



BOUNDLESS ENERGY™

Amos FGD Landfill - CCR Location Restriction Evaluation – Revision 1

**John E. Amos Plant, Winfield Road,
Putnam County, Winfield, West Virginia**

January 19, 2024

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Prepared By:

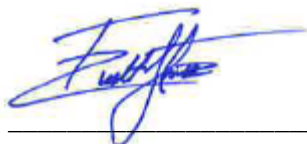
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Contents

Acronyms and Abbreviations.....	v
1 Introduction.....	1
2 Background Information.....	2
2.1 Facility Location Description.....	2
2.2 Description of FGD Landfill CCR Unit.....	2
2.2.1 Landfill Configuration.....	2
2.2.2 Area/Volume.....	2
2.2.3 Construction and Operational History.....	3
2.2.4 Surface Water Control.....	4
2.3 Previous Investigations.....	4
2.4 Hydrogeologic Setting.....	6
2.4.1 Climate and Water Budget.....	7
2.4.2 Regional and Local Geologic Setting.....	7
2.4.2.1 Unconsolidated.....	7
2.4.2.2 Bedrock.....	7
2.4.3 Surface Water and Surface Water Groundwater Interactions.....	8
2.4.4 Water Users.....	8
3 Isolation From the Uppermost Aquifer.....	9
3.1 Uppermost Aquifer and Piezometric Analysis.....	9
3.1.1 Piezometric Analysis.....	9
3.1.1.1 Horizontal and Vertical Position Relative to CCR Unit.....	9
3.1.1.2 Overall Flow Conditions.....	10
3.1.2 Uppermost Aquifer.....	10
3.1.2.1 CCR Rule Definition.....	10
3.1.2.2 Common Definitions.....	11
3.1.3 Identified Onsite Hydrostratigraphic Unit.....	11
3.1.4 Hydraulic Connection – Multiple Lines of Physical Evidence Approach.....	11
3.2 Compliance with Isolation Distance.....	12
4 Wetlands.....	13
4.1 Local Wetlands.....	13
4.2 Compliance with Wetland Restrictions.....	13

5 **Fault Areas** 13

5.1 **Description of Regional Geologic Structural Features**..... 13

5.2 **Compliance with Fault Area Restrictions**..... 13

6 **Seismic Impact Zone** 14

6.1 **Definition of Seismic Impact Zone**..... 14

6.2 **Compliance with Seismic Impact Zone Restriction** 14

7 **Unstable Areas**..... 14

7.1 **Definition of Unstable Area and Local Conditions**..... 14

7.1.1 **CCR Rule Definition**..... 14

7.1.2 **Poor Foundation Soils** 14

7.1.3 **Mass Movements** 15

7.1.4 **Karst**..... 15

7.1.5 **Subsurface Mining**..... 15

7.2 **Compliance with Unstable Areas Restriction** 15

8 **Summary, Conclusions, And PE Certification**..... 16

9 **References** 17

Table

Table 1. Water Level Data

Figures

- Figure 1. Site Location Map
- Figure 2. Plant and CCR Unit Location Map
- Figure 3. FGD Landfill Layout and Well Locations Map
- Figure 4. Stress Relief Fracture System Conceptual Site Model
- Figure 5. Cross Section Location Map
- Figure 6A. Cross Section A-A'
- Figure 6B. Cross Section B-B'
- Figure 6C. Cross Section C-C'
- Figure 7. Potentiometric Surface Map, November 22, 2010
- Figure 8. Surface Water Features

Figure 9. Nearby Fault Locations

Figure 10. Seismic Impact Zones

Figure 11. Nearby Landslides and Related Features

Figure 12. West Virginia Karst Areas

Appendices

Appendix A. Record of Changes

Appendix B. Boring/Well Construction Logs and Closure Information

Appendix C. Well Survey

Appendix D. Photographic Log

Acronyms and Abbreviations

AEP	American Electric Power Service Corporation
amsl	above mean sea level
Arcadis	Arcadis U.S., Inc.
ASD	alternate source demonstration
BAP	bottom ash pond
bgs	below ground surface
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
FAP	fly ash pond
FGD	flue gas desulfurization
ft	feet
GAI	GAI Consultants, Inc.
LCS	Leachate Collection System
PVC	polyvinyl chloride
SRF	stress relief fracturing
USGS	United State Geological Survey

1 Introduction

This report was prepared by Arcadis U.S., Inc. (Arcadis) for American Electric Power Service Corporation (AEP) to assess the location of the landfill relative to the location restrictions included in the Coal Combustion Residual (CCR) requirements, as specified in Code of Federal Regulations (CFR) 40 CFR 257.60 to 257.64, for the offsite flue gas desulfurization (FGD) Landfill (CCR Unit) located approximately 2 miles northwest of Appalachian Power Company's John E. Amos Plant (Amos Plant) at 1530 Winfield Road in Winfield, West Virginia (**Figure 1**). The CCR Rules requires an evaluation of whether the CCR unit meets up to 5 location restrictions. The location 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 located 2) 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 evaluation of the groundwater monitoring well network monitoring the uppermost aquifer required by the CCR Rule is not included in this report and was completed previously under separate cover. This report summarizes the evaluation of the location restriction criteria at the offsite FGD Landfill (Site).

Two other regulated CCR units are associated with the Amos Plant and include the bottom ash pond (BAP) system and the fly ash pond (FAP) (**Figure 2**) and are not part of this update for the Landfill.

An initial evaluation of the FGD Landfill monitoring well network was completed in October 2016 and included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the FGD Landfill, as well as publicly available geologic and hydrogeologic data. The initial evaluation was completed before construction began in the northern portion of the Site (i.e. north valley). Since that time, sequence 4 in the north valley was constructed and placed into service in 2019. Additional development in the north valley is ongoing including CCR placement in sequence 4 and construction of associated infrastructure for future sequences. Water was identified under the eastern bowl of sequence 4 in 2020. Additional investigation was completed from 2021 to 2023 and removal and reconstruction of the eastern bowl of sequence 4 was completed in 2023 and 2024. A record of changes that includes an overview of the modifications to the Location Restriction Report is included as **Appendix A**.

The following report presents the updated Conceptual Site Model based on a combination of historical site data, regional data for the Site and surrounding vicinity, site-specific investigations completed through 2023, and revised permit documentation. By considering the additional data, the revised CSM provides an updated understating of the groundwater flow conditions and the uppermost aquifer characteristics in relation to the five location restriction criteria. As a result, it has been determined that the Site successfully meets the location restriction requirements.

2 Background Information

The following section provides background information for the Amos FGD Landfill that was used to support the location restriction evaluation.

2.1 Facility Location Description

The Amos Plant is located in Putnam County, bounded by State Route 817 (Old U.S. Route 35) to the west and the Kanawha River to the east. The FGD Landfill is located approximately 2 miles northwest of the Plant and approximately three-quarters of a mile west of Winfield Road (WV 817) (**Figures 1 and 2**). The CCR Unit occupies approximately 258 total acres, located in an isolated area, with surrounding land use predominantly residential or undeveloped, with some agriculture (**Figure 3**).

2.2 Description of FGD Landfill CCR Unit

The following section discusses the landfill configuration, area, volume, construction and operational history, and surface water control associated with the FGD Landfill.

2.2.1 Landfill Configuration

The landfill consists of nine sequences with sequences 1 to 3 draining through the south valley and sequences 4 to 9 draining through the north valley. The landfill is surrounded on all sides by ridges with the north and south valleys separated by a topographic high point. The surface of the waste was designed in the south valley to be covered with a minimum of 6-inches of soil overlying CCR, a 50-mil High Density Polyethylene Integrated Drainage System geomembrane or equivalent and covered with at least 18-inches of protective and vegetative cover soil (in the upper 6-inches of the protective cover) and vegetated with grass cover as closure construction at each landfill area is completed. From 2018 to 2023, a final cover was placed on approximately 25.3 acres of the south valley of the landfill (primarily in sequence 3). The general construction of the landfill final cover was further detailed in the *Design Report: Landfill Final Cover System* (GAI Consultants, Inc. [GAI] 2016).

The topography surrounding the FGD Landfill consists of steep ridges greater than 200 ft on most sides (**Figure 3**). The highest point at the Site is greater than 1,000 ft above mean sea level (amsl), while the river valley elevations range from less than 600 ft amsl (Kanawha River valley) to less than 700 ft amsl (Lick Run). The Kanawha River is located east of the FGD Landfill and from 2016 to 2013 ranged in elevation from approximately 565 to 585 ft amsl (United States Geological Survey [USGS] 2023).

2.2.2 Area/Volume

The total area of the FGD Landfill is approximately 258 acres which includes both disposal and non-disposal use. The current permitted area for disposal is 192 acres, with a permitted waste capacity of approximately 36.8 million cubic yards (AEP 2022a) (**Figure 3**).

2.2.3 Construction and Operational History

In March 2006, AEP acting on behalf of Appalachian Power Company submitted the *Class F Industrial Landfill Facility Application* (GAI 2006) to West Virginia Department of Environmental Protection. The application was approved, and landfill activities began in April 2009. Subsequent permit modifications and renewals related to solid waste disposal have been submitted and approved for the Site, most recently in 2016 at the time of this report, although the facility is awaiting agency approval on a renewal application submitted in 2022 (GAI 2016, 2022). Landfill construction is planned for 9 individual sequences (i.e. cells), and the designed disposal rate is 2 million cubic yards per year. With a maximum design capacity of 36.7 million cubic yards, the landfill design life is approximately through the middle of year 2035 (GAI 2016).

The south valley was the only active landfill disposal area through 2019, receiving CCR material in sequences 1, 2, and 3. Sequence 3 stopped receiving CCR material in 2020 and construction of final cover began, while sequences 1 and 2 remained active. The south valley continues to receive CCR material in sequences 1 and 2. The north valley construction began in 2013 with installation of the groundwater interceptor drainage system, as well as the sedimentation and leachate ponds, and followed by the sequence 4 bottom liner construction in 2018 to 2019. Upon completion of sequence 4 construction in 2019, it was placed into service and began receiving CCR material (AEP 2020a). Sequences 5 through 9 in the north valley have not yet been constructed and placed into service.

The liner system is composed of multiple layers, including leachate and groundwater collection systems designed to collect and safely convey to respective leachate or sediment collection ponds. During a visual inspection in January 2020, water was observed accumulating underneath the liner in the eastern bowl of sequence 4 in the northern valley (AEP 2020a). It appeared the groundwater underdrain was not functioning as intended within the area and therefore was deficient in controlling seepage (AEP 2022a). Several interim repairs were completed in 2020, including draining and lining the nearby sedimentation pond, but were not effective in eliminating the accumulation of water below the liner.

No CCR material was placed in the eastern portion of sequence 4 after the deficiency was observed. Subsequent investigations were performed in 2021 and 2022. The investigations identified groundwater seepage along bedding planes within the sequence 4 valley walls that was not sufficiently conveyed by the constructed groundwater underdrain system causing the accumulation beneath the liner. Groundwater seepage zones and flow characteristics are further discussed below in Section 3.1.1.2.

A sequence 4 repair plan was developed in 2023 and is currently being implemented. The revised underdrain system includes placement of a 1.5 feet thick gravel blanket that is a minimum of five feet from the bottom of the compacted clay liner that intersects seepage zones and directs flow to the groundwater underdrain system. The original liner design was described in detail in the *Solid Waste/NPDES Permit Renewal Application* (GAI 2006), and liner construction in the southern valley was consistent with that permit renewal application. The liner design for the northern valley has been modified based on the 2021 sequence 4 investigation and corrective measures implemented in 2023. In general, the landfill liner consists of the following layers:

- Groundwater interceptor drainage system approximately 5 ft below the subgrade
- 12-inches of compacted or in-place clayey-silt subbase
- 24-inches of compacted clay liner (north valley); 18-inches of compacted clay liner (south valley)
- 30-mil polyvinyl chloride (PVC) geomembrane

- Leachate Collection System (LCS)
- 18-inches of protective cover (typically bottom ash, potentially West Virginia Department of Transportation mortar sand or gypsum)

The CCR byproducts from the three coal-fired generating units at the Plant (Unit 1 through Unit 3) are placed in the landfill. These waste products include fly ash, bottom ash, FGD (synthetic gypsum), and FGD purge stream treatment solids (limestone inert solids). Fly ash and bottom ash are trucked from the Amos Plant to the landfill active cell area. FGD is sluiced from the Amos Plant to the Chloride Purge Stream Wastewater Treatment Plant directly adjacent to the Landfill via pipelines. FGD products are dried and caked at this facility before being trucked to the landfill for disposal. Fly ash and bottom ash are trucked directly from the Amos Plant to the landfill via a private haul road for direct disposal. The landfill was also permitted to receive CCR byproducts from the Plants at Big Sandy, Clinch River, Conesville, Gavin, Glen Lyn, Mitchell, Mountaineer, Muskingum River, Sporn, Tanners Creek, and Kanawha River (GAI 2006; GAI 2016).

2.2.4 Surface Water Control

Surface water control at the CCR Unit is discussed in detail in *Class F Industrial Landfill Facility Application* (GAI 2006) and consists of surface runoff and infiltration of surface runoff. Surface runoff is managed through a series of collection channels, sediment traps, and pipe culverts that channel flow to 4 sediment collection ponds around the perimeter of the site. Leachate and surface flow in active landfill areas are directed to the leachate pond at the mouth of the south or north valleys, respective to the active portion of the landfill containing the contact water. This is accomplished with vertical chimney drains that divert water to the LCS component of the landfill liner, which is a geo-composite drainage net consisting of a high-density polyethylene geo-net with needle-punched nonwoven geotextiles heat-bonded to its upper and lower surfaces draining to a network of perforated PVC pipes. The LCS channels leachate and surface flow in active landfilling areas to the leachate ponds (GAI 2006). Sedimentation ponds are located in the northwest, southwest, and east portions of the landfill at the mouth of each drainage area for the north and south valley and along the eastern side of the landfill near the divide between the north and south valleys.

2.3 Previous Investigations

Prior to submission of the *Class F Industrial Landfill Facility Application* in March 2006, GAI Consultants, Inc., in coordination with AEP, performed an initial Site investigation to characterize the conditions at the proposed landfill facility. These investigations included drilling through soil and into rock, split barrel soil sampling and standard penetration testing, undisturbed soil sampling (Shelby tubes), continuous rock coring (where appropriate), and pump or packer testing of select rock units (GAI 2006).

Soil samples were analyzed for geotechnical parameters to assist with general site characterization and stability analyses. These parameters include grain size distribution, Atterberg limits, specific gravity, moisture content, compaction, permeability, cation exchange capacity, and X-Ray Diffraction characteristics. Additionally, soil samples were analyzed for physical properties at a proposed onsite borrow site for liner quality determination (GAI 2006).

During the Site investigation, piezometers were installed in 23 of 25 soil borings advanced in the projected landfill footprint. Ten 2-inch PVC monitoring wells were also installed, generally around the perimeter of the proposed extent. Groundwater samples were collected from monitoring wells to characterize background water quality.

Since 2016, background and detection groundwater monitoring has been performed in accordance with 40 CFR 257.90 through 40 CFR 257.94. This monitoring includes statistical evaluation of concentrations of Appendix III and Appendix IV parameters as defined in 40 CFR 257. The CCR Unit remains in the detection monitoring program. Analysis of groundwater chemistry data has been successful in demonstrating alternate sources. Specifically, ten alternate source demonstrations (ASDs) have been completed for observed statistically significant increases in Appendix III parameters (AEP 2019, 2020b, 2021, 2022b, 2023):

- November 2017/January 2018 monitoring events: Boron (MW-2), Chloride (MW-5), and Fluoride (MW-2 and MW-4)
- May/June 2018 monitoring events: Boron (MW-2 and MW-5), and Chloride (MW-5)
- November 2018 detection event: Boron (MW-2)
- June 2019 detection event: Calcium (MW-5)
- November 2019 detection event: Calcium (MW-5)
- May 2020 detection event: Calcium (MW-2)
- November 2020 detection event: Chloride (MW-4, MW-1802)
- May 2021 detection event: Chloride (MW-4, MW-1801, MW-1802)
- November 2021 detection event: Calcium (MW-1802), chloride (MW-4, MW-1801)
- May 2022 detection event: Calcium and chloride (MW-1802)

These ASDs suggested that concentration trends may be the result of Type IV (natural variability) attributable to native geologic material and/or Type V (alternative source) causes. In particular, construction activities and/or road salting may represent an anthropogenic Type V factor contributing to concentration variability in several wells at the Site. Furthermore, the ASD indicated groundwater types can be divided into two groups, with MW-2, MW-4, and MW-10 exhibiting a tight sodium-carbonate cluster in group 1, and the remaining wells (MW-1, MW-5, MW-6, MW-7R, MW-8, MW-9, 1801, 1802) occurred outside of this range in group 2 (AEP 2019). Down gradient wells within the uppermost aquifer (MW-2 and MW-4) that are within a differing groundwater type than shallow perched zone wells (MW-1 and MW-5) further supported separation of these two zones. Monitoring wells MW-1 and MW-5 were removed from the well network and replaced with MW-1801 and MW-1802 and is further discussed in the following.

In 2018, Arcadis completed site investigation activities including high-resolution water level monitoring, hydraulic testing, and well installation. Pressure transducers were installed in seven monitoring wells (MW-1, MW-2, MW-4, MW-5, MW-8, MW-9, and MW-10) to collect continuous water level data from May through August 2018 to further characterize hydrogeologic conditions. The boring and monitoring well installation was designed to augment the CCR monitoring well network at the Site with two additional down gradient wells installed in the stress relief fracture (SRF) system determined to be the uppermost aquifer. Boreholes were continuously logged and advanced to depths ranging from approximately 105 ft below ground surface (bgs) to 115 ft bgs at MW-1801 (south valley) and MW-1802 (north valley), respectively. After completion of the boreholes, straddle packer tests were completed to quantify hydraulic parameters and to assist in final placement of well screen intervals. Well yield testing was completed at the new monitoring wells to further quantify aquifer parameters (Arcadis 2020). Eight background groundwater samples were collected between December 2018 and November 2019 to establish MW-1801 and MW-1802 in the well network going forward as replacements of MW-1 and MW-5, which were maintained as water level monitoring points.

In response to the observed landfill liner deficiency discussed in Section 2.2.3, Arcadis completed additional site investigation activities in 2021 to address data gaps related to groundwater flow. This investigation included the installation of six bedrock borings: four around the northern, southern, and eastern ridges surrounding sequence 4 (2101, 2102, 2103, and 2104), one along the eastern ridge at sequence 6 (2105), and one further downgradient in the north valley center (2106). Borehole depths ranged from 59 ft bgs (2106) to 184 ft bgs (2105). Rock cores were collected at each boring and borehole geophysical logging was performed at all borings (except 2106) to refine stratigraphic and groundwater flow conditions. The borings along the sequence 4 and 6 ridges identified discrete horizontal fracture zones within relatively flat lying fractured shale beds, which were weaker than the sandstone layers, that provided preferential horizontal groundwater flow resulting in groundwater seepage along valley walls where the fractured shale beds outcropped. Piezometers were installed within each of the identified fracture zones that weren't already monitored with a well at 2101, 2102, 2103, and 2105. Slug testing was performed at the new piezometers, and pressure transducers were installed to evaluate long-term hydraulic head within each discrete zone. These piezometers were only installed for purposes of hydrogeologic investigation and hydraulic monitoring.

2.4 Hydrogeologic Setting

The geologic setting surrounding the Site consists of ridges formed by the Pennsylvanian age Monongahela and Conemaugh Formations. The Monongahela and Conemaugh Formations consist of sandstones, shales, limestones, and coal. The bedrock is fractured along depositional planes and in response to a decline in stress and erosion. This decline in stress expands the rock and a system of fractures form throughout the bedrock over time. This process, which is characteristic of Appalachian valleys, is called stress relief fracturing (SRF) and is more prevalent in shallow bedrock (USGS 1981, 2001). Groundwater is present at the Site within these fracture systems (secondary porosity), while groundwater within primary porosity components (i.e., pore spaces) is less significant. A generalized cross section illustrating the features of an Appalachian SRF system is provided on **Figure 4**. Fractures observed at the Site in the SRF system are along bedding planes and range from nearly horizontal to nearly vertical with attitude angles ranging from 75 degrees to near 90 degrees. The high angle fractures occur in sets that are oriented roughly parallel and perpendicular to one another, but not necessarily to the valley walls. The horizontal bedding plane fractures are more consistent laterally but also vary based on depositional and bedding characteristics. Borings installed in both the south valley and north valley have moderate to highly fractured bedrock at depths greater than 100 ft bgs. Bedrock groundwater flow generally follows surface topography within the SRF and is generally downslope of the ridge towards the valley floors. However, groundwater flow is complex and anisotropic with vertical infiltration intersecting lower permeable bedrock units with upper bedding planes that promote a portion of flow laterally to the valley wall (Kipp and Dinger 1991). This is illustrated on **Figure 4** by addition of groundwater flow arrows along example bedding plane fractures near the valley wall.

The SRF is regionally prevalent and is considered the regional uppermost aquifer system outside of primary unconsolidated fluvial valleys (e.g. Kanawha River Valley and Teays Valley) surrounding the Site.

Unconsolidated deposits on top of the bedrock consist primarily of weathered bedrock and residuum, with some colluvial/alluvial deposits consisting of weathered rock, sand, silt, and clay. In the valley bottom, the unconsolidated sediments can be saturated with localized areas of shallow perched groundwater at the soil-rock interface. These localized areas of shallow groundwater generally flow down-valley and have limited connection with the SRF system given the low permeability of the bedrock.

These features are further illustrated on three lines of cross section through the FGD Landfill. Two lines trend from southwest to northeast through the south valley (A-A') and north valley (B-B'). The other line trends from northwest to southeast through both the north and south valleys. A cross section location map is provided on **Figure 5**. Cross sections A-A', B-B', and C-C' are provided on **Figures 6A, 6B, and 6C**, respectively. Detailed boring logs and well construction diagrams are included in **Appendix B**.

2.4.1 Climate and Water Budget

The climate of Winfield, West Virginia is characterized as humid continental with an average rainfall of approximately 40 inches annually. The average maximum temperature is 66 degrees Fahrenheit, and the average minimum temperature is 44 degrees Fahrenheit based on information from the Southeast Regional Climate Center (2017).

The results of a numerical water budget analysis performed as part of the March 2006 *Class F Industrial Landfill Facility Application* is described in detail in Appendix I of that application (GAI 2006). The primary objective of the analysis was to estimate the average annual leachate production and estimate the maximum leachate head within the landfill liner system. Using site-specific climate, slope, and soil characteristics, it was determined that maximum average daily heads, maximum daily peak heads, and average annual leachate heads were all within acceptable ranges (GAI 2006).

2.4.2 Regional and Local Geologic Setting

2.4.2.1 Unconsolidated

The Site is located in the Appalachian Plateau physiographic province, and unconsolidated soils are limited in extent and are residual and colluvial in origin. Soils in lower topographic areas (i.e. valleys) consist of sand, silt, or clay with increasing rock fragments with depth (colluvium), and grade to weathered bedrock (residuum) with depth. Further up on the ridges, soils are composed mainly of residuum. Unconsolidated material is thickest in the valley floors, and average soil thickness is approximately 11 ft (GAI 2006).

2.4.2.2 Bedrock

The primary regional bedrock units encountered are Pennsylvanian age sedimentary rocks of the Monongahela Formation and Conemaugh Formation, in descending order from youngest to oldest. The depositional environment for these formations is characterized by a gradually subsiding shallow sea with alternating marine and freshwater strata. The sedimentary package associated with the Monongahela and Conemaugh Formations consists of alternating shale and sandstone units, with occasional thin limestone and coal beds. Several coal horizons are present in the region and often serve as marker beds for unit identification. The principal marker bed in the region is the Pittsburgh Coal (i.e. No. 8 Coal), which marks the transition from the Monongahela and Conemaugh Formations. However, the Pittsburgh Coal is not represented in Site borings (GAI 2006, Arcadis 2020). The Pittsburgh Limestone has been identified in two borings at the nearby FAP, MW-3 and 2008-26, and is used to mark the local Monongahela-Conemaugh transition. Additionally, the Little Clarksburg Coal has been identified at FAP boring B-0608 and is used to mark the base of the Connellsville sandstone deposition (Latimer, W.J., et al. 1911).

The Monongahela Formation is found capping the hills surrounding the Site. It consists of claystones and sandstones, and to a lesser extent silt shales and siltstones, which have varying degrees of thickness laterally, making correlation difficult (GAI 2006). Stratigraphy and landfill construction details are illustrated on cross sections A-A' (south valley-southwest to northeast), B-B' (north valley-southwest to northeast), and C-C' (north and south valleys-northwest to southeast) (**Figures 6A, 6B, and 6C**, respectively).

Interpretations regarding shallow geologic structures are based on mapping of the Pittsburg Coal. The Parkersburg Syncline and the Byrnside Anticline appears to dip to the north-northwest through the site. Bedding planes at the site have a strike to the east-northeast and dip to the north-northwest at approximately 20 ft per mile (GAI 2006).

Deeper bedrock units produce oil and gas. Six (6) active oil and gas wells are located in the vicinity of the FGD Landfill along with former wells that were located within the landfill footprint (079-00611 and 079-00722) that were closed in 2007 and 2006, respectively. The location of these wells is shown on **Figure 3**. Available information on the closure is provided in **Appendix B**.

2.4.3 Surface Water and Surface Water Groundwater Interactions

There are intermittent streams in both the northern and southern area of the Site, Lick Run, and Little Hurricane Creek (**Figure 3**). Groundwater flows following topographic relief and is generally in the direction of each of these creeks. However, sedimentation, leachate, and stormwater ponds have been constructed around the perimeter of the landfill. The design specifications of these ponds are described in detail in the Class F Industrial Landfill Facility Application (GAI 2006). Groundwater flow, as well as surface water runoff that contacts active landfill areas, is directed to the leachate ponds via the Leachate Collection System component of the landfill liner. Non-contact runoff that contacts covered landfill areas, disturbed borrow areas, or undisturbed areas is contained in the sediment collection ponds or sediment traps which ultimately discharge to either Little Hurricane Creek or Lick Run via principal or emergency spillways (GAI 2006).

2.4.4 Water Users

There are no active groundwater production wells at the Site or within a half-mile radius of the site, based on available information. In 2017, a water well inventory for the Amos Plant indicated no information regarding the use of wells located in the vicinity of the Site was available (Banks Environmental Data, Inc. 2017). The report identified one well registered with the United States Geological Survey within a half-mile of the Site. This well is located approximately 1,700 ft west of the FGD Landfill north valley, on the west side of Lick Run, and appears to be used for groundwater monitoring (**Appendix C**).

There is at least one confirmed private water well located within 0.5 miles of the FGD Landfill. This private well is located east of the Site at 6881 Winfield Road but is not in use because the residence is connected to public water supply.

Public water wells within 0.5 mile of the Site are unlikely. Land use is comprised of residential or undeveloped properties, with some agriculture and industry. Most, if not all, developed parcels in the vicinity of the Site are connected to Putnam Public Service District public water supply. The Putnam Public Service District source water is from the Poplar Fork Creek water shed located over 4 miles to the northwest of the Site. The water is pumped to a reservoir and subsequently treated at the water treatment plant before being distributed to public users (Putnam Public Service District 2017). Additional potable water in the area is supplied by West Virginia American

Water, which operates several water systems that extract water from the Elk River, a tributary to the Kanawha River. The Lower Kanawha River is not used as a source for potable water.

3 Isolation From the Uppermost Aquifer

Per 40 CFR 257.60(a), new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (5 ft) above the upper limit of the uppermost aquifer, or must demonstrate there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high conditions).

3.1 Uppermost Aquifer and Piezometric Analysis

3.1.1 Piezometric Analysis

3.1.1.1 Horizontal and Vertical Position Relative to CCR Unit

The uppermost aquifer is the first encountered aquifer that is horizontally continuous. The uppermost aquifer at the Site is defined by the saturated portion of the SRF system, is independent of lithologic unit, and was examined to confirm hydraulic connection from ridge to valley using multiple lines of evidence that are discussed in Section 3.1.4. Stress relief fractures along vertical and horizontal bedding planes occur in both the Conemaugh and Monongahela Formations. Moderate to highly fractured bedrock was observed from the bedrock surface to depths greater than 100 ft bgs at wells MW-1801 and MW-1802, immediately west of the FGD Landfill in the south and north valleys, respectively. Stress relief fractures present along open horizontal bedding planes are more specific to bedrock unit transition from vertically fractured massive rock units (sandstone) to low permeable shale or siltstone units with fractures at the top of unit. When this characteristic occurs, partial lateral flow intersects the valley walls causing seeps that are more prevalent following precipitation events. In similar SRF systems, the aquifers are generally unconfined but water levels in wells along the ridge and valley floor may be semi-confined to confined with presence of low-transmissivity sediments (i.e. clay) or low permeable rock layers (USGS 1981). The uppermost aquifer (i.e. saturated SRF system) has been observed along all portions of the site and is horizontally continuous across the entire site.

The elevation head represented by the monitoring well is a piezometric surface and doesn't necessarily represent true saturation thickness (i.e. water table) as increased pore pressure is exerted along the screened interval in a semi-confined to confined condition. However, this condition varies and a conservative approach to the upper limit of the uppermost aquifer is defined by the top of the potentiometric surface from monitoring wells in the SRF system, generally located beneath the original bedrock surface prior to landfill construction. The potentiometric surface occurs at depths as shallow as 1 ft below the soil-rock interface (beneath valley walls) to greater than 90 ft below the soil-rock interface (beneath ridgetops, e.g. MW-10) and follows the topographic slope from valley to ridge. The areas of bedding plane seeps with partial flow to the valley walls are considered a minimal component of groundwater flow due to their limited extent. However, the groundwater seeps are considered the top of the uppermost aquifer as defined by the exposed groundwater present at those elevations. The piezometric surface is illustrated on cross sections A to A', B to B', and C-C' (**Figures 6A, 6B, and 6C**), as well as depth to water measurements summarized on **Table 1**.

There are localized areas of shallow perched groundwater at the soil-rock interface. These are limited in valley bottoms and have limited connection with the underlying SRF system. Monitoring wells MW-1 (southern valley), and MW-5 (northern valley) were screened in these shallow perched zones. The shallow perched zones are not considered the uppermost aquifer as they are limited in extent and discontinuous and were replaced by MW-1801 and MW-1802. Within the limits of the landfill, underdrains located at various depths beneath the landfill liner prevent 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 elevation (GAI 2006). However, in areas where lateral seeps have been identified, modifications to the underdrain system have been completed such as increased extent of the rock blanket above the highest observed seeps in sequence 4.

3.1.1.2 Overall Flow Conditions

Groundwater flow at the Site occurs within the SRF system (i.e. uppermost aquifer), mainly flowing along hydraulically connected fractures and other secondary porosity features. Groundwater within primary porosity components (i.e., pore spaces) is less significant. Fractures in this system are hydraulically connected via open bedding planes and high angle fractures. Groundwater flow directions generally follow topography from ridges towards the valley floor and out the northern and southern valley mouths. Locally, there are observed areas of minimal lateral flow along bedding planes that form seeps along the valley walls. Local areas of shallow perched groundwater in the valley have limited horizontal extent and vertical flow of perched groundwater is limited. Available groundwater elevations are summarized on **Table 1** for July 2005, November 2010, and January 2019 through July 2023 well gauging events. Potentiometric contours from the November 2010 event, which is the most recently available data that includes groundwater elevations beneath the landfilled material (e.g., MW-3R, 0512, 0513), are depicted on **Figure 7**. Groundwater levels and flow directions from the most recent gauging events, are consistent with historical data (AEP 2023).

3.1.2 Uppermost Aquifer

3.1.2.1 CCR Rule Definition

Per 40 CFR 257.60(a), new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (5 ft) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high conditions).

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

3.1.2.2 Common Definitions

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

3.1.3 Identified Onsite Hydrostratigraphic Unit

The identified Site hydrostratigraphic unit is the saturated portion of the SRF system, which is considered the uppermost aquifer at the Site. The SRF is known to be regionally prevalent and is considered the regional uppermost aquifer system outside of primary unconsolidated fluvial valleys. The uppermost aquifer is not known to be used locally for groundwater supply or industrial water use.

3.1.4 Hydraulic Connection – Multiple Lines of Physical Evidence Approach

A multiple lines of evidence approach was used to understand the hydraulics related to horizontal and vertical groundwater flow at the Site. The main purpose for this demonstration was to help understand the dynamics and vertical connectivity of the SRF system, both from ridges to valleys, as well as bedding plane groundwater flow, and perched groundwater in valleys to deeper bedrock fractures.

At the Site, the SRF system is determined to be the uppermost aquifer based on spatial occurrence and hydraulic testing. The following lines of physical evidence support the understanding that the SRF system is connected from the ridgetops down to the valleys and the shallow perched zones are hydraulically disconnected.

The physical lines of evidence that verify SRF hydraulics are:

- SRF occurring independent of bedrock units at depths greater than 100 feet (MW-1801 and MW-1802).
- Shallow shales are fractured on ridges according to boring logs.
- Shale or siltstone units cause minimal and local lateral bedding plane flow.
- Hydrographs indicate vertical separation from the local areas of shallow perched groundwater and deeper groundwater within the SRF system.
- ASD evaluation concluded that there is a geochemical distinction between shallow perched groundwater wells MW-1 and MW-5 relative to other wells screened in the SRF system down gradient of the FGD Landfill at MW-2 and MW-4. MW-1 and MW-5 were removed from the groundwater quality monitoring well network, replaced by the installation of MW-1801 and MW-1802 in 2018, and retained only for hydraulic monitoring.
- Vertical gradients at nested piezometers installed at boreholes 2101 through 2015 are consistently downward, indicating vertical groundwater flow through the SRF system.

Based on this information and the positive correlation of these lines of evidence with the Appalachian conceptual site model for groundwater flow (USGS 1981), the SRF system is hydraulically connected from ridges to valleys. A generalized cross section illustrating the features of an Appalachian SRF system is provided on Figure 4.

3.2 Compliance with Isolation Distance

The upper limit of the uppermost aquifer is located beneath the final subgrade surface achieved during landfill construction. As shown on **Figures 6A and 6B**, the top of the uppermost aquifer is over 5 ft in distance from the base of the CCR unit clay liner (i.e. top of the subgrade) in the south and north valleys, both underlying the valley floors and extending up the valley ridges.

In the valley floors, this includes the highest level of groundwater relative to the subgrade at former well 0501 (abandoned), where the subgrade elevation is 766 ft amsl. The groundwater elevation at 0501 as measured in July 2005 was 742.68 ft amsl, which equates to a vertical separation distance of approximately 23 ft. The groundwater interceptor drain, which was installed during landfill construction when perched groundwater was encountered in order to maintain the perched groundwater elevation below the subgrade, was installed at an elevation at least two to three feet lower than the subgrade in the vicinity of 0501 (AEP Drawing No. 13-30500-24-C). Since December 2018, groundwater elevations measured at MW-1801 downgradient of the south valley mouth have ranged from 701.45 to 703.90 ft amsl (**Table 1**). This also suggests more than adequate separation between the base of the CCR unit and the upper limit of the uppermost aquifer. Note the south valley portion of the landfill was constructed prior to October 14, 2015, and therefore the isolation distance requirement does not require further evaluation for that portion of the landfill.

Future landfill sequences may be constructed in the north valley including CCR placement in the area northeast of borings 0523 and 0524 (**Figure 5, Figure 6B**). The main central valley groundwater interceptor drain was previously placed in the northern valley in 2018, along with No. 2 stone placement along the northern valley opening. Based on AEP as-built drawings of the northern valley subgrade, the elevation of the base of the groundwater interceptor drain in the vicinity of boring 0523 is between 700 and 710 ft amsl. The historically available water level elevations measured at 0523 ranged from 668.17 ft amsl (November 2010, **Table 1**) to approximately 675 ft amsl (July 2005, **Figure 6B**). More recently, the groundwater elevation at 2106 located in Sequence 9 has ranged from 709.37 (October 2023) to 710.92 ft amsl (February 2022). This equates to a vertical separation distance of more than 34 ft below the subgrade elevation of 745 ft amsl. At MW-1802 downgradient of the north valley mouth, groundwater elevations have ranged from 657.39 to 660.34 ft amsl since December 2018 (**Table 1**). These observations again demonstrate adequate separation between the base of the CCR unit and the upper limit of the uppermost aquifer. Over much of the north valley, the construction grading includes adding up to 50 ft of subbase fill that further increases the separation between the base of the CCR unit and the upper limit of the uppermost aquifer.

Compliance with isolation distance is evaluated differently along the higher valley ridges where CCR material will be placed along the sloped valley walls (e.g., Sequences 4, 6, and 8). While there are wells and piezometers installed along the surrounding ridges, they represent a measured potentiometric head (total hydraulic head under a particular confining pressure) underlying the ridge. This is not the same as the upper limit of the uppermost aquifer at the surface of the valley walls, above which landfill liner is constructed and CCR material is placed. Rather, the groundwater seeps, although a minimal component, are considered the top of the uppermost aquifer as defined by the exposed groundwater present at those elevations. In areas where lateral seeps have been identified, modifications to the underdrain system have been completed to extend the rock blanket above the highest observed seeps and ensure 5-ft separation by placing a minimum of 5 ft of fill between the top of the rock blanket and the bottom of the clay liner (**Figure 6A**). Therefore, this CCR unit meets the location restriction for separation from the uppermost aquifer as defined in 40 CFR 257.60(a) for both the current waste extent and expected future waste placement.

4 Wetlands

CCR Rule 40 CFR Part 257.61 requires that new CCR landfills must not be located in wetlands.

4.1 Local Wetlands

Based on the August 11, 2015, site visit and review of available published information the FGD Landfill is not located within any areas that exhibited wetland characteristics that might be classified as a regulated wetland. Photo documentation of the site visit is provided in **Appendix D**.

4.2 Compliance with Wetland Restrictions

Based on the August 11, 2015, site visit and review of available information, the FGD Landfill is not located within wetlands (**Figure 8**). Therefore, this CCR Unit meets the location restriction regarding wetlands.

5 Fault Areas

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

5.1 Description of Regional Geologic Structural Features

There are two sets of bedrock structural folds in the vicinity of the landfill. The deepest of these consists of a parallel series of two synclines and an anticline which exhibit a roughly north-south trend. These folds are observed in Mississippian age rocks and are likely the result of oil and gas well installation. In the shallower bedrock, structural folds are assumed to be similar to those observed in the Pittsburg Coal. This includes the Parkersburg Syncline and the Byrnside Anticline, which are roughly parallel and trend in a northeast-southwest direction. Bedrock dips to the north-northwest underneath the site (GAI 2006).

A review of available geologic reports and maps has indicated that the Site is not located near any faults with displacement in the Holocene (USGS 2005; West Virginia Geological and Economic Survey 2013). **Figure 9** presents a map depicting known faults in the region, all of Paleozoic age. As shown on the figure, the nearest faults that do exist are at least tens of miles from the site.

5.2 Compliance with Fault Area Restrictions

Based on our review of geologic structure at the Site and active faults in the area, this CCR unit meets the location restriction for faults.

6 Seismic Impact Zone

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

6.1 Definition of Seismic Impact Zone

CCR Rule 40 CFR Part 257.53 defines a seismic impact zone as an area having a 2% or greater probability that the maximum horizontal acceleration expressed as a percentage of the earth's gravitational pull (g) will exceed 10% g in 50 years. **Figure 10** presents the map of the peak ground acceleration with a 2% probability of exceedance in 50 years for West Virginia, as published by the USGS Earthquake Hazards Program. As shown on **Figure 10**, the Site falls within the zone having a maximum horizontal acceleration of 6% to 10% g.

6.2 Compliance with Seismic Impact Zone Restriction

Based on our review of available seismic impact zone data, this CCR unit meets the location restriction for seismic impact zone.

7 Unstable Areas

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

7.1 Definition of Unstable Area and Local Conditions

7.1.1 CCR Rule Definition

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

7.1.2 Poor Foundation Soils

Embankment slope stability analyses were performed based on final build out grades as part of the Class F Industrial Landfill Facility Application in March 2006. These calculations included both circular and wedge-type failure analysis and were executed using the software program SLOPE/W. This analysis concluded that static and seismic stability factors of safety were adequate for long-term stability.

7.1.3 Mass Movements

Figure 11 presents a map of known landslide activity in the area. While this figure indicates the area of the landfill may be susceptible to landslides, a detailed slope stability analysis of the landfill was performed and included in the landfill permit to install. This analysis demonstrates the landfill will be stable, and therefore not susceptible to mass movement. Therefore, the FGD Landfill meets the siting criteria for mass movements.

7.1.4 Karst

Figure 12 presents a map of known karst features in West Virginia. As shown on this figure, the FGD Landfill is not located in a karst area.

7.1.5 Subsurface Mining

No subsurface mines are known to exist below the FGD Landfill.

7.2 Compliance with Unstable Areas Restriction

Based on the August 11, 2015, site visit and review of available information discussed above, the FGD Landfill is not located within unstable areas. Therefore, this CCR unit meets the location restriction requirements for unstable areas.

8 SUMMARY, CONCLUSIONS, AND PE CERTIFICATION

I, Todd A. Minehardt, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the Site, as well as the evaluations discussed within this report, the Amos FGD Landfill meet the CCR surface impoundment location restrictions of 40 CFR Part 257 for separation from the uppermost aquifer, wetlands, fault areas, seismic impact zones, and unstable areas.

TODD ARAN MINEHARDT

Printed Name of Registered Professional Engineer

Todd A. Minehardt

Signature

23518

Registration No.

WV

Registration State

1/19/2024

Date



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Table

Table 1
Water Level Data
Amos - FGD Landfill
Winfield, West Virginia



Well ID	Top of Casing Elevation	7/1/2005	7/1/2005	11/22/2010	11/22/2010	12/17/2018	12/17/2018	1/24/2019	1/24/2019	2/21/2019	2/21/2019	3/13/2019	3/13/2019	4/23/2019	4/23/2019	6/10/2019	6/10/2019	7/22/2019	7/22/2019	11/4/2019
		Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC
Monitor Wells																				
Downgradient																				
MW-1 ^{a,c,d} (hydraulic monitoring only)	714.79	6.30	705.27	9.76	701.81	13.07	701.72	13.08	701.71	NM	NM	NM	NM	NM	NM	13.02	701.77	12.34	702.45	12.24
MW-2 ^{a,c}	719.90	40.40	671.01	43.06	668.35	44.03	675.87	73.74	646.16	43.82	676.08	NM	NM	NM	NM	44.13	675.77	44.06	675.84	44.47
MW-3	825.00	NA	806.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3R ^a	786.70	NM	NM	NA	779.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3RA	788.21	NM	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4 ^a	676.76	19.70	657.06	20.51	656.25	NM	NM	18.43	658.33	NM	NM	NM	NM	NM	NM	19.11	657.65	19.22	657.54	19.19
MW-5 ^{a,d} (hydraulic monitoring only)	676.84	6.60	670.24	6.34	670.50	4.85	671.99	3.58	673.26	NM	NM	NM	NM	NM	NM	5.20	671.64	5.06	671.78	5.12
MW-1801	738.32	NA	NA	NA	NA	34.48	703.84	34.42	703.90	34.70	703.62	35.23	703.09	35.33	702.99	35.60	702.72	35.47	702.85	34.99
MW-1802	712.69	NA	NA	NA	NA	52.68	660.01	52.35	660.34	53.00	659.69	55.30	657.39	53.73	658.96	53.82	658.87	54.01	658.68	53.92
Upgradient																				
MW-6 ^a	929.29	66.00	863.29	65.75	863.54	NM	NM	61.10	868.19	NM	NM	NM	NM	NM	NM	63.79	865.50	64.71	864.58	65.56
MW-7	945.15	NA	906.55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7R ^a	854.63	NM	NM	72.35	782.28	NM	NM	69.90	784.73	NM	NM	NM	NM	NM	NM	70.02	784.61	70.07	784.56	70.64
MW-8 ^b	937.68	25.80	921.21	31.81	915.20	NM	NM	26.53	920.48	NM	NM	NM	NM	NM	NM	27.44	919.57	28.49	918.52	16.88
MW-9 ^a	935.39	32.90	902.49	37.89	897.50	NM	NM	27.28	908.11	NM	NM	NM	NM	NM	NM	30.63	904.76	32.35	903.04	35.45
MW-10 ^a	911.43	119.70	791.73	101.28	810.15	NM	NM	99.64	811.79	NM	NM	NM	NM	NM	NM	103.18	808.25	100.81	810.62	98.40
Piezometers																				
0501	761.33	18.65	742.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0502	761.46	NM	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0503	777.00	19.30	757.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0504	777.30	6.10	771.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0505	912.89	88.40	824.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0506 ^{a,c}	714.96	41.75	670.02	43.61	668.16	NM	NM	43.81	667.96	NM	NM	NM	NM	NM	NM	44.19	667.58	44.12	667.65	44.53
0507	712.49	14.60	697.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0508	980.97	139.15	841.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0509	826.75	22.25	804.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0510	927.69	NM	NM	NM	NM	NM	NM	45.66	882.03	NM	NM	NM	NM	NM	NM	46.41	881.28	47.48	880.21	46.60
0511	826.67	20.90	805.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0512 ^a	786.29	5.40	780.89	5.22	781.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0513 ^a	786.49	5.70	780.79	5.25	781.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0514	950.65	25.85	924.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0515	935.49	62.85	872.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0517 ^b	937.68	51.20	896.15	52.67	894.68	NM	NM	42.09	905.26	NM	NM	NM	NM	NM	NM	41.92	905.43	42.34	905.01	31.26
0519 ^a	992.97	84.30	908.67	87.54	905.43	NM	NM	73.41	919.56	NM	NM	NM	NM	NM	NM	80.31	912.66	80.39	912.58	80.40
0520 ^a	681.38	24.47	656.91	NA	656.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0521 ^a	1006.48	56.33	950.15	58.05	948.43	NM	NM	54.10	952.38	NM	NM	NM	NM	NM	NM	56.31	950.17	56.33	950.15	56.38
0522 ^a	903.54	67.30	836.24	70.17	833.37	NM	NM	65.32	838.22	NM	NM	NM	NM	NM	NM	65.90	837.64	66.84	836.70	68.77
0523 ^a	972.30	296.90	675.40	304.13	668.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0524 ^a	699.14	5.33	693.81	5.61	693.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0525 ^a	681.48	6.55	674.93	6.47	675.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101ss	934.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101s	934.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101i	934.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101d	934.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2102s	936.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2102i	935.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2102d	935.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2103s	938.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2103i	938.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2105ss	994.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2105s	994.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2105i	994.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2105d	994.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2106	725.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:
Shaded = well not verified or closed
a = Source: AEP DWG. No. 13-30500-12-E
b = Well was re-surveyed in September 2019.
Ground surface was lowered to access stockpiled soil, and subsequently well casing was removed.
Top of casing elevation changed from 947.01 to 937.68 at MW-8, and 947.35 to 937.68 at 0517.
c = Prior to 2018, TOCs were resurveyed when casings were extended during south valley pond dike construction.
MW-1 casing extended 3.32' from 711.47' to 714.79'.
MW-2 casing extended 3.89' from 711.01' to 714.90'.
506 casing extended 3.19' from 711.77' to 714.96'.
d = MW-1, MW-5 were replaced by MW-1801 and MW-1802 and are maintained as hydraulic only monitoring points.
amsl = above mean sea level
Elev = elevation
ft = feet
GW = groundwater
NA = well either abandoned or not installed at time of gauging
NM = well active but not measured
TOC = top of casing

Table 1
Water Level Data
Amos - FGD Landfill
Winfield, West Virginia

Well ID	Top of Casing Elevation	11/4/2019	2/10/2020	2/10/2020	5/4/2020	5/4/2020	7/8/2020	7/8/2020	11/2/2020	11/2/2020	1/5/2021	1/5/2021	5/3/2021	5/3/2021	7/20/2021	7/20/2021	11/1/2021	11/1/2021	2/28/2022	2/28/2022
		GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl
Monitor Wells																				
Downgradient																				
MW-1 ^{a,c,d} (hydraulic monitoring only)	714.79	702.55	13.10	701.69	12.87	701.92	17.3	697.49	12.13	702.66	12.59	702.20	13.10	701.69	12.26	702.53	11.88	702.91	13.18	701.61
MW-2 ^{a,c}	719.90	675.43	31.74	688.16	43.71	676.19	44.34	675.56	44.68	675.22	43.76	676.14	44.00	675.90	44.12	675.78	44.13	675.77	44.03	675.87
MW-3	825.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3R ^a	786.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3RA	788.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4 ^a	676.76	657.57	NM	NA	18.46	658.30	19.38	657.38	19.16	657.60	18.61	658.15	18.80	657.96	19.06	657.70	19.00	657.76	18.49	658.27
MW-5 ^{a,d} (hydraulic monitoring only)	676.84	671.72	3.89	672.95	4.24	672.60	5.32	671.52	5.18	671.66	4.57	672.27	5.12	671.72	5.10	671.74	4.89	671.95	4.77	672.07
MW-1801	738.32	703.33	NM	NA	35.42	702.90	42.5	695.82	34.97	703.35	34.80	703.52	35.55	702.77	35.80	702.52	35.08	703.24	35.17	703.15
MW-1802	712.69	658.77	NM	NA	53.84	658.85	35.8	676.89	54.09	658.60	53.55	659.14	54.10	658.59	53.96	658.73	54.02	658.67	54.04	658.65
Upgradient																				
MW-6 ^a	929.29	863.73	61.91	867.38	61.00	868.29	64.76	864.53	66.23	863.06	62.47	866.82	63.05	866.24	63.60	865.69	65.83	863.46	61.69	867.60
MW-7	945.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7R ^a	854.63	783.99	70.10	784.53	69.69	784.94	69.75	784.88	70.90	783.73	70.72	783.91	70.15	784.48	70.51	784.12	70.79	783.84	70.57	784.06
MW-8 ^b	937.68	920.80	11.80	925.88	12.48	925.20	19.49	918.19	17.51	920.17	12.63	925.05	16.50	921.18	16.35	921.33	16.51	921.17	13.23	924.45
MW-9 ^a	935.39	899.94	26.91	908.48	30.6	904.79	30.52	904.87	38.34	897.05	30.64	904.75	28.13	907.26	28.56	906.83	31.70	903.69	26.94	908.45
MW-10 ^a	911.43	813.03	98.83	812.60	141.7	769.73	98.8	812.63	98.45	812.98	101.88	809.55	98.49	812.94	99.36	812.07	98.58	812.85	98.66	812.77
Piezometers																				
0501	761.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0502	761.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0503	777.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0504	777.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0505	912.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0506 ^{a,c}	714.96	670.43	43.89	671.07	43.77	671.19	NM	NA	64.34	650.62	43.91	671.05	44.05	670.91	44.22	670.74	44.21	670.75	44.18	670.78
0507	712.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0508	980.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0509	826.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0510	927.69	881.09	45.77	881.92	46.82	880.87	NM	NA	103.17	824.52	47.72	879.97	47.85	879.84	48.25	879.44	48.20	879.49	49.24	878.45
0511	826.67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0512 ^a	786.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0513 ^a	786.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0514	950.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0515	935.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0517 ^b	937.68	906.42	25.39	912.29	29.25	908.43	NM	NA	32.16	905.52	26.02	911.66	30.85	906.83	32.57	905.11	32.62	905.06	27.58	910.10
0519 ^a	992.97	912.57	79.22	913.75	72.39	920.58	NM	NA	97.30	895.67	97.60	895.37	79.70	913.27	78.05	914.92	80.71	912.26	97.68	895.29
0520 ^a	681.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0521 ^a	1006.48	950.10	51.44	955.04	53.97	952.51	NM	NA	56.46	950.02	55.88	950.60	56.03	950.45	56.34	950.14	56.52	949.96	62.87	943.61
0522 ^a	903.54	834.77	66.27	837.27	53.86	849.68	NM	NA	68.90	834.64	67.80	835.74	65.83	837.71	67.35	836.19	66.24	837.30	66.18	837.36
0523 ^a	972.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0524 ^a	699.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0525 ^a	681.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101ss	934.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20.22	914.53	19.64	915.11
2101s	934.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	39.42	895.38	39.23	895.57
2101i	934.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54.96	879.74	54.60	880.10
2101d	934.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	51.81	882.87	52.02	882.66
2102s	936.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	41.33	894.73	40.96	895.10
2102i	935.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	79.61	856.37	78.51	857.47
2102d	935.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	103.41	832.56	87.82	848.15
2103s	938.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	47.88	890.16	39.39	898.65
2103i	938.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82.72	855.30	75.76	862.26
2105ss	994.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	60.86	933.73	59.31	935.28
2105s	994.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	109.30	885.19	93.08	901.41
2105i	994.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	117.72	876.88	96.10	898.50
2105d	994.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	179.81	814.99	178.00	816.80
2106	725.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15.17	710.43	14.68	710.92

