ft bmp)						
	MP E	levation (ft)		588.61		Pumping Rate	e (gpm)	0.132					
Land	Surface E	levation (ft)		586.82 Evacuation Method					t valve/proa	ctive pu	ımp		
Sounded	Well De	pth (ft bmp)		81.80	81.80 Volumes Purged								
De	pth to Wa	iter (ft bmp)		46.11									
Wate	er-Level E	levation (ft)				Field Paran	neters						
Wate	Water Column in Well (ft)			35.69			Color		clear				
Casing Diameter/Type			2" PVC			Odor		None	!				
Gallons in Well				5.7	Appearance				clear				
	1	Volume		Conductivity			<u> </u>	ı	Dissolved				
Time	Depth to Water (ft btoc)	VACAL ALTERNA	Well Volumes Removed	(mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks		
6/10/16 10:52	46.13	0.25	0.04	2.295	61.9	16.53	6.85	-10.0	0.86	0.145	Clear, no odor		
6/10/16 10:57	46.13	0.50	0.09	2.285	58.4	16.81	6.90	-13.4	0.28	0.145	Clear, no odor		
6/10/16 11:02	46.13	1.00	0.18	2.255	50.5	17.25	7.01	-11.5	0.30	0.145	Clear, no odor		
6/10/16 11:07	46.13	1.50	0.26	2.235	29.1	17.16	7.05	-9.1	0.27	0.145	Clear, no odor		
6/10/16 11:12	46.13	2.00	0.35	2.211	29.2	17.28	7.08	-11.6	0.19	0.145	Clear, no odor		
6/10/16 11:17	46.13 46.13	2.50 3.00	0.44 0.53	2.189 2.182	35.7 38.6	17.21 17.31	7.09 7.11	-13.4 -10.6	0.21 0.17	0.145 0.145	Clear, no odor		
6/10/16 11:22 6/10/16 11:27	46.13	3.50	0.53	2.173	31.3	17.43	7.11	-11.4	0.17	0.145	Clear, no odor		
6/10/16 11:32	46.13	4.00	0.70	2.164	27.7	17.43	7.12	-7.2	0.17	0.132	Clear, no odor		
6/10/16 11:37	46.13	4.50	0.79	2.165	32.0	17.16	7.13	-9.6	0.19	0.132	Clear, no odor		
6/10/16 11:42	46.13	5.00	0.88	2.159	25.3	17.03	7.14	-16.5	0.14	0.132	Clear, no odor		
Development P	ersonnel:				Tim I	Eyerdom							
Notes: ~2.5 we	ell volumes	removed wit	h foot valv	e; ~6.5 well volumes r	emoved with proacti	ve pump prior t	o measu	ring wat	ter quality.				
Well Lo	cation: In o	gravel parking	lot. Cond	ition of well: good, nee	eds j-plug. Well locke	ed at arrival? You	es. Well	locked a	at departure?	Yes.			

	Well Casing Volumes (gallon/feet)												
	1-1/4" = 0.06		2" = 0.16	3" = 0	.37	4" = 0.65							
	1-1/2" = 0.09		2-1/2" = 0.26	3-1/2" =	0.50	6" = 1.47							
bmp	below measuring point	ml	mililiter	NTU	Nephelometric	Turbidity Units	ORP	Oxidation-Reduction					
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chlor	ride		Potential					
ft	feet	msl	mean sea-level	s.u.	Standard units	3							
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos pe	er centimeter	mV	millivolts					
mg/L	Miligrams per liter	NM	Not Measured	VOC	Volatile Organ	nic Compounds	BPI	Below Pump Intake					



Site/Well No.	JTMN-1										
Project	AEP Mo	ountaineer Pla	ant	Project No.	OHO1597	6.0009		Page	1of	1	
Site Location	1347 G	raham Statior	n Rd., Nev	v Haven, WV 25253				Date	6/29/2016		
Weather	Sunny,	70s (F)		Devel	opment Time Be	gin6/29	/16 9:50		End	6/29/1	6 11:15
Evacuation Da	ata										
	Meas	uring Point		тос	Pump I	ntake Setting (ft bmp)		~66		
		Elevation (ft)		583.67 Pumping Rate (gpm)							
Land		Elevation (ft)					submersible & waterra				
		pth (ft bmp)		-							<u>u</u>
					<u> </u>						
		ater (ft bmp)			_						
						Field Paran					
		n in Well (ft)					Color	Brown			
C	asing Dia	meter/Type		2" PVC			Odor	None			
	Gal	lons in Well		5.28		Appe	arance	Turbid			
		\/=l		Carrado attivita					Dissolved		
	Depth to Water (ft	Volume Withdrawn	Well Volumes	Conductivity (mS/cm or	Turbidity	Temperature	рН	ORP	Oxygen	Rate	
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/29/16 9:55	43.42		0.12	0.581	225	15.99	7.21	NM	13.02	0.132	
6/29/16 10:00	43.42	1.30		0.587	533	15.69	6.87	NM	1.58	0.132	
6/29/16 10:05	43.44	1.95	0.37	0.590	707	15.76	6.91	NM	1.09	0.132	
6/29/16 10:10	43.44	2.60	0.49	0.592	641	16.01	7.03	NM	0.98	0.132	
6/29/16 10:15	43.44	3.25 3.90	0.62 0.74	0.595 0.599	598	16.21 16.47	7.15 7.28	NM	0.81 0.72	0.132	
6/29/16 10:20 6/29/16 10:25	43.44	4.55		0.608	592 421	16.69	7.20	NM NM	0.72	0.132 0.132	
6/29/16 10:30	43.44	5.20	0.98	0.614	322	16.69	7.31	NM	0.43	0.132	
6/29/16 10:40	10.11	0.20	0.00	0.011	Additional surging		7.01	14141	0.10	0.102	
6/29/16 11:00	NM	20.00	3.79	NM	NM	NM	NM	NM	NM	1.00	
6/29/16 11:15	43.46	53.00	10.04	0.617	232	16.72	7.34	NM	0.57	2.20	
Development P	Personnel:				т	Darmon					
Notes:	ersonner.					Daimon					
110100.											
	4 1/1 -	0.00		•	Volumes (gallon/f	,		4" - 0.0	25		
$1-\frac{1}{4}$ " = 0.06 2" = 0.16 $1-\frac{1}{2}$ " = 0.09 $2-\frac{1}{2}$ " = 0.26					3" = 3-½"	0.37 = 0.50		4" = 0.6 6" = 1.4			
bmp below measuring point ml milliliter				NTU Nephelometric Turbidity Units ORP Oxidation-Reduct							
°C Degrees ft feet	Degrees Celsius mS/cm Milisiemens per centime feet msl mean sea-level			rentimeter PVC Polyvinyl chloride Potential s.u. Standard units							
pm Gallons per minute N/A Not A				Not Applicable Not Measured	umhos/cm VOC		r centime		mV BPI	millivolts Below Pu	ump Intake



Site/Well No.	JTMN-1											
Project	AEP Mo	ountaineer Pla	ant	Project No.	OHO159	76.0009		Page	1of	1		
Site Location	1347 G	raham Statior	n Rd., Nev	v Haven, WV 25253				Date	6/16/2016			
Weather	Sunny,	~80 F		Devel	opment Time Be	egin6/16/	16 11:05		End	6/16/1	6 11:28	
Evacuation Dat	а											
	Meas	uring Point		тос	Pump	Intake Setting (ft bmp)		~77.5	5		
		Elevation (ft)					_					
Land S		Elevation (ft)					submersible impeller pump					
		pth (ft bmp)		<u> </u>								
				43.63	-				0.70			
								Б.				
				34.17			-		rown changir			
Ca	_	meter/Type					_		None			
Gallons in Well				5.57		Appe	arance_					
	Depth to Volume Well Conductivity						Dissolved					
	Depth to Water (ft	Withdrawn	Well Volumes	(mS/cm or	Turbidity	Temperature	pН	ORP	Oxygen	Rate		
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)		(gpm)	Remarks	
6/16/16 11:08 6/16/16 11:13	43.65 43.65	26.00 27.50	4.67 4.94	0.577 0.576	26.4 ERROR	15.53 15.52	7.43 7.43	NM NM	1.61 1.29	0.211		
6/16/16 11:18	43.65	29.00	5.21	0.576	ERROR	15.57	7.42	NM	1.07	0.211		
6/16/16 11:23	43.65	30.50		0.577	ERROR	15.59	7.44	NM	0.97	0.211		
6/16/16 11:28	43.65	32.00	5.75	0.576	ERROR	15.58	7.42	NM	0.95	0.211		
	+											
Development Pe	ersonnel:			•	T.	Debnam						
Notes:												
				Well Casing	Volumes (gallon/	feet)						
$1-\frac{1}{4}$ " = 0.06 2" = 0.16 $1-\frac{1}{2}$ " = 0.09 $2-\frac{1}{2}$ " = 0.26						0.37 = 0.50		4" = 0.6 6" = 1.4				
bmp below measuring point ml milliliter				NTU	Nephelometric		-			n-Reduction		
•	Degrees Celsius mS/cm Milisiemens per centimet			Milisiemens per centimete mean sea-level	ntimeter PVC Polyvinyl chloride s.u. Standard units				Potential			
gpm Gallons p	m Gallons per minute N/A Not A			Not Applicable Not Measured	umhos/cr VOC		r centimet		mV BPI	millivolts Below Pu	ump Intake	



Site/Well No.	JTMN-2			_							
Project	AEP Mo	ountaineer Pl	ant	Project No.	OHO1597	6.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/28/2016		
Weather	Sunny,	~80s F		Devel	opment Time Be	gin 6/28/	 16 15:30		End_	6/28/1	6 16:45
						<u> </u>	10 10.00			0,20,	
Evacuation Date	a										
	Meas	uring Point		TOC	Pump I	ntake Setting (ft bmp)				
	MP E	levation (ft)		584.06	Pumping Rate (gpm)						
Land S	urface E	levation (ft)		582.16 Evacuation Method							
Sounded	Well De	pth (ft bmp)		75.84		Volumes	Purged		2.06		
Dep	th to Wa	iter (ft bmp)		43.87			-				
Water-Level Elevation (ft)				·		Field Paran	neters				
Water Column in Well (ft)							Color	Liah	Brown chan	aina to c	loar
										0 0	icai
Casing Diameter/Type											
	Gall	ons in Well		5.12		Appe	arance		Slightly to	ırbid	
S Volume				Conductivity					Dissolved		
	Depth to Water (ft	Withdrawn	Well Volumes	(mS/cm or	Turbidity	Temperature	рН	ORP	Oxygen	Rate	
Time	btoc)	(gal)	Removed	ùmhos/cm)	(NTU) Î	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/28/16 15:35	43.76	2.50	0.49	0.665	Overrange	16.11	6.95	NM	36.43	0.650	rate from 0.5-0.8 gpm
6/28/16 15:40	43.76	3.25	0.63	0.668	Overrange	16.02	6.61	NM	18.71	0.159	
6/28/16 15:45	43.76	3.90	0.76	0.680	Overrange	15.51	6.37	NM	7.23	0.132	
6/28/16 15:50	43.76	4.55	0.89	0.629	803	19.60	6.68	NM	2.26	0.132	
6/28/16 15:55	43.76	5.20	1.02	0.641	184	18.23	6.69	NM	1.07	0.132	
6/28/16 16:00	43.76	5.85	1.14	0.618	162	17.54	6.74	NM	0.91	0.132	
6/28/16 16:05	43.76	6.50	1.27	0.600	126	17.22	6.78	NM	0.65	0.132	
6/28/16 16:10	43.76	7.15	1.40	0.595	108	16.89	6.79	NM	0.33	0.132	
6/28/16 16:15	43.76	7.80	1.52	0.596	86.7	16.72	6.80	NM	0.32	0.132	
6/28/16 16:20	43.76	8.45	1.65	0.592	52.1	16.28	6.80	NM	0.29	0.132	
6/28/16 16:25	43.76	9.10	1.78	0.589	47.8	16.06	6.83	NM	0.23	0.132	
6/28/16 16:30	43.76	9.75	1.90	0.584	22.4	15.48	6.83	NM	0.19	0.132	
6/28/16 16:35	43.76	10.10	1.97	0.584	12.10	15.48	6.82	NM	0.21	0.08	
6/28/16 16:40	43.76	10.55	2.06	0.584	9.28	15.47	6.81	NM	0.15	0.08	
	+									\vdash	
Development Pe	rsonnel:				T.	Darmon					
Notes:											
				Well Casing	Volumes (gallon/f	eet)					
	1-1/4" = (2" = 0.16	3" =	0.37		4" = 0.6			
				2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	17		
bmp below measuring point ml m			mililiter	NTU	Nephelometri						
°C Degrees (Celsius		mS/cm	Milisiemens per centimete mean sea-level		Polyvinyl chlor		Potential			
ft feet gpm Gallons p	er minute		msl N/A	Mean sea-level Not Applicable							
gpm Gallons per minute N/A mg/L Miligrams per liter NM			Not Measured VOC		Volatile Organic Compounds						



Site/Well No.	MW-16	01A		_								
Project	AEP Mo	ountaineer Pl	ant	Project No.	OHO1597	6.0009	_	Page	1of	1		
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/15/2016			
Weather	Cloudy,	~75 F		Devel	lopment Time Beg	gin6/15/	/16 11:22		End	6/15/1	16 12:43	
Evacuation Data	1											
	Meas	uring Point		TOC	Pump Ir	ntake Setting ((ft bmp)		~80			
		levation (ft)			Pumping Rate (gpm) _							
Land S		levation (ft)			Evacuation Method							
				80.84	•						ипр	
						volumes	Furgea .		12.24	+		
				65.81								
Water	-Level E	levation (ft)				Field Paran	neters					
Water Column in Well (ft)				15.03			Color	Da	ark brown tur	ning clea	ar	
Casing Diameter/Type				2" PVC			Odor		None			
Gallons in Well						Appe						
	-											
	Depth to	Volume	Well	Conductivity					Dissolved			
Ti	Water (ft		Volumes	(mS/cm or	Turbidity	Temperature	pH	ORP	Oxygen	Rate	Damania	
Time 6/15/16 11:33	65.84	(gal) 5.00	Removed 2.04	umhos/cm) 0.599	(NTU) 126	(°C) 15.87	(s.u.) 7.20	(mV) NM	(g/mL) 4.93	(gpm) 0.211	Remarks 	
6/15/16 11:38	65.84	7.00	2.86	0.598	62.7	15.74	7.21	NM	4.93	0.211		
6/15/16 11:43	65.84	8.50	3.47	0.598	40.9	15.72	7.20	NM	4.77	0.211		
6/15/16 11:48	65.84	10.00	4.08	0.599	44.5	16.01	7.19	NM	4.71	0.211		
6/15/16 11:53	65.84	12.50	5.10	0.599	45.4	16.08	7.14	NM	4.65	0.211		
6/15/16 11:58	65.84	14.00	5.71	0.599	34.5	15.98	7.14	NM	4.71	0.211		
6/15/16 12:03	65.84	16.50	6.73	0.599	31.0	16.07	7.20	NM	4.73	0.211		
6/15/16 12:08	65.84	17.50	7.14	0.600	31.2	15.97	7.20	NM	4.79	0.211		
6/15/16 12:13	65.84	19.00	7.76	0.600	24.8	15.84	7.19	NM	4.67	0.211		
6/15/16 12:18	65.84	21.50	8.78	0.601	25.7	15.90	7.18	NM	4.65	0.211		
6/15/16 12:23	65.84	23.00	9.39	0.601	25.0	15.92	7.20	NM	4.58	0.211		
6/15/16 12:28	65.84	24.50	10.00	0.601	14.2	15.80	7.15	NM	4.49	0.211		
6/15/16 12:33	65.84	27.00	11.02	0.602	13.7	15.86	7.13	NM	4.32	0.211		
6/15/16 12:38	65.84	28.50	11.63	0.603	12.9	15.80	7.13	NM	4.43	0.211		
6/15/16 12:43	65.84	30.00	12.24	0.603	10.2	15.85	7.14	NM	4.39	0.211		
	1											
Development Pe	rsonnel:			!	T. [Debnam						
Notes:												
				Mall Caster	Volumes (maller "	oot\						
	1-1/4" =	0.06		2" = 0.16	Volumes (gallon/fo	•		4" = 0.6	35			
	1-1/2" =			2-1/2" = 0.26		= 0.50		6" = 1.4				
bmp below mea °C Degrees C	0 1	int	ml mS/cm	mililiter Milisiemens per centimet		Nephelometri Polyvinyl chlo	ride	Units	ORP	Oxidation Potential	n-Reduction	
ft feet	ar minute		msl N/A	mean sea-level Not Applicable	s.u. umbos/cm	Standard units		ter	mV	millivolts		
gpm Gallons per minute mg/L Miligrams per liter			NM	Not Measured	VOC	umhos/cm Micromhos per centimete VOC Volatile Organic Compou						