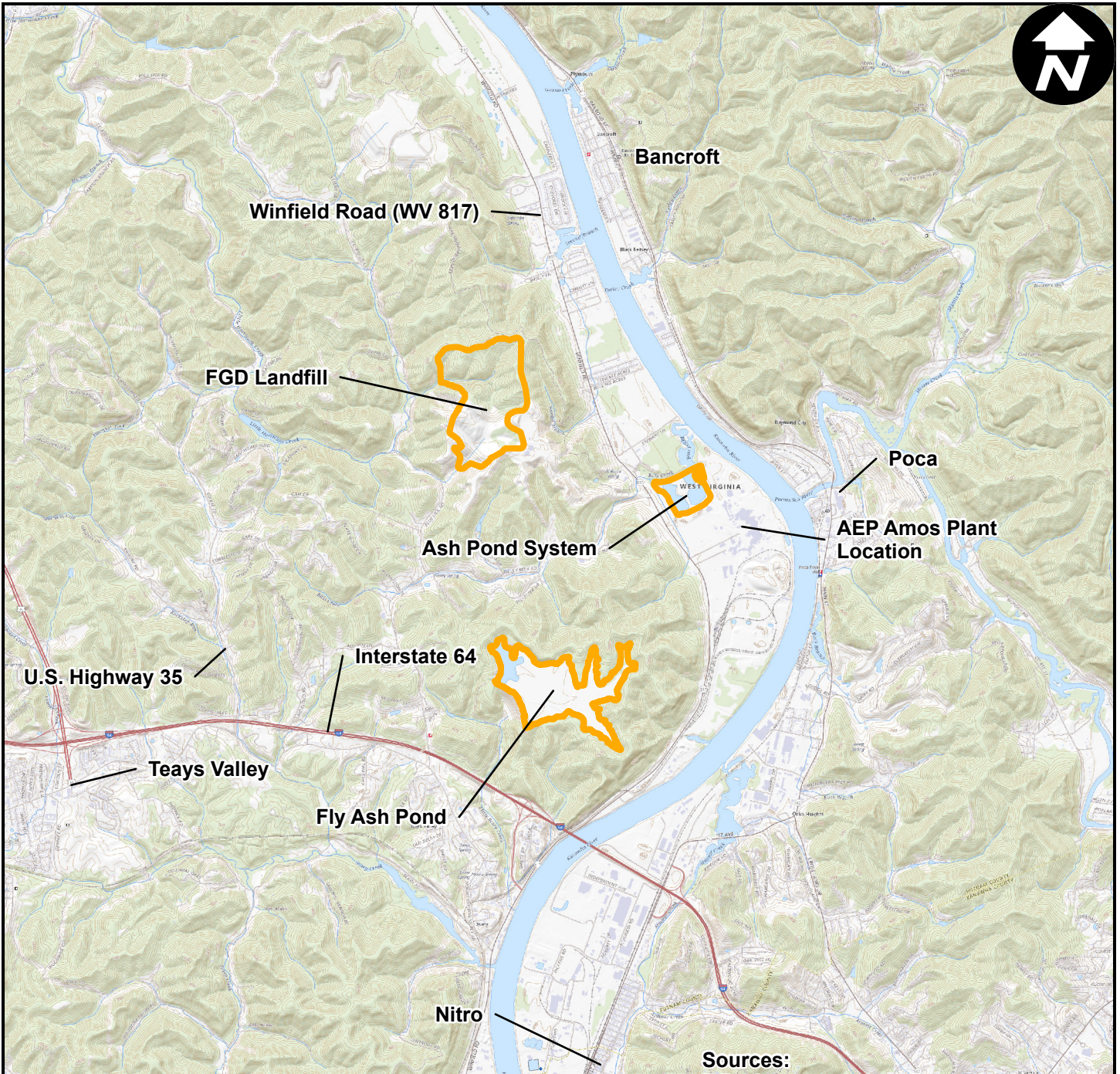
NOTES:
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 TOC = top of casing

Table 1
Water Level Data
Amos - FGD Landfill
Winfield, West Virginia

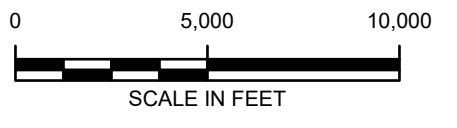
Well ID	Top of Casing Elevation	5/17/2022	5/17/2022	7/26/2022	7/26/2022	10/24/2022	10/24/2022	2/7/2023	2/7/2023	5/24/2023	5/24/2023	7/18/2023	7/18/2023	10/16/2023	10/16/2023
		Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl	Depth to Water ft TOC	GW Elev ft amsl
Monitor Wells															
Downgradient															
MW-1 ^{a,c,d} (hydraulic monitoring only)	714.79	15.80	698.99	11.90	702.89	11.91	702.88	13.08	701.71	13.11	701.68	12.19	702.60	11.98	702.81
MW-2 ^{a,c}	719.90	43.91	675.99	43.67	676.23	44.34	675.56	43.94	675.96	41.10	678.80	44.40	675.50	44.68	675.22
MW-3	825.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3R ^a	786.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3RA	788.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4 ^a	676.76	18.89	657.87	18.87	657.89	19.31	657.45	18.78	657.98	19.06	657.70	19.15	657.61	19.59	657.17
MW-5 ^{a,d} (hydraulic monitoring only)	676.84	5.16	671.68	5.04	671.80	5.48	671.36	5.26	671.58	5.08	671.76	4.25	672.59	5.55	671.29
MW-1801	738.32	35.87	702.45	35.62	702.70	35.33	702.99	35.30	703.02	35.95	702.37	35.62	702.70	36.87	701.45
MW-1802	712.69	54.55	658.14	54.50	658.19	54.95	657.74	54.39	658.30	54.69	658.00	54.58	658.11	55.09	657.60
Upgradient															
MW-6 ^a	929.29	62.45	866.84	62.25	867.04	66.35	862.94	63.95	865.34	64.33	864.96	65.68	863.61	67.09	862.20
MW-7	945.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7R ^a	854.63	70.27	784.36	70.24	784.39	70.31	784.32	70.82	783.81	70.12	784.51	70.55	784.08	70.82	783.81
MW-8 ^b	937.68	17.32	920.36	16.56	921.12	21.92	915.76	14.30	923.38	19.94	917.74	16.66	921.02	22.56	915.12
MW-9 ^a	935.39	27.71	907.68	28.99	906.40	32.60	902.79	28.18	907.21	30.12	905.27	32.80	902.59	34.37	901.02
MW-10 ^a	911.43	104.11	807.32	98.93	812.50	98.31	813.12	99.65	811.78	103.27	808.16	99.25	812.18	98.87	812.56
Piezometers															
0501	761.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0502	761.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0503	777.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0504	777.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0505	912.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0506 ^{a,c}	714.96	45.20	669.76	43.75	671.21	44.50	670.46	44.01	670.95	44.16	670.80	44.51	670.45	45.87	669.09
0507	712.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0508	980.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0509	826.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0510	927.69	48.75	878.94	49.05	878.64	49.31	878.38	49.60	878.09	49.95	877.74	50.38	877.31	51.67	876.02
0511	826.67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0512 ^a	786.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0513 ^a	786.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0514	950.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0515	935.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0517 ^b	937.68	29.80	907.88	29.91	907.77	33.61	904.07	28.22	909.46	31.79	905.89	31.12	906.56	32.92	904.76
0519 ^a	992.97	78.06	914.91	78.74	914.23	80.71	912.26	78.21	914.76	80.58	912.39	80.80	912.17	80.95	912.02
0520 ^a	681.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0521 ^a	1006.48	56.12	950.36	56.38	950.10	56.34	950.14	61.45	945.03	56.39	950.09	56.58	949.90	56.58	949.90
0522 ^a	903.54	65.03	838.51	66.71	836.83	68.08	835.46	67.96	835.58	68.60	834.94	Dry	NA	68.91	834.63
0523 ^a	972.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0524 ^a	699.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0525 ^a	681.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2101ss	934.75	20.40	914.35	20.34	914.41	20.81	913.94	20.39	914.36	20.6	914.15	19.82	914.93	20.82	913.93
2101s	934.80	39.27	895.53	38.99	895.81	47.41	887.39	40.43	894.37	40.25	894.55	39.9	894.90	51.32	883.48
2101i	934.70	54.48	880.22	54.02	880.68	55.15	879.55	54.33	880.37	54.38	880.32	54.73	879.97	56	878.70
2101d	934.68	51.93	882.75	52.87	881.81	54.56	880.12	54.2	880.48	54.87	879.81	58.18	876.50	65.91	868.77
2102s	936.06	41.16	894.90	41.02	895.04	41.44	894.62	41.16	894.90	41.37	894.69	41.05	895.01	42.85	893.21
2102i	935.98	76.79	859.19	77.01	858.97	76.02	859.96	74.95	861.03	74.04	861.94	73.37	862.61	72.69	863.29
2102d	935.97	82.76	853.21	81.07	854.90	80.10	855.87	79.65	856.32	79.82	856.15	79.98	855.99	80.41	855.56
2103s	938.04	39.22	898.82	38.58	899.46	39.51	898.53	37.32	900.72	38.29	899.75	38.5	899.54	38.91	899.13
2103i	938.02	71.21	866.81	65.00	873.02	58.40	879.62	53.19	884.83	49.01	889.01	47.73	890.29	46.52	891.50
2105ss	994.59	57.79	936.80	59.02	935.57	59.22	935.37	59.00	935.59	59.31	935.28	59.58	935.01	59.84	934.75
2105s	994.49	92.35	902.14	92.29	902.20	93.62	900.87	98.15	896.34	95.93	898.56	96.33	898.16	97.6	896.89
2105i	994.60	97.22	897.38	94.81	899.79	95.59	899.01	96.51	898.09	97.05	897.55	97.3	897.30	86.16	908.44
2105d	994.80	Dry	NA	Dry	NA	171.17	823.63	164.57	830.23	160.27	834.53	158.45	836.35	156.13	838.67
2106	725.60	15.39	710.21	15.47	710.13	15.89	709.71	14.88	710.72	15.87	709.73	16.25	709.35	16.23	709.37

NOTES:
 Shaded = well not verified or closed
 a = Source: AEP DWG. No. 13-30500-12-E
 b = Well was re-surveyed in September 2019.
 Ground surface was lowered to access stockpiled soil, and subsequently well casing was removed. Top of casing elevation changed from 947.01 to 937.68 at MW-8, and 947.35 to 937.68 at 0517.
 c = Prior to 2018, TOCs were resurveyed when casings were extended during south valley pond dike construction.
 MW-1 casing extended 3.32' from 711.47' to 714.79'.
 MW-2 casing extended 3.89' from 711.01' to 714.90'.
 506 casing extended 3.19' from 711.77' to 714.96'.
 d = MW-1, MW-5 were replaced by MW-1801 and MW-1802 and are maintained as hydraulic only monitoring points.
 amsl = above mean sea level
 Elev = elevation
 ft = feet
 GW = groundwater
 NA = well either abandoned or not installed at time of gauging
 NM = well active but not measured
 TOC = top of casing

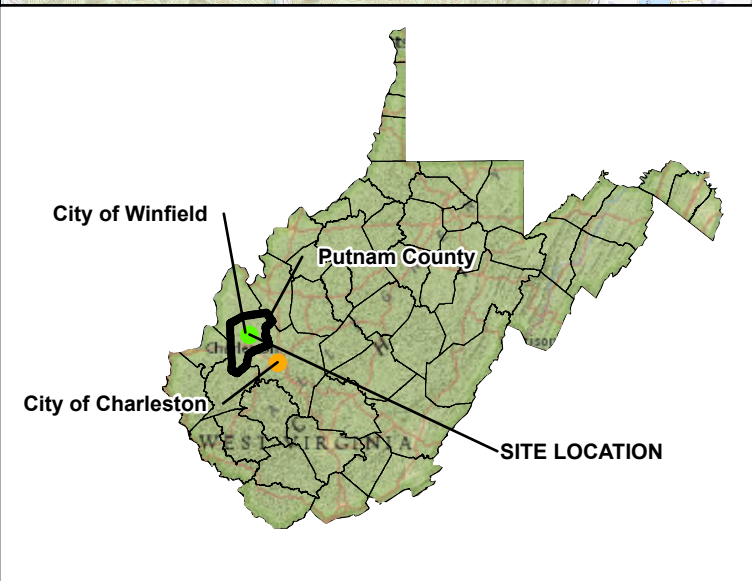
Figures



Sources:
7.5 minute topographic quadrangles
from the National Map:
USGS TNM Topo Base Map 2023



Document Path: T:\ENVAEPAmos\ArcPro\Figures\AEPAmosLanfillRreport.aprx

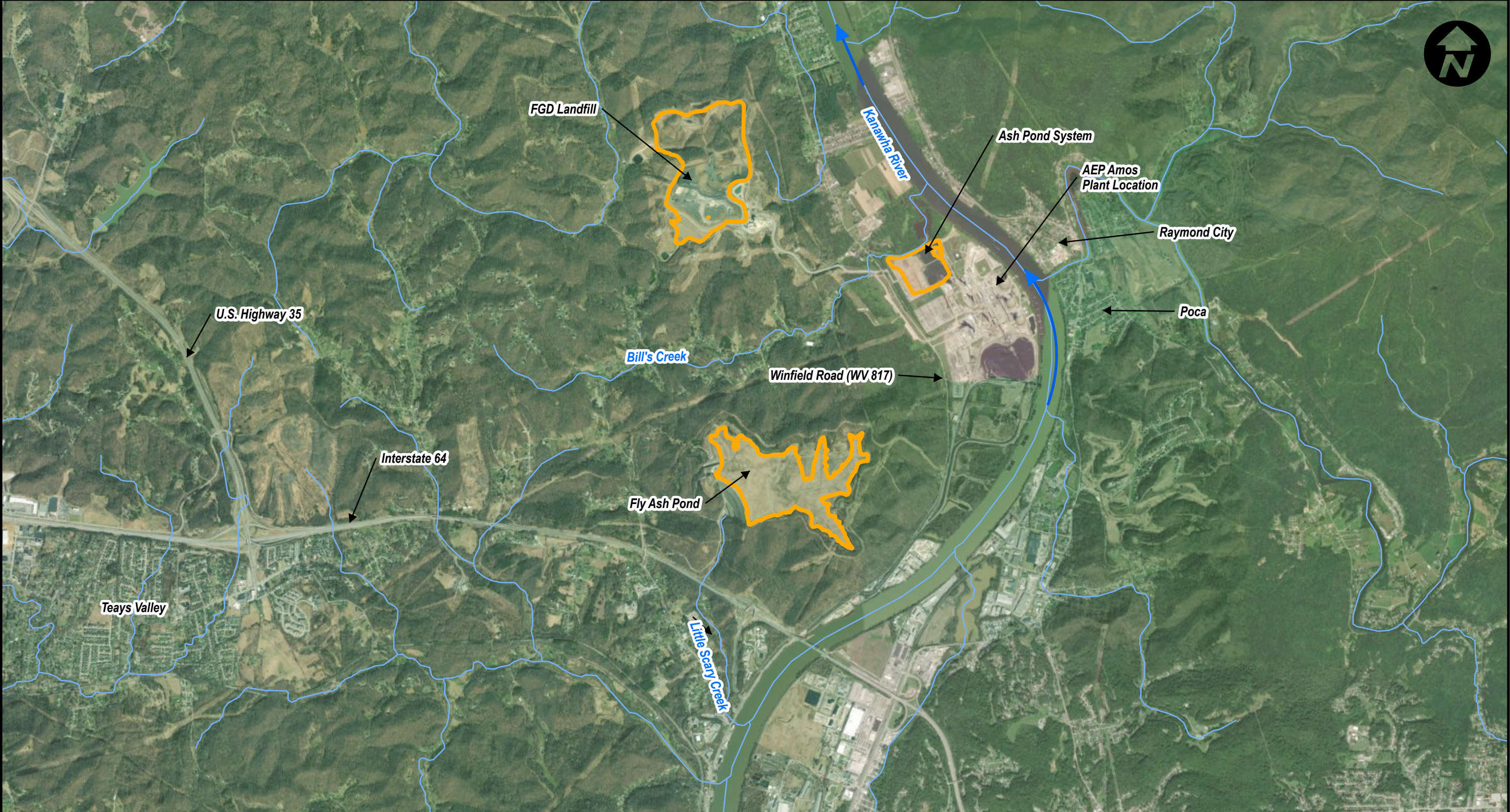


AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA




SITE LOCATION MAP



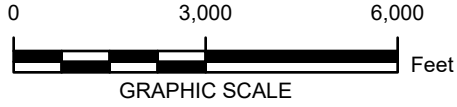
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On: 15976.0009.00001 (Mountainview Ash Pond)
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LEGEND:

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

NOTES:
1. 2022 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. WEST VIRGINIA 1983 STATE PLANAR COORDINATES



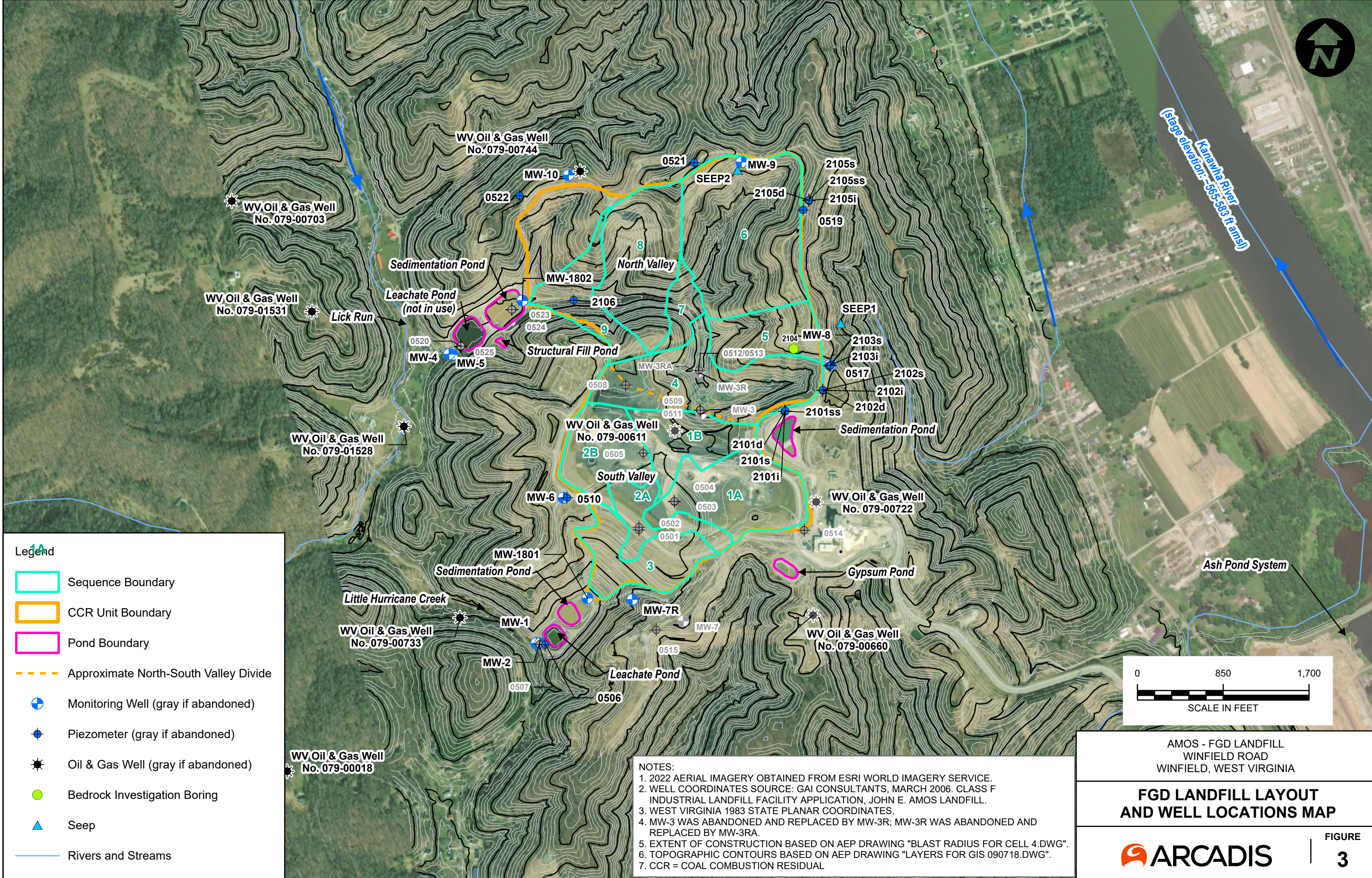
AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA

PLANT AND CCR UNIT LOCATION MAP



FIGURE 2

City: CITRIX Div/Group: MIDV Created By: K.Ives Last Saved By: AKENS
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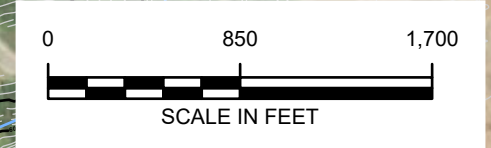


Legend

- Sequence Boundary
- CCR Unit Boundary
- Pond Boundary
- Approximate North-South Valley Divide
- + Monitoring Well (gray if abandoned)
- Piezometer (gray if abandoned)
- * Oil & Gas Well (gray if abandoned)
- Bedrock Investigation Boring
- ▲ Seep
- Rivers and Streams

NOTES:

1. 2022 AERIAL IMAGERY OBTAINED FROM ESRI WORLD IMAGERY SERVICE.
2. WELL COORDINATES SOURCE: GAI CONSULTANTS, MARCH 2006. CLASS F INDUSTRIAL LANDFILL FACILITY APPLICATION, JOHN E. AMOS LANDFILL.
3. WEST VIRGINIA 1983 STATE PLANAR COORDINATES.
4. MW-3 WAS ABANDONED AND REPLACED BY MW-3R; MW-3R WAS ABANDONED AND REPLACED BY MW-3RA.
5. EXTENT OF CONSTRUCTION BASED ON AEP DRAWING "BLAST RADIUS FOR CELL 4.DWG".
6. TOPOGRAPHIC CONTOURS BASED ON AEP DRAWING "LAYERS FOR GIS 090718.DWG".
7. CCR = COAL COMBUSTION RESIDUAL



AMOS - FGD LANDFILL
 WINFIELD ROAD
 WINFIELD, WEST VIRGINIA

FGD LANDFILL LAYOUT
 AND WELL LOCATIONS MAP

FIGURE

3

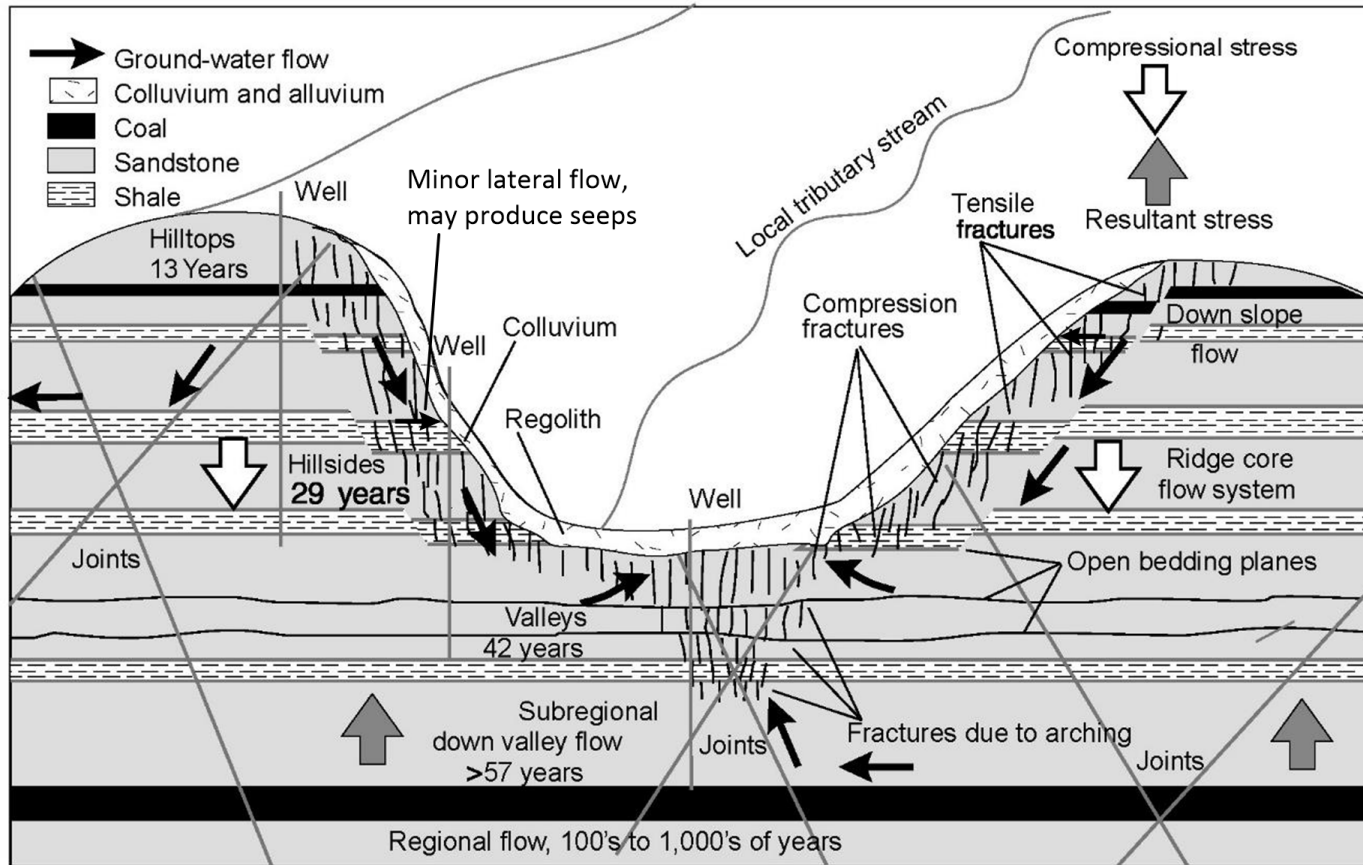


Figure 3. Revised conceptual model of ground-water flow in an Appalachian Plateaus fractured-bedrock aquifer including apparent age of ground water (Modified from Wyrick and Borchers, fig. 3.2-1, 1981 and Kozar, 1998).

References:

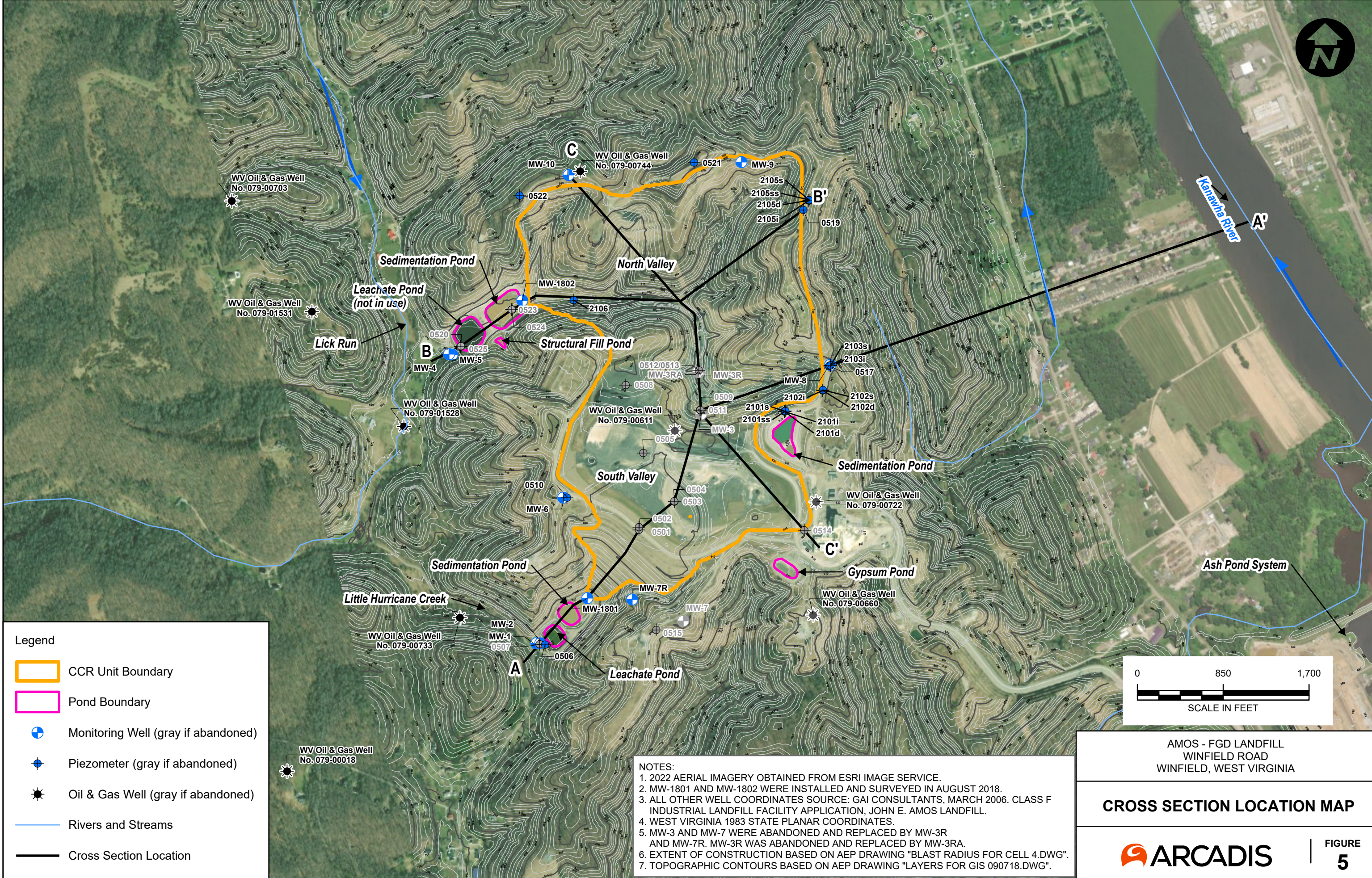
- United States Geological Survey (USGS), Wyrick, G.D. and J.W. Borchers, 1981. Hydrologic Effects of Stress-Relief Fracturing in an Appalachian Valley. Water-Supply Paper 2177.

Notes:

- Flow arrows illustrating minor lateral flow producing seeps along valley walls were added by Arcadis in 2023.

AMOS - FGD LANDFILL WINFIELD ROAD WINFIELD, WEST VIRGINIA	
STRESS RELIEF FRACTURE SYSTEM CONCEPTUAL SITE MODEL	
	FIGURE 4

City: CITRIX Div/Group: MIDV Created By: K.Ives Last Saved By: AKENS
 OH:015976.0009.00001 (Mountainview Ash Pond)
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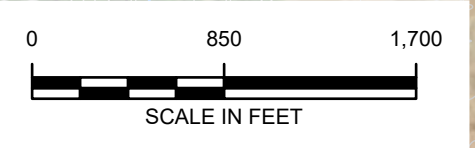


Legend

- CCR Unit Boundary
- Pond Boundary
- Monitoring Well (gray if abandoned)
- Piezometer (gray if abandoned)
- Oil & Gas Well (gray if abandoned)
- Rivers and Streams
- Cross Section Location

NOTES:

1. 2022 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. MW-1801 AND MW-1802 WERE INSTALLED AND SURVEYED IN AUGUST 2018.
3. ALL OTHER WELL COORDINATES SOURCE: GAI CONSULTANTS, MARCH 2006. CLASS F INDUSTRIAL LANDFILL FACILITY APPLICATION, JOHN E. AMOS LANDFILL.
4. WEST VIRGINIA 1983 STATE PLANAR COORDINATES.
5. MW-3 AND MW-7 WERE ABANDONED AND REPLACED BY MW-3R AND MW-7R. MW-3R WAS ABANDONED AND REPLACED BY MW-3RA.
6. EXTENT OF CONSTRUCTION BASED ON AEP DRAWING "BLAST RADIUS FOR CELL 4.DWG".
7. TOPOGRAPHIC CONTOURS BASED ON AEP DRAWING "LAYERS FOR GIS 090718.DWG".

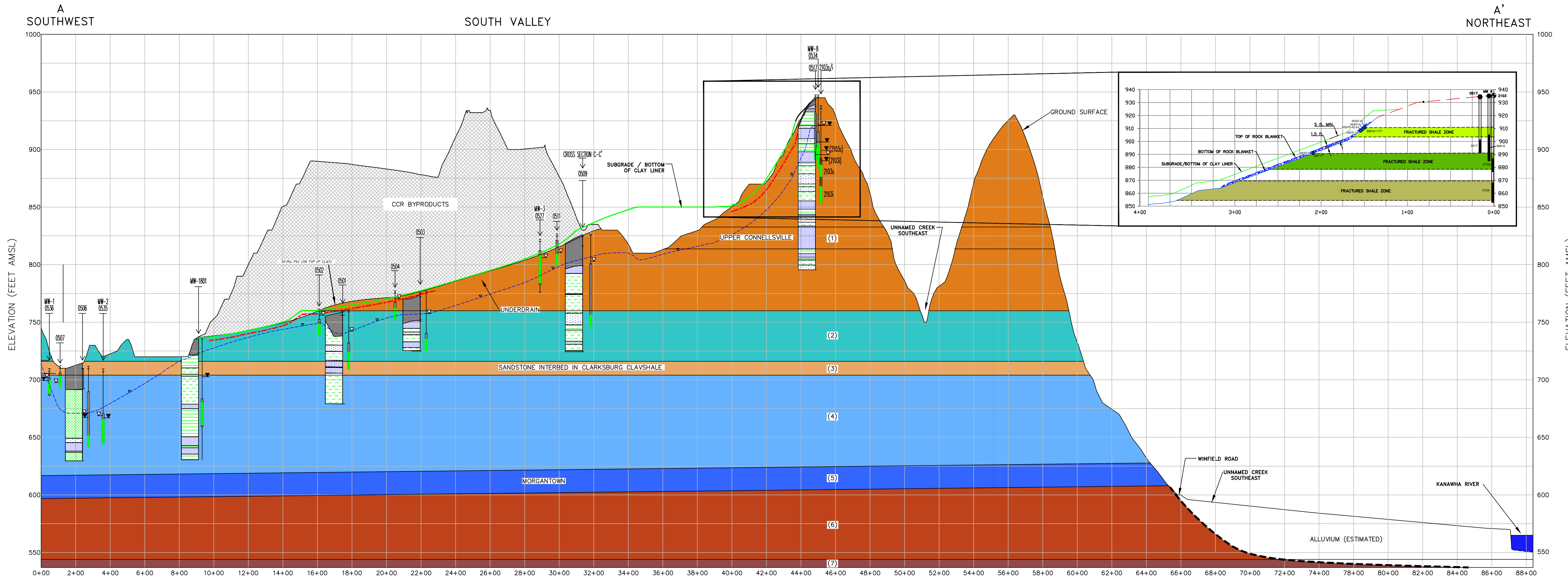


AMOS - FGD LANDFILL
 WINFIELD ROAD
 WINFIELD, WEST VIRGINIA

CROSS SECTION LOCATION MAP

FIGURE
5

CITY: COLUMBUS, OHIO; DIV: GROUP (IMDV); DB: R. SMITH; LD: (Opt); PIC: (Opt); PM: (T. FORTNER); TM: (Opt); LVR: (Opt); ON: OFF; REF: C:\Users\smim\OneDrive\Arcadis ACC US\AUS-998999-AEP-AMOS FGD LANDFILL WINFIELD_WIP\107_ARC_ENV\2024\01-DWG\RESTRICTION-RPT-LANDFILL-CS.dwg LAYOUT: CS-A-A SAVED: 1/16/2024 4:11 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: XREFS: PLOT STYLE TABLE: ACAD.CTB PLOTTED: 1/17/2024 6:46 AM BY: SMITH, ROBERT



LEGEND:

	SOIL AND DECOMPOSED ROCK		INFERRED TOP OF ROCK		PIEZOMETERS AND MONITORING WELLS
	CLAYSTONE		POTENTIOMETRIC SURFACE TRACE (NOVEMBER 2010)		WATER LEVEL RECORDED IN JULY, 2005
	SANDSTONE		MONITORING WELL NUMBER BORING NUMBER		WATER LEVEL RECORDED IN JULY 18, 2023
	SHALE		LINE INDICATES BORING LOCATION		SCREEN
	SILTSTONE		SUBGRADE / BOTTOM OF CLAY LINER		BENTONITE SEAL
			GROUNDWATER UNDERDRAIN (AS BUILT)		SAND PACK

- NOTES:**
1. THE HORIZONTAL POSITION OF THE SAMPLED BORING IS CORRECT ON THE CROSS SECTIONS. THE PIEZOMETERS AND MONITORING WELLS HAVE BEEN MOVED OFF LOCATION SO THEIR INFORMATION CAN BE SEEN. THEIR VERTICAL LOCATIONS AND LENGTHS ARE CORRECT.
 2. THE EXTENT AND DEPTH OF KANAWHA RIVER VALLEY ALLUVIUM ARE ESTIMATED. THERE IS NO AVAILABLE LITHOLOGY DATA BETWEEN THE FGD LANDFILL AND KANAWHA RIVER.
 3. TOP AND BOTTOM SURFACES OF HORIZONTAL FRACTURE ZONES MAY VARY LATERALLY.
- SOURCES:**
1. 2018 GROUND SURFACE: GAI CONSULTANTS DRAWING 13-30500-05-A SHEET 5 OR 25 PROVIDED BY AEP.
 2. POST-CONSTRUCTION SUBBASE ELEVATION: GAI CONSULTANTS DRAWING 13-30500-05-D PROVIDED BY AEP.
 3. POST-CONSTRUCTION CLAY LINER ELEVATION: GAI CONSULTANTS DRAWING 13-30500-06-D PROVIDED BY AEP.
 4. GROUNDWATER UNDERDRAIN CONSTRUCTION DETAILS: GAI CONSULTANTS DRAWING 13-30500-24-C PROVIDED BY AEP.
 5. SUBGRADE ELEVATION BETWEEN 0509 AND MW-8: GAI CONSULTANTS DRAWING 30204SH6 PROVIDED BY AEP.
- HORIZONTAL SCALE: 1"=300'
VERTICAL SCALE: 1"=45'

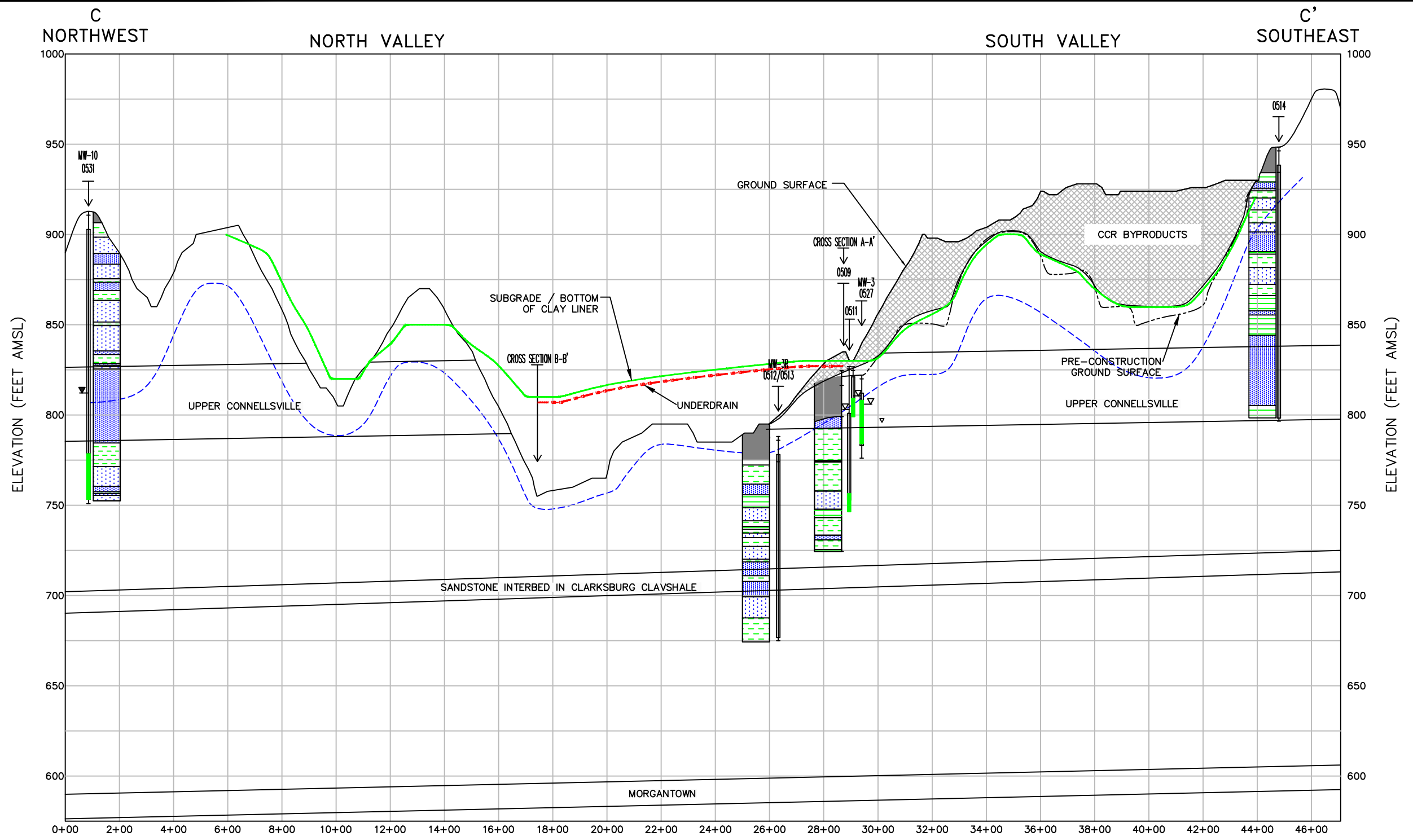
**AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA**

CROSS SECTION A-A'

ARCADIS

FIGURE
6A

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 PLOTSTYLETABLE: ACAD.ctb PLOTTED: 11/17/2024 10:32 AM BY: SMITH, ROBERT



LEGEND:

	SOIL AND DECOMPOSED ROCK		INFERRED TOP OF ROCK	<p>PIEZOMETERS AND MONITORING WELLS</p>
	CLAYSTONE		POTENTIOMETRIC SURFACE TRACE (NOVEMBER 2010)	
	SANDSTONE		MW-1 MONITORING WELL NUMBER 0536 BORING NUMBER LINE INDICATES BORING LOCATION	
	SHALE		SUBGRADE / BOTTOM OF CLAY LINER (DESIGN IN NORTH VALLEY, AS BUILT IN SOUTH VALLEY)	
	SILTSTONE		GROUNDWATER UNDERDRAIN (DESIGN IN NORTH VALLEY, AS BUILT IN SOUTH VALLEY)	

WATER LEVEL RECORDED IN JULY, 2005

WATER LEVEL RECORDED IN JULY 18, 2023

NOTES:

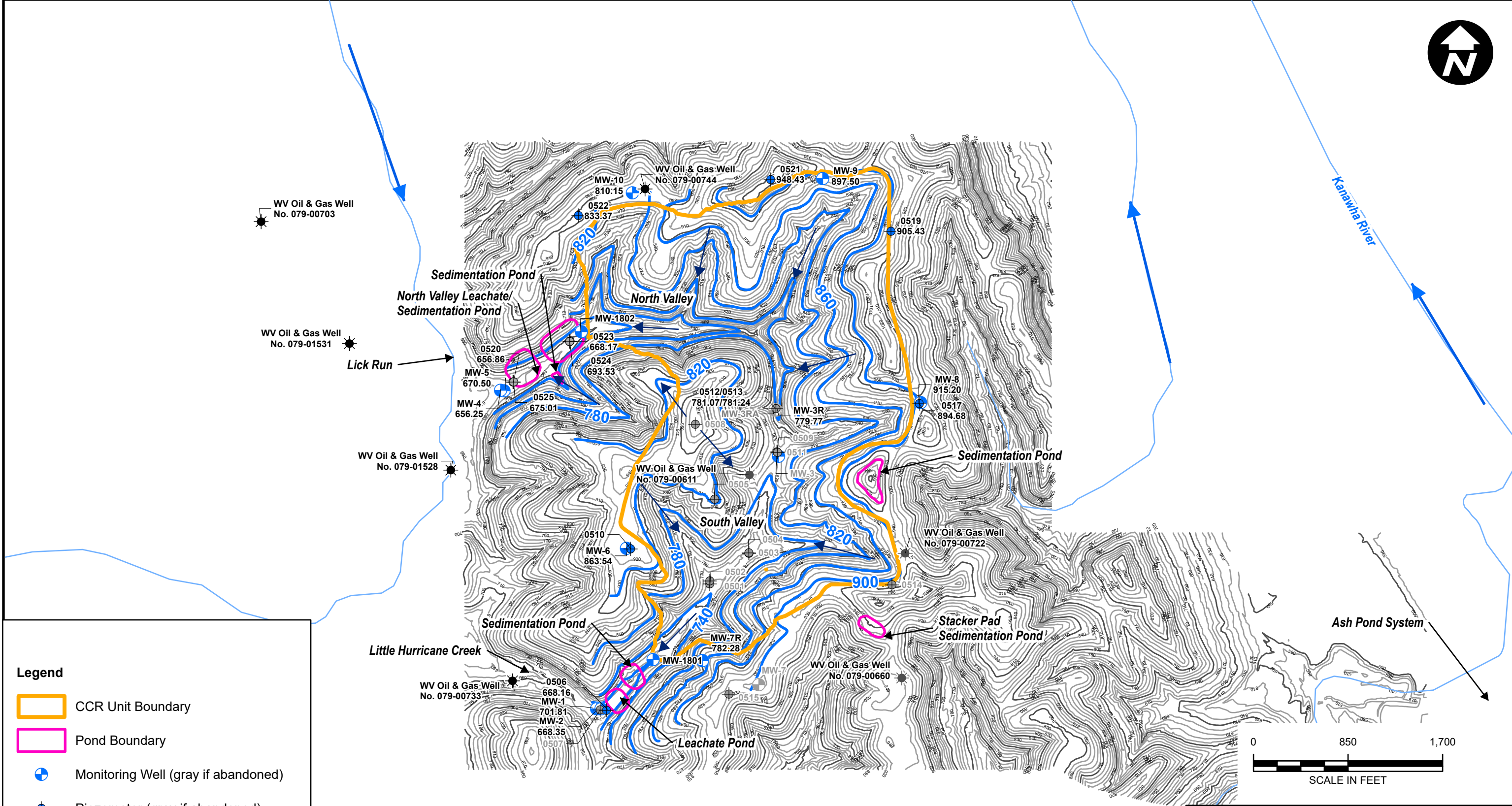
- THE HORIZONTAL POSITION OF THE SAMPLED BORING IS CORRECT ON THE CROSS SECTIONS. THE PIEZOMETERS AND MONITORING WELLS HAVE BEEN MOVED OFF LOCATION SO THEIR INFORMATION CAN BE SEEN. THEIR VERTICAL LOCATIONS AND LENGTHS ARE CORRECT.

SOURCES:

- 2018 GROUND SURFACE: GAI CONSULTANTS DRAWING 13-30500-05-A SHEET 5 OR 25 PROVIDED BY AEP
- POST-CONSTRUCTION SUBBASE ELEVATION: GAI CONSULTANTS DRAWING 13-30500-05-D PROVIDED BY AEP.
- POST-CONSTRUCTION CLAY LINER ELEVATION: GAI CONSULTANTS DRAWING 13-30500-06-D PROVIDED BY AEP.
- GROUNDWATER UNDERDRAIN CONSTRUCTION DETAILS: GAI CONSULTANTS DRAWING 13-30500-24-C PROVIDED BY AEP.