Site/Well No.	MW-1	602		=							
Project	AEP N	/lountaineer Pl	ant	Project No.	OHO159	76.0009		Page	1of	1	
Site Location	1347 (Graham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/7/2016		
Weather	Sunny	r, ~75 F		_ Deve	lopment Time Be	egin			End		
Evacuation	n Data										
	Mea	suring Point		TOC	Pump	Intake Setting (ft bmp)				
	MP	Elevation (ft)		605.12		Pumping Rate					
La	ind Surface	Elevation (ft)		602.37		Evacuation l					
Sour	nded Well De	epth (ft bmp)		74.10		Volumes	Purged		10.00)	
	Depth to W	ater (ft bmp)		59.81							
V	Vater-Level	Elevation (ft)				Field Paran	neters				
V	Vater Colum	nn in Well (ft)		14.29			Color				
	Casing Di	ameter/Type		2" PVC			Odor		None	9	
	Ga	allons in Well		2.2864		Appe	earance		Very tur	bid	
				Conductivity		1			Dissolved	$\overline{}$	
Time	Water (ft Withdrawn Volumes			(mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks
										\vdash	
										\vdash	
										+	
										\longmapsto	
										\vdash	
										\vdash	
										\vdash	
										\vdash	
	. 5										
Developmer			foot numn	· water appeared very		n Eyerdom umn not used an	d water d	nuality d	ata not taker		
Notes: 10 well volumes removed with foot pum			root pump	, water appeared very	tarbia. I Todouvo p	amp not acca an	a water t	luanty a	ata not takoi	<u> </u>	
				•	Volumes (gallon						
	1-½" = 1-½" =			2" = 0.16 $2-\frac{1}{2}" = 0.26$		0.37 = 0.50		4'' = 0.6 6'' = 1.4			
1-1/2" = 0.09 bmp below measuring point ml °C Degrees Celsius mS/cm			mS/cm	mililiter Milisiemens per centime	NTU ter PVC	Nephelometric Polyvinyl chlor	ride		ORP	Oxidation Potential	n-Reduction
gpm Gall	feet msl om Gallons per minute N/A		N/A	mean sea-level Not Applicable Not Measured	s.u. umhos/c VOC	Standard units m Micromhos pe Volatile Orgar	er centime		mV BPI	millivolts Below Pu	ump Intake



Site/Well No.	MW-16	02		=							
Project	AEP M	ountaineer Pl	ant	Project No.	OHO159	76.0009	_	Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Ne	- w Haven, WV 25253				Date	6/15/2016		
Weather	Cloudy	, ~75 F		Devel	opment Time Be						6 11:05
Evacuation D)ata										
	Meas	suring Point		тос	Pump	Intake Setting (ft bmp)		~70		
		Elevation (ft)				Pumping Rate					
Land		Elevation (ft)		-		Evacuation	_				ımn
		pth (ft bmp)				Volumes	-				<u>amp</u>
				59.82		Volumes	i uigeu_		0.02	•	
						Field Deser	4				
						Field Paran					
Wa	iter Columr	n in Well (ft)		13.49			Color	Da	ark brown tui	rning clea	ar
	Casing Dia	meter/Type		2" PVC			Odor		None	9	
	Gal	lons in Well		2.2		Appe	earance _				
	-	I	1	1		Т			Dissolved		
	Depth to		Well	Conductivity (mS/cm or	Turbidity	Temperature	Hq	ORP	Oxygen	Rate	
Time	btoc) (gal) Remov			umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/15/16 10:45	59.85	5.00	2.27	0.494	10.6	14.38	6.78	NM	0.61	0.211	
6/15/16 10:50	59.84	7.00	3.18	0.489	22.4	14.13	6.77	NM	0.80	0.211	
6/15/16 10:55	59.84	9.00	4.09	0.488	11.7	14.10	6.77	NM	0.86	0.211	
6/15/16 11:00	59.84		5.45	0.487	6.89	14.07	6.77	NM	0.88	0.211	
6/15/16 11:05	59.84	15.00	6.82	0.487	4.52	14.07	6.77	NM	0.90	0.211	
	_										
		-									
Development	Personnel:				Т.	Debnam					
Notes:											
				Well Casing	Volumes (gallon/	feet)					
1-½" = 0.06 1-½" = 0.09				2" = 0.16 2-½" = 0.26		0.37 = 0.50		4" = 0.6 6" = 1.4			
									0.11.0	Dedu "	
bmp below measuring point ml °C Degrees Celsius mS/cm			mililiter Milisiemens per centimet	NTU er PVC	Nephelometri Polyvinyl chlo		Units	ORP	Oxidation Potential	n-Reduction	
ft feet msl			mean sea-level	s.u.	Standard units	S		\ /			
• •	Gallons per minute N/A Miligrams per liter NM			Not Applicable Not Measured	umhos/cr VOC	n Micromhos pe Volatile Organ			mV BPI	millivolts Below Pu	ımp Intake



Site/Well No.	MW-16	603		_							
Project	AEP M	lountaineer Pl	ant	Project No.	OHO159	976.0009		Page	1of	1	
Site Location	1347 G	Graham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/10/2016		
Weather	Sunny,	70 F		Deve	opment Time B	egin			End		
Evacuation	Data										
	Meas	suring Point		TOC	Pump	Intake Setting (ft bmp)				
	MP E	Elevation (ft)		606.30		Pumping Rate					
Lan		Elevation (ft)				Evacuation I					
Sound	led Well De	epth (ft bmp)		76.80		Volumes	Purged		10.0	0	
I	Depth to Wa	ater (ft bmp)		61.85							
W	ater-Level E	Elevation (ft)				Field Paran	neters				
W	ater Colum	n in Well (ft)		14.95			Color				
	Casing Dia	ameter/Type		2" PVC			Odor				
	Ga	llons in Well		2.4		Appe	arance				
	<u> </u>	Volume		Conductivity					Dissolved		
Time	Depth to Water (fi btoc)	1	Well Volumes Removed	(mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks
Development	Personnel:	<u>. </u>		l	Tir	n Eyerdom		l			
Notes: 10 w				without any change in							
Well location: In grav				by conveyor. Well Cor	idition: Good. Wel	l locked at arrival	? No. W	ell locke	d at departu	re? No.	
				Well Casing	Volumes (gallor	/foot)					
$1-\frac{1}{4}$ " = 0.06				2" = 0.16	3" =	= 0.37		4" = 0.6			
1-½" = 0.09			2-1/2" = 0.26		" = 0.50		6" = 1.4				
°C Degre				mililiter Milisiemens per centimet	NTU er PVC	Nephelometric Polyvinyl chlor	ride	y Units	ORP	Oxidation Potential	n-Reduction
ft feet gpm Gallo	ns per minute		msl N/A	mean sea-level Not Applicable	s.u. umhos/o	Standard units om Micromhos pe		eter	mV	millivolts	
• •	ams per liter		NM	Not Measured	VOC	Volatile Organ			BPI		ump Intake



Site/Well No.	MW-16	603		_							
Project	AEP M	ountaineer Pl	ant	Project No.	OHO1597	76.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/15/2016		
Weather	Cloudy	, 75 F		Devel	opment Time Be	gin 6/15	/16 8:37		End	6/15/	16 10:05
Evacuation	n Data										
	Meas	surina Point		TOC	Pump I	ntake Setting (ft bmp)		~79		
		Elevation (ft)		·	·	Pumping Rate				7	
La	and Surface E					Evacuation I					
											ипр
Sour				79.90		volumes	Purgea		7.78	1	
	Depth to Wa	ater (ft bmp)		61.35							
V	Nater-Level E	Elevation (ft)				Field Paran	neters				
\	Nater Columi	n in Well (ft)		18.55			Color		dark bro	wn	
	Casing Dia	meter/Type		2" PVC			Odor		None	;	
		lons in Well				Anne					
	Odi			0.02		, , , , ,	ararroo				
	Depth to	Volume	Mall	Conductivity					Dissolved		
Ti	Water (ft	Withdrawn	Well Volumes	(mS/cm or	Turbidity	Temperature	pΗ	ORP	Oxygen	Rate	D
Time 6/15/16 8:50	0 61.74	(gal)	Removed 1.66	umhos/cm) 0.741	(NTU) 87.9	(°C) 16.96	(s.u.) 6.45	(mV) NM	(g/mL) 3.68	(gpm) 0.177	Remarks
6/15/16 8:5		1	1.66 1.90	0.741	74.9	16.71	6.47	NM	3.65	0.177	
6/15/16 9:00		1	2.15	0.757	64.6	16.54	6.47	NM	3.56	0.177	
6/15/16 9:0		1	2.48	0.753	46.0	16.56	6.48	NM	3.57	0.177	
6/15/16 9:10		9.00	2.98	0.744	41.2	16.67	6.47	NM	3.59	0.177	
6/15/16 9:1		10.00	3.31	0.750	30.0	16.60	6.47	NM	3.73	0.177	
6/15/16 9:20	0 61.74	11.50	3.81	0.745	30.5	16.49	6.47	NM	3.71	0.177	
6/15/16 9:2	5 61.74	12.50	4.14	0.743	24.7	16.49	6.47	NM	3.91	0.177	
6/15/16 9:30	0 61.74	14.00	4.64	0.742	21.5	16.48	6.47	NM	3.87	0.177	
6/15/16 9:3	5 61.74	15.00	4.97	0.737	17.5	16.38	6.46	NM	3.97	0.177	
6/15/16 9:40	0 61.74	17.00	5.63	0.736	15.1	16.38	6.47	NM	3.97	0.177	
6/15/16 9:4		1	5.96	0.736	15.0	16.42	6.46	NM	3.97	0.177	
6/15/16 9:50		1	6.46	0.737	10.1	16.42	6.46	NM	3.98	0.177	
6/15/16 9:5			6.95	0.732	10.2	16.37	6.46	NM	4.05	0.177	
6/15/16 10:0			7.45	0.730	8.37	16.38	6.45	NM	4.04	0.177	
6/15/16 10:0	05 61.74	23.50	7.78	0.730	8.52	16.39	6.45	NM	4.01	0.177	
	nt Personnel:				T.	Debnam					
Notes:											
				Well Casing	Volumes (gallon/	feet)					
	1-1/4" =			2" = 0.16	3" =	0.37		4" = 0.6			
	1-1/2" =	0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	17		
bmp below measuring point ml			ml mS/cm	mililiter	NTU	Nephelometri		/ Units	ORP		n-Reduction
	•			Milisiemens per centimet mean sea-level	er PVC s.u.	Polyvinyl chlor Standard units				Potentia	1
gpm Gal				Not Applicable	umhos/cn	n Micromhos pe	er centime		mV	millivolts	
mg/L Mili	grams per liter		NM	Not Measured	VOC	Volatile Orgar	nic Compo	ounds	BPI	Below P	ump Intake



Site/Well No.		MW-160	04S									
Project	ي .	AEP Mo	ountaineer Pla	ant	Project No.	OHO1597	76.0009	,	Page	1of	1	
Site Location	_	1347 Gı	raham Statior	n Rd., Nev	v Haven, WV 25253					6/9/2016		
Weather	_	Sunny,	75 F		Devel	opment Time Be	gin			End		
Evacuati	ion Data											
		Meas	uring Point		TOC	Pump I	ntake Setting (ft bmp)				
			levation (ft)				Pumping Rate					
ı	Land Sui		levation (ft)				Evacuation I					
			oth (ft bmp)		·		Volumes					
	Depth	to Wa	ter (ft bmp)		54.44							
	Water-L	_evel E	levation (ft)				Field Paran	neters				
	Water (Column	in Well (ft)		8.96			Color				
	Casi	ng Dia	meter/Type									
		Gall	ons in Well		1.43		Appe					
										Dissolved		
Time		Depth to Water (ft btoc) Uolume Well Withdrawn Volumes Removed Umhos/cm) Volumes well Volumes (mS/cm or umhos/cm)					Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks
											\vdash	
											\vdash	
Developm	ant Parc	onnel				т	Eyerdom					
•			removed fron	n well with	no visible change in c		•					
V	Well location: Grass near gated area. Condition of \					Well locked at arriv	/al? No. Well loc	ked at d	eparture	? No.		
		1 1/" - 1	2.06			Volumes (gallon/	•		4" - 0.0	:F		
		$1-\frac{1}{4}$ " = 0.06 2" = 0.16 $1-\frac{1}{2}$ " = 0.09 2-\frac{1}{2}" = 0.26					0.37 = 0.50		4" = 0.6 6" = 1.4			
°C D ft fe gpm G	Degrees Ce eet Gallons per	v measuring point ml		mS/cm msl N/A	milliliter Milisiemens per centimet mean sea-level Not Applicable Not Measured	NTU	Nephelometrion Polyvinyl chlor Standard units	ride s er centime	ter	mV	Potential millivolts	n-Reduction



Site/Well No.	MW-16	04S		-							
Project	AEP M	ountaineer Pl	ant	Project No.	OHO159	76.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/16/2016		
Weather	Sunny,	70 F		Devel	opment Time Be	egin6/16	/16 7:35		End	6/16/1	16 8:30
Evacuation Da	ata										
	Meas	uring Point		TOC	Pump	Intake Setting (ft bmp)		~62		
		Elevation (ft)			·	Pumping Rate					
Land		Elevation (ft)				Evacuation I					
											шр
		pth (ft bmp)				volumes	Purgea		12.79	3	
				54.49							
Wat	er-Level E	Elevation (ft)				Field Paran	neters				
Wat	er Columr	n in Well (ft)		7.94			Color		Brown>	Clear	
C	asing Dia	meter/Type		2" PVC			Odor		None	•	
		lons in Well				Appe					
	Depth to		Well	Conductivity (mS/cm or	Turbidity	Temperature	рH	ORP	Dissolved Oxygen	Rate	
Time	Water (ft btoc)	(gal)	Volumes Removed	umhos/cm)	(NTU)	(°C)	рп (s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/16/16 7:40	54.51	1.50	1.16	1.444	173	16.57	7.34	NM	5.42	0.211	
6/16/16 7:45	54.51	3.00	2.33	1.496	164	16.48	7.18	NM	3.23	0.211	
6/16/16 7:50	54.51	4.50	3.49	1.537	124	16.85	7.13	NM	2.77	0.211	
6/16/16 7:55	54.51	6.00	4.65	1.556	100	17.19	7.13	NM	2.33	0.211	
6/16/16 8:00	54.51	7.50	5.81	1.569	88.7	17.31	7.12	NM	2.05	0.211	
6/16/16 8:05	54.51	9.00	6.98	1.570	54.9	17.44	7.12	NM	1.95	0.211	
6/16/16 8:10	54.51	10.50	8.14	1.571	34.7	17.47	7.12	NM	1.92	0.211	
6/16/16 8:15	54.51	12.00	9.30	1.573	20.3	17.52	7.11	NM	1.95	0.211	
6/16/16 8:20	54.51	13.50	10.47	1.574	14.3	17.58	7.11	NM	1.91	0.211	
6/16/16 8:25	54.51	15.00	11.63	1.573	12.4	17.65	7.10	NM	1.87	0.211	
6/16/16 8:30	54.51	16.50	12.79	1.577	9.34	17.64	7.10	NM	1.86	0.211	
										\vdash	
										\vdash	
Development F	ersonnel:				T.	Debnam					
Notes:											
				Wall Casina	Values (nellas	(F = - 4)					
	1-1/4" =	0.06		2" = 0.16	Volumes (gallon/ 3" =	0.37		4" = 0.6	35		
	1-1/2" =			2-1/2" = 0.26		= 0.50		6" = 1.4			
bmp below measuring point ml			mililiter	NTU	Nephelometri	c Turbidity	Units	ORP	Oxidation	n-Reduction	
°C Degrees Celsius mS/cm			Milisiemens per centimet	er PVC	Polyvinyl chlor	ride			Potential		
ft feet msl			mean sea-level Not Applicable	s.u. umhos/cr	Standard units m Micromhos pe		ter	mV	millivolts		
• •				Not Measured	VOC	Volatile Organ			BPI		ımp Intake