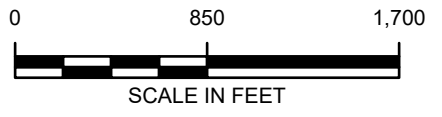
HORIZONTAL SCALE: 1"=400'
VERTICAL SCALE: 1"=60'

AMOS - FGD LANDFILL WINFIELD ROAD WINFIELD, WEST VIRGINIA	
CROSS SECTION C-C'	
	FIGURE 6C



Legend

- CCR Unit Boundary
- Pond Boundary
- Monitoring Well (gray if abandoned)
- Piezometer (gray if abandoned)
- Oil & Gas Well (gray if abandoned)
- Rivers and Streams
- Potentiometric Surface Contour Lines
- Estimated Groundwater Flow Path



NOTES:

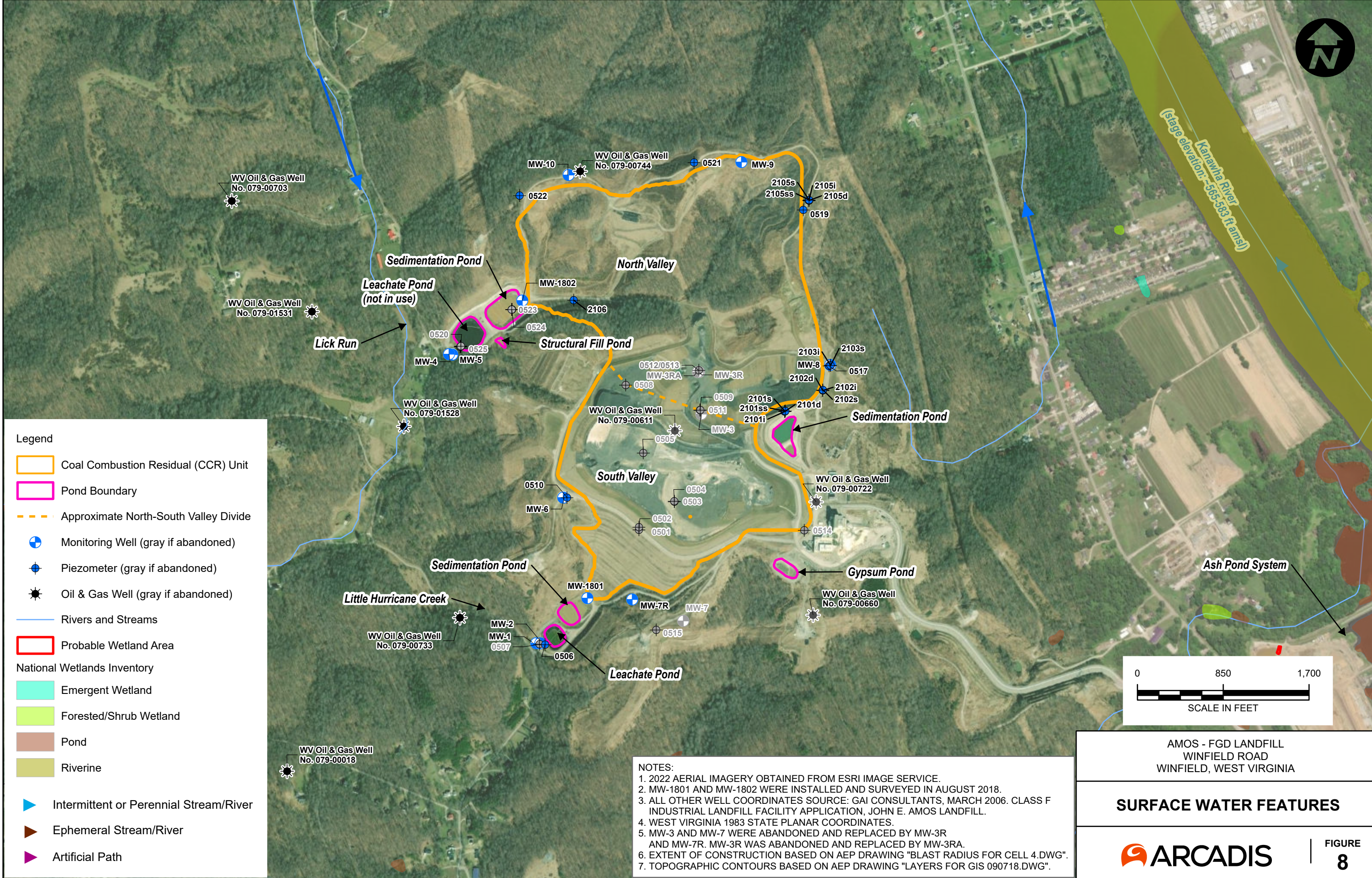
1. PRE-CONSTRUCTION TOPOGRAPHY FROM AEP DRAWING 13-30500-11-E. CONTOUR INTERVAL: 10 FEET
2. WELL COORDINATE SOURCE: GAI CONSULTANTS, MARCH 2006. CLASS F INDUSTRIAL LANDFILL FACILITY APPLICATION, JOHN E. AMOS LANDFILL.
3. WEST VIRGINIA 1983 STATE PLANAR COORDINATES.
4. MW-3 AND MW-7 WERE ABANDONED AND REPLACED BY MW-3R AND MW-7R. MW-3R WAS ABANDONED AND REPLACED BY MW-3RA.
5. MW-1801 AND MW-1802 WERE NOT GAUGED DURING THE NOVEMBER 2010 SAMPLING EVENT, AS THEY WERE INSTALLED AND SURVEYED IN AUGUST 2018.
6. EXTENT OF CONSTRUCTION BASED ON AEP DRAWING "BLAST RADIUS FOR CELL 4.DWG"

AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA

**POTENTIOMETRIC SURFACE MAP
NOVEMBER 22, 2010**

**FIGURE
7**

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: AKENS
 Oh:015976.0009.00001 (Mountainair Ash Pond)
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- Legend**
- Coal Combustion Residual (CCR) Unit
 - Pond Boundary
 - Approximate North-South Valley Divide
 - ⊕ Monitoring Well (gray if abandoned)
 - ⊕ Piezometer (gray if abandoned)
 - ☼ Oil & Gas Well (gray if abandoned)
 - Rivers and Streams
 - Probable Wetland Area
 - National Wetlands Inventory**
 - Emergent Wetland
 - Forested/Shrub Wetland
 - Pond
 - Riverine
 - ▶ Intermittent or Perennial Stream/River
 - ▶ Ephemeral Stream/River
 - ▶ Artificial Path

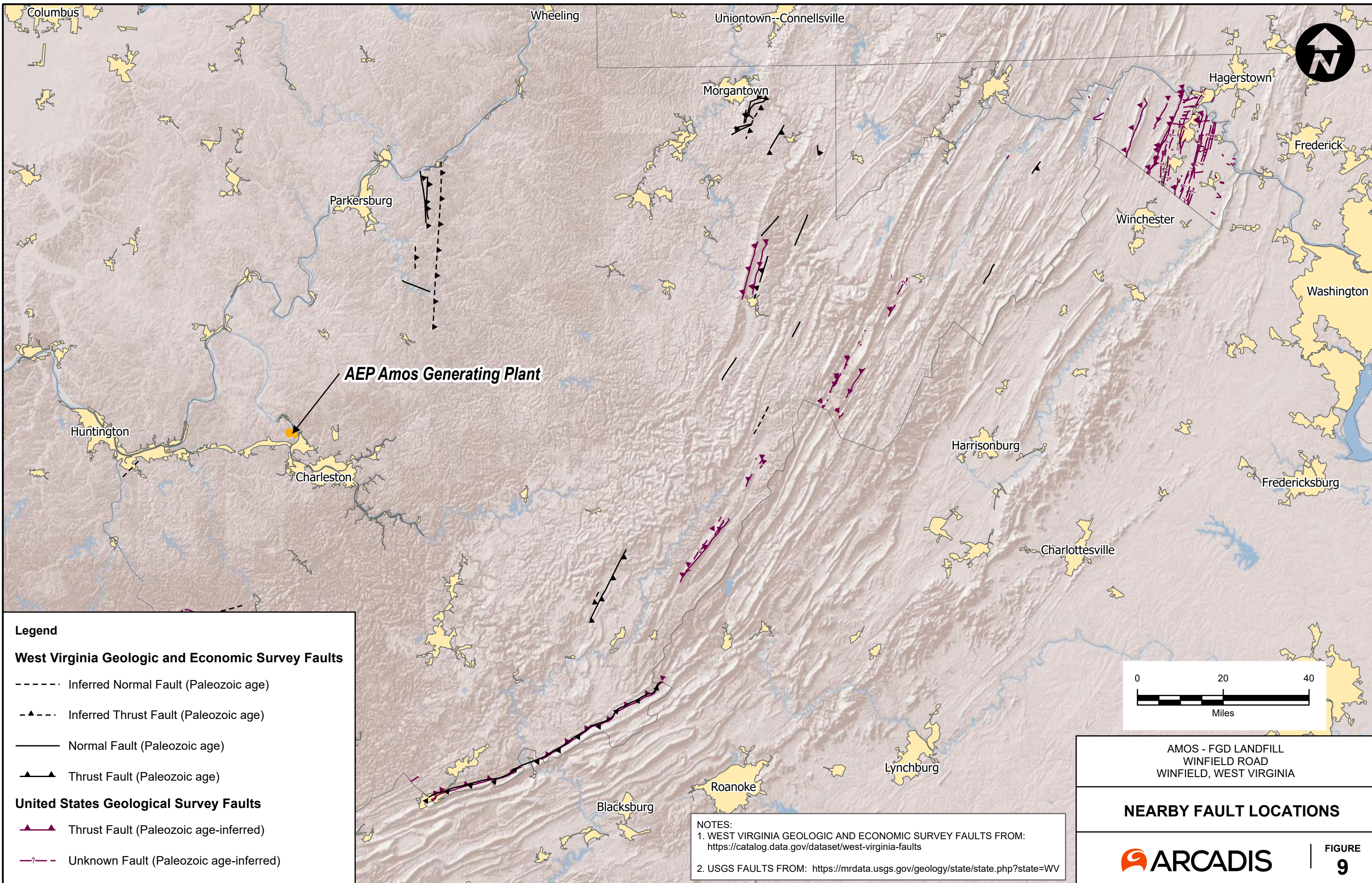
NOTES:

1. 2022 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. MW-1801 AND MW-1802 WERE INSTALLED AND SURVEYED IN AUGUST 2018.
3. ALL OTHER WELL COORDINATES SOURCE: GAI CONSULTANTS, MARCH 2006. CLASS F INDUSTRIAL LANDFILL FACILITY APPLICATION, JOHN E. AMOS LANDFILL.
4. WEST VIRGINIA 1983 STATE PLANAR COORDINATES.
5. MW-3 AND MW-7 WERE ABANDONED AND REPLACED BY MW-3R AND MW-7R. MW-3R WAS ABANDONED AND REPLACED BY MW-3RA.
6. EXTENT OF CONSTRUCTION BASED ON AEP DRAWING "BLAST RADIUS FOR CELL 4.DWG".
7. TOPOGRAPHIC CONTOURS BASED ON AEP DRAWING "LAYERS FOR GIS 090718.DWG".

AMOS - FGD LANDFILL
 WINFIELD ROAD
 WINFIELD, WEST VIRGINIA

SURFACE WATER FEATURES

FIGURE
8



Legend

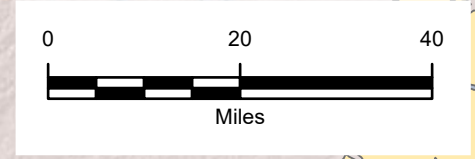
West Virginia Geologic and Economic Survey Faults

- Inferred Normal Fault (Paleozoic age)
- ▲--- Inferred Thrust Fault (Paleozoic age)
- Normal Fault (Paleozoic age)
- ▲▲ Thrust Fault (Paleozoic age)

United States Geological Survey Faults

- ▲▲ Thrust Fault (Paleozoic age-inferred)
- ?-- Unknown Fault (Paleozoic age-inferred)

NOTES:
 1. WEST VIRGINIA GEOLOGIC AND ECONOMIC SURVEY FAULTS FROM: <https://catalog.data.gov/dataset/west-virginia-faults>
 2. USGS FAULTS FROM: <https://mrdata.usgs.gov/geology/state/state.php?state=WV>



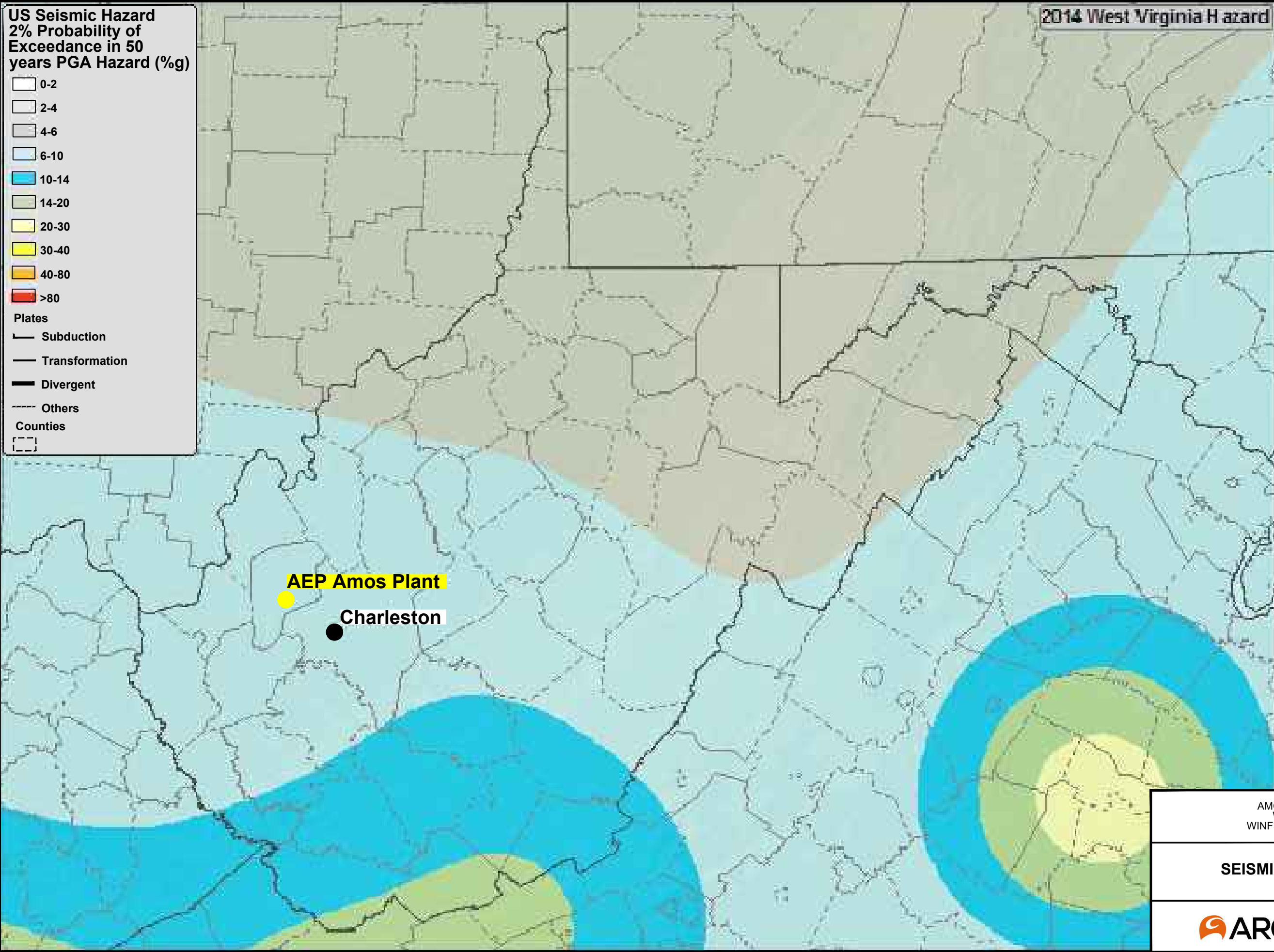
AMOS - FGD LANDFILL
 WINFIELD ROAD
 WINFIELD, WEST VIRGINIA

NEARBY FAULT LOCATIONS



City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: AKENS
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PLOT STYLE TABLE: ACAD.CTB PLOTTED: 1/5/2024 11:52 AM BY: SMITH, ROBERT



2014 West Virginia Hazard



**US Seismic Hazard
2% Probability of
Exceedance in 50
years PGA Hazard (%g)**

- 0-2
- 2-4
- 4-6
- 6-10
- 10-14
- 14-20
- 20-30
- 30-40
- 40-80
- >80

Plates

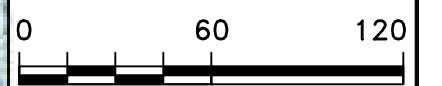
- Subduction
- Transformation
- Divergent
- Others

Counties

-

NOTES:
- PGA - PEAK GROUND
ACCELERATION.
- %g - PERCENT OF STANDARD
GRAVITY.

SOURCE:
USGS Earthquake Hazards Program,
West Virginia: 2014 Seismic Hazard
Map



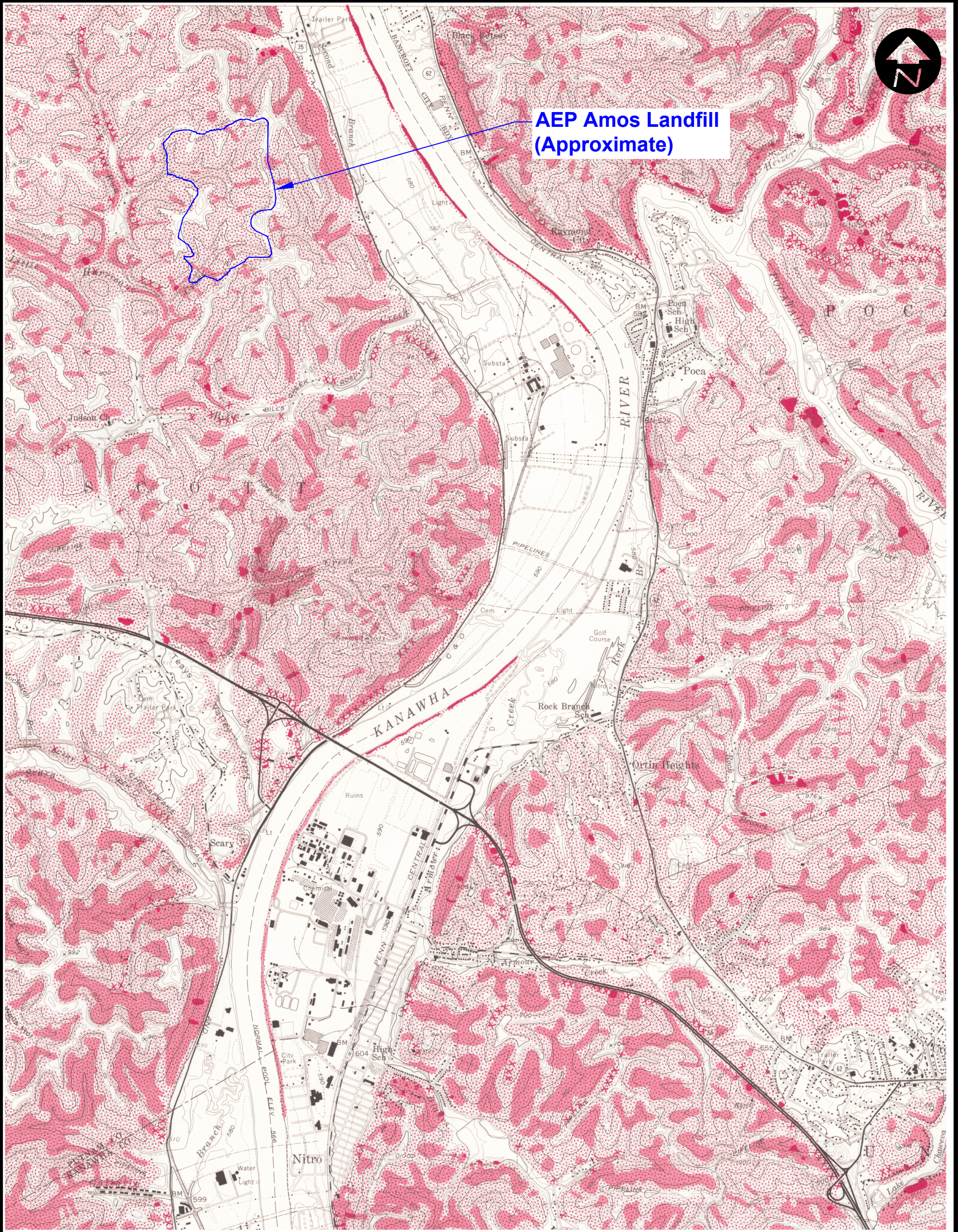
SCALE IN MILES
SCALE IS APPROXIMATE

AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA

SEISMIC IMPACT ZONES

 **ARCADIS** | FIGURE
10

C:\Users\smithd\OneDrive\Documents\Arcadis\AUS-AEP-AMOS GENERATING PLANT-WINFIELD West Virginia\Project Files\2023\01-1-in Progress\01-DWG\AMOS_Landslides and RELATED FEATURES.dwg LAYOUT: AMOS LANDFILL_LANDSLIDES_SAVED: 8/29/2023 7:42 AM ACADVER: 24.2S (LMS TECH) PAGESETUP: PLOTSTYLETABLE: ACAD.CTB PLOTTED: 1/5/2024 11:54 AM BY: SMITH, ROBERT



**AEP Amos Landfill
(Approximate)**

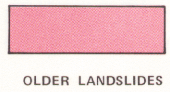
EXPLANATION

Information on this map is intended as a general guide and should not be used as a substitute for detailed geological engineering and on-site investigations. Slide-prone areas are based on evidence of new and old slides. Stable slopes may be susceptible to landslides if they are modified by man. Additional information is contained in the report accompanying this map.



RECENT LANDSLIDES

Areas where landslides have been historically recorded or characterized by fresh scars and obvious recent movement.



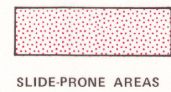
OLDER LANDSLIDES

Areas lacking evidence of recent movement, but characterized by hummocky ground, slump blocks, flow structures, water seeps, or evidence from aerial photographs. Presently stable but can be reactivated easily.



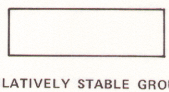
ROCKFALLS

Areas where rocks have fallen or are highly likely to fall. Normally confined to very steep, natural or man-made slopes and cliffs.



SLIDE-PRONE AREAS

Areas judged to be unstable due to the occurrence of landslides, incompetent rock and soil, steep slope, or other evidence of instability.



RELATIVELY STABLE GROUND

Areas judged to have very low susceptibility to landslides and contain no known evidence of instability.

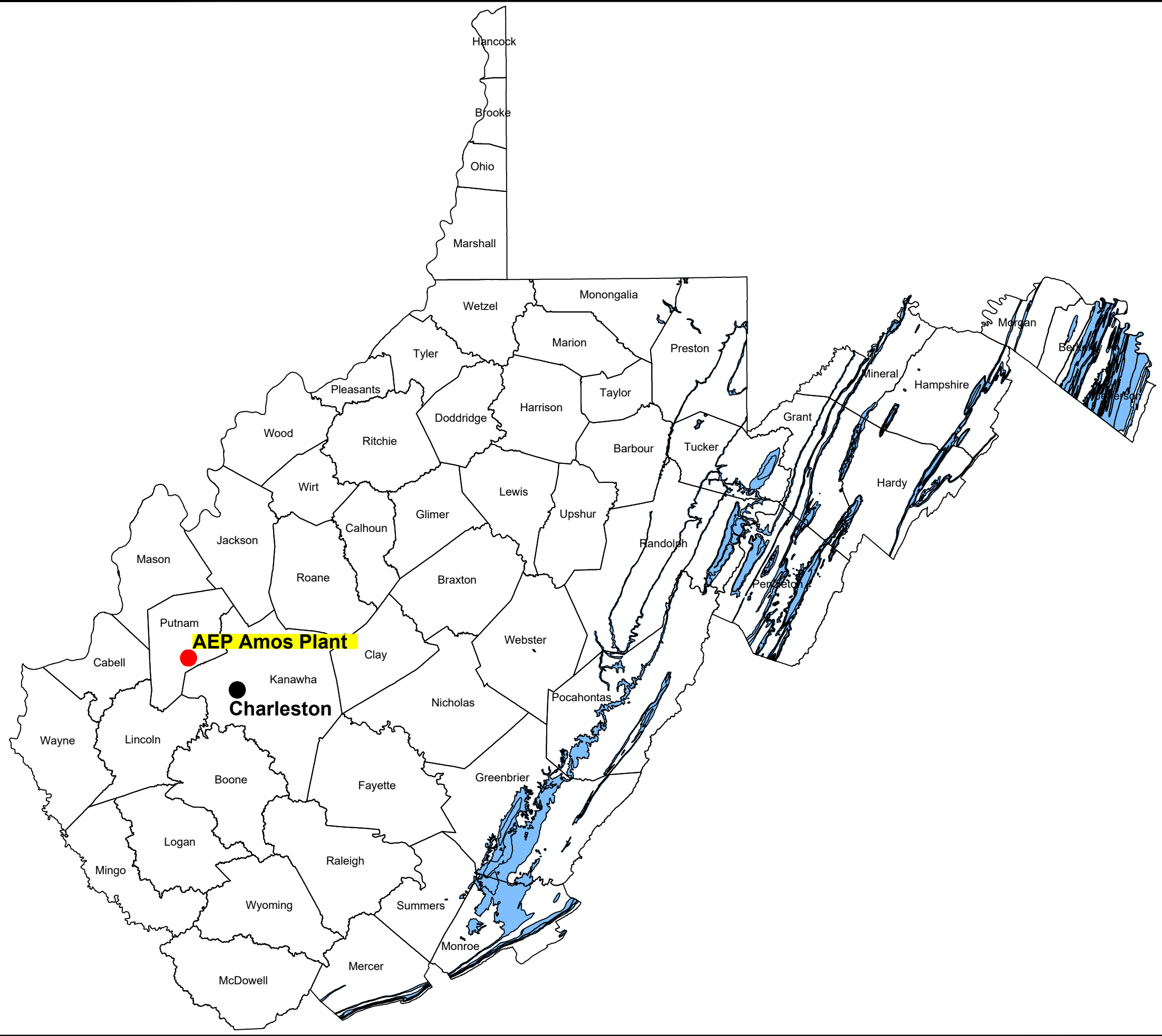
SOURCE:
West Virginia Landslide Study, West Virginia Geological and Economic Survey by Robert B. Erwin, Director and State Geologist. Saint Albans 7.5' Quadrangle, 1975.



**SCALE IN MILES
SCALE IS APPROXIMATE**

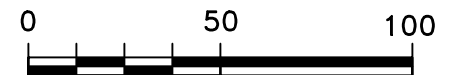
<p>AMOS - FGD LANDFILL WINFIELD ROAD WINFIELD, WEST VIRGINIA</p>	
<p>NEARBY LANDSLIDES AND RELATED FEATURES</p>	
	<p>FIGURE 11</p>

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LEGEND
[Blue shaded area] KARST AREAS: LIMESTONE AND DOLOMITE, UNDIFFERENTIATED

SOURCE:
KARST REGIONS DERIVED FROM 1968 GEOLOGIC MAP OF WEST VIRGINIA, WEST VIRGINIA GIS TECHNICAL CENTER.



SCALE IN MILES
SCALE IS APPROXIMATE

AMOS - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA

WEST VIRGINIA KARST AREAS

Appendix A

Record of Changes

RECORD OF CHANGES

Revision No	Revision Date	Description
0	10/5/2016	Original Location Restriction Evaluation Report
1	1/18/2024	<p>Revised Report to include removal and reconstruction of eastern bowl of sequence 4 and associated additional borings 2101 to 2106. Text revised in Sections 2.2.3-Construction and Operational History, 2.3-Previous Investigations, 3.1.1.1-Horizontal and Vertical Position Relative to CCR Unit, 3.2-Compliance with Isolation Distance.</p> <p>Updated figures and cross sections with landfill sequences and borings 2101 to 2106 including Fig.-3-Landfill Layout and Well Location Map, Fig. 4-Stress Relief Fracture System CSM, Fig. 6a-Cross Section A-A', Fig. 6b-Cross Section B-B', Fig. 8-Surface Water Features.</p> <p>Updated Table 1-Water Level Data through October 2023 and Appendix A-Boring logs (added MW-7R well construction log, 2101 to 2106 boring/piezometer construction logs).</p> <p>Added Appendix D-Record of Changes.</p>

Appendix B

Boring/Well Construction Logs and Closure Information

State of West Virginia		Monitoring Well Construction
Department of Environmental Protection		Well Number: 00015-0018-08
		Approved
Site Name/Physical Address: Site: John E. Amos FGD Landfill Line 1: 1530 Winfield Road Line 2: City: Winfield State: WV Zip: 25213- County: Putnam	Well Registration No. 00015-0-18-0- Grid Location: a. Latitude: 38 28 46 .0 b. Longitude: 81 51 22 .0 c. Method Used: GPS	Purpose of Monitoring Well: Assessment
Well Owner (Name, Firm, Address): Owner: American Electric Power Line 1: 1 Riverside Plaza Line 2: City: Columbus State: OH Zip: 43215- Phone: 614-836-4200	Company/Project Well No.: MW-7R Installed By (Name, Firm, Address): Installer: AEP Dolan Lab Line 1: 4001 Bixby Road Line 2: City: Groveport State: OH Zip: 43125- Phone: 614-836-4200	Date Well Installed: 04/14/2008 Driller's WV Cert No. RoushM31
Section B: (all number fields must be in decimal format)		
1. Cap and Lock:	YES	
2. Protective Cover:	Protective Cover Pipe	
3. Monitoring Well Reference Point:	0 ft.	
4. Borehole Diameter:	6 inches.	
5. Ground Surface Seal: a. Material: concrete b. Installation Procedure: Formed 7' x 7' Pad Arrow Concrete		
6. Surface Seal Bottom/Annular Space Top:	1 ft.	
7. Well Riser: a. OD Well Riser: 2.25 inches. b. ID Well Riser: 2 inches. c. Material: PVC d. Installation Procedure: Hand Set w/Drill		
8. Annular Space Seal: a. Material: bentonite powder - b. Installation Procedure: tremie pipe-gravity		
9. Well Development Procedure: airlift -		
10. Drilling Method Used: air rotary -		
11. Annular Space Seal Bottom/Filter Seal Top:	53.1 ft.	
12. Drilling Fluid Used: Yes Source: Water		
13. Filter Pack Seal: a. Material: bentonite pellet b. Installation Procedure: Gravity Fed c. Volume Added: 100 pounds		
14. Bottom of Bentonite Seal/Filter Pack Top:	60.2 ft.	
15. Depth to Top of Screen:	64.1 ft.	
16. Screen: a. Material: PVC b. Installation Procedure: Hand Set w/Centralizers c. Slot Size: 0.02 inches. d. Screen Length: 20 ft.		
17. Filter Pack: a. Material: coarse sand b. Installation Procedure: Gravity		
18. Well Depth:	84.6 ft.	
19. Bottom of Filter Pack:	86.8 ft.	
20. Bottom of Borehole:	86.8 ft.	
21. Backfill Material (below filter pack): #4 Quartz		
22. Decontamination Procedures: Niqui-Nox and High Pressure Water Pump		
23. Special Circumstances and Exceptions: No Variance Number:		
24. WV Contractor License No. 00015		



GAI Consultants, Inc. 2006

Boring Logs

**B-0501 to B-0525 & MW-1 to
MW-10**

N 540558.4978
E 1723508.1269 Grade El. 759.08



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. 0501
ELEVATION _____ GWL 0 HRS 8.4 PROJECT NO. C040384.42-01
DATE 18-19 APR 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*	
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10	
1.5	1	S-1			V. LOOSE	BROWN	SANDY SILT	ml	SLIGHTLY MOIST	
3.0	3	REC 0.8			LOOSE	BROWN	SANDY SILT AND SMALL ROCK FRAGS	ml	SLIGHTLY MOIST	
4.5	1	S-3			V. STIFF	BROWN	SILTY CLAY	cl	* 2.0 TSF	
6.0	3	REC 0.8			V. STIFF	GRAY + BROWN MOTTLED	SANDY CLAY MOIST	cl	* 2.75 TSF	
7.5	5	S-5			V. STIFF	GRAY + BROWN MOTTLED	SANDY CLAY MOIST	cl	WATER ~ 6'	
9.0	4	REC 1.5			V. STIFF	GRAY + BROWN MOTTLED	SANDY CLAY MOIST	cl	* 3.0 TSF	
10.5	3	S-7			V. STIFF	GRAY + BROWN MOTTLED	SANDY CLAY MOIST	cl	* 3.0 TSF	
12.0	8	1.3			V. STIFF	GRAY + BROWN MOTTLED	SANDY CLAY MOIST	cl	* 3.75 TSF	
13.5	3	S-9			HARD	GRAY + BROWN MOTTLED	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.5 TSF	
15.0	4	REC 1.5			HARD	GRAY + BROWN MOTTLED	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.5 TSF	
16.5	3	S-11			HARD	GRAY + BROWN MOTTLED	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.0 TSF	
18.0	4	REC 1.5			HARD	GRAY	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.25 TSF	
19.5	2	S-13			HARD	GRAY	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.5 TSF	
21.0	3	REC 1.5			HARD	GRAY BLUE BROWN MOTTLED	SANDY CLAY : DECOMP. CLAYSTONE	cl	* 4.5 TSF	
22.3	16	S-15		22.3	SOFT	GRAY	DECOMPOSED SANDY CLAYSTONE			
				22.3	V. SOFT TO SOFT	GRAY + BROWN MOTTLED	HIGHLY WEATHERED CLAYSTONE	UBR-BR	30° SLICEN, IDED FRAC- TUNES AT 23.5, 23.75, 24.9 LOW ANGLE FRACTURES AT 22.7, 23.0, 23.6, 23.9, 24.05, 24.2, 24.5, 24.6, 25.2, 26.0, 26.3, 27.7, 28.0, 28.4, 29.6, 30.3	
	9.2	9.2	100%	71	27.4	SOFT	GRAY	SANDY CLAYSTONE	BR-BL	
				25.0	SOFT TO	GRAY	INTERBEDDED SANDY SILTSTONE AND SANDSTONE	BL	45° FRACTURE 27.25 - 27.4	

REMARKS ** DRILLED BY ...
BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" Ø CASING, MQ-2 WIRELINE COILING TOOLS

PROJECT AREA 2/3 AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0501
 ELEVATION _____ GWL 0 HRS 8.4 PROJECT NO. C040384/40-01
 DATE 18-19 APR 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
31.5	◆				M. SOFT	GRAY	INTER-BEDDED SANDY SILTSTONE AND SANDSTONE (CONT)	BL	
									LOW ANGLE FRACTURES
									33.6, 34.4, 36.0, 36.2, 36.7, 37.35, 37.8, 38.0, 38.2
				34.6	SOFT	GRAY + MARLON MOTTLED	CLAYSTONE	VBR-	41.1
	10.0	10.0	100%	70				BR	30° FRACTURES W/ SLICKE- SIDES 35.4, 39.25, 39.75, 40.0, 41.3-41.5
									BROKEN ZONES 35.6-35.8, 40.0-41.0, 41.5-42.3
41.5	◆								
				42.3	M. SOFT TO M. HARD	GRAY	SANDSTONE	BL	LOW ANGLE FRACTURES
									42.3, 43.25, 48.0, 48.1, 48.5, 50.2, 51.5, 51.7
	9.3	10.0	93%	88					52.2, 52.7, 53.4
				48.0					
				48.5	SOFT	DK GRAY	SANDY CLAYSTONE	BR	
					M. SOFT TO M. HARD	GRAY	INTERBEDDED SANDSTONE AND SANDY SILTSTONE	BL	
51.5	◆								
				53.4	SOFT	GRAY + MARLON MOTTLED	SANDY TO SILTY CLAYSTONE	VBR- BR	LOW ANGLE FRACTURES
									53.7, 54.05, 54.3, 54.85, 55.4, 55.55, 55.7, 55.85, 56.05, 56.5, 56.7, 56.9, 57.2, 58.0, 58.5, 58.9, 59.4, 60.6, 60.85, 61.35
	9.3	10.0	93%	31					BROKEN ZONE 59.3-60.6

REMARKS ** _____ ~30° SLICKENSIDED FLACS. 54.4, 57.55, 57.9, 58.25, 58.75, 61.1

PROJECT AREA 2-1/3 AMOS POWER PLANT ST ALBANS, WV

BORING NO. B0501

ELEVATION _____ GWL 0 HRS 8.4

PROJECT NO. C040384.40.01

DATE 18-19 APR 2005 CLASSIFIED BY DAN SANGER

PAGE 3 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
61.5	◆			61.6					
					SFFT	MARBLE W/ GRAY YELLOW, AND PURPLE MOTTLING	CLAYSTONE HIGHLY WEATHERED - CORE IS HIGHLY PITTED	VBR- BR	61.5-65.9 APPARENT ZONE OF CORE LOSS BROKEN ZONE: 69.5-66.7 LOW ANGLE FRACTURES 66.9, 67.15, 67.3, 67.75, 67.85, 68.9, 69.1, 69.65, 70.6
	5.6	60	56%	28%					
71.5	◆								
	7.6	85	89%	27					30° SLICKENSIDED FRACTURE 69.9, 71.1, 71.4, 74.2, 75.0 BROKEN ZONE 71.5-72.3 APPARENT CORE LOSS 72.3- 73.2
80.0	▲			80.0					LOW ANGLE FRACTURES 74.55, 74.7, 75.35, 75.55, 75.8, 76.1, 76.75, 77.5, 77.65, 77.85, 78.2, 78.5, 78.65, 78.75, 78.85, 79.0, 79.2, 79.5, 79.8, 79.9
							BOTTOM OF BORING : 80.0'		

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B0501

(8-3)

N 540563.2422
 E 1723508.0316 Grade El. 759.46



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBERTS, MN BORING NO. B-0502
 ELEVATION 758± GWL 0 HRS _____ PROJECT NO. CD40384.40-01
 DATE 21 APR 2005 HRS _____ CLASSIFIED BY NAN SANGER PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
							AUGER W/O SAMPLING TO 22'		
							SET PIEZOMETER - TIP AT 21'		
							↑		
							↓		
				22.0			BOTTOM OF BORING: 22'		

REMARKS ** DRILLED BY TERESA TESTING INC. USING A SIMCO 4000 TB TRACK MOUNTED DRILL BORING ADVANCED USING 5/4" SOLID STEM AUGERS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0502
 (34)

N 540843.8055
E 1723858.5630 Grade El. 775.00



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT, ST. ALBANS, WV BORING NO. 0503
ELEVATION _____ GWL 0 HRS 11.4 PROJECT NO. C04084.40-01
DATE 18-19 APR 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 2

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	1 W.O.H	S-1			V. LOOSE	BROWN	CLAYEY SILT	M1	MOIST
3.0	1 W.O.H	REC. 1.0 S-2			V. LOOSE	BROWN	CLAYEY SILT, TRACE SAND	M1	MOIST
4.5	1	REC. 1.1 S-3			V. SOFT	BROWN	SILTY CLAY	CI	WET, * 0.5
6.0	2	REC. 0.1 S-4			HARD	GRAY + BROWN MOTTLED	SANDY CLAY	CI	SLIGHTLY MOIST, * 4.5
7.5	3	REC. 1.4 S-5			M. DENSE	BROWN	SANDY SILT	M1	SLIGHTLY MOIST
9.0	3	REC. 0.4 S-6			HARD	GRAY + BROWN MOTTLED	SANDY CLAY: DECOMP. CLAYSTONE	CI	SLIGHTLY MOIST, * 4.5 TSF
10.5	3	REC. 1.2 S-7			STIFF		SANDY CLAY	CI	MOIST * 3.75 TSF
12.0	6	REC. 0.4 S-8			HARD	GRAY + BROWN MOTTLED	SANDY CLAY	CI	SLIGHTLY MOIST, * 4.5 TSF
13.5	3	REC. 1.2 S-9			HARD	GRAY + BROWN MOTTLED	SANDY CLAY	CI	SLIGHTLY MOIST * 4.5 TSF
15.0	3	REC. 1.3 S-10			HARD	GRAY	SANDY CLAY	CI	SLIGHTLY MOIST, * 4.5 TSF
16.5	3	REC. 1.0 S-11			HARD	GRAY	SANDY CLAY	CI	SLIGHTLY MOIST 4.5 TSF
18.0	1	REC. 1.3 S-12			V. STIFF	GRAY	SANDY CLAY, SOME SILT	CI	MOIST, * 3.75 TSF
19.5	1	REC. 1.4 S-13			V. STIFF	DARK CLAY	SANDY CLAY, TRACE ORGANICS	CI	SLIGHTLY MOIST, * 3.75 TSF
21.0	6	REC. 1.3 S-14			V. STIFF	DARK CLAY	SANDY CLAY, TRACE ORGANICS	CI	SLIGHTLY MOIST, * 3.5 TSF
22.5	2	REC. 1.2 S-15			LOOSE	BLUE + GRAY	CLAYEY SAND, TRACE ROCK FRAGMENTS	SC	MOIST
23.4	2	REC. 1.3 S-16			SOFT	BLUE - GRAY	DECOMPOSED CLAYSTONE FRAGMENTS		
	50/0.4	REC. 0.9		23.4	SOFT	GRAY	DECOMPOSED CLAYSTONE	VBR	TOP OF ROCK 23.4
				24.0	M. SOFT	GRAY	SILTY SANDSTONE	VBA-	CLAY SEAM 24.7, 29.2
					M. HARD			BA	VERTICAL FRACTURES 23.4-24.4
									25.25-25.3, 27.45-27.55
	7.5	7.5	100%	35					LOW ANGLE FRACTURES: 23.6
									23.8, 24.05, 24.15, 24.3,
									24.4, 24.55, 24.9, 25.05, 25.15

REMARKS ** DRILLED BY TERRA TESTING USING A SIMCO 4000 FT TRACK MOUNTED DRILL RIG. BORAING ADVANCED USING 5/4" SOLID STEM AUGERS, NQ CASING, NQ-2 WIRELINE CASING TOOLS

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0503

(B-S)

N 541325.3505
E 1723551.3362 Grade El. 910.89

PROJECT AREA 7/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B 0505

ELEVATION _____ GWL 0 HRS 84.0

PROJECT NO. C046384.40.01

DATE 20 25 APR 2005

CLASSIFIED BY DAN SANGER

PAGE 1 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	3	S-1 REC. 0.1			LOOSE	TAN	SANDY SILT, SLIGHTLY MOIST	ML	
3.2	12	30 REC. 1.5			DENSE				
3.8	12	50/0.3 3.3 REC. 0.8		3.8	U. DENSE				DECOMPOSED SANDSTONE/SANDY SHALE
				11.6	SOFT	TAN	SANDSTONE: HIGHLY WEATHERED	BR-VBR	TOP OF ROCK: 3.8'
				6.2	V. SOFT	TAN	SANDSTONE: COMPLETELY WEATHERED	VBR	
	7.2	7.2	100%	6.2	M. SOFT TO HARD	TAN	SANDSTONE: MODERATELY WEATHERED, MICACEOUS, FINE TO MEDIUM GRAINED	BR-BL	VERTICAL FRACTURE 6.2-6.5 LOW & FRACTURES: 6.7, 7.25, 8.4, 9.8, 11.2, 11.45, 11.6
				11.6	V. SOFT	TAN	SANDSTONE: COMPLETELY WEATHERED, MICACEOUS, FINE TO MEDIUM GRAINED	VBR	
				14.0	SOFT	TAN	SANDSTONE: HIGHLY WEATHERED, MICACEOUS, FINE TO MEDIUM GRAINED	BR	LOW & FRACTURES: 14.0, 14.2, 14.3, 14.35, 14.45, 14.55, 15.75, 16.5, 17.0
	10.0	10.0	100%	36					
				18.5	V. SOFT TO SOFT	TAN	SANDSTONE: COMPLETELY WEATHERED, MICACEOUS, FINE TO MEDIUM GRAINED	VBR	
				21.0	SOFT	TAN	SANDSTONE: HIGHLY WEATHERED, MICACEOUS, FINE TO MEDIUM GRAINED	BR	LOW & FRACTURES: 21.1, 22.3, 22.45, 22.55, 22.7, 23.0, 23.1, 23.5, 23.75, 24.05, 24.55
	8.7	10.0	87%	55					STAINED 30° FRACTURE 21.9

REMARKS ** DRILLED BY TERRA TERRINO, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL BORING ADVANCED USING 5/4" SOLID STEM AUGERS, CONTINUOUS SPT, M3-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B 0505

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0505 (27)

ELEVATION _____ GWL 0 HRS 84.0

PROJECT NO. C040384.40-01

DATE 20 APR 2005 CLASSIFIED BY DAN SANGER

PAGE 2 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION					USCS OR ROCK BROKENNESS	REMARKS*
			PROFILE	SOIL DENSITY- CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10
31.0	◆			31.0	↓	↓	↓	↓	
				32.0	U. SOFT	TAN	SANDSTONE: COMPLETELY WEATHERED	UBR	
					M. HARD	BROWN	SANDSTONE: MODERATELY WEATHERED	BR-BL	
							MICACEOUS, MEDIUM GRAINED		
									70° HIGHLY STAINED
	100	10.0	100%	41					FRACTURE 34.6-35.1
				36.5	SOFT TO M. SOFT	BLUE-GRAY	SHALE	BR	VERTICAL FRACTURE 35.7-36.6
									LOW % FRACTURES: 35.1, 35.3, 35.45
				39.2	↓	↓	↓	↓	
				40.0	M. SOFT	TAN	SILTSTONE	UBR	STAINED VERT. FRAC. 39.2-40.0
41.0	◆			41.3	M. HARD	DK GRAY	SILTY SANDSTONE	BR	HIGH % STAINED FRACS:
					M. HARD	OLIVE	SANDSTONE: V. FINE GRAINED		42.0-40.3, 40.55-40.7
									LOW % STAINED FRAC 41.8
				43.7	↓	↓	↓	↓	NEAR VERTICAL STAINED
					M. SOFT TO SOFT	BLUE-GRAY	SILTY SHALE	VBR	FRACTURE 41.8-42.2
	10.0	10.0	100%	44					HIGH % STAINED FRACTURE 45.6-46.1
				47.0	↓	↓	↓	↓	
					M. SOFT	OLIVE-GRAY	SANDSTONE: FINE GRAINED, SOME CROSS BEDDING	BR	HIGH % STAINED FRACTURE 49.5-49.9, 52.1-52.9, 54.15-54.3, 55.7-55.9
51.0	◆								VERTICAL STAINED FRACTURE 51.5-52.2,
				55.4	↓	↓	↓	↓	
	10.0	10.0	100%	36	SOFT	GRAY	SANDY SHALE	VBR-	VERTICAL STAINED FRACS 55.1-56.7,
									HIGH % + VERTICAL STAINED
									FRACTURES 57.2-59.6

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0505

(27)

PROJECT AREA 273 JOHN E. AMOS POWER PLANT ST ALBANY, NY BORING NO. B-0505
 ELEVATION _____ GWL 0 HRS 84.0 PROJECT NO. C040384.40-0
 DATE 20 25 APR 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
61.0	◆			61.2	SOFT TO M-SOFT	GRAY	CLAY SHALE	BR- BL	30'S STAINED FRAC. 60.3' HIGH & STAINED FRAC-TURE AT 62'
				65.5	M-HARD	GRAY + MOTTLED	SANDSTONE	BSL	
	10.0	10.0	100%	52	66.1	SOFT	GRAY + MOTTLED CLAY SHALE	BR	HIGH STAINED FRAC. 66.5-66.7
				68.8	M-HARD	LT GRAY	SANDSTONE SHALY 67.7-68.8	BR	HIGH FRACTURE 67.7-67.9 VERTICAL FRACTURE 68.2-68.6
71.0	◆				V-SOFT	BROWN GRAY	CLAYSTONE - COMPLETELY WEATHERED	VB- BR	
				73.0	SOFT TO M-SOFT	DK GRAY TO CLAY	CLAYSTONE	BR	SLICKESIDES 73.55, 74.7, 74.8, 75.6, 75.9, 76.5, 77.0, 77.35
	10.0	10.0	100%	40	78.0	M-HARD	BROWN + GRAY SANDSTONE: FINE TO MEDIUM GRAINED	BR	VERTICAL STAINED FRACTURE 77.7-80.5
81.0	◆					BROWN		BL	
	10.0	10.0	100%	76				BR	VERTICAL STAINED FRACTURE 87.5-88.8

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0505
 ELEVATION _____ GWL 0 HRS 84.0 PROJECT NO. C04038440-01
 DATE 20-25 APR 2005 CLASSIFIED BY DAN SANGER PAGE 4 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
91.0	◆				M. HARD	BROWN	SANDSTONE (CONT)	B2-	
								BL	LOW & FRACTURES 93.8, 94.2, 95.1, 95.2, 95.6,
	10.0	10.0	100%	86		GRAY			
101.0	◆			101.5	SOFT	GRAY	SILTY SHALE	UBR	MUCH OF CORE IS PIECES 0.1-0.2'
							: BECOMES SANDY AT 104.75		LOW & FRACTURES 101.4, 102.0, 102.5, 102.9, 103.4, 104.3, 104.5, 104.75
	10.0	10.0	100%	108.7					VERTICAL FRACTURE 106.7-107.7
111.0	◆			112.2	M. HARD	GRAY	SANDSTONE: FINE GRAINED		UNBROKEN ZONE 107.0-107.7 STAINED NEAR VERTICAL FRACTURE 107.1-108.7
					SOFT TO M. SOFT	DK GRAY MAROON	CLAYSTONE	VBR	45° SLICKENSIDE 112.9-113.0
									UNBROKEN ZONE 114.2-114.8
	9.2	10.0	92%		M. SOFT	GRAY			LOW & FRACTURE 117.8, 119.6, 120.4
					SOFT	GRAY MAROON			

REMARKS ** _____

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0505
 ELEVATION _____ GWL 0 HRS 84.0 PROJECT NO. C040384.40-1
 DATE 20-25 APR 2005 CLASSIFIED BY DAN SANDER PAGE 5 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
121.0	◆				SOFT	GRAY + MAROON	CLAYSTONE (CONT) MODERATELY TO HIGHLY WEATHERED	VBR- BR	1.3M & FRACTURES 121.4, 121.7, 122.3, 122.6, 122.9, 123.1, 123.4, 123.8, 124.1
					↓				
					U. SOFT TO SOFT		: HIGHLY WEATHERED	↓	
	6.0	10.0	60%	10				VBR	124.8-132.0 HIGHLY WEATHERED ZONE
131.0	◆					GREEN-GRAY MAROON		BR	45° SLICKENSIDES 133.3, 134.2, 134.9, 136.9, 139.2-139.4
					↓				
	9.2	10.0	92%	67	M. SOFT	GRAY WITH MAROON CLASTS + STAININGS	SANDY CLAYSTONE	BR- BL	SLICKENSIDES AT 142.35, 143.9, 144.7, 145.1, 145.35, 146.25, 148.3, 148.9, 150.4, 150.65
141.0	◆								
	10.0	10.0	100%	55				VBR- BR	
					↓		: BECOMES SILTY AT 144.6		
					SOFT	MAROON			
					↓			BR	

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0505
 ELEVATION _____ GWL 0 HRS 94.0 PROJECT NO. C040384.40-01
 DATE 20-25 APR 2005 CLASSIFIED BY DAN SANGER PAGE 6 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
151.0	◆			151.5	M. HARD	GREEN-GRAY	SANDSTONE	BR	
				153.2	M. SOFT	GRAY	SANDY SHALE	BR	LOW 45° FRACTURE 153.4, 153.65
	10.0	10.0	100%	86	156.1				45° FRACTURE 154.35 - 154.5
				157.5	M. HARD	GRAY	SHALY SANDSTONE	BR-BL	LOW 45° FRACTURE 157.35
161.0	◆								
	10.0	10.0	100%	84					
				168.5	M. SOFT TO SOFT	GRAY TO DR. GRAY	CLAYSTONE	NBA-BR	CLAYSEAM 167.55-167.70 LOW 45° FRACTURES 168.75, 168.85, 169.15, 169.20, 170.7, 171.2, 171.6, 174.8, 174.95
171.0	◆			173.4	M. SOFT TO M. HARD	GRAY + MAROON	SANDY CLAYSTONE	BL	45° FRACTURE 169.75 - 170.1, 172.35, 172.7 LOW 45° SLICKENSIDES 170.4, 172.7, 171.85, 172.9, 173.1, 173.4
	9.3	10.0	93%	6.1					
				179.0	M. SOFT	MAROON	CLAYSTONE	PA-VBR	45° SLICKENSIDES 179.2, 179.4, 179.7, 179.9 - 180.0

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0505
 ELEVATION _____ GWL 0 HRS 84.0 PROJECT NO. CO40384.40-01
 DATE 20-25 APR 2005 CLASSIFIED BY DAN SANGER PAGE 7 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*	
			PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10
181.0	◆				M. SOFT	MAROON	CLAYSTONE		LOW & SLICKEN SIDES 181.9, 182.2, 183.2, 183.6, 184.0, 184.15, 184.4
				185.0	↓	↓	↓	VBR	V. BROKEN 184.4-185.0
	10.0 10.0	100%	67		M. HARD	GRAY	SANDSTONE	BL	
				190.0	↓	↓	↓		CLAY SEAM 188.7
191.0	◆			191.0	M. SOFT	MAROON	CLAYSTONE	BR	
					M. HARD	GRAY	SANDSTONE	BL	
	9.0 9.0	100%	88		↓	↓	↓	↓	
				198.1	↓	↓	↓	↓	
					M. SOFT	GRAY	SANDY CLAYSTONE	VBA-	SLICKEN SIDES 198.45, 198.9,
200.0	▲				↓	MAROON	↓	BR	199.25, 199.35, 199.6, 199.8
							BOTTOM OF BORING: 200.0'		