bmp °C

gpm mg/L

ft

below measuring point

Degrees Celsius

Gallons per minute

Miligrams per liter

feet

WELL DEVEL	.OPME	:NI LOG	j								
Site/Well No.	MW-16	04D									
Project	AEP Mo	ountaineer Pla	ant	Project No.	OHO1597	76.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., New	v Haven, WV 25253				Date	6/9/2016		
Weather	Sunny,	75 F		Devel	opment Time Be	gin6/9/	16 13:05		End	6/9/1	6 14:05
Evacuation Da	ta										
	Meas	uring Point		TOC	Pump I	ntake Setting (ft bmp)				
	MP E	Elevation (ft)		598.22		Pumping Rate	e (gpm)		0.132	2	
Land	Surface E	levation (ft)		595.59		Evacuation I	Method	pro	active and	foot val	ve
Sounded	Well De	pth (ft bmp)		83.30		Volumes	Purged		12.83	3	
				54.56							
						Field Paran	notore				
						i leiu Faiaii					
		n in Well (ft)		•							
С	asing Dia	meter/Type		2" PVC			Odor		None		
	Gallons in Well			4.59		Appe	earance		Cloud	у	
	Depth to Withdrawn Well			Conductivity					Dissolved		
	Water (ft Withdrawn Volum		Well Volumes	(mS/cm or	Turbidity	Temperature	рН	ORP	Oxygen	Rate	
Time			Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/9/16 13:05	54.58	0.50	0.11	1.814	243	18.75	7.39	129.7	5.12	0.080	
6/9/16 13:10	54.58 54.58	1.00 2.50	0.22 0.54	1.807 1.802	163 119	18.28 18.32	7.29 7.22	128.0 126.0	0.32 0.18	0.132	
6/9/16 13:15 6/9/16 13:20	54.58	3.00	0.65	1.801	114	18.24	7.26	125.9	0.18	0.132 0.132	
6/9/16 13:25	54.58	4.50	0.03	1.800	99	18.06	7.22	124.8	0.13	0.132	
6/9/16 13:30	54.58	6.00	1.31	1.802	77.3	17.99	7.29	124.4	0.09	0.264	
6/9/16 13:35	54.58	8.00	1.74	1.802	62.5	17.97	7.21	123.7	0.08	0.264	
6/9/16 13:40	54.58	9.00	1.96	1.804	45.0	18.53	7.19	123.3	0.08	0.132	
6/9/16 13:45	54.58	10.00	2.18	1.810	39.3	18.41	7.20	123.2	0.10	0.132	
6/9/16 13:50	54.58	11.00	2.40	1.806	34.8	18.74	7.23	122.6	0.09	0.132	
6/9/16 13:55	54.58	11.50	2.51	1.804	29.2	18.58	7.23	122.4	0.07	0.132	
6/9/16 14:00	54.58	12.00	2.61	1.801	22.8	19.47	7.23	121.9	0.07	0.132	
6/9/16 14:05	54.58	13.00	2.83	1.820	20.8	19.90	7.22	121.4	0.08	0.132	
Development P						Debnam					
				nd 7 removed with pro							
Well loo	cation: Gra	ss near gated	d area. Co	ndition of well: good. V	/ell locked at arriva	al? No. Well lock	ed at dep	parture?	No.		
				Well Casing	Volumes (gallon/	feet)					
				2" = 0.16		0.37		4" = 0.6			
	1-1/2" = (U.U9		$2-\frac{1}{2}$ " = 0.26	3-1/2"	= 0.50		6" = 1.4	+ /		

NTU

PVC

s.u.

VOC

umhos/cm

Nephelometric Turbidity Units

Micromhos per centimeter

Volatile Organic Compounds

Polyvinyl chloride

Standard units

ORP Oxidation-Reduction

BPI Below Pump Intake

Potential

mV millivolts

mililiter

mean sea-level

Not Applicable

Not Measured

Milisiemens per centimeter

ml

msl

N/A

NM

mS/cm



Site/Well No.	MW-16	05S		-							
Project	AEP M	ountaineer Pla	ant	Project No.	OHO159	76.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/8/2016		
Weather	Sunny,	75 F		Devel	opment Time Be	egin			End		
Evacuation Da	ta										
	Meas	suring Point		TOC	Pump	Intake Setting (ft bmp)				
		Elevation (ft)				Pumping Rate					
Land S		Elevation (ft)				Evacuation					
Sounded	l Well De	pth (ft bmp)		63.00		Volumes	Purged		10.00)	
De	pth to Wa	ater (ft bmp)		47.29							
Wate	er-Level E	Elevation (ft)				Field Paran	neters				
Wate	er Columr	n in Well (ft)		15.71			Color				
C	asing Dia	meter/Type		2" PVC							
	Gal	lons in Well		2.51		Арре	arance				
	<u> </u>	Volume		Conductivity		<u> </u>	<u> </u>		Dissolved	$\overline{}$	
Time	Depth to Water (ft	Withdrawn	Well Volumes	(mS/cm or	Turbidity	Temperature	pH	ORP	Oxygen	Rate	Domorko
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
										\vdash	
										\Box	
	+									\vdash	
										\vdash	
										\vdash	
										\vdash	
Development Po			oot numn	Clarity of water did no		Debnam	not donl	ovod			
-				dition of well: good; ne					t departure?	No.	
				_							
	4 1/1	0.00		•	Volumes (gallon/	,		411 0.0	25		
$1-\frac{1}{4}$ " = 0.06 2" = 0.16 $1-\frac{1}{2}$ " = 0.09 2-\frac{1}{2}" = 0.26				2'' = 0.16 $2-\frac{1}{2}'' = 0.26$		0.37 = 0.50		4" = 0.6 6" = 1.4			
°C Degrees	Degrees Celsius mS/cm			mililiter Milisiemens per centimet		Nephelometri Polyvinyl chlo	ride	y Units	ORP	Oxidation Potential	n-Reduction
• .	msl s per minute N/A			mean sea-level Not Applicable Not Measured	s.u. umhos/cr VOC	Standard units m Micromhos pe Volatile Organ	er centime		mV BPI	millivolts Below Pu	ump Intake



Site/Well No.	MW-16	05S		_							
Project	AEP M	ountaineer Pl	ant	Project No.	OHO1597	6.0009		Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/16/2016		
Weather	Sunny,	65 F		Develo	opment Time Be		/16 6:40		End	6/16/	16 7:07
Evacuation D	ata										
	Meas	suring Point		TOC	Pump II	ntake Setting (ft bmp)		~61.	5	
		Elevation (ft)			·	Pumping Rate					
Land		Elevation (ft)		·		Evacuation I					
		pth (ft bmp)		·		Volumes				ļ	
				·		Volumes	ruigeu.		4.04	<u>'</u>	
				47.36		=:					
						Field Paran					
Wa	ter Columr	n in Well (ft)		14.57			Color		Brown>	Clear	
(Casing Dia	meter/Type		2" PVC			Odor		None	9	
	Gal	lons in Well		2.37		Appe	arance				
		Values	1	Carrado attratta					Dissolved	1	
Time	Depth to Water (ft btoc)		Well Volumes Removed	Conductivity (mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Oxygen (g/mL)	Rate (gpm)	Remarks
6/16/16 6:47	47.40	5.00	2.11	1.656	29.3	16.24	7.26	NM	10.76	0.211	
6/16/16 6:52	47.40	6.50	2.74	1.657	16.5	16.51	7.25	NM	7.62	0.211	
6/16/16 6:57	47.40	8.00	3.38	1.657	13.2	16.55	7.25	NM	4.28	0.211	
6/16/16 7:02	47.40	9.50	4.01	1.657	9.53	16.61	7.26	NM	3.92	0.211	
6/16/16 7:07	47.40	11.00	4.64	1.658	5.73	16.67	7.25	NM	3.86	0.211	
										\vdash	
Development I	Personnel:				Т. Е	Eyerdom					
Notes:											
					Volumes (gallon/f						
1-¼" = 0.06 1-½" = 0.09			2'' = 0.16 $2-\frac{1}{2}'' = 0.26$	3" = 3-½" :	0.37 = 0.50		4" = 0.6 6" = 1.4				
bmp below measuring point ml			mililiter	NTU	Nephelometri	c Turbidity		ORP	Oxidation	n-Reduction	
°C Degree ft feet	C Degrees Celsius mS/cm			Milisiemens per centimete mean sea-level		Polyvinyl chlor Standard units				Potential	
gpm Gallons			msl N/A	Not Applicable	s.u. umhos/cm	Micromhos pe	er centime		mV	millivolts	
	Gallons per minute N/A Miligrams per liter NM			Not Measured	VOC	Volatile Orgar	nic Compo	unds	BPI	Below Pu	ımp Intake



Site/We	ll No.	MW-16	05D									
Project		AEP Mo	ountaineer Pl	ant	Project No.	OHO1597	76.0009	_	Page	1of	1	
Site Loc	ation	1347 G	raham Statio	n Rd., Nev	v Haven, WV 25253			-		6/8/2016		
Weathe	r	Sunny,	70 F		Deve	elopment Time Be	egin 6/8/	16 10:40		End	6/8/1	6 11:20
Ev	acuation Data	ı										
		Meas	uring Point		TOC	Pump l	Intake Setting (ft bmp)				
		MP E	Elevation (ft)		591.01		Pumping Rate	e (gpm)		0.13	2	
	Land St	urface E	levation (ft)		588.51		Evacuation I				Proactiv	re
					84.10					10.8		
					47.51		7 51411155	. a.goa				
							Field Paran	notors				
							i içid i alalı			01		
			n in Well (ft)									
	Cas	sing Dia	meter/Type		2" PVC						9	
		Gall	lons in Well		5.85		Appe	earance		Clea	r	
		I Depth to I Wall I					1	1		Dissolved		
			AACH Joseph		Conductivity (mS/cm or Turbidity Temperature pH					Oxygen	Rate	
	Time	btoc)	(gal)	Removed	umhos/cm)	m) (NTU) (°C) (s.u.)				(g/mL)	(gpm)	Remarks
6/8	/16 10:40	47.50	1.00	0.17	2.517	77.3	16.92	7.15	128.7	4.16	0.132	clear, no odor
6/8	/16 10:45	47.50	1.50	0.26	2.487	57.7	17.09	7.18	48.1	0.53	0.132	clear, no odor
6/8	/16 10:50	47.50	2.00	0.34	2.442	12.5	16.81	7.23	89.9	0.26	0.132	clear, no odor
6/8	/16 10:55	47.50	2.50	0.43	2.417	8.60	17.06	7.23	54.2	0.20	0.132	clear, no odor
6/8	/16 11:00	47.50	3.00	0.51	2.416	9.77	17.18	7.24	21.7	0.18	0.132	clear, no odor
6/8	/16 11:05	47.50	3.50	0.60	2.417	11.80	17.31	7.25	-1.2	0.19	0.132	clear, no odor
6/8	/16 11:10	47.50	4.00	0.68	2.413	5.89	17.07	7.26	-15.9	0.25	0.132	clear, no odor
6/8	/16 11:15	47.50	4.50	0.77	2.408	4.57	17.32	7.26	-23.9	0.29	0.132	clear, no odor
6/8	/16 11:20	47.50	5.00	0.85	2.412	8.56	17.26	7.25	-28.5	0.20	0.132	clear, no odor
		ļ										
		ļ										
Day	alanment Der						Franksis					
	elopment Per		ith foot numn	/. 7 well w	volumes) 15 gal rama		Eyerdom	lumas) f	- aal ran	acuad while	takina	
INC	Notes: 40 gal removed with foot pump (~7 well volumes). 15 gal re											
water quality measurements (60 gal total). Well location: at arrival: No. Well locked at departure: No.						alongside nwy 62.	Condition of well	. good, r	ieeus J-	plug. Well lo	скеи	
	at arrivar.	INO. WE	ii iockeu at ue	parture. N	VO.							
					Well Casing	Volumes (gallon/	feet)					
		1-1/4" = (2" = 0.16		0.37		4" = 0.6			
-		1-1/2" = 1	0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	11		
bmp			mililiter	NTU	Nephelometri		/ Units	ORP		n-Reduction		
· ·		Milisiemens per centime mean sea-level	ter PVC s.u.	Polyvinyl chlor Standard units				Potentia				
gpm				Not Applicable	umhos/cr	n Micromhos pe	er centime		mV	millivolts		
mg/L	Miligrams _I	per liter		NM	Not Measured	VOC	Volatile Orgar	nic Compo	ounds	BPI	Below P	ump Intake



Site/Well No	٥.	MW-16	06S		_							
Project		AEP Mo	ountaineer Pla	ant	Project No.	OHO15	976.0009	_	Page	1of	1	
Site Locatio	n	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/8/2016		
Weather		Sunny,	75 F		Deve	lopment Time E	Begin			End		
Evacu	ation Data											
		Meas	uring Point		TOC	Pump	Intake Setting	(ft bmp)				
		MP E	levation (ft)		590.15		Pumping Rat	e (gpm)				
	Land Su	ırface E	levation (ft)		587.28		Evacuation	Method	Fo	ot pump		
5	Sounded V	Vell De	pth (ft bmp)		57.10		Volume	s Purged		11.3	0	
	Deptl	n to Wa	iter (ft bmp)		46.01							
	Water-	Level E	levation (ft)				Field Para	meters				
	Water	Columr	n in Well (ft)		11.09			Color				
	Cas	ing Dia	meter/Type		2" PVC			Odor				
		Gal	lons in Well		1.77		App					
Tim	Depth to Water (ft bloc) Depth to Water (ft Withdrawn (gal) We Volume We Volume (gal)				Conductivity (mS/cm or umhos/cm)	Turbidity (NTU)	Temperature (°C)	pH (s.u.)	ORP (mV)	Dissolved Oxygen (g/mL)	Rate (gpm)	Remarks
								<u> </u>				
	. 5	<u> </u>										
	ment Pers		were remove	ed with for	nt numn/surge block (Γ. Debnam I not improve. Sub	mersible	nroactiv	/e numn was	not	
	Notes: 11.3 well volumes were removed with deployed. Well location: grass along H						•					no
1 1/" - 0 06						Volumes (gallo						
1-1/4" = 0.06 1-1/2" = 0.09			2" = 0.16 $2-\frac{1}{2}" = 0.26$		= 0.37 ½" = 0.50		4" = 0.6 6" = 1.4					
bmp °C ft	below measuring point ml Degrees Celsius mS/cm feet msl			mililiter Milisiemens per centime mean sea-level	s.u.	Nephelometr Polyvinyl chlo Standard uni	oride ts		ORP	Potential	n-Reduction	
gpm mg/L	Gallons per Miligrams p	per minute N/A			Not Applicable Not Measured	umhos/ VOC	cm Micromhos p Volatile Orga			mV BPI	millivolts Below Pu	ump Intake