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 539424.9688
E 1722518.6810 Grade El. 709.52



PROJECT AREA #3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0506
ELEVATION _____ GWL 0 HRS 21.3 PROJECT NO. COY0384.45.0
DATE 21 APR 2005 CLASSIFIED BY DAN JAMER PAGE 1 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	1 2 4	S-1 REC 0.6 S-2			LOOSE	BROWN	SANDY SILT SOME ORGANICS	ml	FILL
3.0	4 5 6	REC 0.9			M-DENSE	RED BROWN	SANDY SILT MOIST	ml	
4.5	3 5 6	S-3 REC 1.5 S-4			M-DENSE	RED BROWN	CLAYEY SILT / SILTY CLAY w/ R.F.	ml/cl	
6.0	8 3 3	REC 1.5			M-DENSE	RED BROWN	CLAYEY SILT AND ROCK FRAGMENTS	ml	MOIST
7.5	4 5 6	S-5 REC 0.2 S-6			M-DENSE	RED BROWN	CLAYEY SILT AND ROCK FRAGMENTS	ml	MOIST
9.0	10 11	REC 0.6			M-DENSE	RED BROWN	CLAYEY SILT AND ROCK FRAGMENTS (DECOMPOSED CLAYSTONE)	ml	MOIST
10.5	7 12	S-7 REC 1.5 S-8							
12.0	16 18	REC 1.0			DENSE	RED BROWN	CLAYEY SILT AND ROCK FRAGMENTS (DECOMPOSED CLAYSTONE)	ml	SLIGHTLY MOIST
13.5	8 11	S-9 REC 1.5 S-10			DENSE	RED BROWN	DECOMPOSED CLAYSTONE		DRY
15.0	22 24 30	REC 1.2			V-DENSE	YELLOW CLAY	DECOMPOSED CLAYSTONE		DRY
16.5	18 25	S-11 REC 1.5 S-12			V-DENSE		DECOMPOSED CLAYSTONE		DRY
18.0	12 19 20 21 22 23 24 25 26 27 28 29 30	REC 1.5		18.0	HAND		DECOMPOSED CLAYSTONE		DRY
				19.2	SOFT TO M-SFT	MARON	CLAYSTONE	BL	LOW # FRACTURES
22.0	4.0	100%	90						19.65, 20.05, 21.6
							: SANDY 24.7-25.4		BROKEN ZONE: 22.0-22.5
							: SANDY 27.4-29.4		45° SLICKENSIDE w/ SLICKENSIDE 22.75-22.95
	9.6	10.0	96%	86					LOW # FRACTURES
									24.6, 45° SLICKENSIDE 28.3-28.55

REMARKS ** DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000 T2 TRACK MOUNTED DRILL.
BORING ADVANCED USING 5/8" SOLID STEM AUGERS, 4" I.D. STEEL CASING, CONTINUOUS SPT, NQ-2 WIRELINE CORING TOOLS
* POCKET PENETROMETER READINGS BORING NO. B-0506
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN B. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0506
 ELEVATION _____ GWL 0 HRS 21.3 PROJECT NO. C040384.40-01
 DATE 22-2 APR 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0	◆				SOFT TO M. SOFT	MARON	CLAYSTONE (CONT) : CORE SURFACE WEATHERED		LOW % FRACTURES w/ SLICKENSIDES: 32.65 33.0, 33.25, 33.75, 34.05, 35.55, 36.65, 38.4 45° FRACTURES w/ SLICKENSIDES: 36.9 37.25-37.45, 38.85- 38.95
	9.9	10.0	99%	58			: IRREGULAR CALCAREOUS CLASTS 37.5-38.7	BR	
42.0	◆								LOW % FRACTURES w/ SLICKENSIDES 42.4, 42.65, 42.95, 44.25 45.25, 45.7, 45.9, 47.75, 45° FRACTURES w/ SLICKENSIDES = 48.6, 48.8, 49.0
	10.0	10.0	100%	76					
52.0	◆				S1.0 S1.7	M. SOFT GRAY	SANDY CLAYSTONE		
						MARON	CLAYSTONE	BR	LOW % FRACTURES w/ SLICKENSIDES: 52.3, 52.4
					S4.9	HARD GRAY	SANDSTONE 54.6-54.9	BR	
					S6.5		SANDY CLAYSTONE	BL	53.5, 54.2
	10.0	10.0	100%	73					45° FRACTURES w/ SLICKENSIDES 53.55-53.75 54.45-54.6
						M. SOFT MARON	CLAYSTONE		

REMARKS ** _____

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0506

ELEVATION _____ GWL 0 HRS 2/3

PROJECT NO. C040384.40-01

DATE 22-27 APR 2005

CLASSIFIED BY DAN SANGER

PAGE 3 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				62.4	M. HARD	GRAY	SHALY SILTSTONE	BL	
62.0	◆				↓	↓	↓		
				64.1	M. HARD	LT GRAY	SANDSTONE		
					↓	↓	↓		
	10.0	10.0	100%	76	HARD				VERTICAL FRACTURE 64.7-65.7 65° FRACTURE 65.9-66.2
				71.5	M. SOFT	GRAY	SILTY SHALE	BE	
72.0	◆				↓	↓	↓		
				72.7	SOFT TO M. SOFT	GRAY	CLAYSTONE	BR-BL	LOW FRACTURE 72.6
					↓	↓	↓		
	8.0	8.0	100%	78					30° FRACTURE W/SUCKEN-SIDE 74.3
				80.0					
80.0	▲								BOTTOM OF BORING: 80.0'

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 539428.8146
E 1722523.7682 Grade El. 709.99



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANY WI BORING NO. B:0507
 ELEVATION _____ GWL 0 HRS DRY PROJECT NO. 140324.1111
 DATE 26 APR 2005 HRS _____ CLASSIFIED BY DAN SANGER PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	DESCRIPTION		USCS OR ROCK BROKENNESS	REMARKS*
								MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10	
							AUGER w/o SAMPLING TO 18 FT.			
							PIEZOMETRIC INSTALLED, T.P. AT 17 FT			
18.0				18.0			▼ BOTTOM OF BORING: 18'			

REMARKS** DRILLED BY TERRA TESTING USING A SIMCO 4000-72 TRACK MOUNTED DRILL
BORING ADVANCED USING 5/8" SOLID SHANK AUGER;

N 541996.9754
E 1723377.3436

Grade El. 979.22



PROJECT AREA ^{2/3} JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0508
ELEVATION 982± GWL 0 HRS 87.3 PROJECT NO. C040384.40-01
DATE 27-28 APR 2005 HRS CLASSIFIED BY DAN SANGER PAGE 1 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	14	S-1 REC 1.0			M. DENSE	TAN	SILT AND DECOMPOSED SHALE FRAGMENTS	M	SLIGHTLY MOIST
3.0	18	S-2 REC 1.2			V. DENSE				
4.5	37	S-3 REC 1.3							
5.2	22	S-4 REC 0.7		5.2					
5.7	5.7	100%	38	11.5	SOFT	TAN TO BROWN	CLAY SHALE - HIGHLY WEATHERED	BR	LOW & FRACTURES: 5.7, 6.25, 6.75, 6.9 7.4, 7.7, STAINED: 9.2, 9.6 RED STAINED - 65° FRACTURE: 8.4-8.6, 9.0
10.9				12.6	SOFT	TAN	FILTY SHALE	BR	10.4-10.7, 12.0-12.4
				13.7	5 FT	TAN + CLAY	SHALY SANDSTONE - WEATHERED		LOW FRACTURES 12.9, 13.5
					SOFT	TAN	SHALE - GRADES FROM SILT TO CLAY - WEATHERED		BROKEN 14.1-14.3 VERTICAL FRACTURE 14.8-15.0
	9.7	10.0	97%	16.4					LOW FRACTURES 15.6, 15.9
					SOFT	MARON	CLAYSTONE	BR-BL	16.3, 16.45, 17.0, 17.3, 18.2, 18.65, 20.6 VERTICAL FRACTURE 20.9-21.3 70° FRACTURE WITH SLICKEN SIDES AT 22.2-22.4
20.9									
	10.0	10.0	100%					BL	
								BR	

REMARKS** DRILLED BY TERRA TESTIN INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
BORING ADVANCED USING 5/4" SOLID STEM AUGERS, CONTINUOUS SPT, AND 2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0508
(25)

PROJECT AREA #3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0508
 ELEVATION 982± GWL 0 HRS 87.3 PROJECT NO. C040384-01
 DATE 27-28 APR 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.9	◆				SSFT	MAROON	CLAYSTONE	NBR	LOW & FRACTURES W/ SLICKENSIDES 31.0, 31.15, 31.3, 31.5, 32.4, 33.0, NEAR VERTICAL FRACTURE 31.8, 32.1
		91.6	100%	96%		GRAY			70° FRAC. W/ SLICKENSIDES 32.4-32.65
				38.5	↓	MAROON		↓	30° FRAC. W/ SLICKENSIDES
					M.S. FT	OLIVE-GRAY	SHALY SANDSTONE - V. FINE GRAINED	NBR	LOW & FRACTURE 35.8, 37.3, 37.5, 37.85
40.9	◆								LOW & ORANGE STAINED FRACTURE 39.0
									NEAR VERTICAL & TANGENT FRACTURE 39.4-39.7
				45.3	↓			↓	HIGH & FRACTURE 40.4
		10.0	10.0	100%	91	SOFT TO M. SOFT	BROWN-SANDY SHALE	BR	BROKEN 40.4-40.9
				46.2		M. SOFT TO M. HARD	GRAY SANDSTONE - FINE TO MED. GRAINED, MICACEOUS	BR-BL	LOW & FRACTURE 43.0
				51.0	↓			↓	
				51.9	M. SOFT	OLIVE	SANDY SHALE		
					M. SOFT TO M. HARD	OLIVE-GRAY	SANDSTONE		
				54.3					
				56.0	M. SOFT	OLIVE	SANDY SHALE		
		10.0	10.0	100%	87	MAROON & GRAY	CLAYSTONE	BR	BROKEN ZONE 55.2-55.4
									LOW & FRACTURE 56.6, 57.75
				59.7	↓			↓	

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT SR. ALBANS, WV
ELEVATION 982± GWL 0 HRS 87.3

BORING NO. B-0508
PROJECT NO. C04038440-01

DATE 27-28 APR 2005 CLASSIFIED BY DAN SANGER

PAGE 3 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.9	◆			60.8	M. SOFT	GRAY	SANDY CLAYSTONE	BL	
					SOFT	GRAY	CLAY SHALE	BR	LOW # FRACTURES 61.5
				64.2					62.2, STAINED 45° FRACTURE
	10.0	10.0	100%	65.8		GRAY + MAROON	CLAY SHALE, TRACE SAND	BL	62.6-62.8, 63.6-63.8.
					SOFT TO V. SOFT	MAROON	CLAYSTONE - WEATHERED		STAINED VERTICAL FRAC 64.2-64.3, 64.7-64.8, 65.3-65.45
70.9	◆								45° FRACTURES 72.9, 73.5
				73.5				BL	
				74.0			SANDY SHALE		
	10.0	10.0	100%	75	M. SOFT TO M. HARD	GRAY	SANDSTONE: V. FINE TO FINE GRAINED		SHALE PARTING 77.6
80.9	◆								
				82.0					
					M. HARD	GRAY	SANDSTONE: FINE TO MEDIUM GRAINED	BL	
	9.3	10.0	93%	71					
				88.1					STAINED VERTICAL FRACTURE 87.6-88.15
					SOFT	DIS GRAY	CLAYSTONE	BR	30° FRAC. 4 SICKEN SIDES 88.9

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA #3 JOHN E. AMOS POWER PLANT ST. ALBANS WV BORING NO. B-0508
 ELEVATION 982± GWL 0 HRS 87.3 PROJECT NO. CV4038440-01
 DATE 27-28 APR 2005 CLASSIFIED BY DAN SANGER PAGE 4 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*	
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10	
90.9	◆				SOFT	DK GRAY	CLAYSTONE (CONT)	BR	45° SLICKENSIDED FRACTURES 92.0-92.1, 92.55-92.65	
									BROKEN 92.9-93.2	
									30° SLICKENSIDED FRACTURES AT 93.0, 93.25, 93.6, 93.9, 94.3	
	100	100	100%	37	92.4					
					M-SOFT TO M. HARD	GRAY	SILTY FINE GRAINED SANDSTONE	BL	45° FRACTURES & SLICKENSIDES 94.05, 94.85, 95.75	
100.9	◆								NEAR VERTICAL FRAC-	
					101.1					
					101.2	SOFT	GRAY + MARLON	CLAYSTONE	UBR	TWICE 98.5-99.0
						M-SOFT	GRAY	SILTSTONE	BL	60° FRACTURES & SLICKENSIDES 101.6-101.9, INTERSECTED BY 45° SLICKENSIDE @ 104.5
					104.0					
					105.2	SOFT	MARLON + GRAY MOTTLED	CLAYSTONE	BR	VERTICAL FRACTURE (NO STAINING) 105.4-106.8
	10.0	10.0	100%	75	106.8	M. HARD	GRAY	SANDSTONE		
					108.9	M-SOFT	GRAY	SILTSTONE	BL	
						SOFT TO M-SOFT	MARLON + GRAY MOTTLED	SILTY CLAYSTONE	BR	30° SLICKENSIDE 111.3
110.9	◆									
					112.3					
						M-SOFT	GRAY	SILTSTONE		SHALE PARTING 114.3
					114.7					
	10.0	10.0	100%	92	116.0		GRAY	SANDSTONE - FINE GRAINED SILTSTONE		

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA #13, JOHN G. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0508

ELEVATION 982± GWL 0 HRS 87.3

PROJECT NO. 0040384.40-01

DATE 27-28 APR 2005

CLASSIFIED BY DAN SANGER

PAGE 5 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
120.9	◆			120.1	M. HARD	GRAY	SANDSTONE	BR	HEAVILY STAINED VERTICAL
				121.5	↓	↓	↓	↓	↓ FRACTURE 120.2-122.2
				123.4	M. SOFT	GRAY	SILTSTONE	BL	SHALE PART. NO. 122.3
					M. HARD	GRAY	SANDSTONE	BL	
	10.0	10.0	100%	125.5	↓	↓	↓	↓	
			85		M. SOFT	GRAY	ARGILLACEOUS SILTSTONE	BL	
130.9	◆								
							132.8-133.4 MARION CLAYSTONE		
							133.4-134.0 SANDY		
	10.0	10.0	100%	137.4	↓	↓	↓	↓	
			79		M. SOFT TO M. HARD	GRAY	SANDY SILTSTONE w/ THIN INTERMITTENT SANDSTONE STRINGERS	BR	NEAR VERTICAL FRACTURE (NO STAINING)
				140.0	↓	↓	↓	↓	138.1-140.0
140.9	◆			141.4	M. SOFT	GRAY	ARGILLACEOUS SILTSTONE	BR	SUCKEN SIDES 141.2
					SOFT	GRAY-MAROON-YELLOW	CLAYSTONE		LOW 7 SUCKEN SIDES
									141.8, 142.0, 143.5
									30° SUCKEN SIDES 142.3,
	10.0	10.0	100%	146.0	↓	↓	↓	↓	142.5, 142.75, 144.9, 145.6
			78	147.2	M. HARD	LT GRAY	SANDSTONE; MICELACEOUS		
							INTERBEDDED SHALY SILTSTONE AND SILTY SHALE		
				150.0	↓	↓	↓	↓	

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0508
 ELEVATION 982± GWL 0 HRS 87.3 PROJECT NO. C040384.40-01
 DATE 27-28 APRIL 2005 CLASSIFIED BY DAN SANGER PAGE 6 of 7

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
150.9	◆			150.0	M. HARD	GRAY	SANDSTONE: FINE TO MEDIUM GRAINED, MICACEOUS	BL	
	10.0	10.0	100%	100					
160.9	◆								
	10.0	10.0	100%	100					
170.9	◆								
				873.0	M. SOFT	GRAY	ARGILLACEOUS SILTSTONE	BR-BL	PARTING 173.4, 176.25
	10.0	10.0	100%	96					
				172.8	M. SOFT TO M. HARD	LT. GRAY	SHALY SANDSTONE: MICACEOUS	BL	

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 541748.6664
E 1724111.6219 Grade El. 824.40



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0509
 ELEVATION 825± GWL 0 HRS 53.4 PROJECT NO. C040384.40-01
 23 HRS 16.0 (after lock-in)
 DATE 2 APR - 02 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	2	S-1 REC 1.0			M. STIFF	TAN	SILTY CLAY MOIST	CI	* 0.75 TSF
3.0	3	S-2 REC 1.2			↓		↓	↓	* 1.5 TSF
4.5	4	S-3 REC 1.5			M. DENSE		CLAYEY SILT : DECOMPOSED	MI	DRY
6.0	13	S-4 REC 1.5			↓	TAN + GRAY	CLAYSTONE	↓	DRY
7.5	6	S-5 REC 1.5			M. DENSE		↓	↓	DRY
9.0	15	S-6 REC 1.4			↓		↓	↓	
10.5	5	S-7 REC 1.5			V. STIFF		SILTY CLAY : DECOMPOSED	CI	SLIGHTLY MOIST * 3.5 TSF
12.0	10	S-8 REC 1.5			V. STIFF		CLAYSTONE	↓	" " "
13.5	9	S-9 REC 1.5			V. STIFF		↓	↓	" " * 4.0 TSF
15.0	10	S-10 REC 1.5			↓		↓	↓	" " * 4.0 TSF
16.5	4	S-11 REC 1.5			V. STIFF		THICK ROCK FRAGMENT	↓	" " * 3.25 TSF
18.0	8	S-12 REC 1.5			M. DENSE		CLAYEY SILT : DECOMPOSED CLAYSTONE	MI	" "
19.5	3	S-13 REC 1.5			↓		↓	↓	
21.0	8	S-14 REC 1.5			STIFF		SILTY CLAY : DECOMPOSED CLAYSTONE	CI	MOIST * 1.5 TSF
22.5	5	S-15 REC 1.5			STIFF		↓	↓	MOIST * 1.75 TSF
24.0	10	S-16 REC 1.5			↓		↓	↓	MOIST * 2.25 TSF
25.5	5	S-17 REC 1.5			STIFF		↓	↓	MOIST * 2.0 TSF
25.9	10	S-18 REC 1.5			↓		↓	↓	MOIST * 1.5 TSF
	W.O.F.	S-17 REC 1.5		25.9	M. DENSE	GRAY	DECOMPOSED SANDSTONE	↓	TOP OF ROCK: 25.9
	50/24	S-18 REC 1.5		11/17	V. DENSE	GREEN-GRAY	↓	↓	
	1.1	6.1	18%	0	SO FT	BROWN	SANDSTONE - HIGHLY TO COMPLETELY WEATHERED	UBR	

REMARKS ** DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/4 SOLID STEM AUGERS, 4" I.D. STEEL CASING, NO-2 WIRELINE WRING TOOLS.

* POCKET PENETROMETER READINGS BORING NO. B-0509
 ** METHOD OF ADVANCING AND CLEANING BORING (7)

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0509
 ELEVATION 825± GWL 0 HRS 53.4 PROJECT NO. C040384.43-01
 22 HRS 16.0
 DATE 28 APR - 02 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0	◆			32.0	SOFT	MAROON	CLAYSTONE	BR-BL	
42.0	◆	71	46		M. SOFT	GREEN-GRAY	IRREGULAR CALCAREOUS CLASTS AND FRAGMENTS (TO 1/3')		LOW & FRAG. WITH SW DISCONTINUES 44.4, 44.55, 46.2, 46.45, 46.95, 47.4, 49.0
52.0	◆	98	79	49.7 50.4	M. HARD	LT GRAY	SANDSTONE		
					M. SOFT	GREEN-GRAY	CLAYSTONE		
				53.9	M. SOFT	GREEN-GRAY	SILTY TO SANDY CLAYSTONE	BR-BL	LOW & FRAG. WITH SW DISCONTINUES 54.9, 55.5, 57.2, 58.7, 59.0, 60.0
		100	85				IRREGULAR MAROON CLAYSTONE CLASTS		
							SANDY 56.7 TO 57.3		

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS WV

BORING NO. B-0509

ELEVATION 825± GWL 0 HRS 53.4

PROJECT NO. C040384.40-01

23 HRS 16.0

DATE 28 APR - 02 MAY 2005 CLASSIFIED BY DAN SANGER

PAGE 3 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	FOD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
62.0	◇						CLAYSTONE (CONT)		LOW & FRACTURES 62.2, 62.6, 62.8, 63.4, 63.7, 64.1, 64.3, 64.5, 64.9, 65.2
10.0		100%	67	66.5	M. SOFT	GRAY	INTERBEDDED SILTSTONE AND CLAYSTONE	PL	
72.0	◇								
10.0		100%	92	76.6	M. HARD	GRAY	SANDSTONE	BL	
82.0	◇			81.2	M. SOFT	DK GRAY	SILTY TO SANDY SHALE	BR	LOW & FRACTURES 81.3, 81.45, 82.7, 83.1, 83.6
				83.8	SOFT	GRAY	CLAYSTONE		LOW & FRACTURES 83.9, 84.1, 84.2, 84.7, 85.1, 85.5 HIGH FRACTURE/SPLITTING SURF 87.0-87.2
10.0		100%	77				: BECOMES SILTY @ 87.5		

REMARKS **

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0509

(7)

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT

BORING NO. B-0509

ELEVATION 825 ± GWL 0 HRS 53.4

PROJECT NO. C040384.40-01

23 HRS 16.0

DATE 28 APR - 02 MAY 2005 CLASSIFIED BY

PAGE 4 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
92.0	◆			91.0	↓	↓	↓	↓	
					M. HARD	LT GRAY	SANDSTONE	BL	
				93.6	↓	↓	↓	↓	
					SOFT TO M. HARD		CLAYSTONE	BL	
	80	80	100%	62	M. SOFT				30° FRACTURES 95.1, 95.6, 96.4, 97.3, 98.4, 98.6
				98.9	↓	↓	↓	↓	60° SLICKENSIDE 98.0-98.2
100.7	▲			100.0	M. HARD	GRAY	SILTY SHALE/SILTSTONE	BL	
							BOTTOM OF BORING 100.0		

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 540879.8326
 E 1722795.6504 Grade El. 925.74



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040324.40-01
 DATE 03-04 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	1	S-1			V. LOOSE	TAN	SANDY SILT	MI	MOIST
3.0	4	REC 1.2 S-2			M. DENSE	TAN + GRAY	CLAYEY SILT	MI	SLIGHTLY MOIST
4.5	7	REC 1.3 S-3			V. STIFF		SILTY CLAY	CI	DRY
6.0	10	REC 1.2 S-4			V. STIFF	GRAY	SILTY CLAY	CI	DRY
7.5	13	REC. S-5			HARD	GRAY	SILTY CLAY: DECOMPOSED CLAYSTONE		DRY
8.4	14	S-6 REC. 0.9		8.4	HARD	MAROON + YELLOW	DECOMPOSED CLAYSTONE		
10.7	23	100%	30	11.1 ft	SOFT	LT. BROWN	INTERBEDDED CLAY SHALE AND CLAYEY SILTSTONE: HIGHLY WEATHERED	BR	TOP OF ROCK 8.4 HEAVILY STAINED HIGH & FRACTURE 9.4, 9.7, LOW & STAINED FRACTURES 9.8, 10.4, 10.7, 11.3, 12.6, 12.75, 13.9,
	100	100%	58	14.0	M. SOFT	BROWN	SANDSTONE: WEATHERED TO ~ 15.25, MICACEOUS, FINE TO MEDIUM GRAINED	BA-BL	STAINED LOW & FRACTURES 17.0, 17.3, 18.0
20.7				20.7	M. LTRAL	GRAY			
				22.0	SOFT	GRAY	CLAYSTONE	UBR	
				23.9	M. SOFT	GRAY	SILTSTONE / SILTY SHALE	BR	STAINED HIGH & FRACTURE (60-70°)
	10.0	100%	65		SOFT	LT. GRAY	CLAYSTONE	VBR-	22.8-23.0
						OK GRAY MAROON		BR	NEAR VERTICAL PARTIALLY STAINED FRACTURE 23.3-23.9

REMARKS ** DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DILL
 BORING ADVANCED USING 5 1/4" SOLID STEM AUGERS, 4" I.D. STEEL CASING, NCR-2 WIRELINE COR. ALB. TDSI?

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. MASS POWER PLANT

ST. ALBANS WV

BORING NO. B-0510

ELEVATION _____ GWL 0 HRS 36.0

PROJECT NO. C040384-1-01

DATE 03-04 MAY 2005

CLASSIFIED BY DALSINGER

PAGE 2 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION						USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION				
1	2	3	4	5	6	7	8	9	10		
30.7	◆				SOFT		CLAYSTONE (CONT) HIGHLY WEATHERED	BR-BL			
					↓		↓	↓			
				35.0	↓		↓	↓			
	9.5	10.0	95%	60	M. SOFT → GREENISH GRAY		INTERBEDDED SILTY CLAYSTONE WITH CALCAREOUS CLASTS AND SANDY SILTSTONE	BR-BL	30° FRACTURE 36.2 60° FRACTURE 36.2-36.65		
					M. HARD						
					↓			↓			
40.7	◆				MAROON			VRB			
					↓			↓			
					GRAY			BL			
					↓			↓			
	10.0	10.0	100%	91	MAROON → GRAY MOTTLED				LOW 8 FRACTURE 45.8 46.0, 48.0, 52.5, 52.6 53.5, 55.1, 55.5, 57.85		
					↓			↓			
50.7	◆							BR			
								↓			
	10.0	10.0	100%	76					SLIGHTLY STAINED VERTICAL FRACTURE 55.75-56.1		
					↓			↓			

REMARKS **

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384.40-01
 DATE 03-04 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.7	◆				M-SFT	MAA001 GRAY	INTERBEDDED CLAYSTONE AND SILTSTONE (CONT)	BR-BL	LOW \angle FRACTURES 61.1, 61.6, 62.0, 63.2 63.5, 63.75, 63.9, 64.65, 65.0
	10.0	10.0	100%	92					
70.7	◆						SANDY SILTSTONE 73.0-75.0		
	10.0	10.0	100%	96					
80.7	◆							BR	30° SLICKENSIDES 81.3, 81.5, 81.8, 82.1, 82.7, 82.9, 83.8, 84.1
	10.0	10.0	100%	60					
				87.6	↓	↓	↓	↓	
					M. HARD	GRAY	SANDSTONE FINE TO MEDIUM GRAINED, MICACEOUS	BL	

REMARKS ** _____

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384.40-01
 DATE 03-04 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 4 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION					USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10	
90.7	◆				M. HARD	LT GRAY	SANDSTONE (CWT)	BL		
	10.0	100%	100%							
100.7	◆									
	10.0	100%	100%							
110.7	◆									
				112.0						
					M-SFT M-HARD	GRAY	INTERBEDDED SANDSTONE AND SILTSTONE, SOME THIN SHALE UNITS	BR- BL	LOW FRACTURE 112.4, 114.4, 114.55, 114.7, 119.1	
	10.0	100%	91							

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. ANDS POWER PLANT ST. ALBANS, VT BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384.40-01
 DATE 03-04 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 5 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION					USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10	
120.7	◆			121.5	SOFT TO M. SOFT	GRAY + MAROON	CLAYSTONE IRREGULAR CALCAREOUS CLASTS + STRINGERS: 122.6-124.0, 135.0-138.7	BR	LOW & FRACTURED SLICKENSIDES 122.35, 122.8, 123.35, 124.02, 124.7, 124.9, 125.4, 126.1, 127.65, 128.3, 129.1, 130.1, 130.45, 130.7, 131.5, 131.9, 132.6, 134.5, 135.3	
	10.0	10.0	100%	47						
130.7	◆								HIGH & SLICKENSIDE 133.25-133.6	
	10.0	10.0	100%	60						
140.7	◆			140.7	M. SOFT	GREEN-GRAY, MAROON, YELLOW MOTTLED	SILTY CLAYSTONE: INTERMITTENT IRREGULAR CALCAREOUS CLASTS AND STRINGERS	BR	MOST PIECES 0.2-0.4' LONG	
	10.0	10.0	100%	73						

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT

BORING NO. B-0510

ELEVATION _____ GWL 0 HRS 36.0

PROJECT NO. C040384.40-01

HRS _____

DATE 03-MAY-2005

CLASSIFIED BY DAN SANGER

PAGE 6 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK-RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
150.7	◆						SILTY CLAYSTONE (CONT)		
				153.2					
					M-HALD	LT GRAY	SANDSTONE: FINE TO MEDIUM GRAINED, M.A. CEDUS	BL	
	10.0	10.0	100%	84					1 PIECE OF CORE: 7.6'
160.7	◆								
									1 PIECE OF CORE 6.7'
	10.0	10.0	100%	100					
170.7	◆								
				175.1					
	10.0	10.0	100%	53	SOFT TO M-SFT	GRAY + MAROON	CLAYSTONE	VBR	MOST PIECES 0.2' ~30° SLICKEN SIDES
									176.0, 176.35, 177.55, 177.7, 178.1, 178.45, 178.65, 179.0, 179.35, 179.65-179.85
									60° SLICKEN SIDES 179.1-

REMARKS ** _____

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0510

(26)

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384.40-01
 DATE 03-14 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 7 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
180.7	◆			181.5			CLAYSTONE (CONT)		
					M. SOFT	GRAY	SANDY SILTSTONE	BA-BL	
					↓	↓	↓	↓	
	10.0	10.0	100%	84	185.8				
					SOFT TO M. SOFT	MARL	CLAYSTONE	BA	LOW SLICKENSIDES 187.0, 187.6, 187.8, 189.0
					↓	↓	↓	↓	
190.7	◆			190.2					
					M. HARD	LT GRAY	SILTY SANDSTONE	BL	
					↓	↓	↓	↓	
					194.0				
	10.0	10.0	100%	81	M. SOFT	GRAY + MARL	INTERBEDDED SANDY CLAYSTONE AND SILTSTONE	BR	LOW SLICKENSIDES 194.15, 196.1, 196.75, 197.15, 197.5, 197.85, 198.2,
					↓	↓	↓	↓	
					198.2				
					M. SOFT TO M. HARD	GRAY + LT GRAY	INTERBEDDED SILTSTONE AND SANDSTONE	BA-BL	
200.7	◆								
					↓	↓	↓	↓	
					203.0				
					SOFT TO M. SOFT	MARL	SILTY CLAYSTONE	BR	LOW SLICKENSIDES 204.25, 205.0, 205.25, 205.8, 206.7, 206.85, 207.25, 207.7, 207.85
	10.0	10.0	100%	70					
					↓	↓	↓	↓	
					209.7				
					↓	↓	↓	↓	

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384 (A-D)
 DATE 03-24 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 8 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
210.7	◆				M. SOFT	GRAY	SILTALY SILTSTONE, SOME SAND	BL-BR	
									VERTICAL FRACTURE (NOT STAINED) 212.75 - 214.3
	10.0	10.0	100%	79		GRAY + MAROON GRAY			
220.7	◆			221.3					
					M. SOFT TO SOFT	MAROON + GRAY	SILTY CLAYSTONE	BR-BL	
	10.0	10.0	100%	34					45° SLICKENSIDES 223.0
									BR 225.2, 226.0, 226.6
									VBR 226.8
									LOW & SLICKENSIDES 223.75, 224.25, 224.4, 224.7, 224.8, 225.0, 225.4, 225.7, 226.0, 226.1, 226.3
230.7	◆								
									226 - 233 VBR
	9.7	10.0	97%						BR PIECES 0.1 - 0.2 ✓
									SLICKENSIDES (LOW + HIGH &)
									HIGH & SLICKENSIDES 233.4
									233.9, 234.0, 236.6, 237.6, 238.3, 240.2

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0510
 ELEVATION _____ GWL 0 HRS 36.0 PROJECT NO. C040384.4301
 DATE 03-04 MAY 2005 HRS _____ CLASSIFIED BY DAN SANGER PAGE 9 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
240.7	◆				M. SOFT SOFT	MARON + GRAY + PURPLE	CLAYSTONE	VBR	PIECES ~ 0.1-0.2' w/ SUCCESSIONS
								↓	
								BR	30° SUCCESSIONS APPROX. EVERY 3-4-0.5'
	10.0	10.0	100%	56				↓	
				248.3				VBR	
					M. SOFT	MARON + GRAY	INTERBEDDED SANDY CLAYSTONE AND SILTSTONE	BR-BL	
250.7	▲							↓	
							BOTTOM OF BORING: 250.7'		

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 542140.8876
 E 1724101.7636 Grade El. 784.29



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0512
 ELEVATION 795± GWL 0 HRS 2.6 PROJECT NO. C040384.40-01
 DATE 04-05 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	1	S-1			V. LOOSE	BROWN	SILT, TRACE ORGANICS	ml	MOIST
3.0	2	REC 0.8							
3.0	2	S-2			STIFF	BROWN	SILTY CLAY	cl	MOIST * 1.5 TBF
4.5	3	REC 1.0			LOOSE	BROWN	SANDY SILT, SOME ROCK FRAGMENTS	ml	SLIGHTLY MOIST
6.0	5	S-3							
6.0	5	REC 1.3			STIFF	GRAY + BROWN	SILTY CLAY, TRACE ROCK FRAGMENTS	cl	SLIGHTLY MOIST * 1.5 TBF
7.5	1	S-4			M. STIFF	BROWN		cl	WET * 1.0 TBF
9.0	2	REC 0.8		8.0					
9.0	2	S-5			V. DENSE	MARON + GRAY	ROCK FRAGMENTS AND SANDY SILT:	gm	DRY
10.5	3	REC 1.5					DECOMPOSED CLAYSTONE	gm	DRY
12.0	13	S-6							
12.0	13	REC 1.5		12.0				gm	DRY
12.0	50/2.0	S-7			M. SOFT	GREEN-GRAY, MARON, PURPLE MOTTLED	SILTY CLAYSTONE	BR	TOP OF ROCK: 12.0'
		S-8							
		REC 0.0							
10.0	10.0	100%	40					BR	
22.0				22.15	M. HARD	LT GRAY	SILTY SANDSTONE	BL	
10.0	10.0	100%	91	28.5	M. SOFT TO M. HARD	GRAY	SILTY TO SANDY SHALE	BR-BL	

REMARKS - DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" SA STEEL CASING, HQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA ^{2/3} JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0512

ELEVATION 795± GWL 0 HRS 2.6

PROJECT NO. C040384.40-01

HRS

DATE 04-05 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 2 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY			DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0					M. SOFT TO M. HARD	GRAY	SHALE (CONT)	BA-BL	
				35.7					
	10.0	10.0	100%	95	M. SOFT TO M. HARD	GRAY	INTERBEDDED SANDY SHALE AND SILTSTONE	BL	
42.0									
				42.95					
					SOFT	DK GRAY	CLAYSTONE	BR	LOW X SLICKENSIDES 43.1, 44.15, 45.0, 45.2, 45.8
				46.0					
	10.0	10.0	100%	90	M. SOFT	GRAY	SANDY SHALE	BA-BL	
				47.6	SOFT	GRAY + MAROON	CLAYSTONE	BR	
				49.7					LOW X FRACTURE 49.0
					M. SOFT TO M. HARD	LT GRAY	SANDY SILTSTONE	BL	
52.0									
				52.25					
					M. SOFT	MAROON	CLAYSTONE	BR	LOW X SLICKENSIDES 52.55, 53.0, 53.6, 53.85, 54.4, 54.65, 55.35
				57.1					
	9.9	10.0	99%	85	M. SOFT TO M. HARD	LT GRAY	INTERBEDDED SANDY SHALE AND SILTSTONE	BL	

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0512
 ELEVATION 795± GWL 0 HRS 2.6 PROJECT NO. C040384.40-01
 DATE 04-05 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
62.0	◆				M. SOFT TO M. HARD	LT GRAY	INTERBEDDED SANDY SHALE AND SILTSTONE (LONIT) CLAYSTONE 62.7-63.2	↓ VBR	
				64.2	↓	↓	↓	↓	
				65.1	SOFT TO M. SOFT	MARON	CLAYSTONE	BR	VERTICAL FRACTURE 64.2-64.6
	10.0	10.0	100%	94	M. HARD	LT GRAY	SILTY SANDSTONE: FINE TO MEDIUM GRAINED, MICACEOUS	BL	
72.0	◆								
				73.3	↓	↓	↓	↓	
				74.5	M. SOFT	MARON + GRAY	SILTY CLAYSTONE	BR	VERTICAL FRACTURE 75.1-75.3
	10.0	10.0	100%	87	↓	↓	↓	↓	45° FRACTURE 75.65
					M. HARD	LT GRAY	SANDSTONE: MICACEOUS	BL	
82.0	◆								
				85.0	↓	↓	↓	↓	
	9.8	10.0	98%	77	M. SOFT	GRAY	SILTSTONE	BR	LOW Z FRACTURES 85.0, 86.35, 86.5, 88.0, 89.3
				89.7	↓	↓	↓	↓	

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 540555.6419
E 1725145.9412 Grade El. 948.40



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT, ST. ALBANS, WV BORING NO. B-0514
 ELEVATION _____ GWL 0 HRS 32.1 PROJECT NO. CA-10384.1.12-21
 DATE 09-10 MAY 2005 CLASSIFIED BY DANIEL SANGER PAGE 1 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	4	4	S-1		LOOSE	BROWN	SILTY SAND, SOME ROCK FRAGMENTS	SM	
3.0	4	3	S-2		↓	↓	↓	↓	
4.5	2	5	S-3		V. STIFF	MARBLE	SILTY CLAY	CI	* 3.5 TSF
6.0	4	4	S-4		↓	↓	↓	↓	* 3.0 TSF
7.5	7	7	S-5		↓	↓	↓	↓	* 3.0 TSF
9.0	7	10	S-6		↓	↓	↓	↓	
10.5	9	9	S-7		HARD		: DECOMPOSED CLAYSTONE		* > 4.5 TSF
12.0	17	13	S-8	10.5	DENSE	TAN	DECOMPOSED SANDY SHALE	GM	* > 4.5 TSF
14.2	15	15	S-9		↓	↓	↓	↓	
14.7	21	20	S-10	14.2	V. DENSE	DR BROWN	DECOMPOSED SANDSTONE FRAGMENTS	SM	
				14.7	SOFT	LT BROWN	HIGHLY WEATHERED SHALE SANDSTONE / SANDY SHALE	VA-BA	HEAVILY STAINED VERTICAL FRACTURE
					↓	↓	↓	↓	14.3-14.5, 17.5-17.7, 18.2-18.3
	7.8	7.8	100%	45			↓		STAINED 37 FRACTURE
				19.3	M. HARD	BROWN	SANDSTONE : STAINED TO ~ 22.2'		11.8, 15.5, 16.05, 16.15, 17.1, 17.6
22.0				22.8	↓	GRAY	↓	↓	
				24.2	M. SOFT	GRAY	SILTSTONE STAINED 23.85-24.25	BR	LOW & STAINED FRACTURE 24.1, 24.5
					M. SOFT TO SOFT	DK GRAY	CLAYSTONE w/ CALCAREOUS CHASTS + STRINGERS : SANDY 25.8-26.25	BR	LOW & STAINED FRACTURE 25.4, 26.6
10.0	10.0	100%	62	28.2	↓	↓	↓	↓	LOW & FRACTURE 27.0
					M. SOFT	GRAY	INTERBEDDED SANDY SHALE AND SILTSTONE	BR	27.8

REMARKS ** DRIILLED BY TORRA TESTIX USING A SIMCO 4000-TL TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 1" I.D. STEEL CASING, N2-2 WIRELINE COILING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 23 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0514
 ELEVATION _____ GWL 0 HRS 32.1 PROJECT NO. C04138410-01
 DATE 09-10 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0	◆			34.8	M. SOFT	GRAY	SHALE/SILTSTONE (CONT)	BR	LOW 3 FRACTURES 29.5, 31.0, 31.15, 32.9, 33.45, 34.5
					↓	↓	↓	↓	
	10.0	11.0	100%	52	SOFT	MAROON	CLAYSTONE	BR	~30° FRACTURES w/ SLICKENSIDES 35.8, 37.8, 39.2, 39.8, 40.7, 41.15, 41.35
42.0	◆			42.0	N			↓	
					M. SOFT TO M. HARD	GRAY	INTERBEDDED SANDY SHALE AND SILTSTONE	BR-GL	
	10.0	10.0	100%	89	↓	↓	↓	↓	
				47.0	M. HARD	LT GRAY	SANDSTONE	GL	
52.0	◆				↓	↓	↓	↓	
	10.0	10.0	100%	97	↓	↓	↓	↓	
				57.9	↓	↓	↓	↓	
				59.3	M. SOFT	GRAY	SILTY SHALES	BR	~30° FRACTURES 57.9,
					↓	DK. GRAY	CLAYSTONE, SLIGHTLY CALCARAEUS	UBA-BA	58.4

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0514
 ELEVATION _____ GWL 0 HRS 22.1 PROJECT NO. C040384.40-01
 DATE 09-13 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
62.0	◆				M. SOFT	GRAY + MAROON	CLAYSTONE (CONT)	BR	LOW # FRACTURES 59.5, 59.9, 60.4, 61.2 45° FRACTURE SLICKENSIDES 62.1-62.25 30° FRACTURES 62.6
		100	100	86	66.7	↓	↓	↓	62.7, 62.8, 63.0, 63.4
72.0	◆				M. SOFT TO GRAY M. HARD		SANDY SHALE/SILTSTONE w/ NUMEROUS IRREGULAR CALCAREOUS CLASTS AND STRINGERS	BL	63.5, 64.1, 64.4, 65.25, 65.5, 65.75, 66.1, 66.5
		100	100	92	76.0	↓	↓	↓	MAROON CLAYSTONE 71.25-71.55, 72.0-72.4 SLICKENSIDES 71.4, 72.0
82.0	◆				M. SOFT TO M. HARD	MAROON GRAY + MAROON MOTTLED	CLAYSTONE w/ NUMEROUS IRREGULAR CALCAREOUS CLASTS AND STRINGERS	BR	
		100	100	90	82.2	↓	↓	↓	SILTY SHALE w/ INTERMITTENT CALCAREOUS STRINGERS, SOME THIN (≤ 2") SANDSTONES
									VERTICAL FRACTURE 86.6-87.6

REMARKS** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0514
 ELEVATION _____ GWL 0 HRS 32.1 PROJECT NO. C040384.40-01
 DATE 09-10 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 4 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				92.65	M. HARD	LT. GRAY	SANDSTONE	BL	
92.0	◆			93.0	↓	↓	↓	↓	
					M. SOFT	GRAY	SILTY TO SANDY SHALE	BL	
	19.0	10.0	100%	95					
							CLAY SHALE 98.4-99.0	BR	LOW # FRACTURES 98.4,
								BL	98.6, 98.95
102.0	◆					MARSHY + GRAY MOTTLED			SUCKERSIDE 102.0
				104.3	↓	↓	↓	↓	111.0 (~45°)
					M. HARD	LT. GRAY	SANDSTONE	BL	
	10.0	10.0	100%	98					
112.0	◆								
	10.0	10.0	100%	73					

REMARKS ** _____

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0514
 ELEVATION _____ GWL 0 HRS 32.1 PROJECT NO. C040384.40-01
 DATE 29-10 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 5 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
122.0	◆				M. HARD	LT GRAY	SANDSTONE: MICACEOUS (CONT)	BL	
	10.0	10.0	100%	100					
132.0	◆								
	10.0	10.0	100%	100					
142.0	◆								
				143.2	↓	↓	↓	↓	
					M. SOFT	DK GRAY	CLAY SHALE	BR-BL	
									~30° FRACTURE 7/8" CLK
	8.0	8.0	100%	87					143.7, 146.3, 148.8
									LOW ANGLE FRACTURE 149.3
150.0	▲								

BOTTOM OF BORING: 150.0'

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 539572.1065
E 1723680.1660 Grade El. 933.64



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0515
 ELEVATION _____ GWL 0 HRS 42.3 PROJECT NO. C040384.40-01
 DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	13	S-1 REC 1.3 S-2			STIFF	ORANGE-BROWN	SANDY CLAY	CI	1.5 TSF
3.0	5	REC 1.3			V. STIFF	BROWN GRAY	SANDY CLAY	CI	2.5 TSF DM
4.5	7	S-3 REC 1.2			DENSE	BROWN	DECOMPOSED SANDSTONE FRAGMENTS		
5.4	16	S-4 REC. 0.9		5.4	V. DENSE	BROWN GRAY	DECOMPOSED SANDSTONE AND SANDY CLAY	RC	TOP OF ROCK 5.4
	3.6	4.9	73%	40	SOFT	BROWN	HIGHLY WEATHERED SANDSTONE	VBA-BR	
					M. SOFT TO M. HARD	BROWN GRAY	MODERATELY WEATHERED SANDSTONE	BR	
10.3				8.8	SOFT	MARBLE TAN	CLAYSTONE: HIGHLY WEATHERED	VBR	~30° FRACTURE 10.5, 11.0, 11.4, 13.9
	10.0	10.0	100%	65				BL	
				17.3	M. SOFT TO SOFT	OLIVE GRAY	CLAY SHALE: MODERATELY TO HIGHLY WEATHERED	BR	LOW STRENGTH
20.3				21.0					HEAVY WEATHERED
				22.2	M. SOFT		SILTY SHALE	BR	FRACTURE 22.2, 17.3
	16.7	10.0	100%	83	M. SOFT TO M. HARD	OLIVE GRAY	SILTY SANDSTONE: MEDIUM	BL	
						GRAY			

REMARKS ** DRILLED BY TERRA TESTING USING A SIMCO 1000-T2 TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/8" SOLID STEEL AUGERS, 4" STEEL CASING, NO. 2 WIRELINE COILING TOOLS

* POCKET PENETROMETER READINGS BORING NO. B-0515
 ** METHOD OF ADVANCING AND CLEANING BORING (24)

PROJECT RAEY²/7 JOHN E. AMOS POWER PLANT ST. ALBANS, VT

BORING NO. B-0515

ELEVATION _____ GWL 0 HRS 12.3

PROJECT NO. 2040384.11-01

HRS _____

DATE 12-1 MAY 2005

CLASSIFIED BY DAN SANDLER

PAGE 2 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.3	◆						SANDSTONE (CONT)		~65° STAINED FRACTURE
				32.1	↓	↓	↓	↓	30.6-31.0, LOST WATER
				34.3	SOFT	GRAY + MAROON	INTERBEDDED CLAY SHALE AND CLAYSTONE: HIGHLY WEATHERED	UBR	1.2W & FR. L. TAGS
							CLAYSTONE	BR	32.2, 32.5, 31.9, 33.05
	8.8	100	88%	51	20 FT	GRAY + MAROON		BR	34.0, 34.3, 35.1
40.3	◆			40.8					
				42.6	M. SOFT TO M. HARD	GRAY	SANDY SILTSTONE	BR	VERTICAL FRACTURE 41.1-42.6
					M. SFT	GRAY	CLAYSTONE w/ INTERMITTENT IRREGULAR CALCAREOUS NODULES AND STRINGERS	BR	~25-30° FRACTURE w/ SLICEN SIDES 43.15, 44.55, 45.45, 47.4, 47.75, 48.6, 49.85, 53.5
	10.0	10.0	100%	63					
						MAROON			
50.3	◆			53.7		GRAY	: BECOMES SANDY AT 50.1		
					M. SOFT	GRAY	SANDY SHALE: INTERMITTENT SMALL (≤ 2mm) CALCAREOUS NODULES	BR	
	10.0	10.0	100%	93		MAROON			
						GRAY			

REMARKS ** _____

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST ALBANS, WV BORING NO. B-0515
 ELEVATION _____ GWL 0 HRS 42.3 PROJECT NO. C040384.40-01
 DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.3	◆						SANDY SHALE (CONT)		LOW # FRACTURES 63.0, 63.4, 68.0 (SLIGHT SLICKENSIDE) 68.6 VERTICAL FRACTURE 69.1- 69.6, 70.3-70.7, 70.85-71.05, 74.8- 75.1, 76.25-77.4
		10.0	10.0	100%	86				
70.3	◆								LOW # FRACTURE 72.7, 79.4, 79.45, 80.05
		10.0	10.0	100%	80				
80.3	◆								
					83.5	↓	SOFT ORGANIC CLAYSTONE		PITTED CORE SURFACE. LOW # FRACTURES ^W /SLICKEN- SIDES 83.6, 83.95, 84.2, 84.55, 84.7, 85.0, 85.45
		9.2	10.0	92%	72	↓	M-SOFT GRAY SANDY SHALE	BR-BL	HIGH # FRACTURE ^W /SLICKEN- SIDES 86.2-86.35

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0515

ELEVATION _____ GWL 0 HRS 42.3

PROJECT NO. C040384.40-01

DATE 10-11 MAY 2005

HRS _____ CLASSIFIED BY DAN SANGER

PAGE 5 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
120.3	◆			120.5	M. SOFT	GRAY	SANDY SHALE	BR	
				122.6					
					M. SOFT TO M. HARD	LT GRAY	SHALY SANDSTONE; MICACEOUS	BR	
	10.0	10.0	100%	125.55	M. SOFT TO SOFT	GRAY + MAROON MOTTLED	CLAYSTONE	BR	45° SLICKENSIDES 126.9-127.05. PIECES ~0.2-0.4'
			64						
130.3	◆							VBL	LOW & FRACTURE EVERY 0.1-0.85'
									25-30° SLICKENSIDES 131.1, 131.25, 131.3 131.75
	10.0	10.0	100%	32		MAROON			V. BROKEN ZONE 131.75-137.1: NUMEROUS ~30° SLICKENSIDES PIECES 0.1-0.3'
				138.5					CALCAREOUS NODULES
					M. SOFT	GRAY	SHALE WITH NUMEROUS IRREGULAR CALCAREOUS NODULES AND STRINGERS	BR-BSL	137.2-138.0
140.3	◆								
	10.0	10.0	100%	9.1			SANDY 148.3-148.6, 149.35-150.15		

REMARKS ** _____

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT

BORING NO. B-0515

ELEVATION _____ GWL 0 HRS 42.3

PROJECT NO. C04038441-01

HRS _____

DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER

PAGE 6 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
150.3	◆						SHALE (CONT)		
							= SANDY 154.6 - 155.7		60° IRREGULAR
							157.0 - 160.2 (FAN		FRACTURE 155.2 - 155.5
	100	10.0	100%	88			MODULES)		
160.3	◆								
				161.0	M. SOFT	GRAY + PURPLE	CLAYSTONE	BA-	20-30° SLICKENSIDES
								UBA	161.4, 161.8, 162.2,
				164.7					163.2, 163.35, 163.65
									164.0, 164.1
	10.0	10.0	100%	77	M. SOFT	GRAY	SANDY SHALE	BA-BL	
170.3	◆								
				171.7	M. HARD	LT GRAY	SANDSTONE - MICACEOUS	BL	
				174.8	M. SOFT	GRAY	SANDY SHALE	BL	
	10.0	10.0	100%	100					

REMARKS ** _____

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT

BORING NO. B-0515

ELEVATION _____ GWL 0 HRS 42.3

PROJECT NO. C040384.40-01

DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER

PAGE 7 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY RQD (%) OR TORVANE				DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
					PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10	
180.3	⬇						SANDY SHALE (CONT)			
				184.0	SOFT TO M. SOFT	DK GRAY	CLAY STONE	VRB - BR	~30° SLICKEN SIDES EVERY 0.2-0.4'	
	10.0	10.0	100%	50		MAROON				
190.3	⬇			190.3	M. SOFT	GRAY + MAROON	SILTY TO SANDY SHALE	BL - BR	LOW # FRACTURE 194.1, 194.3, 195.0, 196.05, 196.4, 196.9, 197.6, 197.9	
	10.0	10.0	100%	82						
				197.0	SOFT TO M. SOFT	MAROON	CLAY STONE	BA - VBR	30° FRACTURE 196.15 30° SLICKEN SIDES ~ EVERY 0.4'	
200.3	⬇			200.5	M. SOFT	MAROON	SILTY SHALE	BL	GRADES INTO SILTY SHALE	
	10.0	10.0	100%	100						
				206.55	M. SOFT TO M. HARD	GRAY	SHALY SANDSTONE	BR		
					M. HARD	LT GRAY	SANDSTONE	BR		

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E: AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0515
 ELEVATION _____ GWL 0 HRS 423 PROJECT NO. C040384.4001
 DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 8 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
210.3	◆			210.3	M. SOFT	GRAY	SANDY SHALE	BR	
				212.4	M. HARD	↓	↓	↓	
				214.3	M. SOFT	MAROON	SILTY SHALE	BR	
	10.0	10.0	100%	88	M. SOFT	BROWN, MAROON, GRAY MOTTLED	CLAYSTONE	BR	25-30° SLICKENSIDES 215.0, 215.20, 215.55 216.15, 217.85, 218.15 60° SLICKENSIDE 215.3- 215.45
				218.8	↓	↓	↓	↓	
220.3	◆			220.3	M. HARD	LT GRAY	SHALY SANDSTONE	BR	
				221.5	M. SOFT	GRAY	SANDY CLAYSTONE	BR	
				223.5	↓	↓	↓	↓	30° SLICKENSIDE 123.1
	10.0	10.0	100%	90	M. SOFT	GRAY	SANDY SHALE	BR-BL	LOW # FRACTURES 125.55, 125.8
				227.7	↓	↓	↓	↓	
230.3	◆			230.3	M. SOFT TO SOFT	GRAY, OLIVE, MAROON MOTTLED	CLAYSTONE	BR	20-30° SLICKENSIDES 229.9, 231.4, 231.5 232.2, 232.4, 232.5 233.0, 233.2, 233.8 234.4, 235.6, 236.1 236.4, 237.5, 237.9, 238.9, 239.1, 239.6 239.8, 240.1
	10.0	10.0	100%	56	↓	↓	↓	↓	

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0515
 ELEVATION _____ GWL 0 HRS 42.3 PROJECT NO. C040384.40-01
 DATE 10-11 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 9 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
240.3	◆				SOFT	MARON	CLAYSTONE (CONT)	VBR	20-30 SLICKENSIDES EVERY 0.1-0.3'
	10.0	10.0	100%	○					
250.3	▲								
							BOTTOM OF BORING: 250.3'		

REMARKS** _____

N 540842.6369
 E 1724930.8565 Grade El. 864.94



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0516
 ELEVATION _____ GWL 0 HRS M/A PROJECT NO. C040384.40-01
 DATE 13 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	44	S-1			LOOSE	BROWN	SANDY SILT, FEW ROCK FRAGMENTS	m1	DRY
	7	S-2							
3.0	9 22	REC. 1.2			M-DENSE	BROWN MARL	SILTY SAND AND ROCK FRAGMENTS ;	SM-GM	DRY
3.9	24 5/8.4	S-3 REC. 0.9		3.9 FILE			DECOMPOSED CLAYSTONE		
							BRING CANCELLED AND BACK FILLED		

REMARKS ** DRILLED BY TERLA TESTING, INC USING A SIMCO 4000-T2 TRACK MOUNTED DRILL.
BORING ADVANCED USING 5/4" SOLID STEEL AUGERS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 542185.2965
 E 1725391.3276 Grade El. 945.55



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0517
 ELEVATION 948± GWL 0 HRS 18.1 PROJECT NO. CO40384.40-01
 DATE 16-17 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	3	S-1							10
1.5	3	REC. 1.5			V. STIFF	MAROON-RED	SILTY TO SANDY CLAY (DECOMPOSED CLAYSTONE)	CI	* 2.5 TSF
3.0	5	REC. 0.8			STIFF				* 1.5 TSF
4.5	6	S-3			HARD		DECOMPOSED CLAYSTONE, TRACE CALCAREOUS NODULES		24.5 TSF
6.0	19	REC. 1.2							
7.5	20	S-5							
9.0	25	REC. 1.5		8.0	V. DENSE	YELLOW GRAY	DECOMPOSED SANDY SHALE	SM	
9.9	28	REC. 0.9		9.9					
12.0	2.0	95%	81	11.1	M. SOFT	OLIVE	SANDY SHALE	BR	
				12.9	M. HARD	GRAY	SANDSTONE	BR	
					M. SOFT	OLIVE-GRAY	INTER-BEDDED SANDY SHALE AND SHALY SANDSTONE	BR-	
	10.0	10.0	100%						STAINED ~60° FRACTURE 13.45-13.6, 19.05-19.3, 19.7-19.9, 20.2-20.5
22.0									LOW & FRACTURES 14.3, 15.25, 15.4, 15.65, 16.9, 19.3, 20.1, 20.65
							SANDSTONE 22.5-23.5		STAINED V. BROKEN ZONE 19.7-19.7
				24.7					STAINED LOW & FRAC -
	9.9	10.0	99%	27.1	SOFT	MAROON	CLAYSTONE	BR-	TUNES 22.35, 23.45,
									23.9, 24.15, 24.25, 25.0
					M. SOFT TO M. HARD	OLIVE-GRAY	SHALY SANDSTONE - MICACEOUS	BA- BL	UBA 25.7-26.2

REMARKS ** DRILLED BY TERRATESTING USING A SIMCO 400D-T2 TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" STEEL CASING, HQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B0517
 ELEVATION 948± GWL 0 HRS 18.1 PROJECT NO. C040884.40-01
 DATE 16-17 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0	◆				M. HARD	GRAY	SANDSTONE (COH'G)		
									STAINED LOW & FRAC-TURES 32.3, 34.15
				36.2	SOFT	MAYWOOD	CLAYSTONE	BR	20-30° SLICKENSIDES
	10.0	10.0	100%	82					36.7, 37.4, 37.8, 38.4
				40.5				VBR	38.8, 38.95, 39.2
42.0	◆				M. MFT	GRAY	INTERBEDDED SHALE AND SANDSTONE	BR	
									44.6 CLAY SEAM
	9.6	10.0	96%	96					
				47.6	M. HARD	LT. GRAY	SANDSTONE - FINE TO MED GRAINED, MICACEOUS	BL	
52.0	◆								VERTICAL FRACTURE (NO STAINING) 53.3-54.4
				55.7					
	10.0	10.0	100%	70	M. HARD	LT. GRAY	CALCAREOUS SANDSTONE	BR	LOW # FRACTURES 55.7, 56.2, 56.7, 57.5, 58.1
					SOFT	GRAY	CLAY SHALE, SOME SILT	BR	59.25, 59.55, 59.7, 60.0, 60.25
				59.7					

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHNE AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0517

ELEVATION 948± GWL 0 HRS 18.1

PROJECT NO. C040384/0-01

DATE 16-17 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 3 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
62.0	◆				SOFT	DARK GRAY MAROON	CLAYSTONE	BR - VBR	25-35° SLICKEN SIDES ~ EVERY 0.2-0.4'
10.0	10.0	100%	67	66.7	↓	↓	↓	↓	
72.0	◆				M. HARD	GRAY	SILTSTONE w/ INTERMITTENT IRREGULAR CALCAREOUS NODULES AND STRINGERS, SOME SAND	BL	45° FRACTURE 70.35, INTERSECTING 45° FRACTURE AND 30° FRACTURE 71.6-71.9 NEAR VERTICAL FRAC - TRACE 72.9-73.4
10.0	10.0	100%	79	75.5	↓	↓	↓	↓	
					SOFT	MAROON	CLAYSTONE	BR - VBR	30° SLICKEN SIDES ~ EVERY 0.2-0.3'
					M. SOFT TO M. HARD	GRAY	SANDY SILTSTONE w/ INTERMITTENT IRREGULAR CALCAREOUS NODULES (≤ 1/2") AND STRINGERS	BA-BL	~45° FRACTURE AT LARGE CALC. NODULE AT 78.6-78.8
82.0	◆			82.0	↓	↓	↓	↓	
					SOFT TO M. SOFT	MAROON GRAY	INTERBEDDED CLAYSTONE AND SANDY SILTSTONE (WHITS ARE 0.9-1.5" IN THICKNESS) w/ INTERMITTENT IRREGULAR CALCAREOUS NODULES (1/2") AND STRINGERS	BR - BL	SLICKEN SIDES (30°) 82.25
10.0	10.0	100%	97		↓	↓	↓	↓	

REMARKS **

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT, ST-ALBANS, WV

BORING NO. B-0517

ELEVATION 948 ± GWL 0 HRS 18.1

PROJECT NO. C040384.40-01

DATE 16-17 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 4 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				90.2	M. HARD	LT GRAY	SHALY SANDSTONE - MICACEOUS	BL-	
92.0	◆								
				97.4	SOFT TO M. SOFT	GRAY MARLON	SILTY SHALE	BR	LOW X FRACTURE 98.15, 98.8, 101.0
	10.0/10.0	100%	90						
102.0	◆			101.8					LOW FRACTURE 99.1-99.4, 100.0-100.5
				103.0	M. HARD	LT GRAY	SHALY SANDSTONE		
					M. SOFT	GRAY	SILTSTONE	BL	
				106.0					
	10.0/10.0	100%	94		M. SOFT	GRAY + MARLON	INTERBEDDED SILTSTONE AND SANDY CLAYSTONE		30° SLICKESSIDE 106.8
				108.7		MARLON + BROWN + GRAY	CLAYSTONE W/ INTERMITTENT IRREGULAR CALCAREOUS NODULES (1/2") AND STRINGERS	BR	20-30° SLICKESSIDES 109.2, 109.85, 110.75, 111.2, 111.45,
112.0	◆			112.0	M. SOFT TO M. HARD	GRAY	SANDSTONE WITH SOME SHALE SEAMS TO 120.6	BL	
	10.0/10.0	100%	100						

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0517

ELEVATION 948± GWL 0 HRS 18.1

PROJECT NO. CD40384.40-01

DATE 16-17 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 5 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
122.0	◆				M. HARD	GRAY TO LT. GRAY	SANDSTONE (CONT)	BL	
		10.0	10.0	100%					
132.0	◆			132.0	M. SOFT	GRAY	SANDY SHALE	BL	
		10.0	10.0	100%					
				136.0	M. HARD	LT GRAY	SANDSTONE		
				139.0	M. SOFT	GRAY	SANDY SHALE		
				142.0	M. SOFT	LT GRAY	SILTY SANDSTONE		
142.0	◆			142.0	M. SOFT	GRAY	SANDY CLAYSTONE	BR	SLICKEN SIDES
									142.3, 143.65, 144.2,
									144.7, 145.0, 145.15,
		8.0	8.0	100%					145.75. NUMEROUS BREAKS DURING CORE EXTRACTION
				146.0	M. SOFT	GRAY	SILTSTONE	BL	CALCAREOUS FODDLES
									146.0-146.2
150.0	▲						BOTTOM OF BORING: 150'		

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 541508.473
E 1724947.2614

Grade El. 1015.78



PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT

BORING NO. B-0518

ELEVATION 1005± GWL 0 HRS 14.2, BACKFILLED

PROJECT NO. C040384.40-01

DATE 17 MAY 2005

HRS _____ CLASSIFIED BY DAN SANGER

PAGE 1 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	2 2	S-1 REC 1.4			LOOSE	BROWN	FINE TO MEDIUM SAND	SP	
3.0	8 5	REC 1.3 S-2			M. DENSE V. DENSE				
3.6	50	50% S-3 REC 0.6		3.6 					TOP OF ROCK: 3.6'
	5.0	7.2	69%	0	SOFT	YELLOW BROWN	SANDSTONE: MICACEOUS, COMPLETELY WEATHERED	VBR	AFTER THIS RUN, DROVE CASING TO 10.8'
10.8									
	9.4	10.0	94%	46					: HIGHLY WEATHERED PIECES 0.3-0.6'
									: COMPLETELY WEATHERED PIECES ≤ 0.2'
20.8									
	6.8	10.0	68%	18					

REMARKS -- DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
BORING ADVANCED USING 5/4" SOLID STEM AUGER, 4" STEEL CASING, NQ-2 WIRELINE COILING TOOLS

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0518
(29)

PROJECT AREA 2/3 DOWN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0518
 ELEVATION 1005± GWL 0 HRS 14.2 BACKFILLED PROJECT NO. 2040384.4020
 DATE 17 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.8	◆				SOFT	YELLOW-BROWN	SANDSTONE (CONT)	UBR	
							HIGHLY WEATHERED	BR	70° STAINED FRACTURE 30.8-31.3
	10.0	100	100%	39					
				36.8					
				39.0	M. SOFT	BROWN	SANDY TO SILTY SHALE	BR	30° STAINED / FRACTURES 37.6
40.8	◆				SOFT	MARBLE, PURPLE, YELLOW, GRAY	CLAYSTONE	BR	38.6, 39.0
									SLICKENSIDES: 41.05, 41.3, 41.7, 42.9, 43.5, 44.9, 45.15, 45.85, 46.5, 47.3, 47.95, 48.15, 49.25, 49.8, 50.15, 50.45, 50.8, 51.1, 51.4, 51.8, 52.2, 52.75, 53.15, 53.7, 54.2
	10.0	100	100%	64					
50.8	◆								
	9.5	100	95%	64					
								UBR	VERTICAL FRACTURE 56.4-58.7

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT, ST. ALBANS, VT BORING NO. B-0518
 ELEVATION 1005± GWL 0 HRS 14.2, BACKFILLED PROJECT NO. C040384.40-01
 DATE 17 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.8	◆				SFFT	MARON, GRAY, PURPLE YELLOW	CLAYSTONE (CONT)	BR-	
	4.2			62.8	↓		↓	VBR	
65.0	▲			65.0	M. SOFT	GRAY	SANDY SILTSTONE w/ CALcareous NODULES AND STRINGERS	BR-	
					↓	↓		BL	
							BOTTOM OF BORING: 65'11"		

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0519
 ELEVATION _____ GWL 0 HRS 3285 PROJECT NO. C040384.41-01
 DATE 17-19 MAY 2005 CLASSIFIED BY DANSANGER PAGE 1 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION					
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	S-1		5	6	7	8	9	10
1.5	3	REC. 1.2		0.7	V. LOOSE	BROWN	TOP SOIL		
3.0	6	REC. 1.3			LOOSE	BROWN	SANDY SILT	M1	
4.5	7	S-3			M. DENSE		SILT, TRACE CLAY		
6.0	10	REC. 1.2			DENSE	BROWN + GRAY	DECOMPOSED SHALE	gm	
7.4	28	S-5		7.4	V. DENSE				
	3.1	3.1	100%	10.0	SOFT	BROWN + GRAY	CLAY SHALE: COMPLETELY WEATHERED	NBR	TOP OF ROCK 7.4
12.5									NUMEROUS LOW & FRACTURES
									HIGHLY BROKEN ZONE 8.1-8.7
				13.7					
				14.7	SOFT		CLAYSTONE: COMPLETELY WEATHERED	BR	HIGH FRACTURE 13.7
	9.5	10.0	95%	15.5	M. HARD		SANDSTONE	BR	
					SOFT	MAROON WITH YELLOW MOTTLING	CLAYSTONE: HIGHLY WEATHERED	BR	30° SLICKEN SIDES 18.7, 19.4, 19.85, 23.0, 23.3, 23.6, 23.9, 24.05
20.5					SOFT TO M. SOFT		: SOME CALCAREOUS NODULES		
					M. SOFT	GRAY			45° FRACTURES 22.2
	10.0	10.0	100%	60		GRAY w/ MAROON MOTTLING	: PIECES 0.2-0.4' LONG		STAINED 20-30° FRACTURES 24.7, 25.2, 25.8, 26.0

REMARKS ** DRILLED BY TERAA TESTING USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
 BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" STEEL CASING, NQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AAEA 2/3 JOHN E. AMOS POWER PLANT ST ALBANS, WV

BORING NO. B-0519

ELEVATION _____ GWL 0 HRS _____

PROJECT NO. C040384.43-01

HRS _____

DATE 17-19 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 2 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.5	◆			31.4			CLAYSTONE (CONT)	VBR	
					M. SOFT	OLIVE-GRAY	SANDY SILTSTONE	BR	STAINED LOW & FRACTURE 32.2, 33.0, 33.3
				33.2	↓	↓	↓	↓	34.3, 34.8, 35.1, 35.45
					S. FT TO	GRAY	CLAY SHALE		
				35.1	M. SOFT	↓	↓	↓	
	10.0	10.0	100%	58	36.4	M. SOFT	OLIVE-GRAY	SANDY SILTSTONE	
					SOFT TO	MAROON + GRAY	CLAYSTONE	BR-BL	
					M. SOFT	↓	↓	↓	
40.5	◆			41.5	↓	↓	↓	↓	20° SLICKENSIDES, 40.5
					M. HARD	GRAY	SANDSTONE: MICACEOUS	BR-BL	70° SLICKENSIDE 41.0-41.3
				43.8	↓	↓	↓	↓	NEAR VERTICAL FRACTURE
					M. SOFT	GRAY	SHALY SILTSTONE, SOME SAND	BR	42.85 - 43.8
	10.0	10.0	100%	71	47.4	↓	↓	↓	
					M. SOFT	GRAY	SILTY CLAYSTONE	BR	
					↓	MAROON + DK GRAY	↓	↓	20-30° SLICKENSIDES
50.5	◆								48.65, 49.6, 50.3, 50.8, 52.9, 53.2, 53.5, 54.2, 54.8, 55.3, 55.6, 55.8, 56.0, 56.6, 57.0, 57.4, 57.8, 58.1, 58.4, 59.2
	10.0	10.0	100%	53					

REMARKS ** _____

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0519

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST ALBANS, WV

BORING NO. B-0519

ELEVATION _____ GWL 0 HRS 32.85

PROJECT NO. C040384.43-01

DATE 17-19 MAY 2005

HRS _____ CLASSIFIED BY DAN SANGER

PAGE 3 of 5

1 DEPTH (FT.)	2 BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	3 SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	4 RQD (%) OR TORVANE	5 PROFILE	6 DESCRIPTION			9 USCS OR ROCK BROKENNESS	10 REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	7 COLOR	8 MATERIAL CLASSIFICATION		
60.5	◇				SOFT to M. SOFT	MAROON	CLAYSTONE (CONT)	BR ↓ VBR BR ↓ VBR	20°-30° SLICKENSIDES EVERY ~ 0.2-0.5'
	8.7	10.0	87%	41					
70.5	◇							BR ↓ BR-BL	30° SLICKENSIDES 70.9, 71.7 VERTICAL FRACTURE 70.5-70.8, 71.9-72.1
	10.0	10.0	100%	78	M. SOFT M. HARD		GRAY SANDSTONE; U.FINE GRAINED, ARGILLACEOUS, SOME CROSS BEDDING, FEW IRREGULAR CALCAREOUS NODULES		VERTICAL FRACTURE 78.5-78.8, 80.0-80.5
80.5	◇								
	10.0	10.0	100%	95				↓	CLOSED VERTICAL FRACTURE 84.3-85.3
				86.2	M. SOFT	MAROON + GRAY	SANDY CLAYSTONE	BR	30° SLICKENSIDES 88.5, 89.15
				89.6	M. SOFT to HARD	LT GRAY	SANDY SANDSTONE	BR	

REMARKS ** _____

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0519

ELEVATION _____ GWL 0 HRS 32.85

PROJECT NO. C040384.40-01

DATE 17-19 MAY 2005 CLASSIFIED BY DAN SANGER

PAGE 4 of 5

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
90.5	◆				M. SOFT TO M. HARD	LT GRAY	SHALY SANDSTONE (CONT)	BR	10-20° FRACTURES
				94.0	↓	↓	↓	↓	91.1, 91.55, 92.0, 92.4, 92.6, 93.1,
	10.0	10.0	100%	50	M. SOFT	GRAY + MAROON MOTTLED	SANDY CLAYSTONE	BR	VERTICAL FRACTURE
				95.8	↓	↓	↓	↓	92.6 - 93.1, 94.3-94.6
					M. SOFT TO SOFT	MAROON	CLAYSTONE	BR-VBR	20-30° SLICKENSIDES EVERY ~ 0.1-0.3'
100.5	◆				↓	↓	↓	↓	100.5-102.7 VERY BROKEN ZONE, HEAVILY STAINED 100.5-101.7
				104.5	↓	GRAY	↓	↓	
	10.0	10.0	100%	58	M. SOFT TO M. HARD	LT GRAY	SITELY SANDSTONE	BR-BL	
					↓	↓	↓	↓	
110.5	◆				M. HARD	LT GRAY	SANDSTONE; MICACEOUS	BL	110.5-114.7 - 1 PIECE
				114.7	↓	↓	↓	↓	
	10.0	10.0	100%	77	M. SOFT	GRAY	SANDY SHALE	BL	VERTICAL FRACTURE
				117.5	↓	↓	↓	↓	115.25 - 115.75
					M. SOFT	GRAY + MAROON MOTTLED	CLAYSTONE	BR	20-30° SLICKENSIDES EVERY ~ 0.3-0.5'
					↓	↓	↓	↓	

REMARKS **

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 7/3 JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0520
 ELEVATION _____ GWL 0 HRS 18.6 PROJECT NO. C040387.40-01
 DATE 23 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	3	S-1			STIFF	maroon	SANDY CLAY AND ROCK FRAGMENTS	cl	* 2.0 TSP
3.0	4	REC. 1.5							* 2.5 TSP
4.5	5	S-3							* 2.0 TSP
6.0	6	REC. 1.5			M. DENSE	BROWN + BLACK	CLAYEY SILT AND ORGANICS	mi	WET
7.5	8	S-5		7.6					
7.6	33	REC. 1.5		7.6	V. DENSE	GRAY + MAROON	DECOMPOSED CLAYSTONE	gm	TOP OF ROCK: 7.6'
	4.4	100%	12		SOFT	maroon	CLAYSTONE: HIGHLY WEATHERED	VBR-BR	MOST PIECES 0.2
12.0				12.0			: GRAY 10.9 - 11.2		
				13.7	SOFT	GRAY	SANDY SHALE: WEATHERED	VBR-BR	
					SOFT	maroon	CLAYSTONE	BR	VERTICAL FRACTURE
									16.6 - 17.4
	9.3	10.0	93%	SI		GRAY	: CALcareous NODULES 16.0-16.5 : SANDY 16.5-17.1		
						maroon			20° SLICKEN SIDE 19.75
22.0									
	9.2	10.0	92%	BS					30° SLICKEN SIDE 26.4 27.7, 28.7, 29.25, 29.8

REMARKS ** DRILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRILL BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 1" STEEL CASING, NQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0520

ELEVATION _____ GWL 0 HRS 18.6

PROJECT NO. C040384.40-01

DATE 23 MAY 2005

HRS _____ CLASSIFIED BY DAN SANGER

PAGE 2 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
32.0	◆				SOFT	MARON	CLAYSTONE (CONT)	BR	
					↓	↓	↓	↓	
				35.5	↓	↓	↓	↓	
	9.9	10.0	99%	47	M. HARD	LT. GRAY	SHALY SANDSTONE / SANDY SHALE	BL	
				37.2	M. SOFT	MARON	CLAYSTONE	BR	
					↓	↓	↓	↓	
				40.2	↓	↓	↓	↓	
42.0	◆				M. HARD	LT. GRAY	SHALY SANDSTONE / SANDY SHALE	BR	VERTICAL FRACTURE
				41.7	↓	↓	↓	↓	40.4-41.0, 42.0-42.3
					M. SOFT	MARON	INTERBEDDED SANDY CLAYSTONE	BR-BL	
					M. HARD	GRAY	AND SANDY SHALE, FEW THIN (50.5') SANDSTONE UNITS, FEW IRREGULAR CALCAREOUS NODULES AND STRINGERS		
	10.0	10.0	100%	85					
					↓	↓	↓	↓	
52.0	◆				M. HARD	LT. GRAY	SILTY SANDSTONE	BL	
				52.1	↓	↓	↓	↓	
				54.4	M. SOFT	MARON + GREEN GRAY	CLAYSTONE w/ NUMEROUS IRREGULAR CALCAREOUS NODULES AND STRINGERS	RL-BR	SLICKENSIDES 56.1, 56.5, 56.7, 57.0, 60.7, 61.0, 61.3
	10.0	10.0	100%	81					
					↓	↓	↓	↓	

REMARKS ** _____

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0520

ELEVATION _____ GWL 0 HRS 18.6

PROJECT NO. C040384.40-01

HRS _____

DATE 23 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 3 of 4

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
62.0	◆				M. SOFT	MAKOOH GRAY	CLAYSTONE (CONT)	BR	
					↓	↓	↓	↓	
				66.2	↓	↓	↓	↓	
	10.0	10.0	100 1/2	75	M. SOFT	GRAY	SANDY CLAYSTONE, FEW SANDY SILTSTONE SEAMS	BR	
					↓	↓	↓	↓	
72.0	◆				↓	↓	↓	↓	
				73.6	↓	↓	↓	↓	
					M. SOFT	GRAY	INTERBEDDED SILTSTONE AND FINE GRAINED SANDSTONE	BA-BL	
					↓	↓	↓	↓	
	10.0	10.0	100 1/2	96	↓	↓	↓	↓	
					↓	↓	↓	↓	
82.0	◆				M. HARD	LT. GRAY	SANDSTONE	BL	
					↓	↓	↓	↓	
					↓	↓	↓	↓	
	9.9	10.0	99 1/2	100	↓	↓	↓	↓	
					↓	↓	↓	↓	

REMARKS ** _____

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0521
 ELEVATION ~1003 GWL 0 HRS 24.6 PROJECT NO. C040384.40-01
 DATE 23 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	3	S-1			V. STIFF	MAROON	SILTY CLAY/CLAYEY SILT	U/M	< 3.0 TSF
3.0	6	S-2			DENSE	BROWN-GRAY	SANDY SILT, FEW SHALE FRAGMENTS	M	
3.4	7	S-2		3.4	V. DENSE	OLIVE	RECOMPACTED SANDY SHALE		
	24	S-2		12/11/11	SOFT	BROWN	SILTY SHALE, SOME SAND	BR	STAINED VERTICAL FRACTURE 4.5-5.1, 6.1-6.7
	7.0	100%	40						LOW % STAINED FRACTURES 4.0, 5.1, 5.5, 6.1, 8.0, 8.5, 9.55
10.4				10.3	M-SOFT	BROWN-GRAY	SANDY SHALE	UBR-	PIECES 0.1-0.4'
				13.3	M-HARD	BROWN-GRAY	SANDSTONE - MEDIUM GRAINED	BL	
	10.0	100%	78						
20.4									
	10.0	100%	92						LOW % FRACTURES 28.2, 28.45, 28.85, 29.35, 29.85, 30.15, 30.3
									VERTICAL STAINED FRACTURE 29.3-29.7

REMARKS ** DRIILLED BY TERRA TESTING, INC. USING A SIMCO 4000-T2 TRACK MOUNTED DRIILL

BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" STEEL CASING, NR-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV

BORING NO. B-0521

ELEVATION 1003± GWL 0 HRS 24.6

PROJECT NO. C040384.40-01

DATE 23 MAY 2005 CLASSIFIED BY DAN JANIGER

PAGE 2 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.4	◆				M. HARD	BROWN-GRAY	SANDSTONE : MEDIUM GRAINED MICACEOUS (CONT)	BL	
									ALL BREAKS ARE MECHANICAL - CORE IN 4' AND 6' PIECES - BRAKE DURING HANDLING
	10.0	10.0	100%	100					
40.4	◆								
	10.0	10.0	100%	100					
50.4	◆								
	9.7	10.0	97%	94					
									0.05' CARBONACEOUS SHALE AT 59.8

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 7/3, JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0521
 ELEVATION 1003 ± GWL 0 HRS 24.6 PROJECT NO. C040384.40-01
 DATE 23 MAY 2005 CLASSIFIED BY DAN JANGER PAGE 3 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.4	◆				M-HARD	DRY GRAY	SANDSTONE (COPT)	BL	
				64.0	↓	↓	↓	↓	
	9.6	10.0	96%	58	M-SOFT	LT GRAY	SANDY CLAYSTONE w/ CALCAREOUS NODULES	BR	
				66.5		GRAY	SILTY CLAYSTONE		
						MAROON	CLAYSTONE		30° SLICES AT 66.75, 67.6, 68.0, 68.25, 68.4, 68.6, 69.1, 69.45, 69.7, 70.3, 70.4
70.4	▲			70.4	↓	↓	↓	↓	
							BOTTOM OF BORING : 70.4'		

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

N 543873.4417
E 1722326.4148 Grade El. 901.64



PROJECT AREA 2/3 JOHN E. AMOS POWER-PLANT ST. ALBANS, WV BORING NO. B-0522
ELEVATION 902± GWL 0 HRS 56.8 PROJECT NO. C040384.4/0-01
DATE 24-25 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	2	S-1			V-STIFF	MAROON	SILTY CLAY	CI	* 3.5 TSF
3.0	5	REC. 0.6 S-2		3.4	↓	↓	↓	↓	
4.2	18 38	S-3 REC 1.0		4.2	V-DENSE	OLIVE-GRAY	DECOMPOSED SANDY SHALE		
				11.1	SOFT TO M-SOFT	OLIVE + GRAY	INTERBEDDED SANDY SHALE AND SHALY SANDSTONE	BR	TOP OF ROCK: 4.2' LOW & FRACTURES 11.7, 5.1, 6.1, 6.85, 6.95, 7.35 STAINED 30° FRACTURE 8.4 VERTICAL STAINED FRACTURE 8.85-9.2 STAINED LOW & FRACTURES 10.8, 11.6, 12.55, 12.65, 14.7, 14.9, 15.2, 15.3, 15.9, 16.05, 16.45, 16.5, EVERY 0.1 TO 0.3' 16.5-
	6.3	100%	63						
10.5									
	10.0	10.0	100%	36				VBR	
								BR	
20.5				20.0	SOFT TO V-SOFT	MAROON GRAY	CLAYSTONE	BR	
								BL	
	8.8	10.0	88%	46				UVR-BR	
				27.0	M-HARD	GRAY	SHALY SANDSTONE	BR	STAINED VERTICAL FRACTURE 27.0-28.0
									30.7-30.9

REMARKS ** DRIILLED BY TERRA TESTING, INC USING A SIMCO 4000-T2 TRACK MOUNTED DRILL
BORING ADVANCED USING 5/4" SOLID STEM AUGERS, 4" STEEL CASING, NQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0522
(1.0)

PROJECT AREA 2/3, JOHN E. AMST POWER PLANT ST. ALBANS, VT BORING NO. B-0522
 ELEVATION 902 ± GWL 0 HRS 56.8 PROJECT NO. C040384-400
 DATE 24-25 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 2 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
30.5	◆			31.1	V. SOFT	MAROON	CLAYSTONE	VR	NO RECOVERY IN THIS UNIT
	3.6	10.0	36%	24					
				37.5	M. SOFT	OLIVE + GRAY	INTERLEAVED CLAYSTONE AND SANDY SHALE	BR	LOW & FRACTURES
									41.45, 41.7, 41.9, 43.7, 43.8, 46.8, 48.4, 49.4, 50.0, 50.9, 51.1, 51.4, 52.2
40.5	◆								STAINED HIGH & FRACTURES 45.5-46.5
									47.4-47.9, 48.7-48.95
	10.0	10.0	100%	56					
				52.3	M. SOFT	OLIVE-GRAY	SANDY SHALE	BR	LOW & FRACTURES 52.7, 53.9, 54.3, 54.65, 55.1, 56.4, 57.45, 59.3
									STAINED LOW & FRACTURES 53.45, 55.75-55.9, 56.5, 57.1, 58.9 60.0
50.5	◆			57.9	SOFT TO M. SOFT	MAROON + GRAY	CLAYSTONE	BR-	HIGH & STAINED FRACTURE
									58.7-59.3

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT ST. ALBANS, VT BORING NO. B-0522
 ELEVATION 902± GWL 0 HRS 56.8 PROJECT NO. C040384.4J-U1
 DATE 24 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 3 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
60.5	◇			60.7					
					M. SOFT	GRAY	SANDY SHALE	BR	STAINED LOW% FRAC-
				63.0	↓	↓	↓		TUNES 60.75, 61.0,
				64.0	M. SOFT	MAROON	CLAYSTONE		61.5, 61.9
	10.0	100%	36		M. SOFT	GRAY	SILTY SANDSTONE / SANDY SHALE		HEAVILY STAINED NEAR
									VERTICAL FRACTURE 65.35-67.8
									± 67' 100% WATER LOSS *
									STAINED VERTICAL FRACTURE
									TUNES 68.1-68.7, 69.2-
70.5	◇			70.4				VBR	70.3
						MAROON + GRAY	CLAYSTONE	BR	
									VERTICAL FRACTURE
									74.6-76.5
	10.0	100%	61					VBR	
								BR	
							SANDY 78.5-80.5	BR	
80.5	◇								LOW% FRACTURE 80.8
									81.2, 83.1, 83.7, 84.5
								VBR	U. BLOCKED ZONE 81.3-83.1
						DK GRAY			
	10.0	100%	57	86.1				BR	HIGH% FRACTURE 84.2-
									84.45
					M. SOFT	GRAY	SILTSTONE	BR	LOW% FRACTURE 87.1, 87.65
									88.3,
									NEAR VERTICAL INTER-
									FRACTURE 88.5-89.2

REMARKS **

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0522

ELEVATION 902± GWL 0 HRS 56.8

PROJECT NO. C040384.40-01

DATE 24-25 MAY 2005 CLASSIFIED BY DAN SANGER

PAGE 4 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
90.5	◆			90.0	M. HARD	LT GRAY	SHALY SANDSTONE MICACEOUS	BL	
	10.0	10.0	100%	93					
100.5	◆								
	10.0	10.0	100%	95			SHALE 107.0 - 107.6 (BA)		
							SHALE PEBBLES/CHIPS 108.6 - 109.8		
110.5	◆								
	10.0	10.0	100%	95					

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3 JOHN E. AMOS POWER PLANT ST. ALBANS, WV BORING NO. B-0522
 ELEVATION 902± GWL 0 HRS 56.8 PROJECT NO. 040384.43-01
 DATE 24-25 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 6 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USGS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
150.5	◆			150.8			SANDSTONE (CONT)		
					S>FT	MAROON, GRAY, PURPLE, YELLOW	CLAYSTONE, SOME SAND	BR	
				154.5	↓	↓	↓	↓	30° SLICKENSIDES 153.05, 153.6, 154.0
	10.0	10.0	100%	75	M. SOFT TO M. HARD	GRAY TO LT. GRAY	INTERBEDDED SANDY SHALE AND SANDSTONE	BL	
160.5	◆								
	10.0	10.0	100%	100					
170.5	◆								
				173.0	↓	↓	↓	↓	
				174.7	S>FT	GRAY	CLAY SHALE	BR	
	10.0	10.0	100%	72	S>FT	DK GRAY + MAROON	SILTY TO SANDY CLAYSTONE	BR	20-30° SLICKENSIDES
							IRREGULAR CALCAREOUS SPANGERS		175.0, 175.4, 175.55, 176.1, 176.6, 177.35, 177.65, 177.75, 178.35, 179.15, 179.4,
									179.4-180.0

REMARKS ** _____

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

PROJECT AREA 2/3, JOHN E. AMOS POWER PLANT, ST ALBERT, WV BORING NO. B-0522
 ELEVATION 1021 GWL 0 HRS 56.8 PROJECT NO. 043224301
 DATE 24-25 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 7 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
180.5	◆			180.0	M. SOFT	GRAY	SILTY SILTSTONE	BL	
				183.0	M. SOFT TO SOFT	MAROON + GRAY	CLAYSTONE	BL- BR	30° SLICKENSIDES AT 185.1, 185.3, 185.5, 186.4, 186.7, 187.0, 187.2, 187.55, 188.1
	10.0	10.0	100%	78					
				188.6					
190.5	◆				SOFT TO M. SOFT	MAROON + GRAY	INTERBEDDED CLAYSTONE AND SANDY SHALE, SOME SANDSTONE,	BL	
	10.0	10.0	100%	90					
				200.5					
200.5	◆				M. SOFT	MAROON + GRAY	CLAYSTONE	BA-BL	20-30° SLICKENSIDES 202.3, 202.65, 202.9, 203.2, 203.45, 203.7
	10.0	10.0	100%	86					
				206.5	M. HARD	GRAY	SANDY SILTSTONE	BL	
				209.7					

REMARKS **

PROJECT AREA #3, JOHN E. AMOS POWER PLANT, ST. ALBANS, WV

BORING NO. B-0522

ELEVATION 902 ± GWL 0 HRS 56.8

PROJECT NO. C04038440-01

DATE 24-25 MAY 2005

HRS _____ CLASSIFIED BY DAN SANGER

PAGE 8 of 9

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	DESCRIPTION			USCS OR ROCK BROKENNESS	REMARKS*
					SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
210.5	◆				M. HARD	LT. GRAY	SANDSTONE: FINE TO MEDIUM GRAINED, MICACEOUS	BL	
		10.0	10.0	100%					
220.5	◆			220.0	M. SOFT TO SOFT	MAROON, GRAY, PURPLE, GREEN-GRAY	CLAYSTONE: SILTY 220-225'	BR	
		10.0	10.0						225-250.5 - CORE PIECES 0.2-0.4' w/ 20-30° SLICKEN SIDES
							CALCAREOUS NOBULES 227.5-235.5'		
230.5	◆								
		10.0	10.0	100%					

REMARKS ** _____

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 542742.2422
 E 1722248.6749 Grade El. 696.90



PROJECT AREA 23, JOHN E. AMOS POWER PLANT, STALBANS, WV BORING NO. B-0523
 ELEVATION _____ GWL 0 HRS 220 PROJECT NO. COM384.40-01
 DATE 24 MAY 2005 CLASSIFIED BY DAN SANGER PAGE 1 of 2

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
1.5	1	S-1 REC 0.7		2.0	V. LOOSE	Brown	SILT, SOME CLAY	ml	
3.0	4	S-2 REC 1.2			↓	↓	↓		
4.5	4	S-3 REC 0.6			↓	↓	CLAYEY SILT AND ROCK FRAGMENTS		
6.0	4	S-4 REC 0.5		6.0	↓	↓	↓		
7.5	4	S-5 REC 0.3			STIFF	Brown GRAY MAADON	CLAYEY SILT / SILTY CLAY AND ROCK FRAGMENTS	ml-cl	MOIST x 2.0 TSF
9.0	8	S-6 REC 1.5			V. STIFF	↓	SILTY CLAY - DECOMPOSED CLAYSTONE		* 3.0 TSF
10.5	5	S-7 REC 1.1			↓	↓	↓		
12.0	10	S-8 REC 0.6		12.0	HARD	↓	↓		* > 4.5 TSF
13.5	10	S-9 REC 1.3			V. DENSE	MAADON + GRAY + YELLOW	DECOMPOSED CLAYSTONE	gm-gc	
15.0	23	S-10 REC 0.9			↓	↓	↓		
16.5	17	S-11 REC 0.8			↓	↓	↓		
17.9	20	S-12 REC 0.4		17.9	↓	↓	↓		TOP OF ROCK: 17.9'
	34	S-13 REC 4.1	4!!		SOFT	MAADON + BROWN + GRAY	CLAYSTONE: HIGHLY WEATHERED	BR-BL	LOW & FRACTURE 19.5, 20.3, 20.5 21.0, 21.2 45° SLICEPSIDE 20.5-20.65
22.0	10.0	100% 88							LOW & FRACTURES 23.6, 24.55, 24.85 26.4, 27.9, 29.1 30.3, 30.6, 31.2

REMARKS - DRILLED BY TERRA TESTING INC USING A SIMCO 4000-T2 TRACK MOUNTED DRILL BORING ADVANCED USING 5/8" SOLID STEM AUGERS, 4" STEEL CASING, NQ-2 WIRELINE CORING TOOLS

* POCKET PENETROMETER READINGS
 ** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0523

PROJECT AREA 2/3 JOHN E. AMIS POWER PLANT, ST. ALBANS, VT

BORING NO. B-0523

ELEVATION 69.6± GWL 0 HRS 22.0

PROJECT NO. C050384 43-0

DATE 24 MAY 2005

CLASSIFIED BY DAN SANGER

PAGE 2 of 2

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION					USCS OR ROCK BROKENNESS	REMARKS*
			PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION			
1	2	3	4	5	6	7	8	9	10
32.0	◆				SOFT TO M-SOFT	MARL + GRAY	CLAYSTONE (CONT)	BR	
				34.7	↓	↓	↓		LOW & FRACTURES 34.0, 34.5, 34.7
	19.0 19.0	100%	65	36.5	M-SOFT	GRAY	SHALY SANDSTONE	↓	
				32.5	SOFT	MARL	CLAYSTONE	BR	LOW & FRACTURES 37.05, 37.9, 38.1
				40.3	M-SOFT TO M-HARD	GRAY	SHALY SANDSTONE	BR	
42.0	◆				SOFT	MARL + GRAY	CLAYSTONE	BR	LOW & FRACTURES 40.5, 40.6, 40.8, 40.9, 41.1, 42.4, 43.3, 43.45, 43.7
	8.0 8.0	100%	73						30 SUCKENSINES 42.75, 43.9, 44.2, 44.4, 44.7, 44.85, 45.0, 45.75, 48.0, 49.4
50.0	▲								VERTICAL FRAC. 49.0-48.5
							BOTTOM OF BORING: 50.0'		

REMARKS **

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 539371.31
E 1753962.87

Grade El. 709.57 Top of PVC Riser El. 711.47



PROJECT Area 2/3 John E. Amos Power Plant

BORING NO. 0536 (mw-1)

ELEVATION _____ GWL 0 HRS Dry

PROJECT NO. 040384.40.01

DATE 7-12-05 24 HRS 13.8

CLASSIFIED BY TR Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				8.0		Red BR	Clayey Silt and Rock Fragments - Trace Sand		Start 1:35 moist
				10.0		BR	Sand and Rock Fragments		Damp RF > 2" φ
				11.0		Red BR	Clayey Silt and Rock Fragments		Moist RF < 2" φ
				19.0		Red	Decomposed Claystone		Damp. Dry @ 14'
							Bottom @ 19.0'		Finish 2:00
							Installation		Material
							Sand 19.0' to 18.0'		10' Screen, cap
							10' Screen 18.0' to 8.0'		9 Bags Sand
							Sand 18.0' to 6.0'		1 3/4 Bucket Pellets
							Bentonite Pellets 6.0' to 3.0'		10 Bags Concrete Mix
							Water added to pellets		1 6" x 5' Steel Casing
							1.9' Stack up PVC		
							2.3' Stack up Steel Casing		

REMARKS** 4 1/4" ID Hollow Stem Augers to 19.0', 4000-T2 Simco Track Drill
Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0536 (mw-1)

PROJECT Area 2/3 John E Amos Power Plant

BORING NO. 0535 (MW-2)

ELEVATION _____ GWL 0 HRS 40.1'

PROJECT NO. C040384.40.01

DATE 7-12-05 24 HRS 38.2'

CLASSIFIED BY T.R. Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						Red	Clayey Silt and Rock		Moist, start 8:45
						BRN	Fragments - trace sand		RF 72" φ
				10.0		↓	↓		
						Red	Decomposed Claystone		Dry
				18.0		↓	↓		TOR 18.0'
				20.0		Red	weathered Claystone		Auger to 20.0'
						BRN	Fine Grain Sandstone w/		
				23.0		Red	Interbedded claystone		
						Hard Gray	Interbedded sandstone &		
						↓	Siltstone - few thin Red		
				30.0		↓	Claystone Seams		
						Red	Claystone		Few sec. of moist
				34.2		↓	↓		cuttings @ 42.0'
						Gray	Siltstone/shale		with some @ 42.0'
				39.0		↓	↓		is one of water
				60.0		Red	Claystone		Moist cuttings back
						Gray	Siltstone		@ 62 wait 15 min
				62.5		↓	↓		water in hole
							Bottom @ 62.5'		End 10:35 AM
							Installation		Materials
							Sand 62.5 to 62.0'		20' 2" φ PVC Screen
							Screen 62.0' to 42.0'		4 Bags Sand
							Sand 62.0' to 37.0'		1/4 Bucket Pellets
							Bentonite Pellets 37.0 - 34.0		4 Bags Volclay grout
							Pellets into water		10 Bag Concrete Mix
							Volclay to 4.0'		
							Concrete 4.0 to 0.0', 6' φ Red		
							Steel Casing 2.1' stickup		

REMARKS * 4 1/4" ID Hollow Stem Augers to 20', 4" φ Air Rotary to 62.5'
Since 4000-T2 Track Drill, Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

N 541672.50
E 1755563.50

Grade El. 823.00 Top of PVC Riser El. 825.00



PROJECT Area 2/3 John E Amos Power plant

BORING NO. 0527 (MW-3)

ELEVATION _____ GWL 0 HRS Dry

PROJECT NO. C040384.40.01

DATE 6-24-05 48 HRS 17.0

CLASSIFIED BY TR Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				2.0'		Red- BR.	Silty Clay		Start 10:15 AM Damp
				12.0'		BR	clayey silt		Dry
				25.5'		Red- BR.	Silty Clay to Decomposed claystone		Dry, slow augering damp at 21.6' moist at 25'
				30.0'		Gray BR	Weathered sandstone - with fine mica grains		Auger Refusal 29.5'
				41.0'		Red	Siltstone		6-27-05 WL=17'
							Bottom @ 41.0'		Start air rotary @ 8:30 AM
							Installation		Finish @ 9:00 AM
							Pellets 41 to 32.5'		Clean hole 9:00 to 11:00. Drilling while cleaning 41.0' Material
							Sand 32.5 to 32.0		
							20' Screen 32.0'-12.0'; 1 1/2" cap		20' 2" d screen
							32.0 to 9.0' Sand		2 caps
							Bentonite pellets 9.0' to 9.0'		12 bags sand
							1 bucket water poured in pellets		1 bucket pellets
							Volclay grout to 3.3'		1/2 Bag Volclay
							Concrete Mix 10 Bags		10 Bags Concrete Mix
							5' steel pipe 6" d 2.5' stick up		6" x 5' Steel Casing
							2' PVC stick up		
							2.5' steel Casing stick up		

REMARKS ** 30' south of 0509, 4 1/4" ID HSA to 25.5', 4" d air rotary w/hammer to 41.0'

Simco 4000-Ta Track Rig, Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0527 (MW-3)

N 542305.16
E 1753086.04

Grade El. 674.76 Top of PVC Riser El. 676.36



PROJECT Area 2/3 John E Amos Power Plant

BORING NO. 0532 (mw-4)

ELEVATION _____ GWL 0 HRS 19.2'

PROJECT NO. C040354.40.01

DATE 7-7-05 24 HRS 17.9'

CLASSIFIED BY TR Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				2.0		BR	Sandy Silt		Damp, start 9:45
						BR	Sand and Rock Fragments of shale		Damp
				6.0		↓			
						BR	Sandy Clay - some Rock Fragments of Sandstone		RF < 2" φ, Moist
				9.0		↓			Auger to 10.0' refusal
						Red	Decomposed claystone		Damp, TOR 10.0'
						↓	weathered ^{to} claystone		
				12.5		↓			
						Gray	Siltstone Interbedded with Claystone/clayshale		
						Red			
				41.0		↓			
						Gray	Silt shale/Siltstone - trace Red seams of claystone		
				49.0		↓			
					Soft	Red	claystone		
				53.0		↓			
						Gray	interbedded silt shale + claystone		
				68.0		Red	claystone		
						Gray	Siltstone		Net cuttings lost
				70.0		↓			dust @ 58.0' water
						Gray	Sandstone		Ann hole by 62.0'
				78.5		↓			more water @ 71.0'
							Bottom @ 78.5'		
							Installation		Materials
							Sand 78.5 to 78.0', 20'		4 Bags Sand
							Screen 78.0 to 58.0', Sand		1/2 bucket pellets
							78.0 to 53', Bentonite to		2 bags Volclay grout
							49.0', Volclay grout to 3'		10 Bags Concrete mix
							Concrete to 0.0, 6" φ Pad		6"x5' Steel Casing
							PVC stickup 1.6, Steel 2.1		

REMARKS** 4 1/4" ID HSA to 10.0', 4" φ Air Rotary 10.0' to 78.5', Simco 4000-T2 Track Rig
Doug Novotny Driller, Terra Testing.