Site/Well No.	MW-16	06S		=							
Project	AEP M	ountaineer Pl	ant	Project No.	OHO159	76.0009	_	Page	1of	1	
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/15/2016		
Weather	Sunny,	85 F		Devel	opment Time Be	egin 6/15/	/16 18:16				6 18:45
Evacuation D	ata										
	Meas	uring Point		TOC	Pump	Intake Setting (ft bmp)		~57		
	MP E	levation (ft)		590.15		Pumping Rate	_				
Land		Elevation (ft)				Evacuation I	-				
		pth (ft bmp)		·		Volumes	_				
				46.02			9				
						Field Paran	neters				
				11.21		r icia r aran			brown	Claar	
				·			·-		brown>		
,				2" PVC			_		None		
	Gal	lons in Well		1.83		Appe	earance _				
	1	Volume	1	Conductivity					Dissolved	П	
	Time Depth to Water (ft btoc) Withdrawn (gal) Ren			(mS/cm or	Turbidity	Temperature	рН	ORP	Oxygen	Rate	
			Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks
6/15/16 18:25	46.06	2.50	1.37	1.587	76.4	16.41	7.29	NM	1.38	0.224	
6/15/16 18:30 6/15/16 18:35	46.06 46.06	4.00	2.19	1.589	37.7	16.33	7.16	NM	1.25 1.19	0.224	
6/15/16 18:40	46.06	6.50 8.00	3.55 4.37	1.589 1.590	29.6 14.6	16.38 16.41	7.12 7.11	NM NM	1.19	0.224	
6/15/16 18:45	46.06	9.50	5.19	1.590	10.1	16.43	7.11	NM	1.14	0.224	
0/10/10 10:10	10.00	0.00	0.10	1.000	10.1	10.10	7.10	1 4141	1.10	0.221	
										igsquare	
										\longmapsto	
										++	
										++	
										+-+	
										\vdash	
Development	Personnel:				T.	Debnam					
Notes:											
						(5)					
	1-1/4" =	0.06		2" = 0.16	Volumes (gallon/	(feet) 0.37		4" = 0.6	35		
1-74 - 0.06 1-½" = 0.09				2-1/2" = 0.26		= 0.50		6" = 1.4			
bmp below measuring point ml			mililiter	NTU	Nephelometri	c Turbidity	Units	ORP	Oxidation	-Reduction	
°C Degree	°C Degrees Celsius mS/cm			Milisiemens per centimet	er PVC	Polyvinyl chlor	ride			Potential	
ft feet gpm Gallon	s per minute		msl N/A	mean sea-level Not Applicable	s.u. umhos/cr	Standard units m Micromhos pe		ter	mV	millivolts	
• •	Gallons per minute N/A Miligrams per liter NM			Not Measured	VOC	Volatile Organ			BPI		ımp Intake



WELI	L DEVEL	OPME	INT LOG	j												
Site/Well No. MW-1606D					_											
Project AEP Mountaineer Plant			Project No.	Project No OHO15976.0009				Page 1 of 1								
Site Loc	cation	1347 G	raham Statio	n Rd Nev	w Haven, WV 25253					6/9/2016						
				irita., ive												
Weathe	er	Sunny,	70 F		_ Deve	lopment Time Beg	gin6/9/	16 9:34		Ena	6/9/1	6 10:34				
Ev	acuation Data	a														
		Meas	uring Point		TOC	Pump II	ntake Setting (ft bmp)								
		MP E	levation (ft)		590.10		Pumping Rate				6					
	Land S										d foot valve					
Land Surface Elevation (ft) Sounded Well Depth (ft bmp)							Volumes									
					<u> </u>		Volumes	i uigeu		11.0	บษ					
					46.01											
							Field Paran									
	Water	r Column	n in Well (ft)		31.59			Color		Clea	r					
	Ca	sing Dia	meter/Type		2" PVC			Odor		None	е					
		Gall	ons in Well		5.05		Appe	arance								
						T										
		Depth to	Volume Withdrawn	Well	Conductivity (mS/cm or	Turbidity	Temperature	рН	ORP	Dissolved Oxygen	Rate					
	Time	Water (ft btoc)	(gal)	Volumes Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks				
6/9	9/16 9:34	46.09	0.00	0.00	2.017	202	16.84	7.26	-22.0	2.46	0.106	cloudy, no odor				
6/9	9/16 9:39	46.11	0.50	0.10	2.017	156	17.07	7.31	-24.6	0.44	0.106	cloudy, no odor				
6/9	9/16 9:44	46.11	1.00	0.20	2.009	148	17.82	7.32	-25.3	0.27	0.106	cloudy, no odor				
6/9	9/16 9:49	46.11	1.50	0.30	2.014	225	16.21	7.37	-27.5	0.94	0.106	cloudy, no odor				
6/9	9/16 9:54	46.11	2.00	0.40	2.001	337	16.81	7.33	-25.9	0.25	0.106	cloudy, no odor				
6/9	9/16 9:59	46.11	2.50	0.50	1.988	438	16.81	7.39	-29.0	0.34	0.106	cloudy, no odor				
6/9	9/16 10:04			1	Proa	ctive used to surge	well to lower tur	bidity								
	9/16 10:09	46.11	3.00	0.59	2.033	403	16.35	7.46	-31.8	0.75	0.106	cloudy, no odor				
	9/16 10:14	46.11	3.50	0.69	2.022	378	17.26	7.36	-27.4	0.17	0.106	cloudy, no odor				
	9/16 10:19	46.11	4.00	0.79	2.034	339	17.46	7.35	149.7	0.12	0.106	cloudy, no odor				
	9/16 10:24	46.11	4.50	0.89	2.026	155	17.01	7.34	149.5	0.11	0.106	cloudy, no odor				
	9/16 10:29	46.11	5.00	0.99	2.015	152	18.18	7.33	147.4	0.17	0.106	cloudy, no odor				
6/9	9/16 10:34	46.11	5.50	1.09	2.017	163	17.39	7.34	146.4	0.16	0.106	cloudy, no odor				
											\Box					
	elopment Pe						Eyerdom									
No			ere removed v	with the fo	ot valve. 2 well volume	es were removed wit	th proactive pur	p before	e taking	water quality						
	measure		ion of walls a	rana alama	hung 62 Condition of	wall, good Mall loo	lead at arrival, no	N/all la	alrad at	doporturos						
		Local	lon or well: g	rass along	hwy 62. Condition of	weii: good. vveii ioc	ked at arrival: no	o. well id	ocked at	departure: r	10.					
					Well Casing	Volumes (gallon/f	eet)									
		1-1/4" = (2" = 0.16	3" =			4" = 0.6							
		1-1/2" = (0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	+1						
bmp °C		asuring poi	nt	ml mS/cm	mililiter	NTU ter PVC	Nephelometric		y Units	ORP	Oxidation Potential	n-Reduction				
°C ft	Degrees (feet	CISIUS		mS/cm msl	Milisiemens per centimet mean sea-level	er PVC s.u.	Polyvinyl chlor Standard units				rotential	ı				
gpm	Gallons po			N/A	Not Applicable	umhos/cm				mV	millivolts					
mg/L	Miligrams	per liter		NM	Not Measured	VOC	Volatile Organ	iic Compo	ounds	BPI	Relow Pr	ump Intake				



Site/Well No. MW-1606D				-											
Project	AEP Mo	ountaineer Pl	ant	Project No.	Project No. <u>OHO15976.0009</u>					Page 1 of 1					
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date 6/15/2016							
Weather	Sunny,	untaineer Plant Project No. OHO15976.0009 aham Station Rd., New Haven, WV 25253 BS F Development Time Begin 6/15/16 17:36 uring Point TOC Pump Intake Setting (ft bmp) evation (ft) 590.10 Pumping Rate (gpm) evation (ft) 587.25 Evacuation Method oth (ft bmp) 77.78 Volumes Purged er (ft bmp) 46.03 evation (ft) - Field Parameters		i	End	6/15/1	6 18:00								
Evacuation	Data														
	Meas	uring Point		тос	Pump I	ntake Setting (ft bmp)		~77.5	i					
MP Elevation (ft)							-								
Laı											ımp				
						Volumes	Purged		2.12	- · · · · -					
						Field Paran	neters								
							Color		brown>	->clear					
						Δnne	-								
	Oali	ions in wei		3.10		Дрре	arance.								
Time	Depth to Water (ft btoc)	Withdrawn	Volumes	(mS/cm or		· -		ORP (mV)	Dissolved Oxygen (g/mL)	Rate (gpm)	Remarks				
6/15/16 17:40				i	†	16.25		NM	2.62	0.211					
6/15/16 17:45	5 46.06	6.5	1.25	1.748	15.0	16.17	7.30	NM	0.40	0.211					
6/15/16 17:50				1	†			NM	0.24	0.211					
6/15/16 17:55				†	1			NM	0.23	0.211					
6/15/16 18:00	0 46.02	11.0	2.12	1.749	7.82	16.12	7.29	NM	0.20	0.211					
Developmen	nt Personnel:					Debnam									
Notes:	it reisonnei.				1.1	рерпаш									
				Wall Casino	Volumes (gallon/i	Foot)									
	1-½" = 1-½" =			2" = 0.16 2-½" = 0.26	3" =	,		4" = 0.6 6" = 1.4							
	w measuring poi		mI mS/cm	mililiter Milisiemens per centime	NTU	Nephelometric	C Turbidity			Oxidatior Potential	n-Reduction				
ft feet gpm Gallo			msl N/A NM	mean sea-level Not Applicable Not Measured	s.u. umhos/cm VOC	Standard units	s er centime			millivolts					