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0532 (mw-4)

N 542305.96
E 1753080.68

Grade El. 674.84 Top of PVC Riser El. 676.84



PROJECT Area 2/3 John E

BORING NO. 0533 (mw-5)

ELEVATION _____ GWL 0 HRS Dry

PROJECT NO. C040384.40.01

DATE 7-7-05 24 HRS 8.6'

CLASSIFIED BY TR. Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						BR	Sandy Silt		Damp
				3.0		↓	↓		
						BR	Sand and Rock Fragments		Damp
				6.0		↓	↓		
						BR	Sandy Clay and Rock Fragments		Moist
				9.0		↓			
				10.2		Red	Decomposed claystone		Dry
							Bottom @ 10.2'		
							Installation:		Material
							3" sand to 10.0'		4 Bag Sand
							5' screen w/cap 10.0'-5.0'		1/2 Bucket Pellets
							Sand 10.0 to 4.0'		10 Bags Concrete Mix
							Bentonite Pellets 4.0'-3.0'		6"x5" Steel Casing
							Comment 3.0' - 0', 6" pad		
							2' stick up PVC		
							2.2' stick up steel casing		

REMARKS** 4 1/4" ID HSA to 10.2', Simco 4000-T2 Track Rig
Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0533 (mw-5)

N 540837.74
E 1754220.53

Grade El. 927.29 Top of PVC Riser El. 929.59



PROJECT Area 2/3 John E. Amos Power Plant

BORING NO. 0526 (mw 6)

ELEVATION _____ GWL 0 HRS 62.5' in well

PROJECT NO. CO40384.40.01

DATE 6-23-05 24 HRS 62.5'

CLASSIFIED BY TR Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						Red Brn.	Clayey Silt		Start 9:00 AM
				10.5		Yellow BR	Highly weathered siltstone to fine grain claystone		
				13.5		Lt Brn	Sandstone		Auger to 14'
				28.0		Gray	@ 25'		Air Hammer 14' to 91' 8'/10min in sandstone
				30.0		Gray	shale		
				36.0		Red	Claystone		
				38.0		Gray	Sand stone		
				76.0		Gray Red	Interbedded shale and siltstone / fine sandstone		Water encountered @ 76'
				91.0					End 11:30 AM
							Bottom of Boring @ 91.0'		
							Installation		Material
							Clean hole 11:30-12:25		
							Stabilize water @ 62.55' 2:00		
							Place bentonite pellets 91.0'		2 buckets bentonite
							to 78.5'; Sand 78.5' to 78.0'		4 50lbs bags sand
							Set 20' screen @ 78' to 58'		2 1/2 50lb bag volcay
							8" screen cap on end, stick up		10 Bags Concrete Mix
							2.3' Sand 78.0 to 55'		6" x 5" steel casing
							bentonite pellets 55' to 50'		
							Volcay grout to 4.0' 6-22-05		
							Concrete to surface, 2.5' steel stick		

REMARKS ** 4 1/4" ID Hollow Stem Augers to 14', 4" φ downhole hammer w/air to 91.0'

Simeo 4000-T2 Track Rig, Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0526 (mw-6)

N 539635.79
E 1755425.04

Grade El. 943.15 Top of PVC Riser El. 945.15



PROJECT Area 2/3 John E Amos Power plant

BORING NO. 0528 (mw-7)

ELEVATION _____ GWL 0 HRS 40.0

PROJECT NO. C040384.40.01

DATE 6-27-05 18 HRS 37.0

CLASSIFIED BY TR Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						BR	Silty Sand and Sandstone		Start 3:50 PM
				2.0		↓	Rock Fragments		Dry
				6.0		Yellow	Decomposed Sandstone		Dry
						BR	↓		Auger Refusal @ 6.0'
						Gray	Sandstone		Dry
				22.0	Hard	BR	↓		
						Gray	18.0' to 22.0'		± 1'/min
						BR	Siltstone		
						to Gray	↓		
						Red	from 24'		Water Encountered @ 40.0'
				55.5		Gray	↓		End 5:00 PM
							Bottom @ 55.5'		Clean with air until 5:40 PM
							Installation		Materials
							Sand 55.5' to 52.0'		4 bag sand
							20' Screen 52.0 to 32.0'		1/4 bucket pellets
							Sand 52.0 to 30.0'		2 Bags Volclay
							Bentonite Pellets 30.0' to 28.0'		10 Bags Concrete
							Bucket of water on Pellets		6" φ steel casing
							Volclay Grout to 3.3', 3.3' of		5' total length
							Concrete. Pad 6' diameter		
							2' stickup PVC		
							2.5' stickup steel casing		

REMARKS ** 4 1/4" ID HSA to 6.0', 4" b Air Rotary w/hammer to 55.5'

Simco 4000-T2 Track Rig, Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0528 (mw-7)

N 542134.95
E 1756839.14

Grade El. 945.01 Top of PVC Riser El. 947.01



PROJECT Area 2/3 John E Amos Power plant

BORING NO. 0534 (mw-8)

ELEVATION _____ GWL 0 HRS 19.8'

PROJECT NO. COYO 384.40.01

DATE 7-11-05 48 HRS 23.8'

CLASSIFIED BY T R Gower

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				6.0		Red	Silty Clay		Start 11:00 AM moist
				9.0		Red	Decomposed Claystone		Dry
				23.0		Gray/BR	Sandy shale / sandstone Med Grain.		TOR 10.0' 10:30 air Rotary
				26.0		Red	Claystone		Slight Hammering
				28.0		BR	Sandstone / sandy shale		
				37.0	Hard	Gray BR	Sandstone @ 37'		
				41.0		Red	Claystone		Moist @ top 6" Moist cuttings back
				60.5	Hard	Gray	Sandstone / Sandy shale		2 1/2 of 410' Run
							Bottom @ 60.5'		End 12:35 PM
							Installation		Material
							60.5' to 60.0' Sand		20' screen, 2 caps
							3" cup on bottom 20' Screen		5 Bags Sand
							Screen 60.0 to 40.0'		1/4 Bucket Pellets
							Sand 60.0 to 30.0'		3 Bags Volclay
							Bentonite Pellets to 27.0'		11 Bags Concrete Mix
							Volclay Grout to 3.0'		6" x 5" Steel Casing
							Concrete 3.0 to 0.0', 6" Pad		
							2' stick up of PVC		
							2.5' stick up of steel casing		

REMARKS... 4 1/4" ID Hollow Stem Augers to 10.0', 7" Air Rotary to 60.5', 4000-T2 Simco Track Rig, Doug Novotny Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0534 (mw-8)

N 544221.98
E 1756158.78

Grade El. 933.39 Top of PVC Riser El. 935.39



PROJECT Area 2/3 John E Amos

BORING NO. 0530 (mw-9)

ELEVATION _____ GWL 0 HRS 47.4'

PROJECT NO. 0040384.40.01

DATE 6-30-05 24 HRS 30.2'

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PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						Red	Silty Clay		Start 11:10 AM
				2.0			↓		Moist
				5.0		Red	Decomposed Claystone		Dry, Auger to 5.0'
							↓		Air Rotary 11:30
				15.0		Red trace gray	Claystone / clay shale		Hammer in claystone
							↓		Less @ 12'
				29.0	Hard	Gray	Fine grain Sandstone		
				31.0		BR	18 to 20'		
						BR	Sandy shale		
				35.0		Red	Claystone / clay shale		
							↓		
				44.0		Gray trace red	Siltstone w/sandstone seams / silt shale		
							Water Encountered @ 42'		Water encountered @ 42'
				51.0		Red	Claystone		
							↓		
				62.5	Hard	Gray	Sandstone		End Drilling 12:40 PM
							↓		
							Bottom @ 62.5'		Let sit 15 min blow out water 230 sec
							Installation		then dry, 15 min
							62.5 to 62.0' Sand		on 15 sec of water
							20' screen 62.0' to 42.0'		Add potable water to
							Sand 62.0' to 37.0'		clean hole 50 gal total
							Bentonite Pellets 37.0'-34.5'		Material
							Volclay grout to 3.0'		5 Bags Sand
							Concrete 3.0'-0.0' 6" Diameter		20' Screen
							Pad, 2' stickup PVC		1/4 bucket pellets
							2 1/2' stickup 6" φ steel		water added, 2 bags
							Casing 2.5' stickup		Volclay, 9 bags Concrete

REMARKS** 25 ft N345°W from Survey Pt. 307, 4 1/4" ID HSA to 5.0', 4" φ Air rotary w/hammer to Simco 4000-T2 Track Rig, Doug Novotny-Driller, Terra Testing

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0530 (mw-9)

N 544019.11
E 1754183.58

Grade El. 909.43 Top of PVC Riser El. 911.43



PROJECT Area 2/3 John E Amos Power Station

BORING NO. 0531 (mw-10)

ELEVATION _____ GWL 0 HRS Dry

PROJECT NO. 040384.40.01

DATE 6-30-05 24 HRS 102'

CLASSIFIED BY T. R. Gower

PAGE 1 of 2

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
				9.0		BR	Clayey Silt		Start 4:00.
						Red	Decomposed Claystone		Dry
				11.0		↓	weathered claystone		Auger to 10.0'
						Lt BR	Silty Shale / siltstone		
				20.0		↓			
						BR	Sandstone		
				26.0		↓			
						Lt Gray	Siltstone - Red @ 29.0'		
				34.0		↓	Gray @ 31.0'		
				36.0		Red	Claystone		
				40.5	Hard	Gray	Fine grain Sandstone		
						↓			
				46.0		Red Gray	Claystone		
				58.0		Gray	Siltstone		Stop 5:00 @ 52'
				60.0		Red	Claystone		
						Gray	Siltstone / v. Fine Grain		
				71.0		↓	Sandstone, shaly		
					Hard	Gray	Sandstone		
				76.0	↓	↓			
					Soft	Red	Siltstone / Claystone		
				81.0	↓	↓			
				82.0	Hard	Gray	Sandstone		
						Gray	Siltstone		
				84.0		↓			
					Hard	Gray	Sandstone / w/ 6" seams of softer siltstone		Stop @ 112' 11:05 AM
				125.0	↓	↓			
						Red	Claystone		
				138.0		↓			

REMARKS ** 4 1/4" ID Hollow Stem Augers to 10.0', 4" Air Rotary w/hammer 10.0' to 157.0'
Simco 4000-T2 Track Rig, Doug Novotny Driller, Terra Testing.

* POCKET PENETROMETER READINGS
** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0531 (mw-10)

PROJECT Area 2/3 John E Amos Power Station

BORING NO. 0531 (mw-10)

ELEVATION _____ GWL 0 HRS Dry

PROJECT NO. 040384.40.01

DATE 7-1-05 24 HRS 102

CLASSIFIED BY T.R.Gower

PAGE 2 of 2

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	CORE RECOVERY/TYPE & SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION				USCS OR ROCK BROKENNESS	REMARKS*
				PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		
1	2	3	4	5	6	7	8	9	10
						Gray	Siltstone		Dry
				149.0		↓	↓		
						Gray	Sandstone		
				152.0		↓	↓		
						Red	Claystone		
				153.0					
						DK Gray	Sandstone w/mica grains		
				154.0		Gray	Siltstone		
						↓	↓		
				157.0					End 12:05 PM
							Bottom @ 157.0'		
							Installation		Material
							Hole measured @ 154.0'		11 bags sand
							Sand to 153.0'; 20' screen		1/4 bucket pellets
							153.0' to 133.0'; Sand		4 1/2 bags vol clay
							153.0 to 85.0'; bentonite pellets to 81.0'; vol clay to 3.5'; Concrete 3.5 to 0.0'		10 Bags Concrete MIX
							6" φ x 5' steel casing, 6' diameter pad		6" φ x 5' steel casing
							2' stick up PVC		Casing
							2.5' stick up steel casing		

REMARKS **

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

Definition of Terms Used to Describe Subsurface Materials

SOILS

DENSITY OF GRANULAR SOILS BASED ON STANDARD PENETRATION RESISTANCE

DESIGNATION	STANDARD PENETRATION RESISTANCE (BLOWS/FOOT)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CONSISTENCY OF COHESIVE SOILS IS BASED ON FIELD AND/OR LABORATORY TESTS

CONSISTENCY	UNC. COMPRESSIVE STR. (TONS PER SQUARE FOOT)	FIELD IDENTIFICATION
VERY SOFT	LESS THAN 0.25	EASILY PENETRATED SEVERAL INCHES BY FIST
SOFT	0.25 TO 0.50	EASILY PENETRATED SEVERAL INCHES BY THUMB
MEDIUM STIFF	0.50 TO 1.0	CAN BE PENETRATED SEVERAL INCHES BY THUMB WITH MODERATE EFFORT
STIFF	1.0 TO 2.0	READILY INDENTED BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT
VERY STIFF	2.0 TO 4.0	READILY INDENTED BY THUMBNAIL
HARD	MORE THAN 4.0	INDENTED WITH DIFFICULT BY THUMBNAIL

ADDITIONAL TERMS USED IN THE DESCRIPTION OF SOILS:

AND	INDICATES APPROXIMATELY EQUAL AMOUNTS OF MATERIALS, SUCH AS A SAND AND GRAVEL MIXTURE. IF THE MATERIALS OCCUR IN THIN SEPARATE SEAMS, IT IS NOTED IN THE DETAILED WORD CLASSIFICATION. THE THICKNESS IS GIVEN WHERE POSSIBLE.
SOME	INDICATES A SIGNIFICANT AMOUNT OF THE ACCESSORY MATERIAL. EXAMPLE: MEDIUM DENSE SILTY SAND - SOME GRAVEL
TRACE	INDICATES A MINOR AMOUNT OF THE ACCESSORY MATERIAL. EXAMPLE: LOOSE SILTY SAND - TRACE OF GRAVEL
INTERBEDDED	USED TO DESCRIBE THIN ALTERNATING SEAMS. THICKNESS IS GIVEN WHERE POSSIBLE EXAMPLE: HARD INTERBEDDED SILT AND CLAY (APPROXIMATELY 1/16" THICK)

ROCK

TERM	DEFINITION
SEAM	THIN (12 INCHES OR LESS) PROBABLY CONTINUOUS LAYER
SOME	INDICATES SIGNIFICANT (15 TO 40 PERCENT) AMOUNTS OF THE ACCESSORY MATERIAL. EXAMPLE: ROCK COMPOSED OF SANDSTONE (70%) AND SEAMS OF SHALE (30%) WOULD BE: SANDSTONE - SOME SHALE SEAMS
FEW	INDICATES MINOR (0-15 PERCENT) AMOUNTS OF THE ACCESSORY MATERIAL. EXAMPLE: ROCK COMPOSED OF SANDSTONE (90%) AND SEAMS OF SHALE (10%) WOULD BE: SANDSTONE - FEW SHALE SEAMS
INTERBEDDED	USED TO INDICATE THIN OR VERY THIN ALTERNATING SEAMS OF MATERIAL OCCURRING IN APPROXIMATELY EQUAL AMOUNTS EXAMPLE: ROCK COMPOSED OF SANDSTONE (50%) AND SHALE (50%) SEAMS WOULD BE INTERBEDDED SANDSTONE AND SHALE.

THE DEGREE OF BROKENNESS OF THE ROCK IS DESCRIBED BY ONE OF THE FOLLOWING TERMS:
























DESCRIPTIVE TERMS	ABBREVIATION	SPACING
VERY BROKEN	(V. BR.)	LESS THAN 2 INCHES
BROKEN	(BR.)	2 INCHES - 1 FOOT
BLOCKY	(BL.)	1 FOOT - 3 FEET
MASSIVE	(M.)	3 FEET - 10 FEET

ROD-ROCK QUALITY DESIGNATION IS CUMULATIVE LENGTH OF PIECES OF CORE EQUAL TO OR GREATER THAN FOUR INCHES IN LENGTH DIVIDED BY THE TOTAL LENGTH OF CORE RUN, EXPRESSED AS A PERCENTAGE.

THE FOLLOWING BASIC NAMES ARE APPLIED TO SEDIMENTARY ROCK:

ROCK TYPE	CHARACTERISTICS
SANDSTONE	MADE UP PREDOMINANTLY OF GRANULAR MATERIALS RANGING BETWEEN 1/16 AND 2MM IN DIAMETER
SILTSTONE	MADE UP OF GRANULAR MATERIALS LESS THAN 1/16 MM IN DIAMETER. FRACTURES IRREGULARLY, MEDIUM THICK TO THICK BEDDED
CLAYSTONE	VERY FINE GRAINED ROCK MADE UP OF CLAY MATERIALS. FRACTURES IRREGULARLY, VERY SMOOTH TO TOUCH. GENERALLY HAS IRREGULARLY SPACED PITTING ON SURFACE OF DRILLED CORES.
SHALE	A FISSILE VERY FINE GRAINED ROCK. FRACTURES ALONG BEDDING PLANES
LIMESTONE	ROCK MADE UP PREDOMINANTLY OF CALCITES (CA CO ₃) EFFERVESCES UPON THE APPLICATION OF HYDROCHLORIC ACID
COAL	ROCK CONSISTING MAINLY OF ORGANIC REMAINS

LEGEND

	RESIDUAL SOIL		CLAYSTONE		2" O.D. SPLIT BARREL SAMPLE
	GRAVEL		LIMESTONE		CASING SAMPLE
	SAND OR ALLUVIUM		SILTSTONE		ST-1 SAMPLE NUMBER 3" DIA. UNDISTURBED SAMPLE
	SILT		SANDSTONE		4.6 5.0 LENGTH OF CORE RECOVERED LENGTH OF DRILL RUN
	CLAY		SHALE		3-10-66 GROUND WATER LEVEL AND DATE OF OBSERVATION
	ORGANIC MATERIAL		CONCRETE		60/0.3 INDICATES 60 BLOWS REQUIRED FOR SPLIT BARREL TO PENETRATE 0.3 FEET
	SLAG		COAL		APPROXIMATE TOP OF ROCK
	FILL		VOID		



GAI Consultants, Inc. 2006

Well Construction Diagrams

B-0501 to B-0515, B-0517, B-0519 to B-0525 & MW-1 to MW-10

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 JOHN E. AMOS POWER PLANT

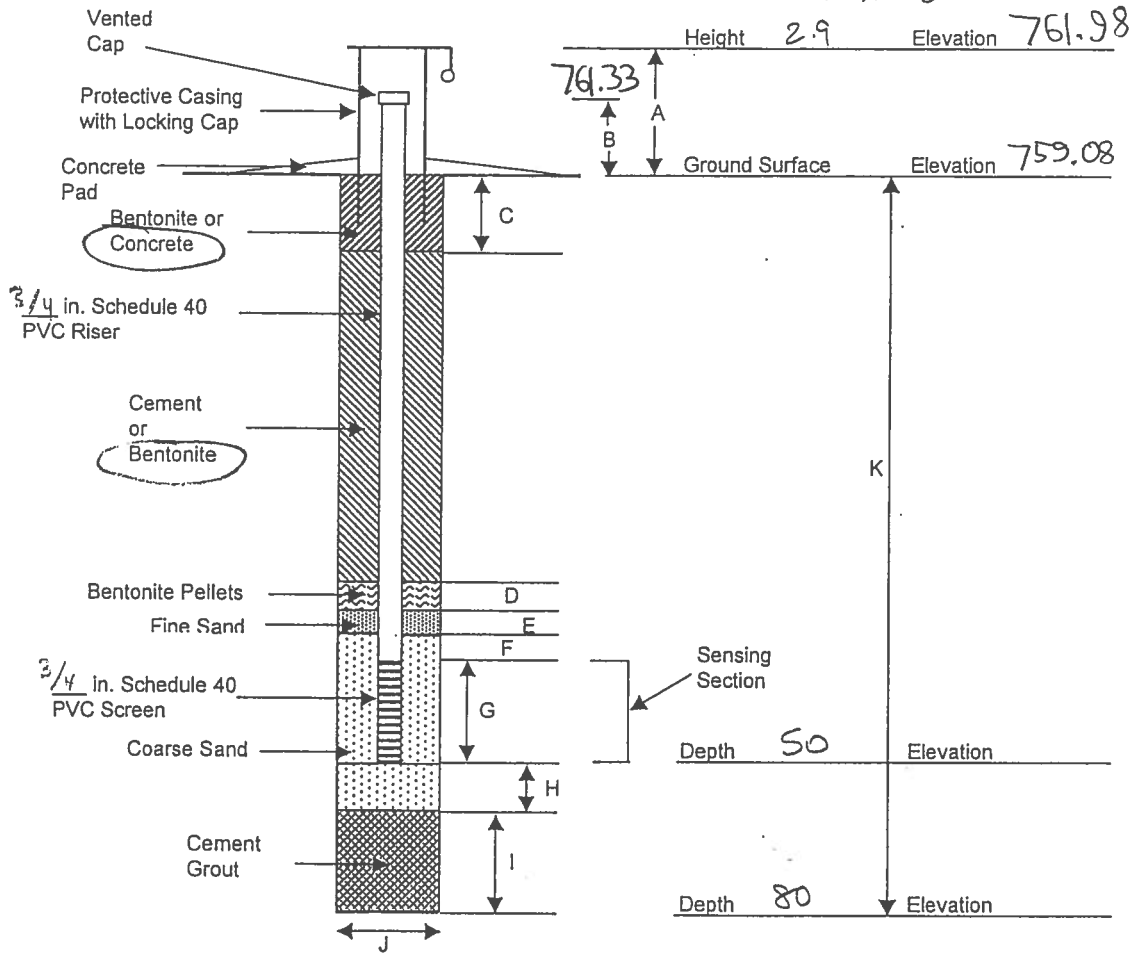
Project No. C040384.40-01

Date 21 APR 2005

Engineer/Geologist DRS

Well No. B-0501

N 540558.4978
E 172508.1269
NAD 83 WV SOUTH



STANDPIPE PIEZOMETER INSTALLATION SKETCH

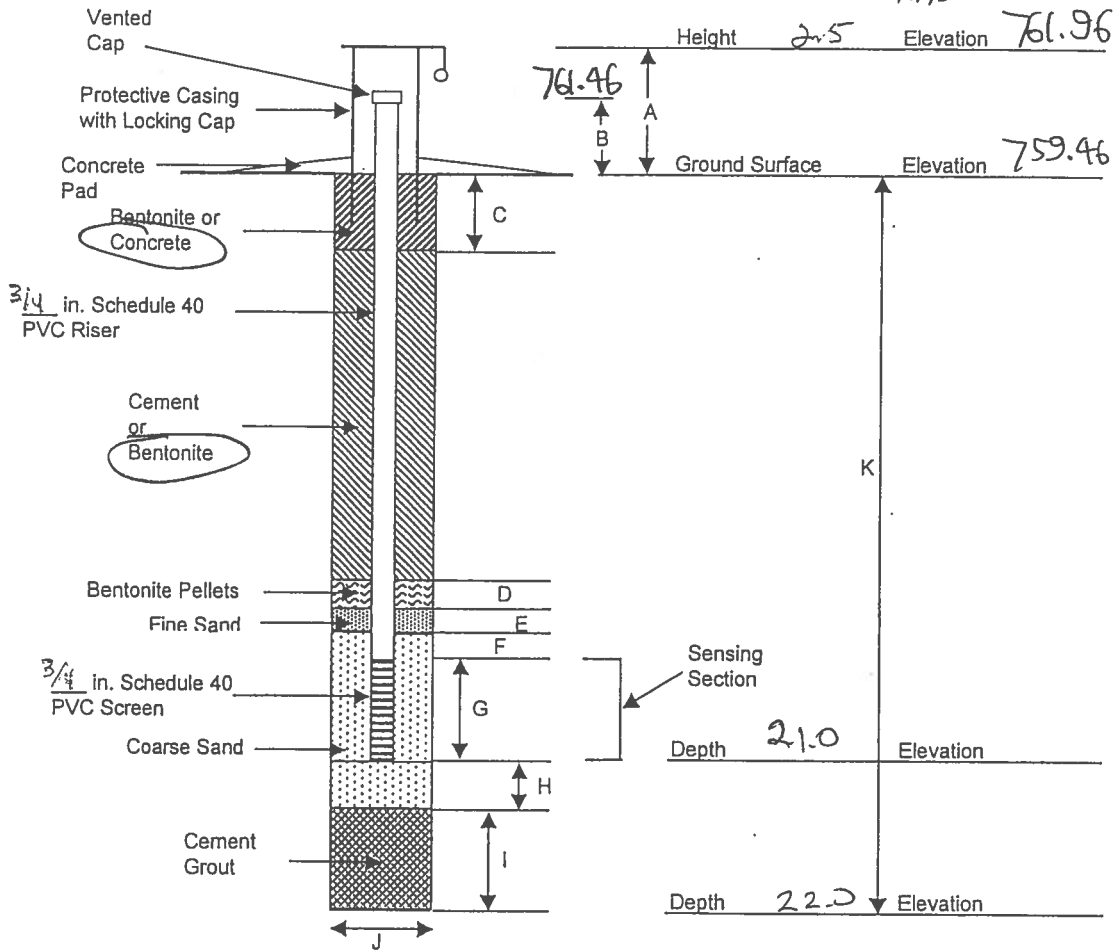
DIMENSIONS (Feet)					
A	B	C	D	E	F
2.9	2.25	35	0	0	5
G	H	I	J	K	
10	3	30	0.25	80.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 JOHN E. AMOS POWER PLANT Project No. CO40384.40-01
Date 21 APR 2005 Engineer/Geologist DBS Well No. B0502

N 540563.2422
E 1723508.0316
MAD 83 WV SOLT



STANDPIPE PIEZOMETER INSTALLATION SKETCH

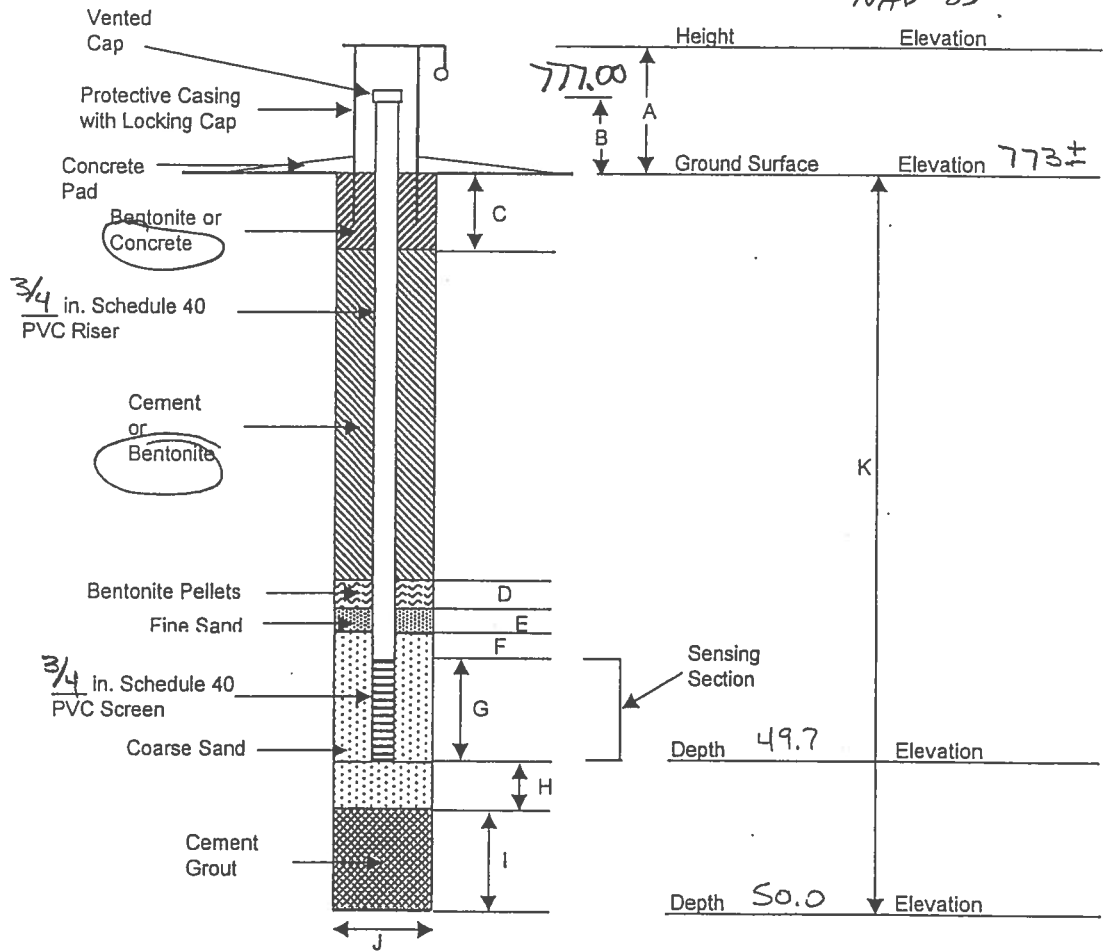
DIMENSIONS (Feet)					
A	B	C	D	E	F
2.5	2.0	7.0	0	0	4
G	H	I	J	K	
10	1	0	0.25	22.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT Project No. C040324.40-01
Date 20 APR 2005 Engineer/Geologist DRS Well No. 0503

N 540843.8055
E 1723858.5630
NAD 83 W W SOUTH



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	2.0	34.7	0	0	5
G	H	I	J	K	
10	0.3	0	0.25	50.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 JOHN E. AMOS POWER PLANT

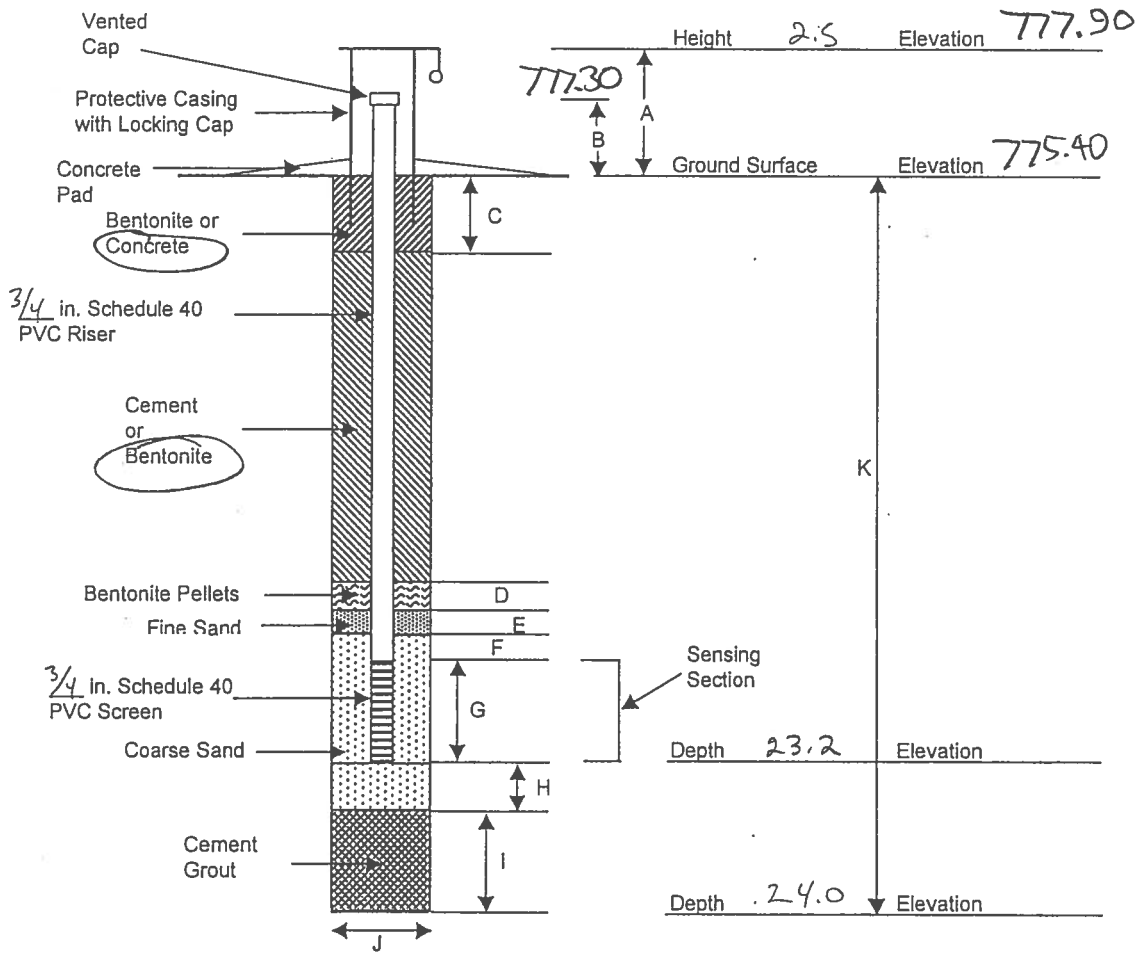
Project No. CD40384.40-01

Date 20 APR 2005

Engineer/Geologist DBS

Well No. B 0504

N 540840.0544
E 1723859.8367



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.5	1.9	8.2	0	0	5
G	H	I	J	K	
10	0.8	0	0.25	24.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 JOHN E. AMOS POWER PLANT

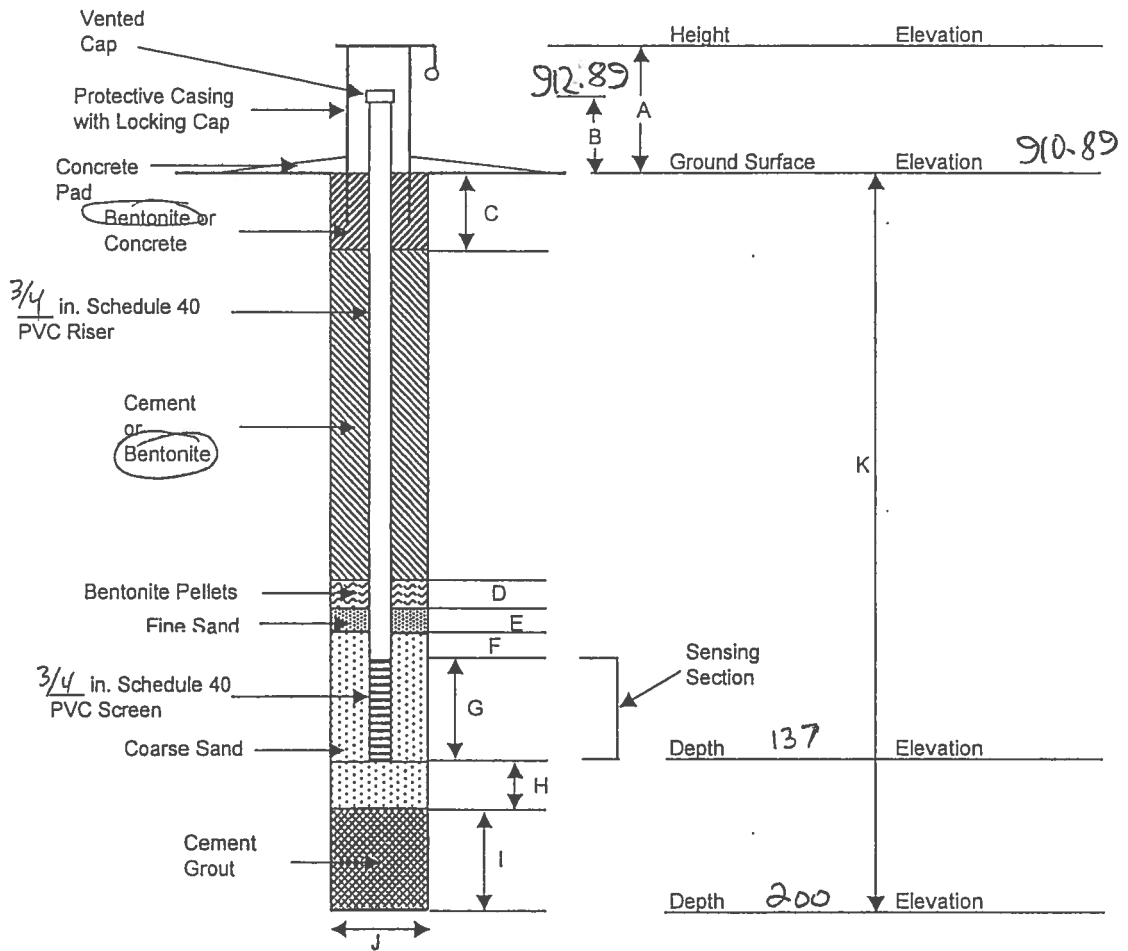
Project No. C040384.40-01

Date 27 APR 2005

Engineer/Geologist DPAS

Well No. B 0505
~~(27)~~

N 541325.3505
E 1723551.3362



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.5	2.0	1.0	0	0	137
G	H	I	J	K	
20	3	60	0.25	200	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

Project No. C040384.40-01

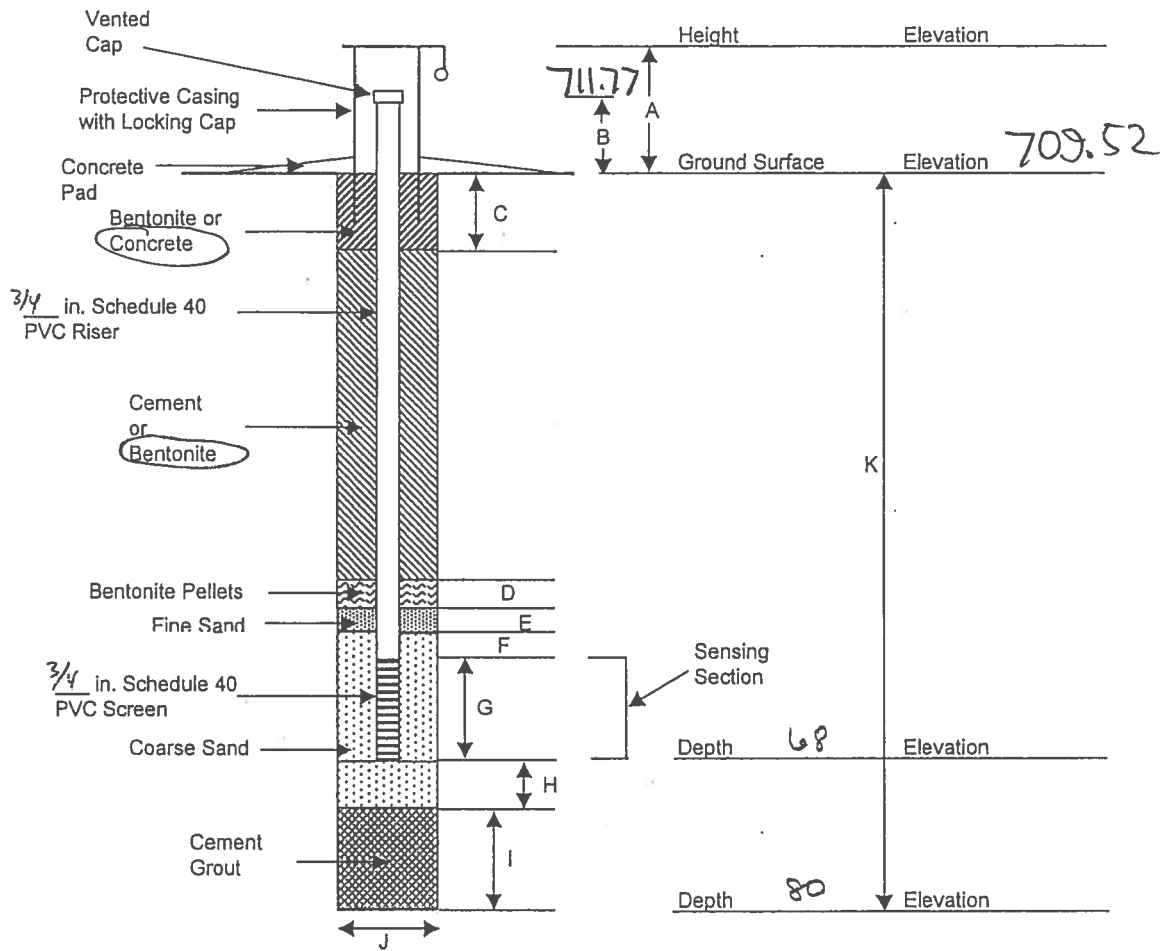
Date 28 APR 2005

Engineer/Geologist DBS

Well No. B0506

N 539424.9688

E 1722518.6810



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.55	2.25	20	0	0	38
G	H	I	J	K	
10	2	10	0.25	80	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 JOHN E. AMOS POWER PLANT

Project No. COY0384.40-01

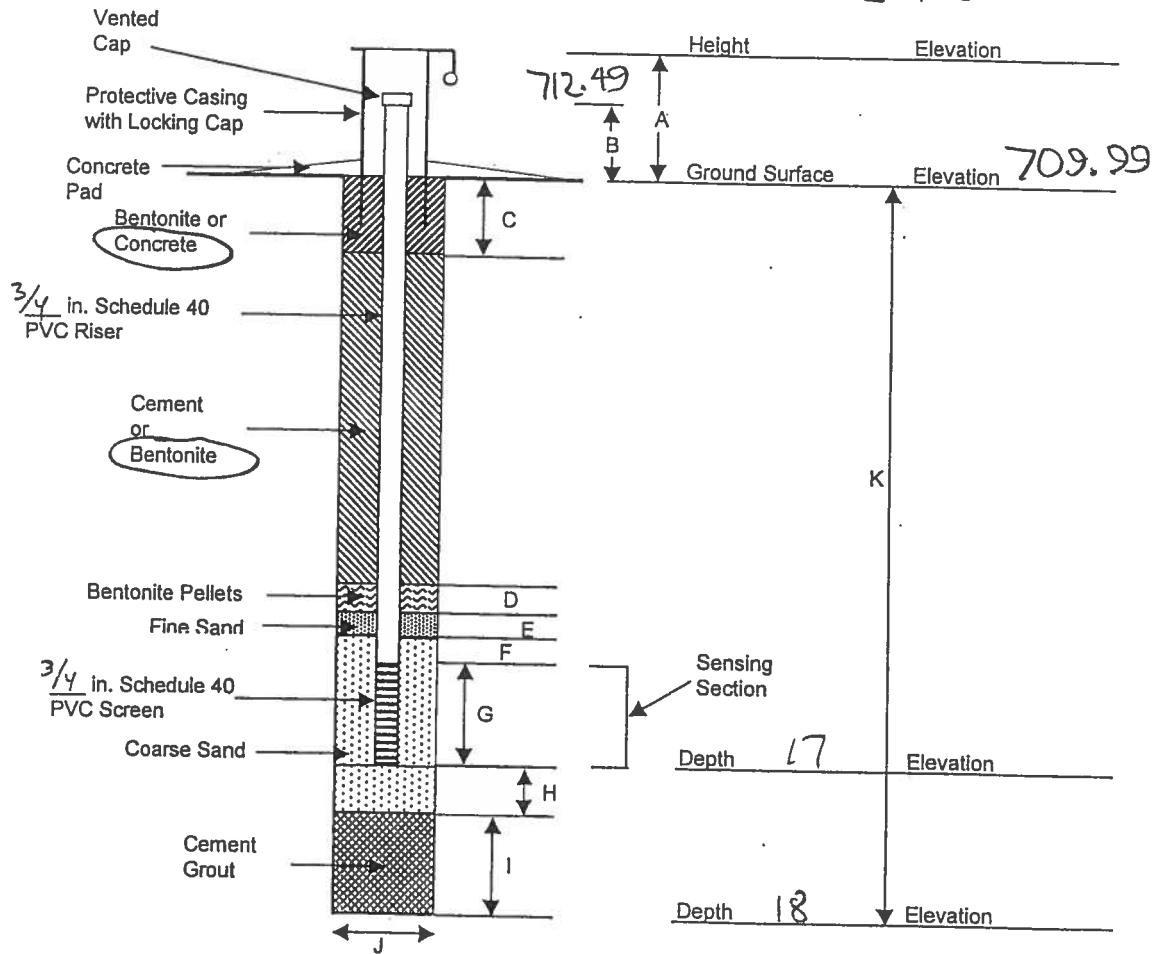
Date 22 APR 2005

Engineer/Geologist DBS

Well No. B0507

N 539428.8146

E 172523.7682



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.75	2.50	4	0	0	3
G	H	I	J	K	
10	1	0	0.25	18	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

Project No. C040384.43-01

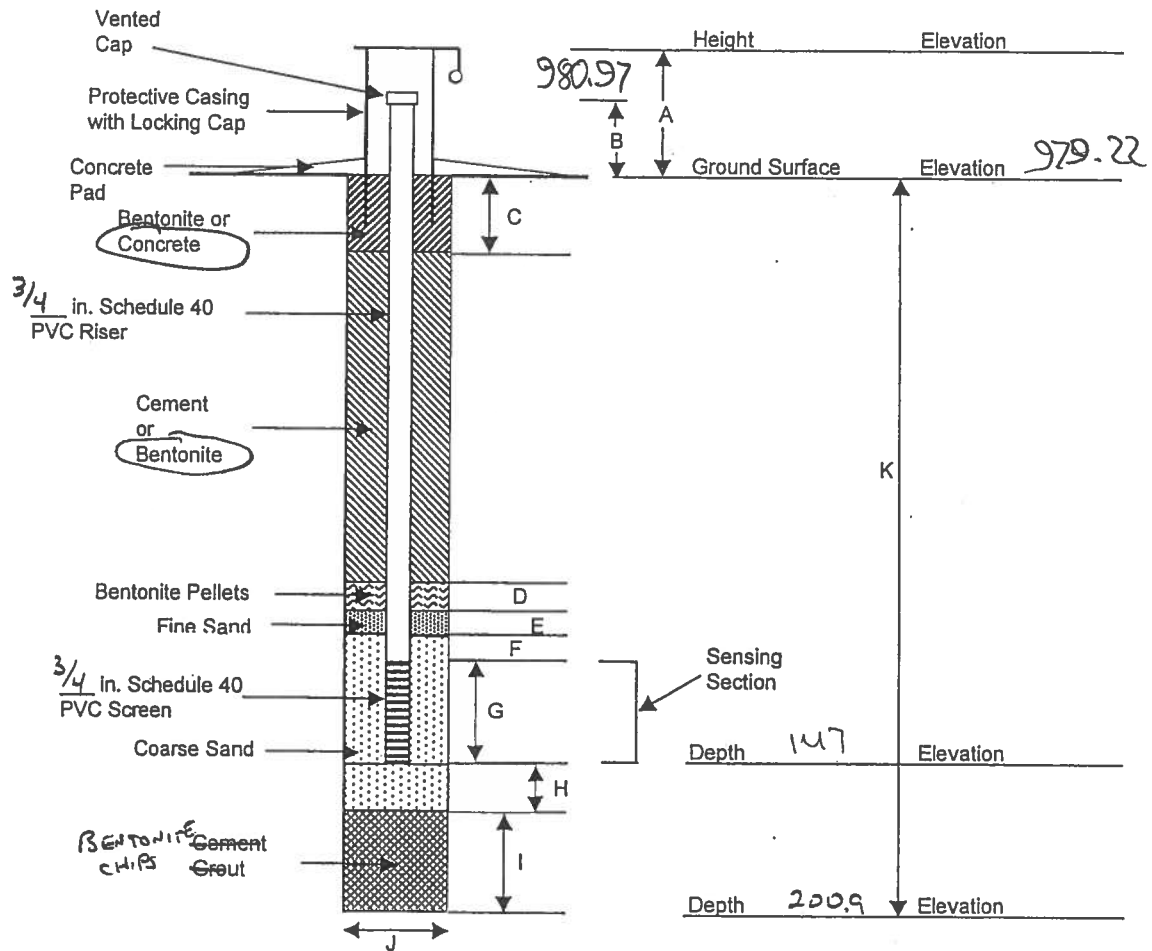
Date 03 MAY 2005

Engineer/Geologist JBC

Well No. B-0508

N 541 996. 9754

E 1723377.3436



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.5	1.75	77	—	—	50.
G	H	I	J	K	
20	3	50.9	0.25	200.9	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

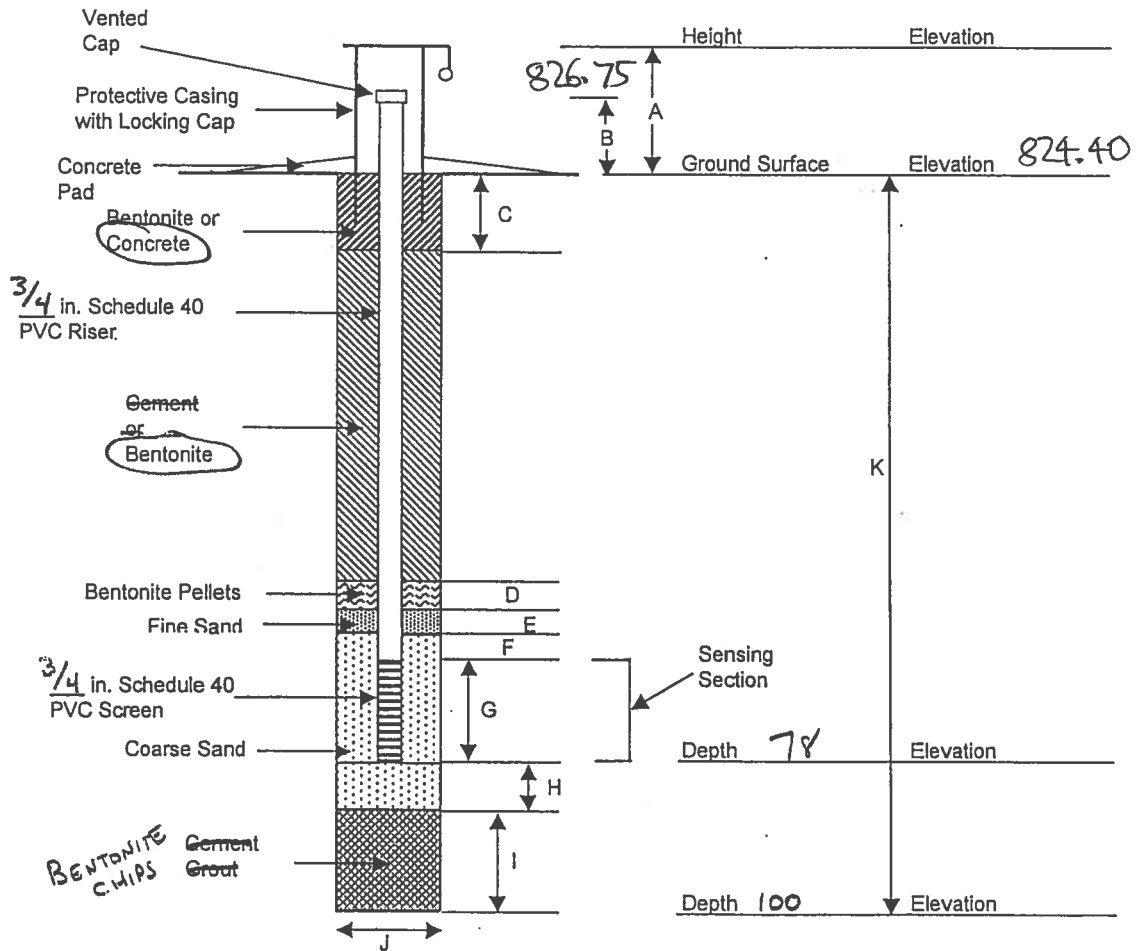
Project No. C040384.40-01

Date 03 MAY 2005

Engineer/Geologist DBS

Well No. B-2509

N 541748.6664
E 172411.6219



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	2.35	20	—	—	48
G	H	I	J	K	
10	2.0	20	0.25	100	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

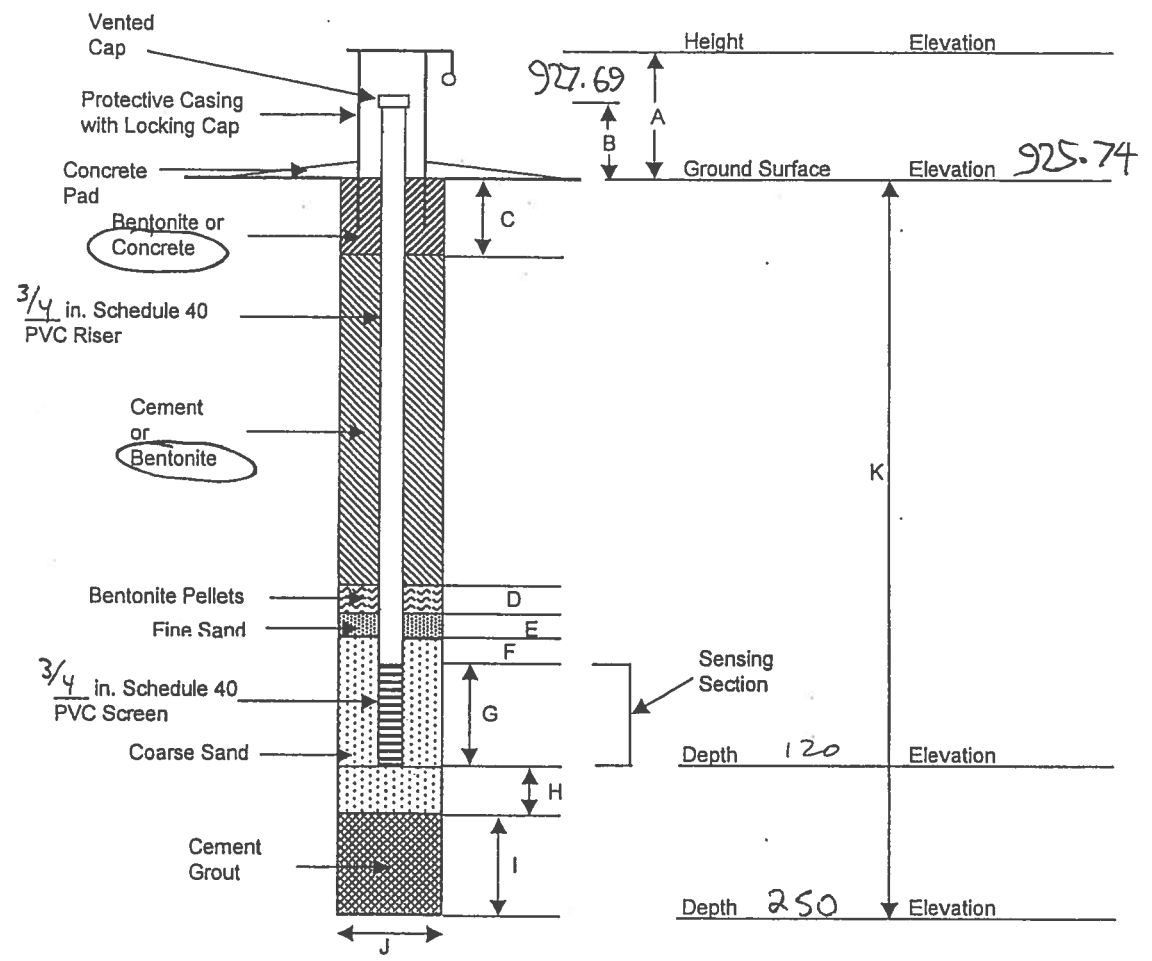
Project No. C040384.40-01

Date 10 MAY 2005

Engineer/Geologist DBS

Well No. B-0510

~~(24)~~
N. 540879. 8326
E 1722795. 6504



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	1.95	30	-	-	70
G	H	I	J	K	
20	2	128.7	0.25	250.7	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 73, JOHN E. AMOS POWER PLANT