Site/Well No.	-			_											
Project				Project No.	OHO159	976.0009 Page 1 of 1					1				
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/15/2016						
Weather	Sunny, 85 F Development Time Begin 6/15/16 16:30														
Evacuation	Data														
	Meas	suring Point		тос	Pump	Intake Setting (ft bmp)		~60						
MP Elevation (ft)				593.99		Pumping Rate	_								
Land Surface Elevation (ft)						Evacuation I	-				ımp				
	ded Well De			·			-		3.57		<u>p</u>				
	Depth to Wa			·		Volumes	i uigou_		0.01	31					
				46.56		Field Paran	actoro								
						rieiu Faiaii									
VV				·	3.72 Color brown>cl										
	Casing Dia	meter/Type		2" PVC			Odor		None	9					
	Gal	lons in Well		2.24		Appe	arance _								
		Volume	1	Conductivity		1			Dissolved						
	Depth to Water (ft	VACAL ALTERNATION	Well Volumes	(mS/cm or	Turbidity	Temperature	pН	ORP	Oxygen	Rate					
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks				
6/15/16 16:35		2.0	0.89	0.836	63.3	15.91	7.51	NM	0.93	0.211					
6/15/16 16:40		3.5	1.56	0.835	28.3	15.92	7.47	NM	0.98	0.211					
6/15/16 16:45		5.0	2.23	0.836	18.3	15.92	7.47	NM	0.80	0.211					
6/15/16 16:50 6/15/16 16:55		6.5 8.0	2.90 3.57	0.836 0.835	9.73	15.90 15.90	7.46 7.44	NM NM	0.81	0.211					
0/13/10 10.33	40.59	0.0	3.37	0.633	9.73	15.90	7.44	INIVI	0.62	0.211					
										\sqcup					
						-									
						1									
Developmen	t Personnel:				T.	Debnam									
Notes:															
				Well Casing	Volumes (gallon	/foot)									
	1-1/4" =	0.06		2" = 0.16		0.37		4" = 0.6	65						
	1-1/2" =	0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	47						
	w measuring po	int	ml	mililiter	NTU	Nephelometri		Units	ORP						
°C Degr	rees Celsius		mS/cm msl	Milisiemens per centimet mean sea-level	er PVC s.u.	Polyvinyl chlor Standard units				Potential					
	ons per minute		MSI N/A	Not Applicable	s.u. umhos/ci			ter	mV	millivolts	n-Reduction				
• •	rams per liter		NM	Not Measured	VOC	Volatile Orgar			BPI	Below Pu	ımp Intake				



Site/Well No.				_											
Project				Project No.	OHO159	76.0009		Page							
Site Location	1347 G	raham Statio	n Rd., Ne	w Haven, WV 25253				Date	6/15/2016						
Weather	1347 Graham Station Rd., New Haven, WV 25253 Partly Cloudy, 80 F Development Time Begin 6/15/		16 15:50		End	6/15/1	6 16:20								
Evacuation Data	a														
	Meas	uring Point		TOC Pump Intake Setting (ft bmp) ~8							0				
MP Elevation (ft)				<u>.</u>		Pumping Rate	-								
Land S		levation (ft)					-			peller pump					
						Volumes	-								
Sounded Well Depth (ft bmp) Depth to Water (ft bmp)							9								
						Field Paran	notors								
						i içid i didii			Park to account						
		n in Well (ft)		·			-		light brown-						
Ca	_	meter/Type					-		None						
	Gal	lons in Well		5.52		Appe	arance								
	1	Volume	1	Conductivity					Dissolved	П					
	Depth to Water (ft	VACAL ALTERNA	Well Volumes	(mS/cm or	Turbidity	Temperature	рН	ORP	Oxygen	Rate					
Time	btoc)	(gal)	Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks				
6/15/16 16:00	46.76	2.5	0.45	0.759	57.1	16.32	7.72	NM	0.24	0.224					
6/15/16 16:05 6/15/16 16:10	46.76 46.76	4.0 5.5	1.00	0.759 0.759	26.5 15.4	16.45 16.56	7.69 7.66	NM NM	0.20 0.16	0.224					
6/15/16 16:15	46.76	7.0	1.27	0.758	9.23	16.55	7.65	NM	0.15	0.224					
6/15/16 16:20	46.76	8.5	1.54	0.757	5.94	16.58	7.67	NM	0.14	0.224					
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Development Pe	rsonnel·				т	<u>l</u> Debnam									
Notes:	i 30i ii ici.				1.	Debriam									
				Well Casing	Volumes (gallon/	(foot)									
	1-1/4" =	0.06		2" = 0.16		0.37		4" = 0.6	65						
	1-1/2" =	0.09		2-1/2" = 0.26	3-1/2"	= 0.50		6" = 1.4	47						
bmp below mea		nt	ml	mililiter	NTU	Nephelometri	,	Units	ORP		-Reduction				
°C Degrees (ft feet	Celsius		mS/cm msl	Milisiemens per centimete mean sea-level	er PVC s.u.	Polyvinyl chlor Standard units				Potential					
gpm Gallons pe			N/A	Not Applicable	umhos/cr	n Micromhos pe	er centimet		mV	millivolts					
mg/L Miligrams	per liter		NM	Not Measured	VOC	Volatile Orgar	nic Compo	unds	BPI	Below Pu	ımp Intake				



Site/Well No.				-											
Project				Project No.	OHO1597	76.0009	_	Page 1 of 1							
Site Location	1347 G	raham Statio	n Rd., Nev	w Haven, WV 25253				Date	6/17/2016						
Weather	Cloudy, ~75 F Development Time Begin 6/17/16 12:12 En														
Evacuation D	Data														
	Meas	uring Point		TOC	Pump I	Intake Setting (ft bmp)		~60						
	MP Elevation (ft)					Pumping Rate	_								
Land Surface Elevation (ft)						Evacuation I	-				ımn				
							-		15.8		шпр				
	Sounded Well Depth (ft bmp) Depth to Water (ft bmp)					Volumes	ruigeu _.		13.0	0.87					
						Field Paran	neters								
Wa	ater Columr	n in Well (ft)		12.79			Color		dark brown-	rown>clear					
	Casing Dia	meter/Type		2" PVC			Odor		None)					
	Gal	lons in Well		2.08		Appe	earance _								
		I	ı	O and the street		1			Dissolved						
	Depth to Water (ft		Well	Conductivity (mS/cm or	Turbidity	Temperature	Hq	ORP	Oxygen	Rate					
Time	btoc)	(gal)	Volumes Removed	umhos/cm)	(NTU)	(°C)	(s.u.)	(mV)	(g/mL)	(gpm)	Remarks				
6/17/16 12:13	47.66	24.0	11.54	0.514	18.7	14.87	7.16	NM	17.59	0.211					
6/17/16 12:18	47.66	25.5	12.26	0.513	21.9	14.85	7.02	NM	13.02	0.211					
6/17/16 12:23	47.66	27.0	12.98	0.513	9.67	14.79	6.99	NM	10.14	0.211					
6/17/16 12:28	47.66	28.5	13.70	0.511	4.88	14.78	7.04	NM	7.67	0.211					
6/17/16 12:33	47.66	30.0	14.42	0.511	8.69	14.79	7.04	NM	6.30	0.211					
6/17/16 12:38	47.66	31.50	15.14	0.510	5.85	14.81	7.03	NM	5.31	0.211					
6/17/16 12:43	47.66	33.00	15.87	0.511	3.60	14.90	7.03	NM	5.06	0.211					
<u> </u>															
Development	Personnel:				Т.	Debnam									
Notes:															
				•	Volumes (gallon/										
	1-½" = 1-½" =			2" = 0.16 $2-\frac{1}{2}" = 0.26$		0.37 = 0.50		4" = 0.6 6" = 1.4							
bmp below	measuring po		ml	mililiter	NTU	Nephelometri			ORP	Oxidation	a-Reduction				
°C Degree	es Celsius		mS/cm	Milisiemens per centimet		Polyvinyl chlor	ride	50	014	Potential					
ft feet	s per minute		msl N/A	mean sea-level Not Applicable	s.u. umhos/cr	Standard units m Micromhos pe		er	mV	millivolts	 				
• •	ms per liter		NM	Not Measured	VOC	Volatile Organ			BPI		ımp Intake				