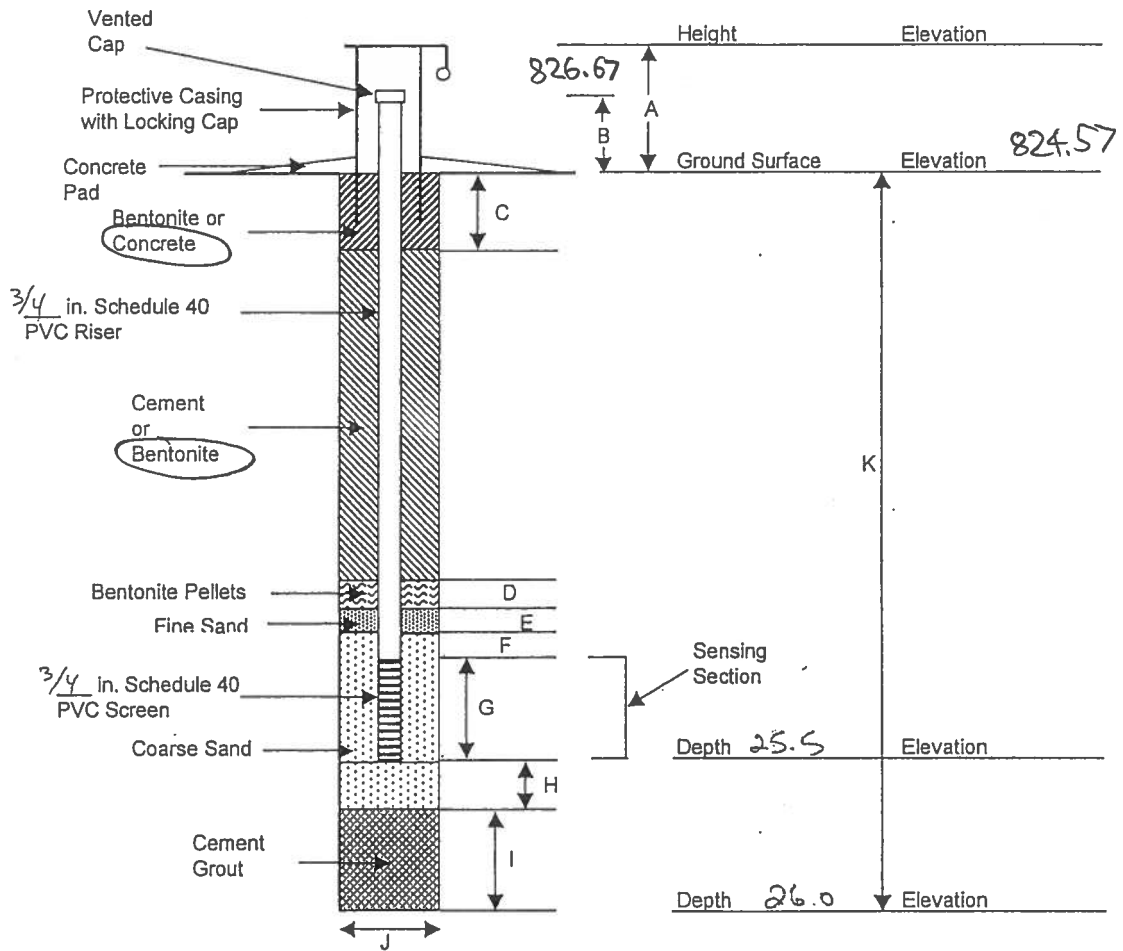
Project No. CO40324.45-01

Date 04 MAY 2005

Engineer/Geologist DBS

Well No. B-0511

N 541746.9425
E 1724116.3536



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.45	2.1	3.5	—	—	12.0
G	H	I	J	K	
10	0.5	—	0.25	26.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

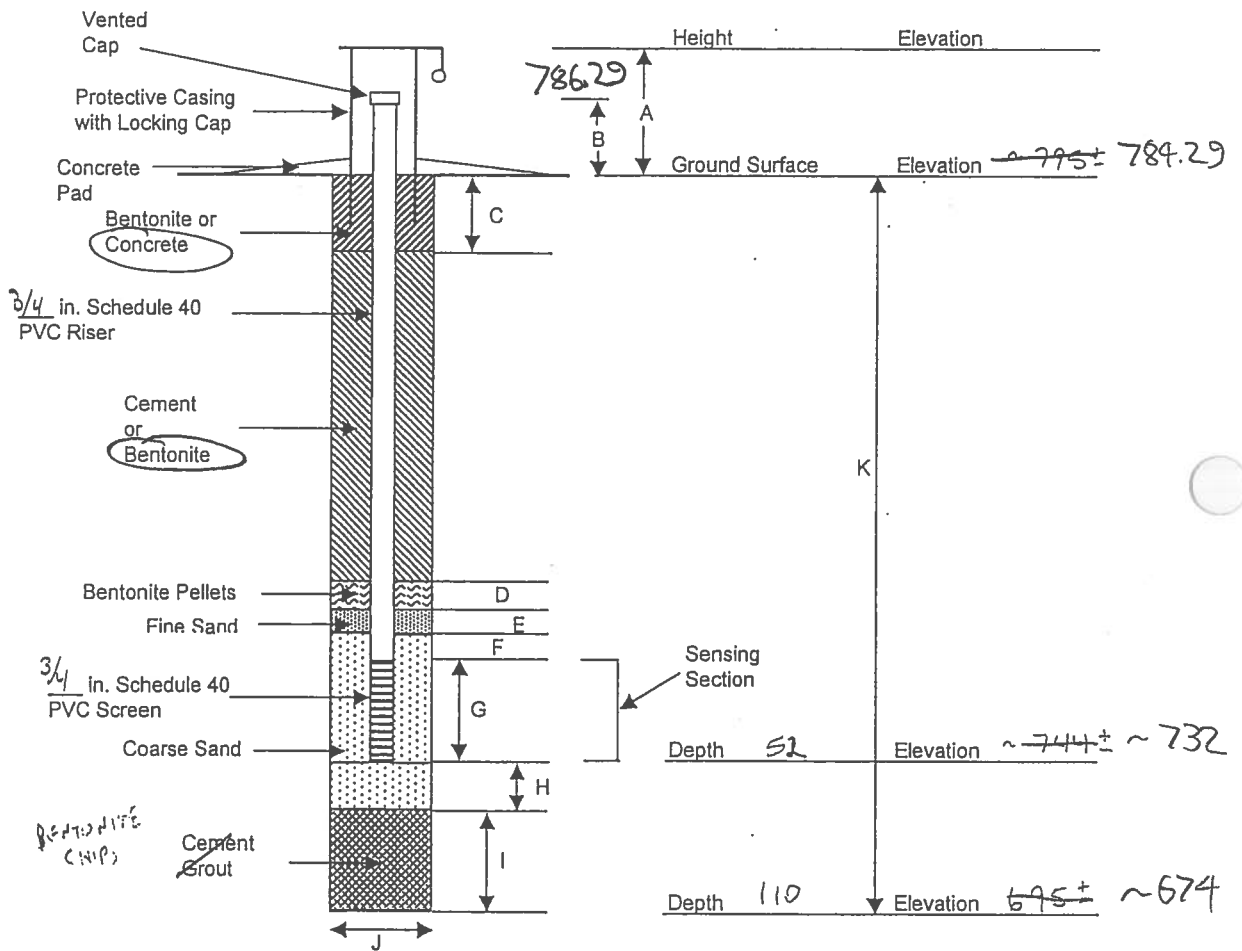
Project No. C040324.43-01

Date 06 MAY 2005

Engineer/Geologist DBS

Well No. B-0512

N 542140.8876
E 1724101.7636



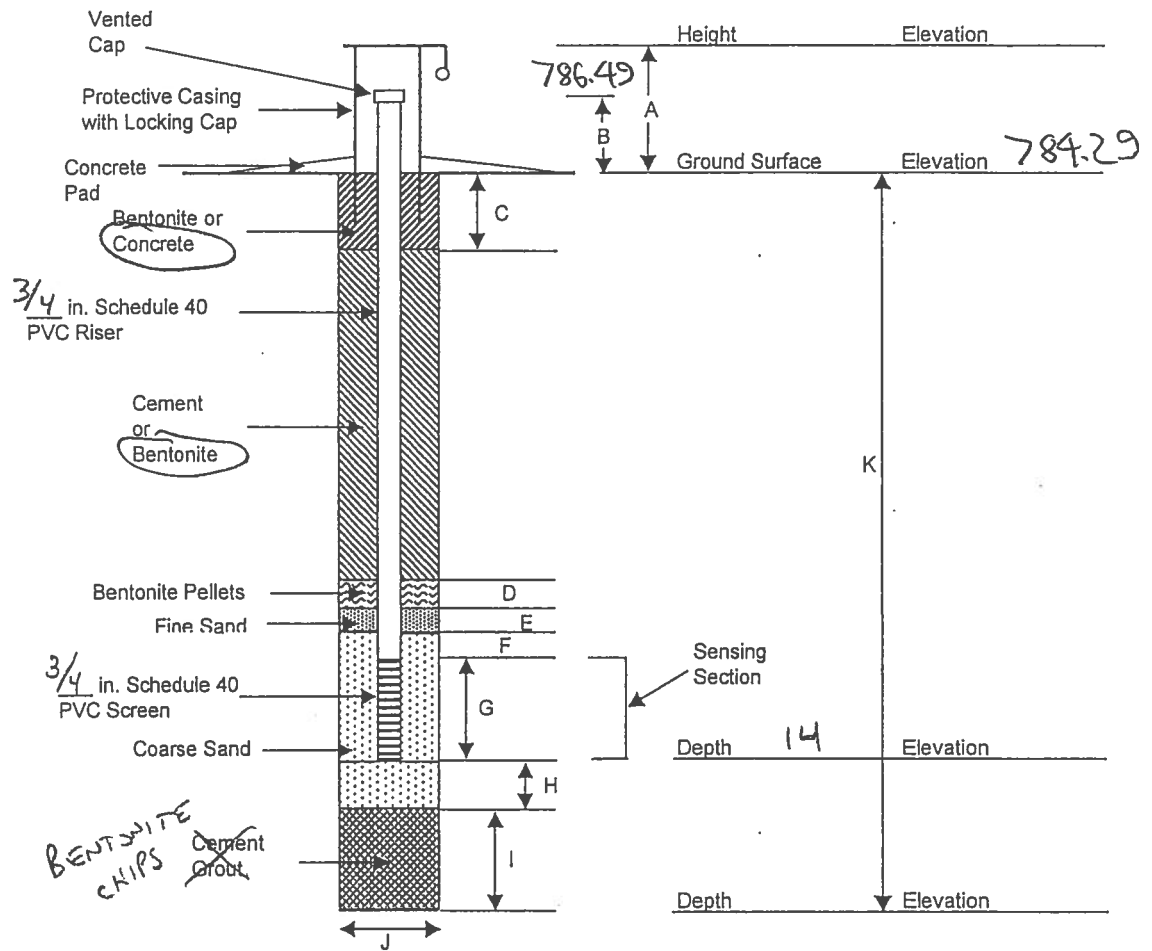
STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	2.0	20.0	—	—	22.0
G	H	I	J	K	
10	2	56	0.25	110	

Remarks PIEZOMETER B-0513 INSTALLED
IN SAME BORE HOLE (TIP AT 14 FT)

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT Project No. C040384.40-01
 Date 06 MAY 2005 Engineer/Geologist DBS Well No. B-0513
 N 542140.8876
 E 174101.7636



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	2.2	3	-	-	1.5
G	H	I	J	K	
10	2	3**	0.25	*	

Remarks * NOTE: PIEZOMETER INSTALLED
IN SAME BORE HOLE AS B-0512
** 2 FT SEAL BETWEEN SAND PACK FOR B-0512 AND
SAND PACK FOR B-0513

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMWS POWER PLANT

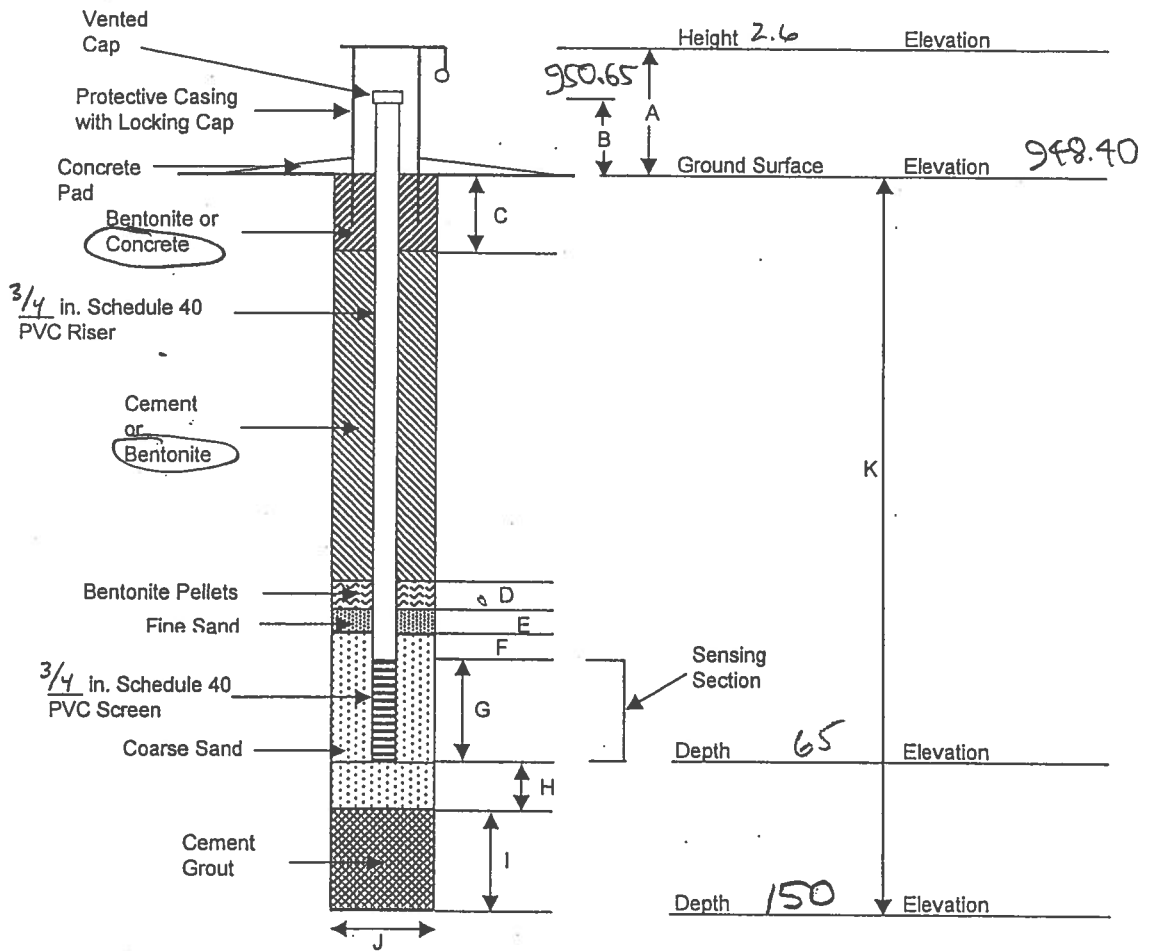
Project No. C040384.40-01

Date 12 MAY 2005

Engineer/Geologist DBS

Well No. B-0514

N 540555.6419
E 1725145.9412



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.6	2.25	17	—	—	38
G	H	I	J	K	
10	2	83	0.25	150	—

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3, JOHN E. AMOS POWER PLANT

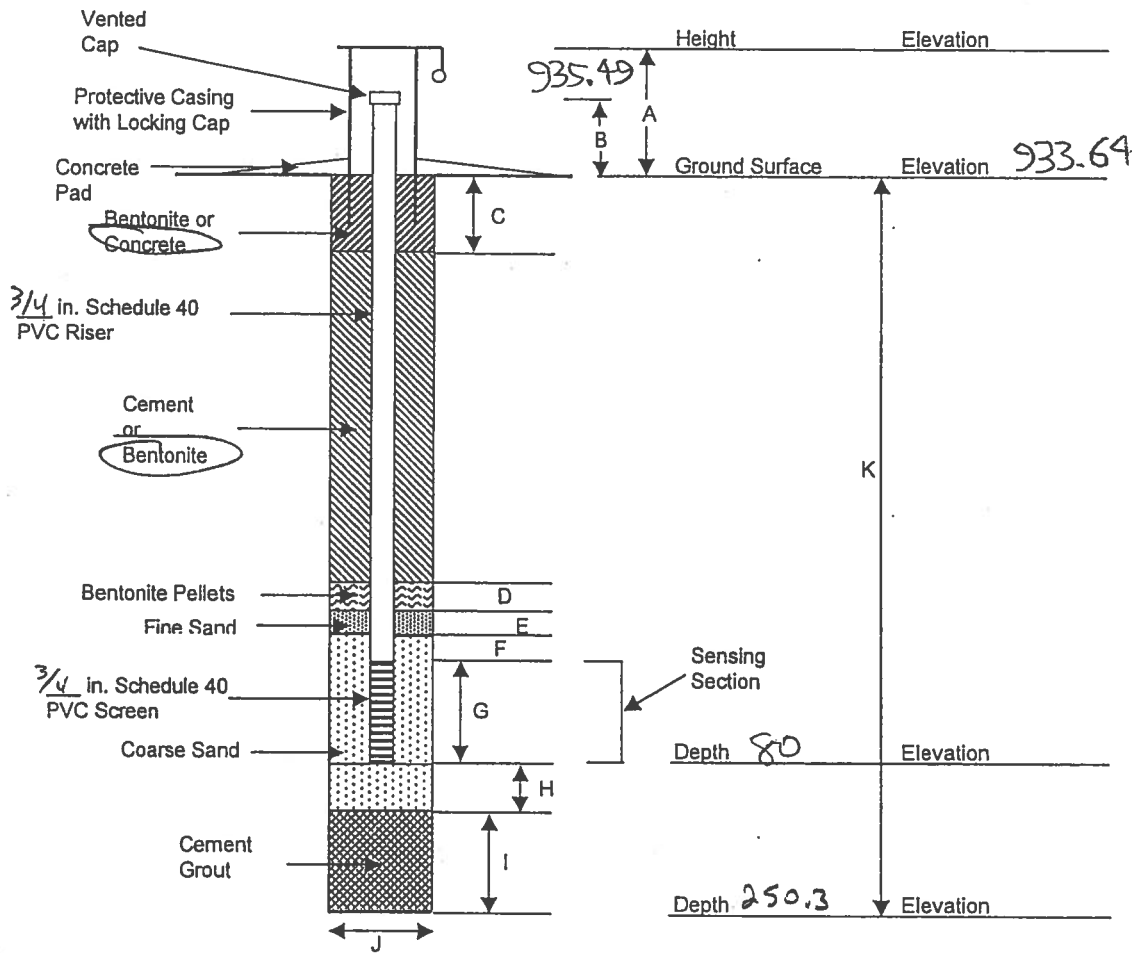
Project No. 6040384.40-01

Date 16 MAY 2005

Engineer/Geologist DBS

Well No. B-0515

N 539572.1065
E 173680.1660



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.1	1.85	20.0	—	—	50
G	H	I	J	K	
10	2	168.3	0.25	250.3	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 7/3 AMOS POWER PLANT

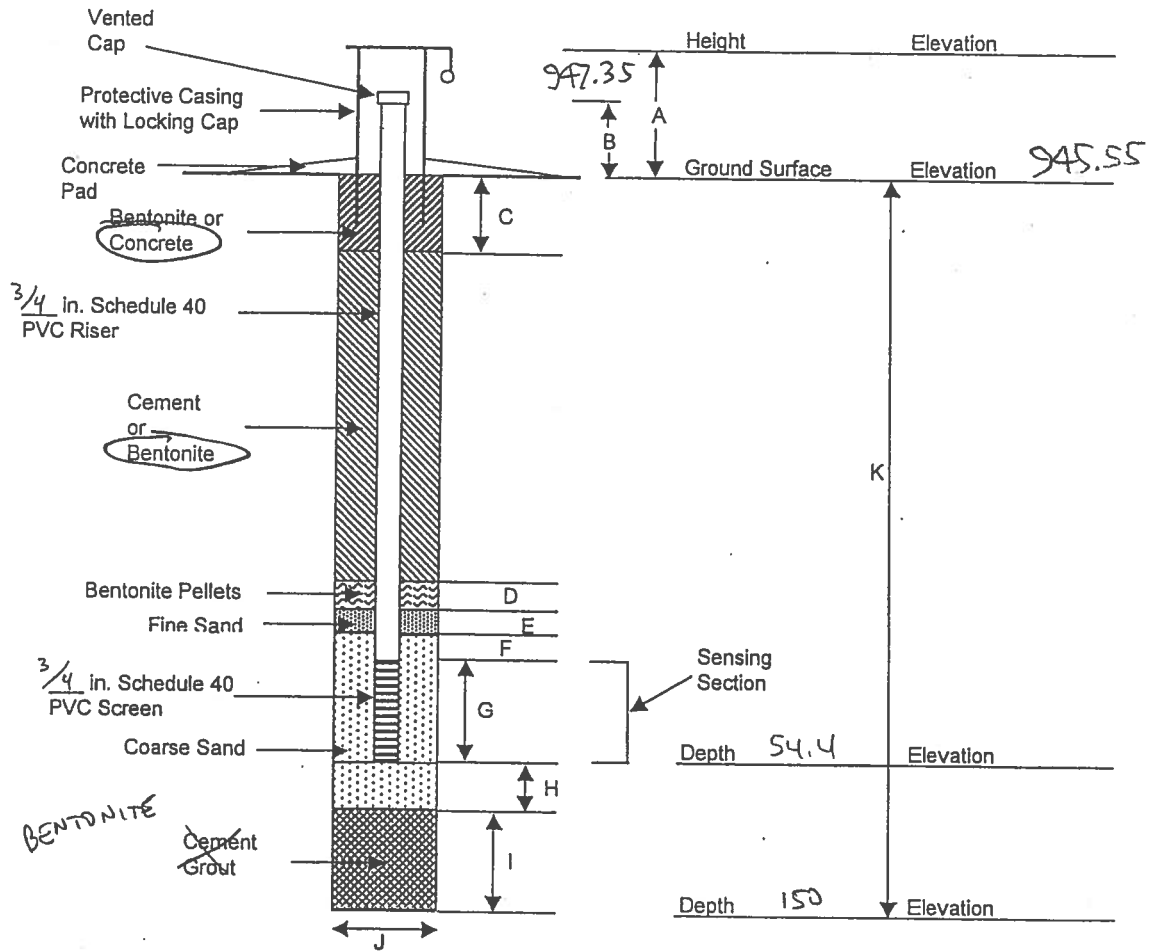
Project No. C040384.40-01

Date 19 MAR 2005

Engineer/Geologist DBS

Well No. B-0517

N 542185.2965
E 1725391.3276



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.3	1.8	14	—	—	30.4
G	H	I	J	K	
10	2	93.6	0.25	150	

Remarks PACKER ASSEMBLY STUCK IN HOLE. SALVAGED
UPPER PACKER AND PUMP. PUSHED REMAINDER DOWN HOLE.

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project REAR 3/4 COMP. AMAS PDR. S. F. RST

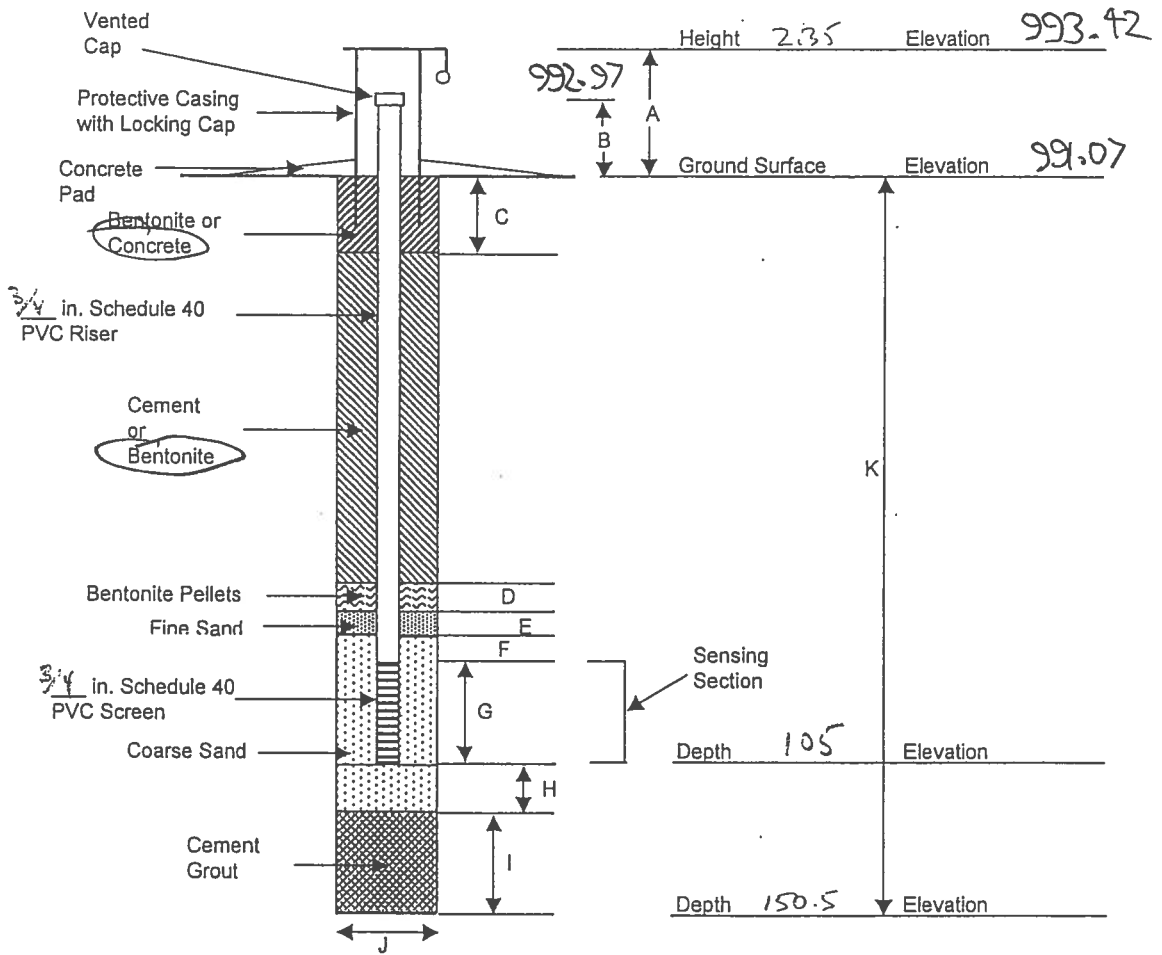
Project No. 0040384.43-01

Date 19 MAY 2005

Engineer/Geologist DBS

Well No. B-0517

N 543 732. 8856
E 1725136. 5233



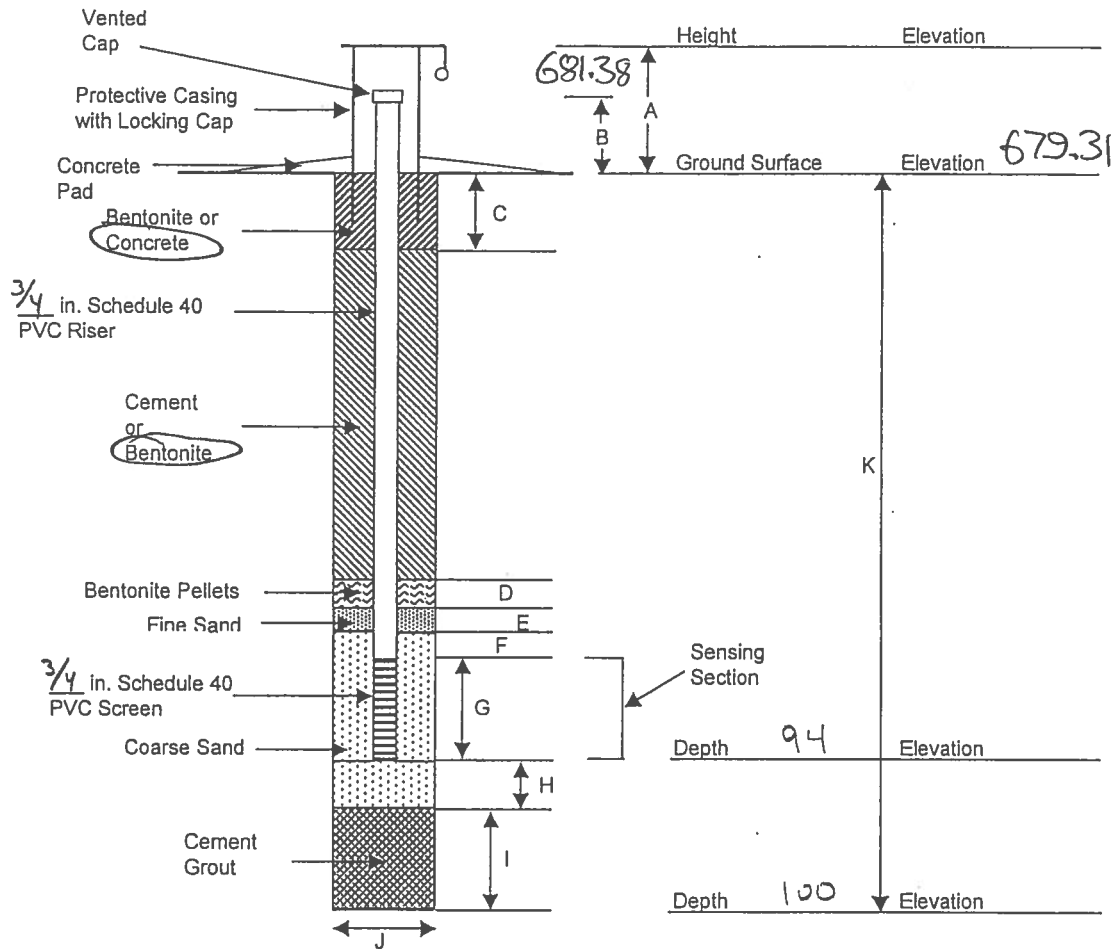
STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.35	14	15	—	—	80
G	H	I	J	K	
10	3	42.5	0.25	150.5	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project ARETA 2/3 AMOS POWER PLAN Project No. C0403.84.00-01
 Date 24 MAY 2005 Engineer/Geologist DBS Well No. B-0520
N 542378.3755
E 172739.7942



STANDPIPE PIEZOMETER INSTALLATION SKETCH

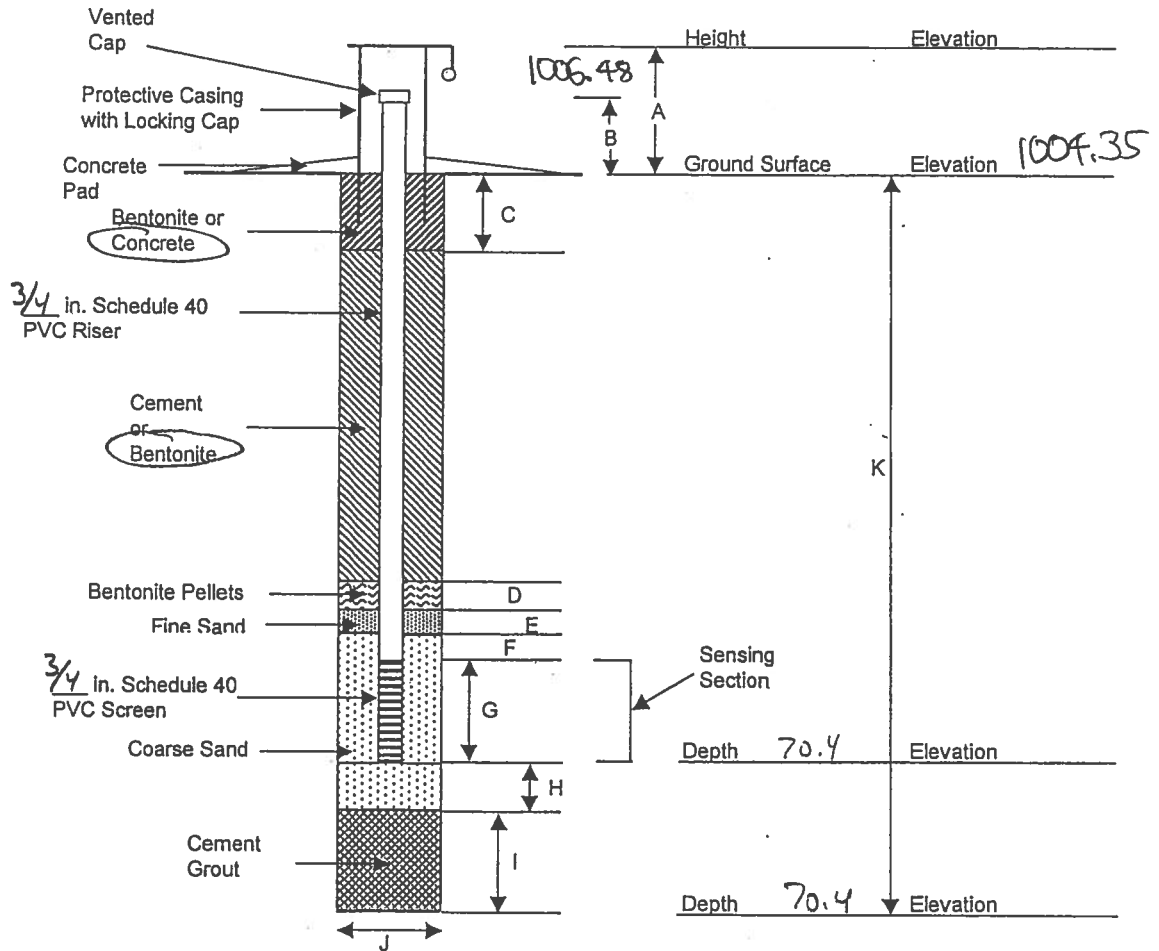
DIMENSIONS (Feet)					
A	B	C	D	E	F
2.4	2.07	34	—	—	50
G	H	I	J	K	
10	2	4	0.25	100	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA #3, AMOS POWER PLANT Project No. C040384.40-01
Date 23 MAY 2005 Engineer/Geologist DBS Well No. B-0521

N 544199.5521
E 174094.5791



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.58	2.13	12.4	—	—	48
G	H	I	J	K	
10	—	—	0.25	70.4	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT

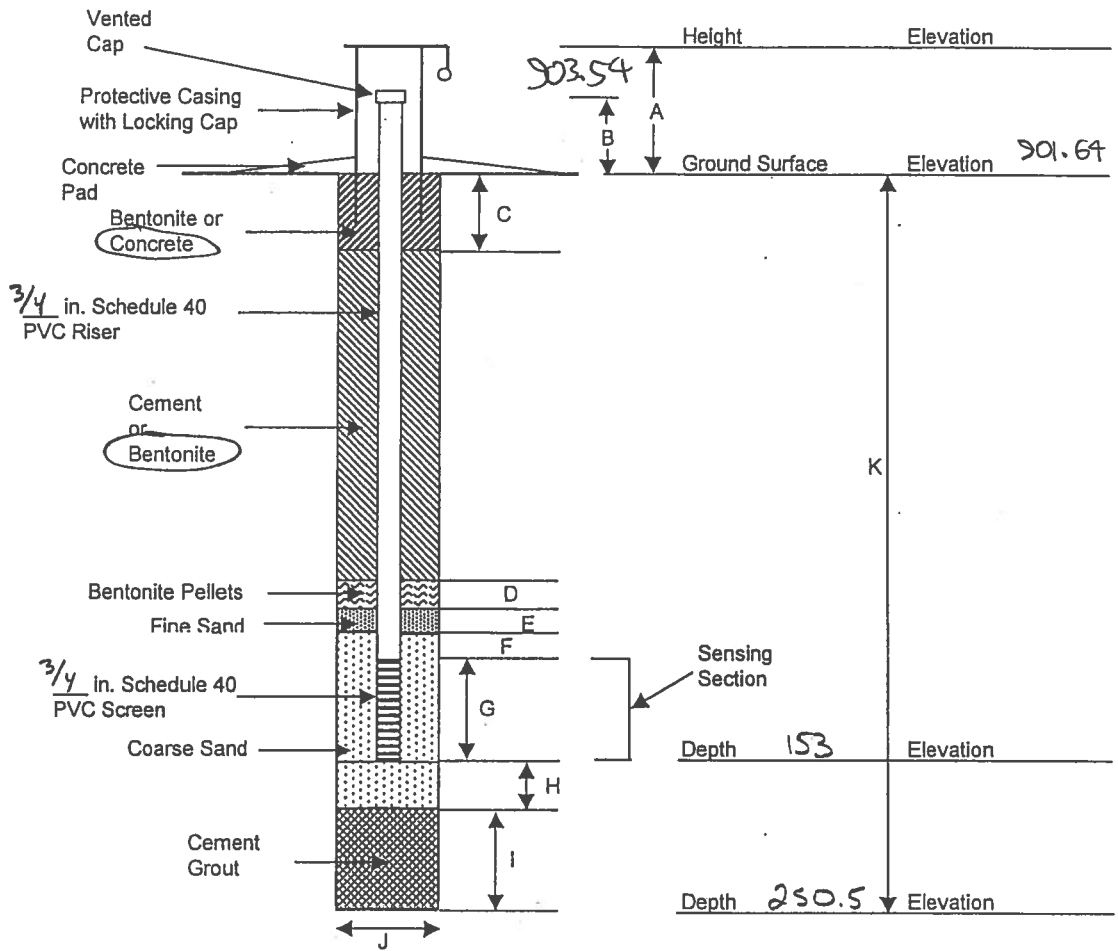
Project No. C040384.40-01

Date 25/26 MAY 2005

Engineer/Geologist DBS

Well No. B-0522

N 543873.4417
E 172326.4148



STANDPIPE PIEZOMETER INSTALLATION SKETCH

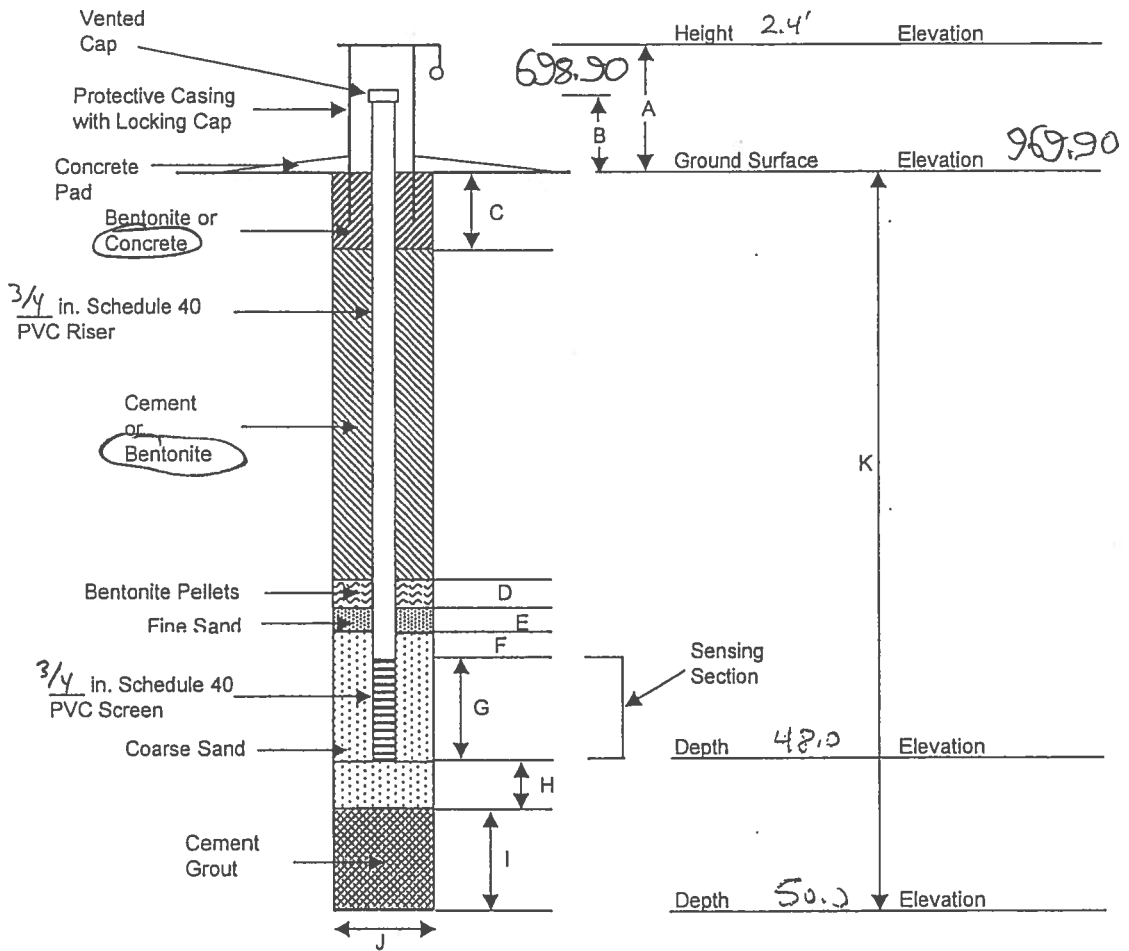
DIMENSIONS (Feet)					
A	B	C	D	E	F
2.18	1.9	35	←	←	98
G	H	I	J	K	
20	2	95.5	0.25	250.5	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMOS POWER PLANT Project No. C040384.40-01
Date 25 MAY 2005 Engineer/Geologist DPS Well No. B-0523

N 542742.2422
E 1722248.6749



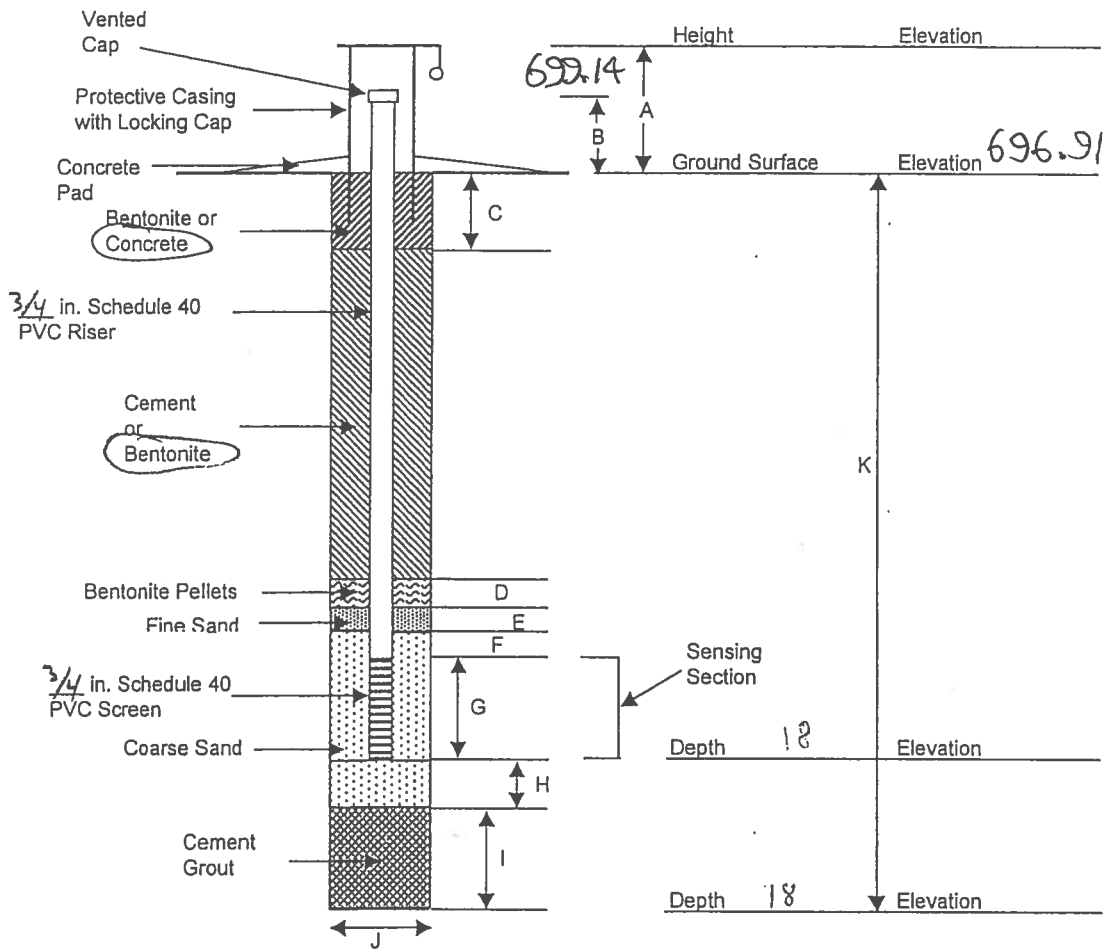
STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.4	2.0	24	-	-	14
G	H	I	J	K	
10	2	-	0.25	50.0	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3, AMOS POWER PLANT Project No. C040324.43-01
 Date 25 MAY 2005 Engineer/Geologist D.B.S. Well No. B-0524
N 542745.0961
E 172251.4149



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.55	2.23	3	-	-	5
G	H	I	J	K	
10	-	-	0.25	18	

Remarks _____

MONITORING WELL CONSTRUCTION DIAGRAM
(Not to Scale)

Project AREA 2/3 AMMS FORMAL PLANT

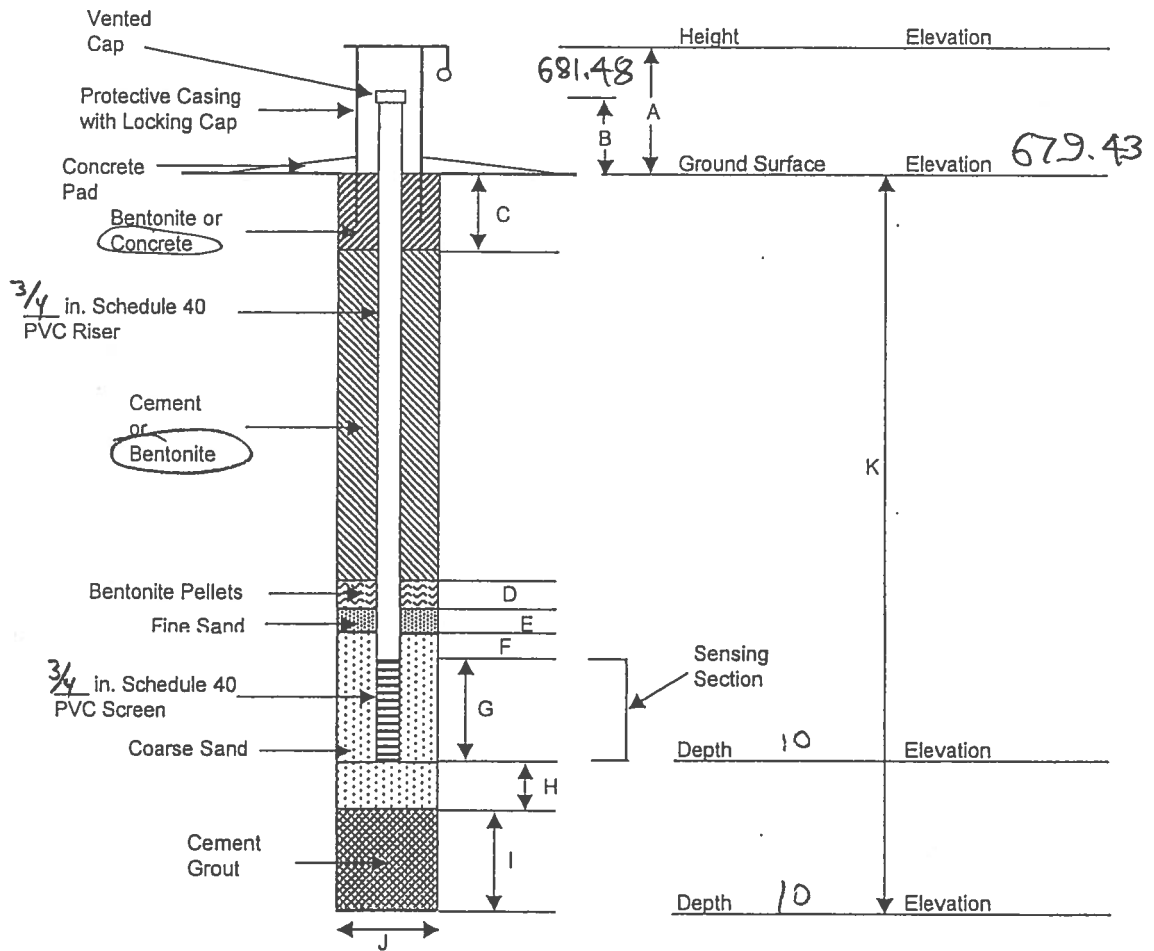
Project No. 6040384.120-01

Date 25 MAY 2005

Engineer/Geologist DBS

Well No. B-0525

N 542379.9472
E 1721745.3670



STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)					
A	B	C	D	E	F
2.3	2.05	2	-	-	3
G	H	I	J	K	
5	0	-	0.25	10	

Remarks _____

Well No: 05-36/MW-1

Project: John E. Amos Power Plant

Well Tag: 0275-24-05

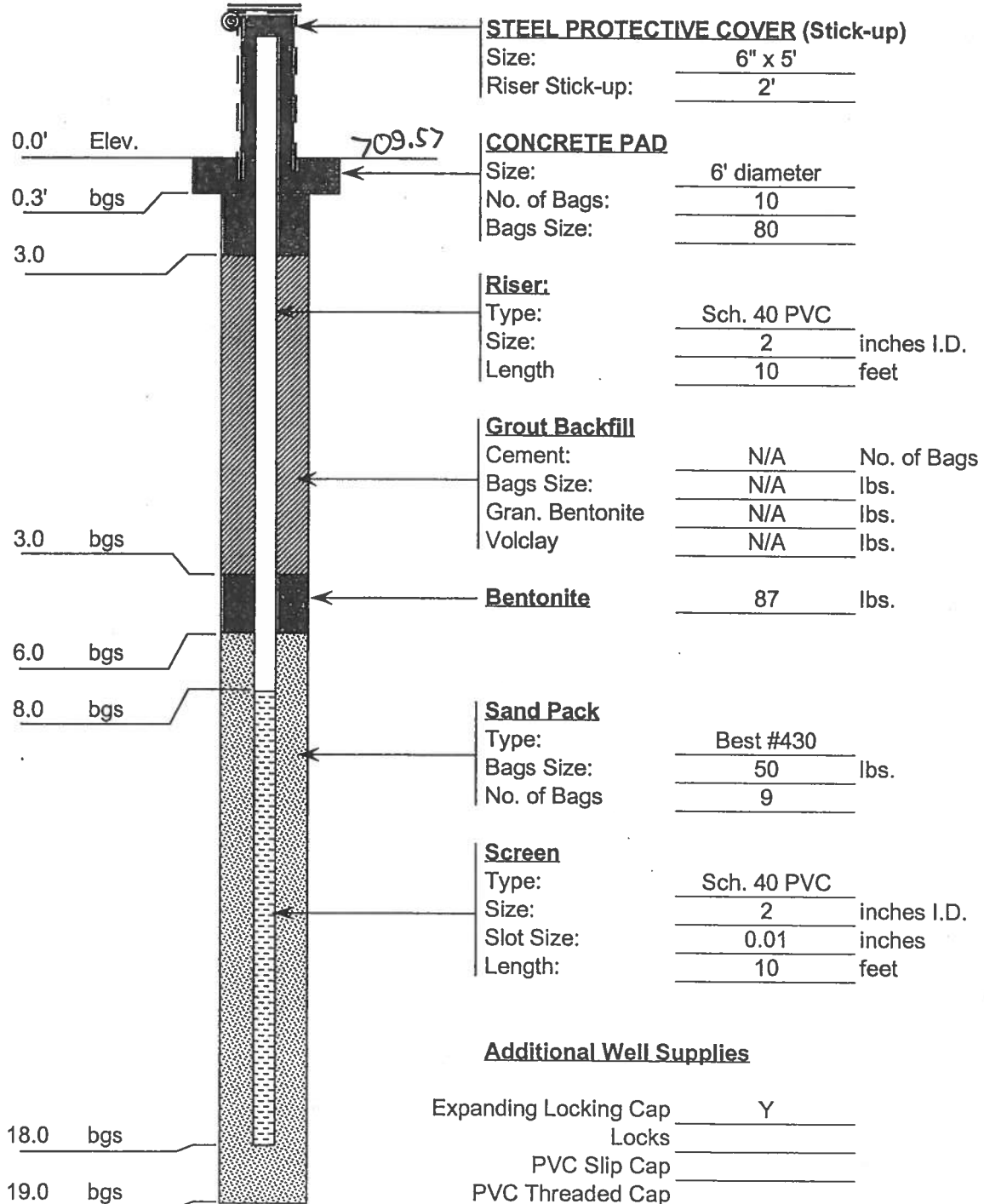
TTI Proj. No: 05639

Date Installed: 07/12/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 28' 41.8"

Longitude: W 081° 51' 33.8"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

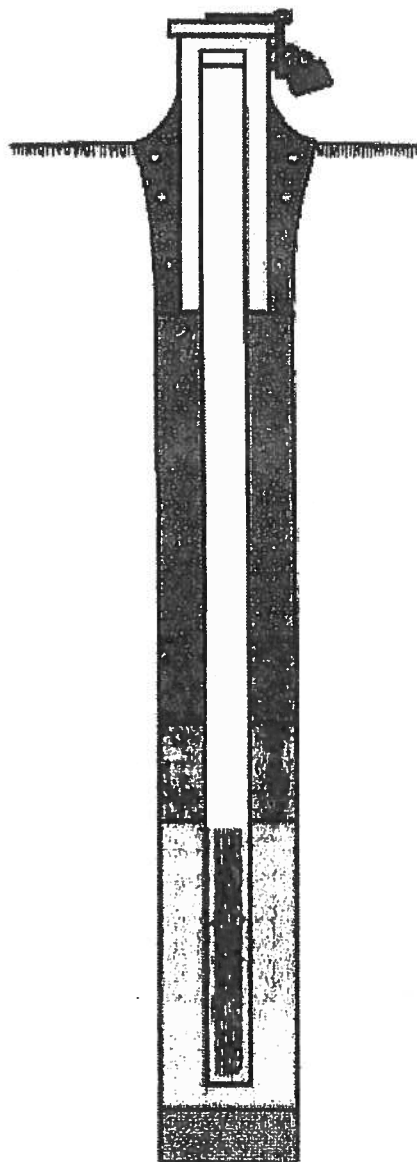
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0024-05

Site Name/Physical Address:		Well Registration No. WV00275-0024-05	Purpose of Monitoring Well:
Site:	Proposed Landfill	Grid Location:	Monitor Groundwater
Line 1:	Area 2/3	a. Latitude:	38 28 41 ..8
Line 2:	Blue Lick Road	b. Longitude:	81 51 33 ..8
City:	Windfield	c. Method Used:	GPS
State:	WV		
Zip:	25213-	Company/Project Well No.:	
County:	Putnam	05839/05-36-MW-1	
Well Owner (Name, Firm, Address):		Installed By (Name, Firm, Address):	
Owner:	Tom Carroll	Installer:	Yern Curtis / Douglas Novotny
Line 1:	John E. Amos Power Plant	Line 1:	Terra Testing, Inc.
Line 2:	1530 Winfield Road	Line 2:	260 Meadowlands Boulevard
City:	Windfield	City:	Washington
State:	WV	State:	PA
Zip:	25213-	Zip:	15301-
Phone:	304-759-3156	Phone:	724-746-9100
		Date Well Installed:	07/12/2005
		Driller's WV Cert No.	WV00275

Section B: (all number fields must be in decimal format)

- 1.Cap and Lock: YES
- 2.Protective Cover: Protective Cover Pipe
- 3.Monitoring Well Reference Point: 0 ft.
- 4.Borehole Diameter: 4 inches.
- 5.Ground Surface Seal:
 - a.Material: concrete
 - b.Installation Procedure: Hand Mixed
- 6.Surface Seal Bottom/Annular Space Top: 3 ft.
- 7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID Well Riser: 2 inches.
 - c.Material: PVC
 - d.Installation Procedure: Thru Augers & Open Bedrock Hole
- 8.Annular Space Seal:
 - a.Material: not applicable -
 - b.Installation Procedure: pour
- 9.Well Development Procedure: other - By Client
- 10.Drilling Method Used: percussion -
- 11.Annular Space Seal Bottom/Filter Seal Top: 3 ft.
- 12.Drilling Fluid Used: Yes Source: Air
- 13.Filter Pack Seal:
 - a.Material: bentonite pellet
 - b.Installation Procedure: Gravity Fed
 - c.Volume Added: 87 pounds
- 14.Bottom of Bentonite Seal/Filter Pack Top: 6 ft.
- 15.Depth to Top of Screen: 8 ft.
- 16.Screen:
 - a.Material: PVC
 - b.Installation Procedure: Thru Augers & Open Bedrock Hole
 - c.Slot Size: .01 inches. d.Screen Length: 10 ft.
- 17.Filter Pack:
 - a.Material: medium sand
 - b.Installation Procedure: Gravity Fed
- 18.Well Depth: 18 ft.
- 19.Bottom of Filter Pack: 19 ft.
- 20.Bottom of Borehole: 19 ft.
- 21.Backfill Material (below filter pack): Sand
- 22.Decontamination Procedures: None
- 23.Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24.WV Contractor License No. WV002350



Well No: 05-35/MW-2

Project: John E. Amos Power Plant

Well Tag: 0275-25-05

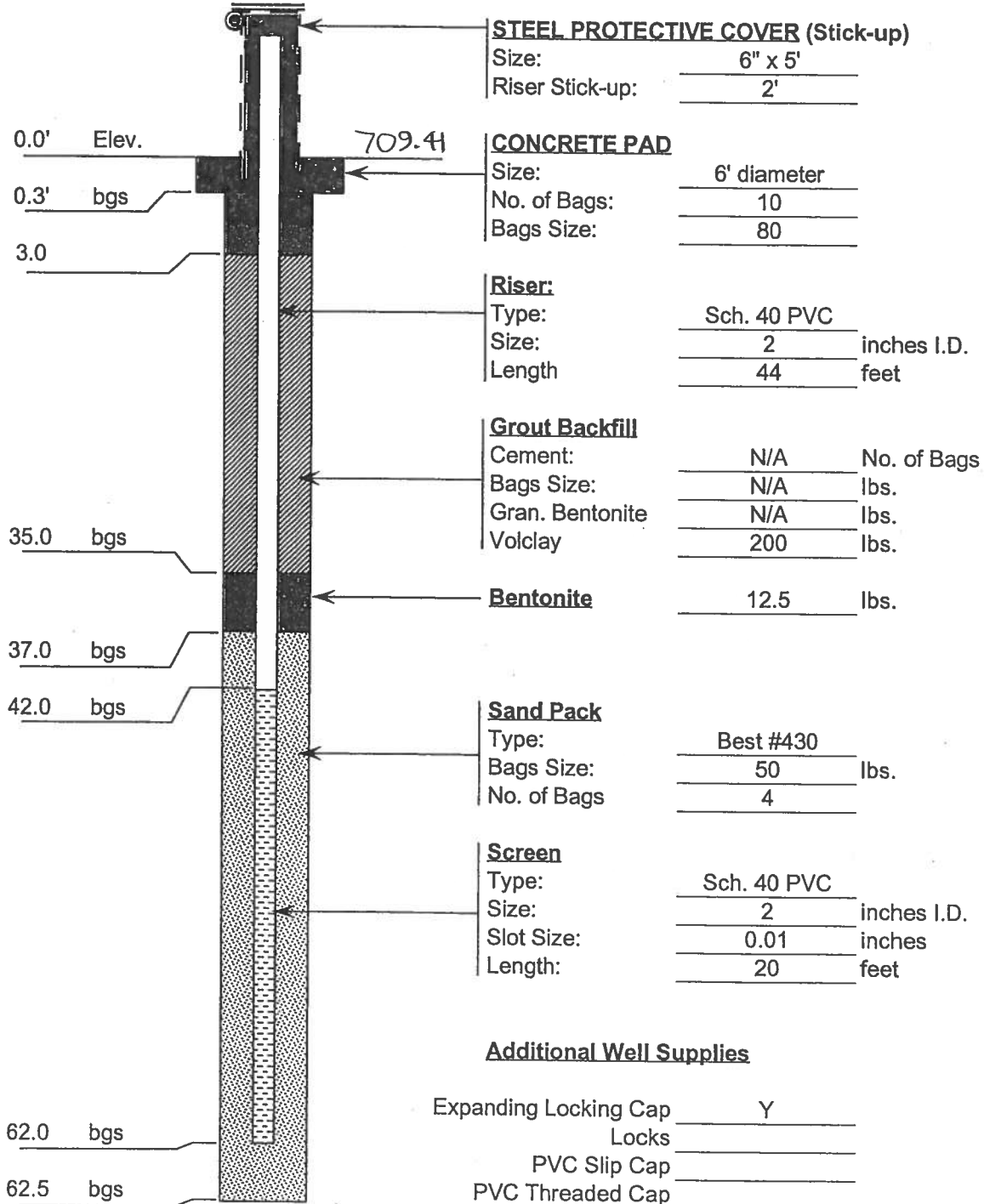
TTI Proj. No: 05639

Date Installed: 07/12/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 28' 41.8"

Longitude: W 081° 51' 33.3"



STEEL PROTECTIVE COVER (Stick-up)

Size: 6" x 5'
Riser Stick-up: 2'

CONCRETE PAD

Size: 6' diameter
No. of Bags: 10
Bags Size: 80

Riser:

Type: Sch. 40 PVC
Size: 2 inches I.D.
Length: 44 feet

Grout Backfill

Cement:	N/A	No. of Bags
Bags Size:	N/A	lbs.
Gran. Bentonite	N/A	lbs.
Volclay	200	lbs.

Bentonite

12.5 lbs.

Sand Pack

Type: Best #430
Bags Size: 50 lbs.
No. of Bags: 4

Screen

Type: Sch. 40 PVC
Size: 2 inches I.D.
Slot Size: 0.01 inches
Length: 20 feet

Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

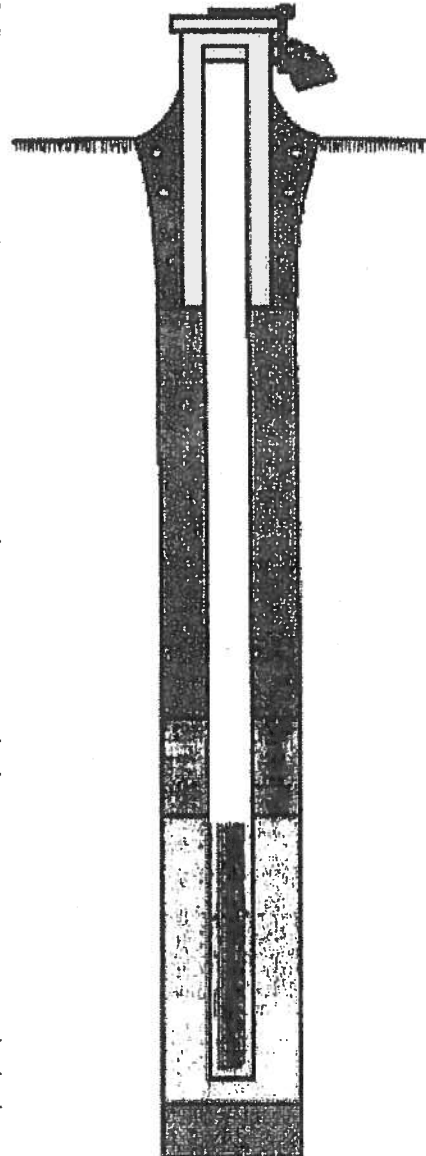
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0025-05

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0025-05 Grid Location: a. Latitude: 38 28 41 ..8 b. Longitude: 81 51 33 ..3 c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-35-MW-2 Installed By (Name, Firm, Address): Installer: Tom Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 07/12/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

1. Cap and Lock:	YES
2. Protective Cover:	Protective Cover Pipe
3. Monitoring Well Reference Point:	0 ft.
4. Borehole Diameter:	4 inches.
5. Ground Surface Seal: a. Material: concrete b. Installation Procedure: Hand Mixed	
6. Surface Seal Bottom/Annular Space Top:	3 ft.
7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches. c. Material: PVC d. Installation Procedure: Thru Augers & Open Bedrock Hole	
8. Annular Space Seal: a. Material: high solids grout - b. Installation Procedure: pour	
9. Well Development Procedure: other - By Client	
10. Drilling Method Used: percussion -	
11. Annular Space Seal Bottom/Filter Seal Top:	35 ft.
12. Drilling Fluid Used: Yes Source: Air	
13. Filter Pack Seal: a. Material: bentonite pellet b. Installation Procedure: Gravity Fed c. Volume Added: 12.5 pounds	
14. Bottom of Bentonite Seal/Filter Pack Top:	37 ft.
15. Depth to Top of Screen:	42 ft.
16. Screen: a. Material: PVC b. Installation Procedure: Thru Augers & Open Bedrock Hole c. Slot Size: .01 inches. d. Screen Length: 20 ft.	
17. Filter Pack: a. Material: medium sand b. Installation Procedure: Gravy Fed	
18. Well Depth:	62 ft.
19. Bottom of Filter Pack:	62.5 ft.
20. Bottom of Borehole:	62.5 ft.
21. Backfill Material (below filter pack): sand	
22. Decontamination Procedures: None	
23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05	
24. WV Contractor License No. WV002350	



Well No: 05-27/MW-3

Project: John E. Amos Power Plant

Well Tag: 0275-26-05

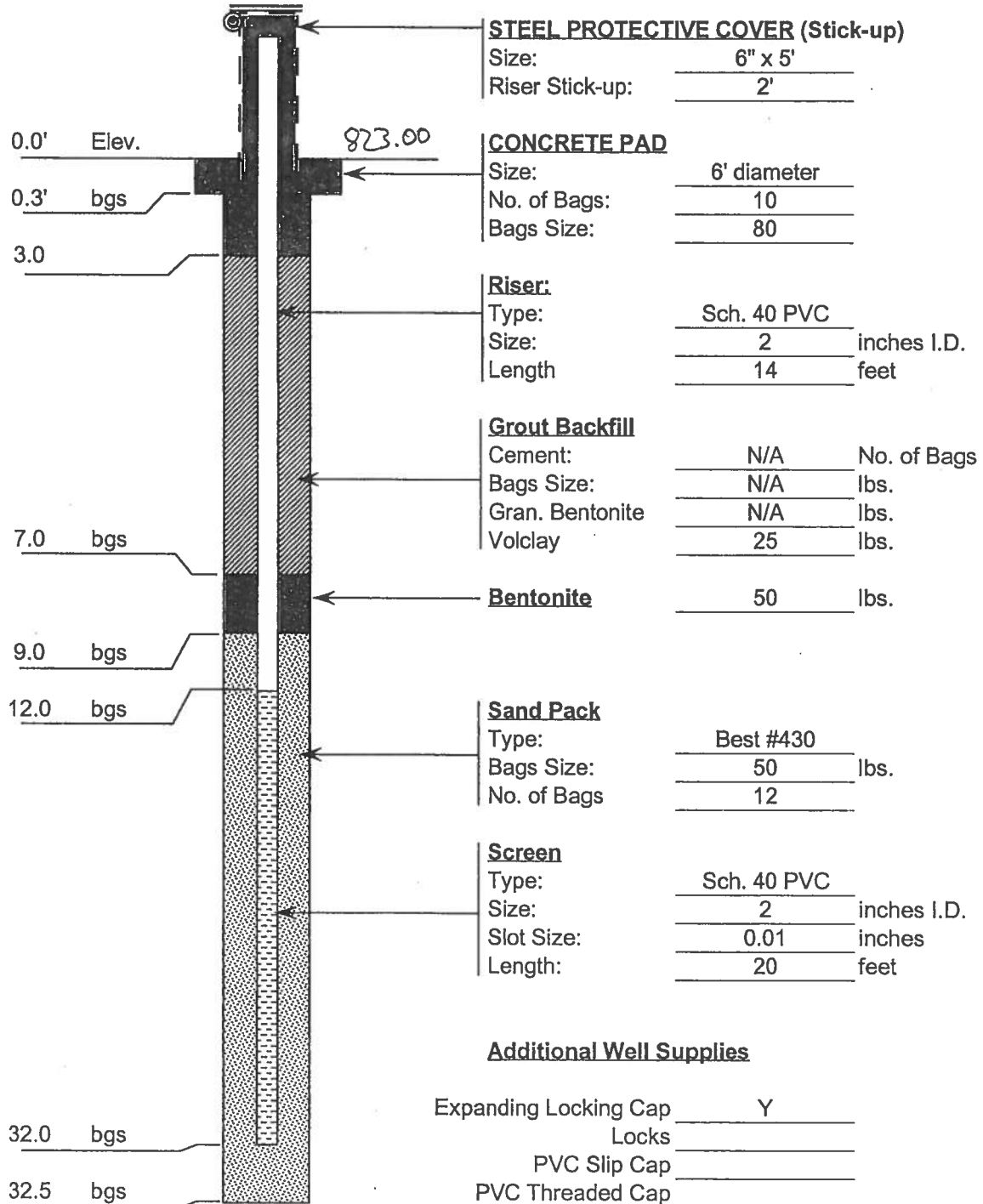
TTI Proj. No: 05639

Date Installed: 06/27/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 04.4"

Longitude: W 081° 51' 13.5"



STEEL PROTECTIVE COVER (Stick-up)

Size: 6" x 5'
Riser Stick-up: 2'

CONCRETE PAD

Size: 6' diameter
No. of Bags: 10
Bags Size: 80

Riser:

Type: Sch. 40 PVC
Size: 2 inches I.D.
Length: 14 feet

Grout Backfill

Cement: N/A No. of Bags
Bags Size: N/A lbs.
Gran. Bentonite: N/A lbs.
Volclay: 25 lbs.

Bentonite

50 lbs.

Sand Pack

Type: Best #430
Bags Size: 50 lbs.
No. of Bags: 12

Screen

Type: Sch. 40 PVC
Size: 2 inches I.D.
Slot Size: 0.01 inches
Length: 20 feet

Additional Well Supplies

Expanding Locking Cap Y
Locks _____
PVC Slip Cap _____
PVC Threaded Cap _____
PVC Bottom Plug Y
Auger Plugs _____
No. of 55-gallon Drums Used _____
No of Guard Posts Used _____

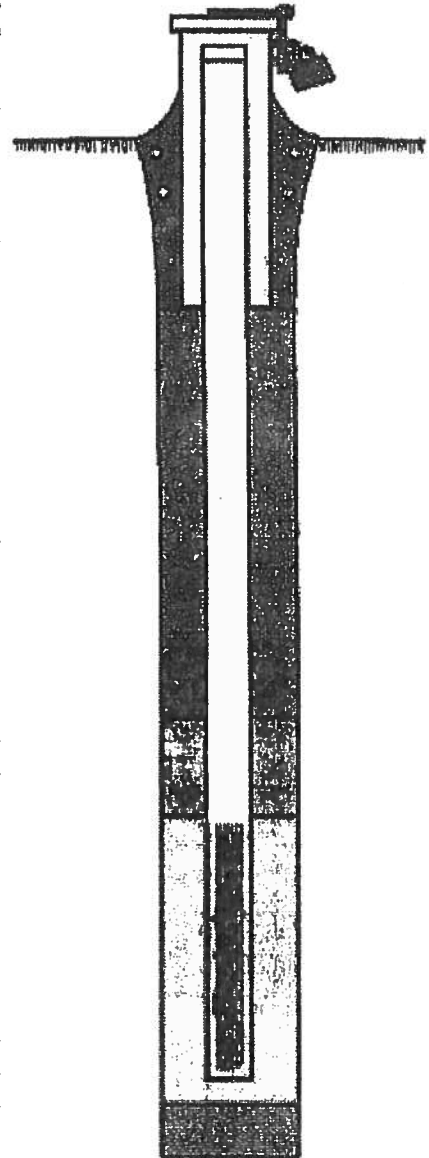
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0026-05

Site Name/Physical Address:		Well Registration No. WV00275-0026-05	Purpose of Monitoring Well:
Site:	Proposed Landfill	Grid Location:	Monitor Groundwater
Line 1:	Area 2/3	a. Latitude:	38 29 4 .4
Line 2:	Blue Lick Road	b. Longitude:	81 51 13 .5
City:	Windfield	c. Method Used:	GPS
State:	WV	Company/Project Well No.:	
Zip:	25213-	05639/05-27-MW-3	
County:	Putnam	Installed By (Name, Firm, Address):	
Well Owner (Name, Firm, Address):		Installer:	Tom Curtis / Douglas Novotny
Owner:	Tom Carroll	Line 1:	Terra Testing, Inc.
Line 1:	John E. Amos Power Plant	Line 2:	260 Meadowlands Boulevard
Line 2:	1530 Winfield Road	City:	Washington
City:	Windfield	State:	PA
State:	WV	Zip:	15301-
Zip:	25213-	Phone:	724-746-9100
Phone:	304-759-3156	Date Well Installed:	
		06/27/2005	
		Driller's WV Cert No.	
		WV00275	

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
 - a. Material: concrete
 - b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
 - c. Material: PVC
 - d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
 - a. Material: high solids grout -
 - b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 7 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
 - a. Material: bentonite pellet
 - b. Installation Procedure: Gravity Fed
 - c. Volume Added: 50 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 9 ft.
- 15. Depth to Top of Screen: 12 ft.
- 16. Screen:
 - a. Material: PVC
 - b. Installation Procedure: Thru Augers & Open Bedrock Hole
 - c. Slot Size: .01 inches. d. Screen Length: 20 ft.
- 17. Filter Pack:
 - a. Material: medium sand
 - b. Installation Procedure: Gravity fed
- 18. Well Depth: 32 ft.
- 19. Bottom of Filter Pack: 32.5 ft.
- 20. Bottom of Borehole: 32.5 ft.
- 21. Backfill Material (below filter pack): sand
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350



Well No: 05-32/MW-4

Project: John E. Amos Power Plant

Well Tag: 0275-27-05

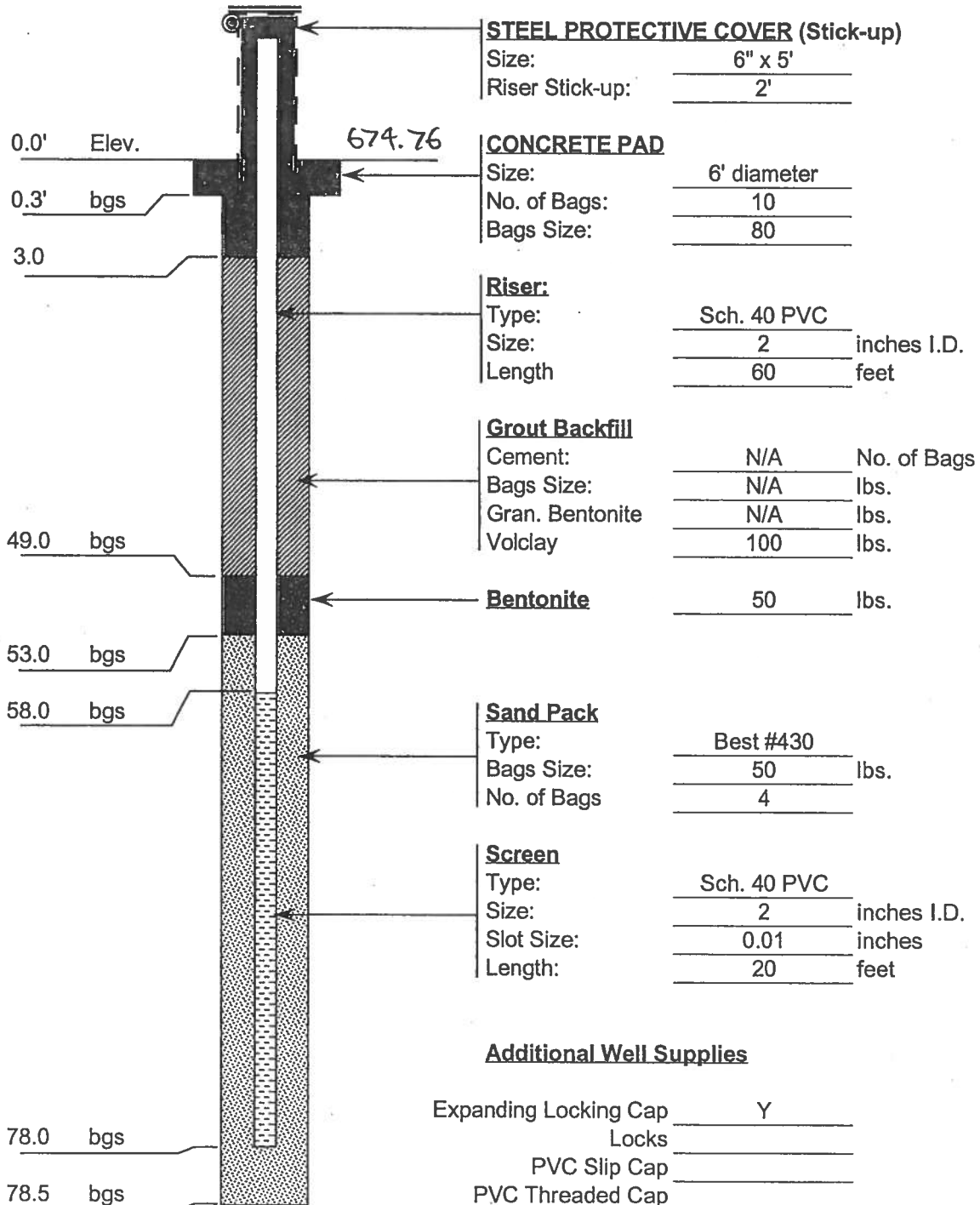
TTI Proj. No: 05639

Date Installed: 07/07/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 10.03"

Longitude: W 081° 51' 45.0"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

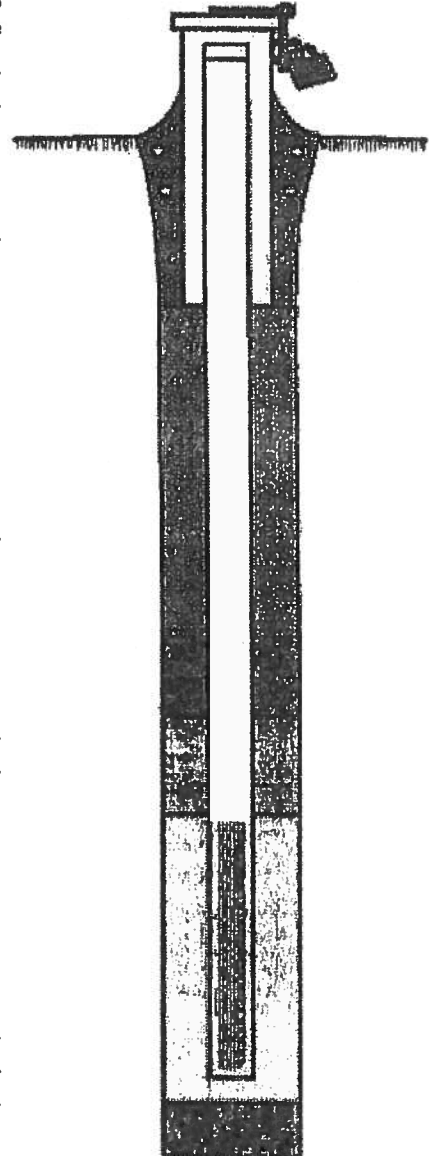
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0027-05

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0027-05 Grid Location: a. Latitude: 38 29 10 .03 b. Longitude: 81 51 45 . c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-32-MW-4 Installed By (Name, Firm, Address): Installer: Tom Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 07/07/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

- 1.Cap and Lock: YES
- 2.Protective Cover: Protective Cover Pipe
- 3.Monitoring Well Reference Point: 0 ft.
- 4.Borehole Diameter: 4 inches.
- 5.Ground Surface Seal:
a.Material: concrete
b.Installation Procedure: Hand Mixed
- 6.Surface Seal Bottom/Annular Space Top: 3 ft.
- 7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID Well Riser: 2 inches.
c.Material: PVC
d.Installation Procedure: Thru Augers & Open Bedrock Hole
- 8.Annular Space Seal:
a.Material: high solids grout -
b.Installation Procedure: pour
- 9.Well Development Procedure: other - By Client
- 10.Drilling Method Used: percussion -
- 11.Annular Space Seal Bottom/Filter Seal Top: 49 ft.
- 12.Drilling Fluid Used: Yes Source: Air
- 13.Filter Pack Seal:
a.Material: bentonite pellet
b.Installation Procedure: Gravity Fed
c.Volume Added: 50 pounds
- 14.Bottom of Bentonite Seal/Filter Pack Top: 53 ft.
- 15.Depth to Top of Screen: 58 ft.
- 16.Screen:
a.Material: PVC
b.Installation Procedure: Thru Augers & Open Bedrock Hole
c.Slot Size: .01 inches. d.Screen Length: 20 ft.
- 17.Filter Pack:
a.Material: medium sand
b.Installation Procedure: Gravity Fed
- 18.Well Depth: 78 ft.
- 19.Bottom of Filter Pack: 78.5 ft.
- 20.Bottom of Borehole: 78.5 ft.
- 21.Backfill Material (below filter pack): sand
- 22.Decontamination Procedures: None
- 23.Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24.WV Contractor License No. WV002350



Well No: 05-33/MW-5

Project: John E. Amos Power Plant

Well Tag: 0275-28-05

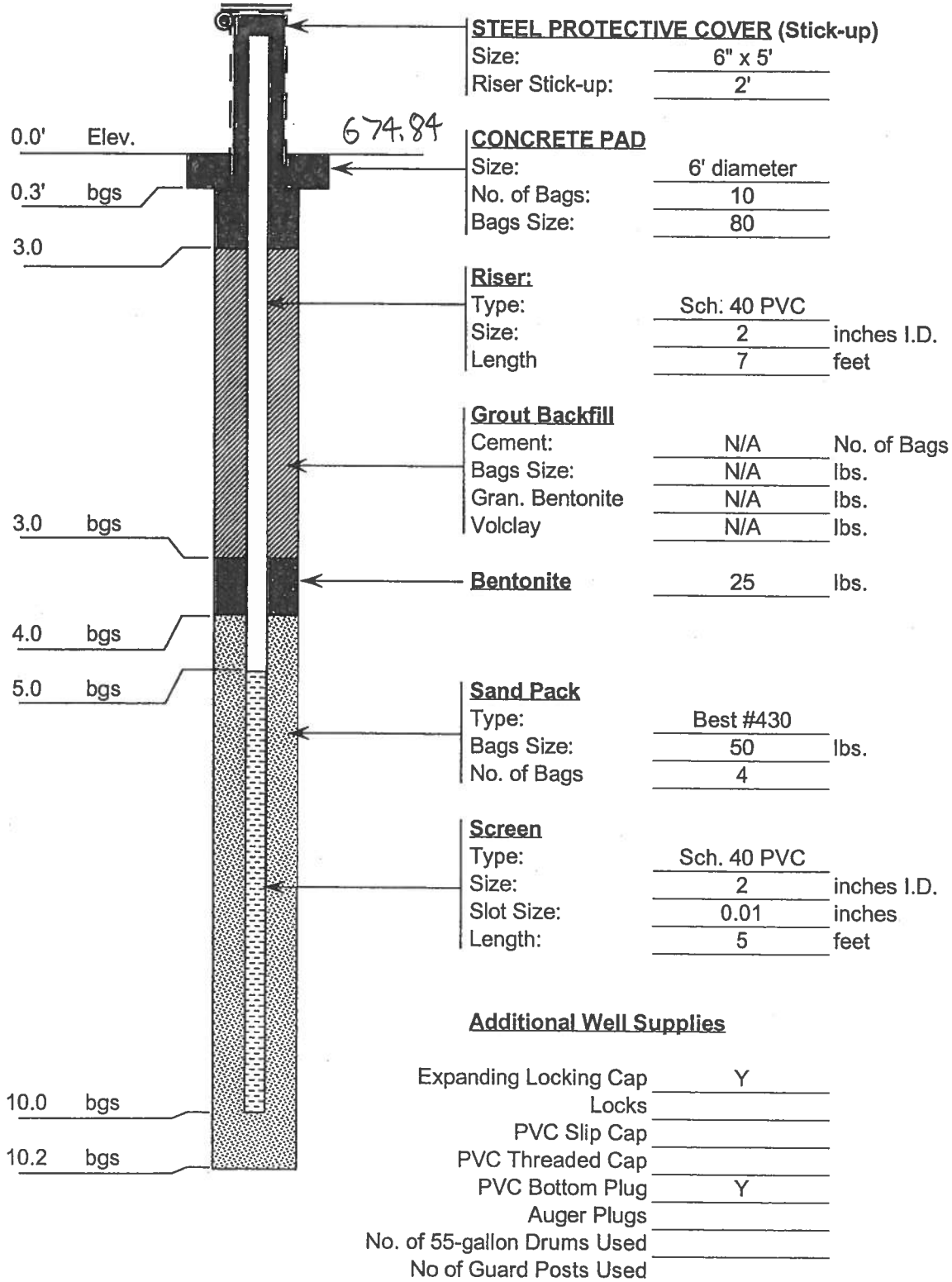
TTI Proj. No: 05639

Date Installed: 07/07/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 10.00"

Longitude: W 081° 51' 44.6"



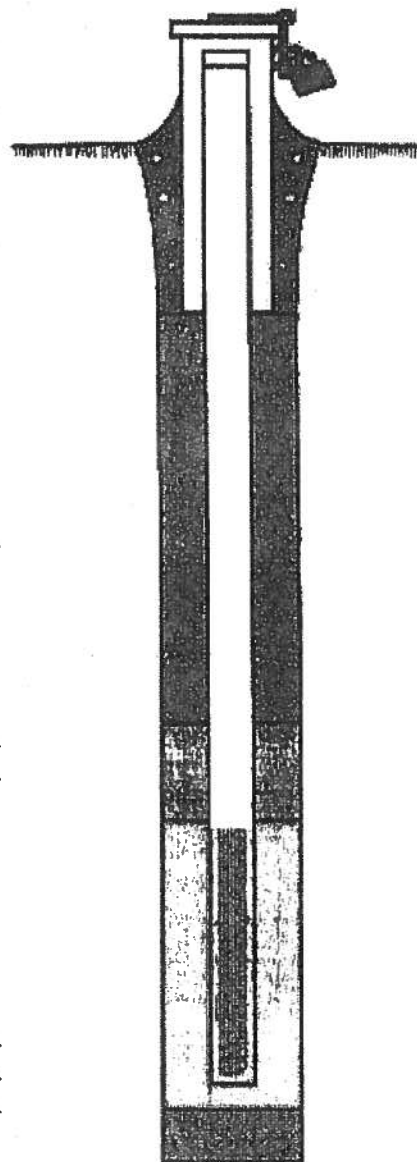
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0028-05

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0028-05 Grid Location: a. Latitude: 38 29 10 . b. Longitude: 81 51 44 .6 c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-33-MW-5 Installed By (Name, Firm, Address): Installer: Vern Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 07/07/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
 - a. Material: concrete
 - b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
- c. Material: PVC
- d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
 - a. Material: high solids grout -
 - b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 3 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
 - a. Material: bentonite pellet
 - b. Installation Procedure: Gravity Fed
 - c. Volume Added: 25 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 4 ft.
- 15. Depth to Top of Screen: 5 ft.
- 16. Screen:
 - a. Material: PVC
 - b. Installation Procedure: Thru Augers & Open Bedrock Hole
 - c. Slot Size: .01 inches. d. Screen Length: 5 ft.
- 17. Filter Pack:
 - a. Material: medium sand
 - b. Installation Procedure: Gravity Fed
- 18. Well Depth: 10 ft.
- 19. Bottom of Filter Pack: 10.2 ft.
- 20. Bottom of Borehole: 10.2 ft.
- 21. Backfill Material (below filter pack): sand
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350



Well No: 05-26/MW-6

Project: John E. Amos Power Plant

Well Tag: 0275-29-05

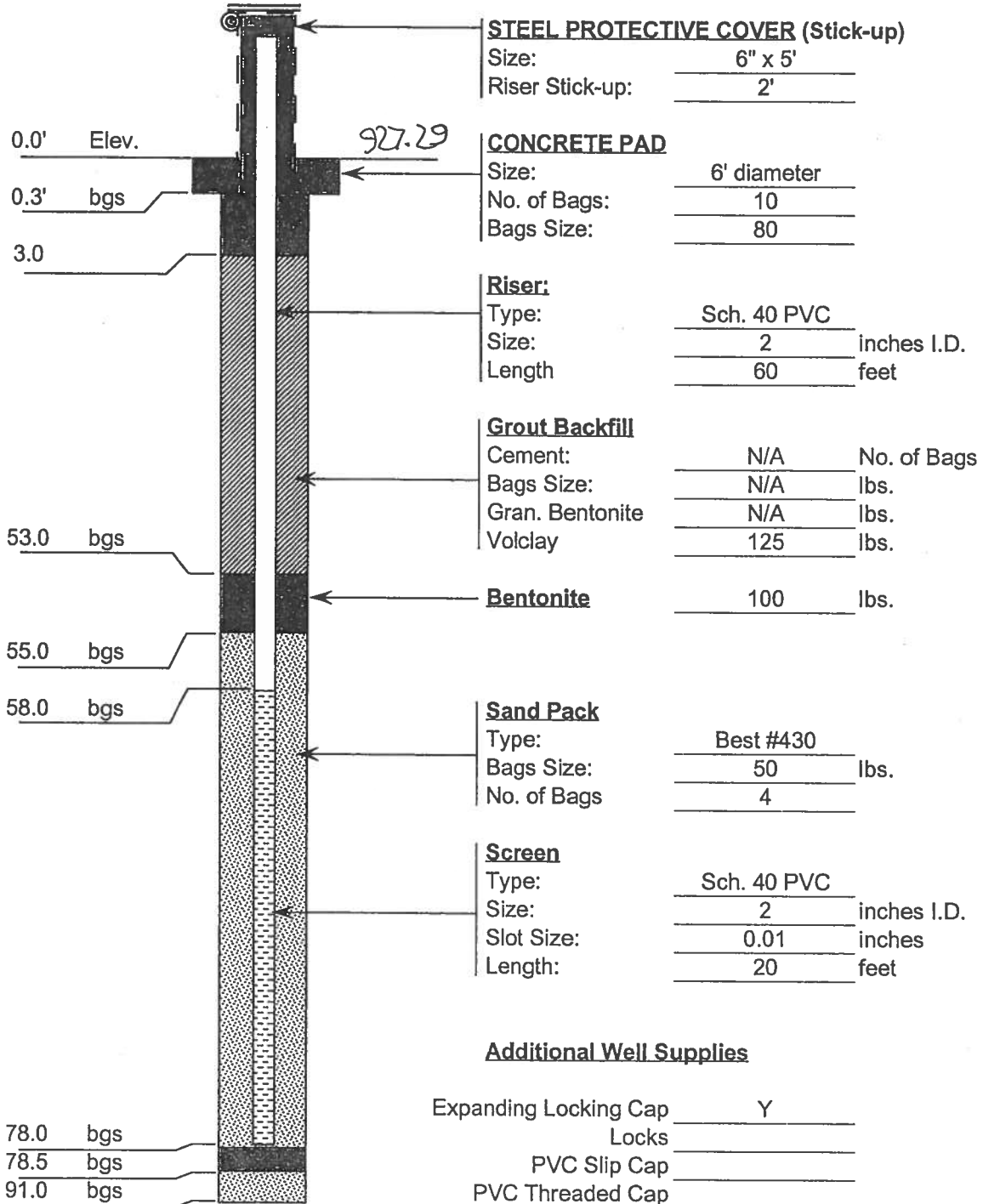
TTI Proj. No: 05639

Date Installed: 06/23/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 28' 56.1"

Longitude: W 081° 51' 30.6"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

**State of West Virginia
Department of Environmental Protection**

**Monitoring Well Construction
Well Number: WV00275-0029-05**

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0029-05 Grid Location: a. Latitude: 38 28 56 .1 b. Longitude: 81 51 30 .6 c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-26-MW-6 Installed By (Name, Firm, Address): Installer: Vern Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 280 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 06/23/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
 - a. Material: concrete
 - b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
- c. Material: PVC
- d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
 - a. Material: high solids grout -
 - b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 53 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
 - a. Material: bentonite pellet
 - b. Installation Procedure: Gravity Fed
 - c. Volume Added: 100 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 55 ft.
- 15. Depth to Top of Screen: 58 ft.
- 16. Screen:
 - a. Material: PVC
 - b. Installation Procedure: Thru Augers & Open Bedrock Hole
 - c. Slot Size: .01 inches. d. Screen Length: 20 ft.
- 17. Filter Pack:
 - a. Material: medium sand
 - b. Installation Procedure: Gravity Fed
- 18. Well Depth: 78 ft.
- 19. Bottom of Filter Pack: 78.5 ft.
- 20. Bottom of Borehole: 91 ft.
- 21. Backfill Material (below filter pack): Bentonite Pellets
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350



Well No: 05-28/MW-7

Project: John E. Amos Power Plant

Well Tag: 0275-30-05

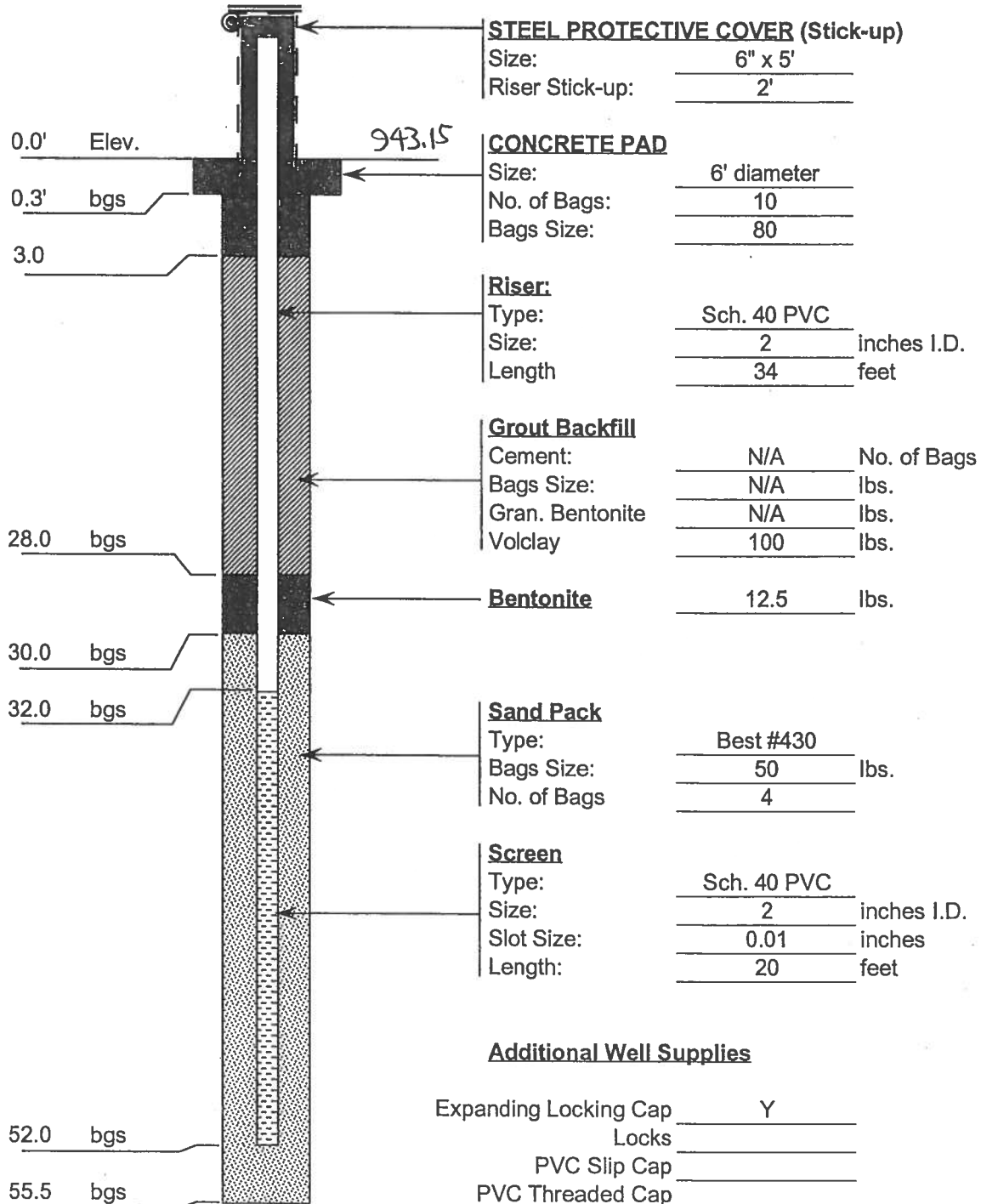
TTI Proj. No: 05639

Date Installed: 06/28/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 39° 28' 44.1"

Longitude: W 081° 51' 15.5"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

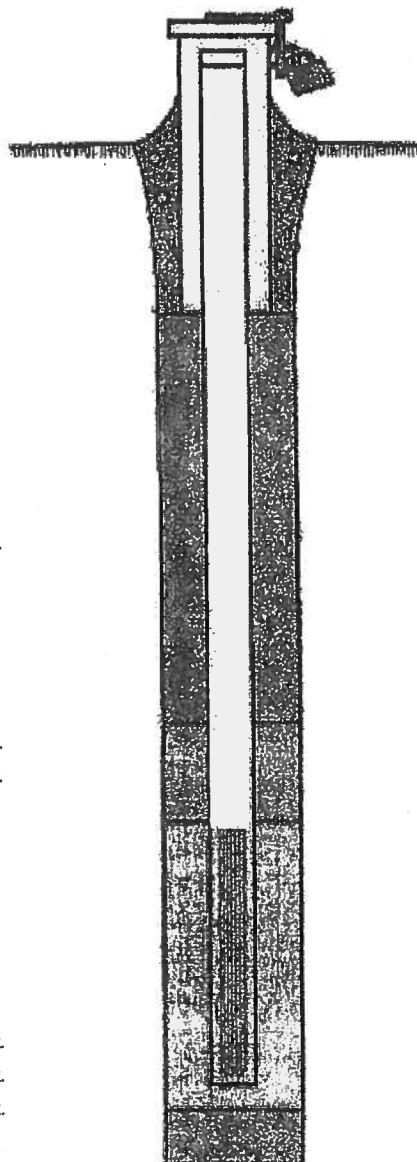
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0030-05

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0030-05 Grid Location: a. Latitude: 38 28 44 ..1 b. Longitude: 81 51 15 ..5 c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-28-MW-7 Installed By (Name, Firm, Address): Installer: Vern Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 06/28/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

- 1.Cap and Lock: YES
- 2.Protective Cover: Protective Cover Pipe
- 3.Monitoring Well Reference Point: 0 ft.
- 4.Borehole Diameter: 4 inches.
- 5.Ground Surface Seal:
a.Material: concrete
b.Installation Procedure: Hand Mixed
- 6.Surface Seal Bottom/Annular Space Top: 3 ft.
- 7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID Well Riser: 2 inches.
c.Material: PVC
d.Installation Procedure: Thru Augers & Open Bedrock Hole
- 8.Annular Space Seal:
a.Material: high solids grout -
b.Installation Procedure: pour
- 9.Well Development Procedure: other - By Client
- 10.Drilling Method Used: percussion -
- 11.Annular Space Seal Bottom/Filter Seal Top: 28 ft.
- 12.Drilling Fluid Used: Yes Source: Air
- 13.Filter Pack Seal:
a.Material: bentonite pellet
b.Installation Procedure: Gravity Fed
c.Volume Added: 12.5 pounds
- 14.Bottom of Bentonite Seal/Filter Pack Top: 30 ft.
- 15.Depth to Top of Screen: 32 ft.
- 16.Screen:
a.Material: PVC
b.Installation Procedure: Thru Augers & Open Bedrock Hole
c.Slot Size: .01 inches. d.Screen Length: 20 ft.
- 17.Filter Pack:
a.Material: medium sand
b.Installation Procedure: Gravity Fed
- 18.Well Depth: 52 ft.
- 19.Bottom of Filter Pack: 55.5 ft.
- 20.Bottom of Borehole: 55.5 ft.
- 21.Backfill Material (below filter pack): sand
- 22.Decontamination Procedures: None
- 23.Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24.WV Contractor License No. WV002350



State of West Virginia Department of Environmental Protection		Monitoring Well Construction Well Number: 00015-0018-08 Approved
Site Name/Physical Address: Site: John E. Amos FGD Landfill Line 1: 1530 Winfield Road Line 2: City: Winfield State: WV Zip: 25213- County: Putnam	Well Registration No. 00015-0-18-0- Grid Location: a. Latitude: 38 28 46 .0 b. Longitude: 81 51 22 .0 c. Method Used: GPS Company/Project Well No.: MW-7R	Purpose of Monitoring Well: Assessment Date Well Installed: 04/14/2008 Driller's WV Cert No. RoushM31
Well Owner (Name, Firm, Address): Owner: American Electric Power Line 1: 1 Riverside Plaza Line 2: City: Columbus State: OH Zip: 43215- Phone: 614-836-4200	Installed By (Name, Firm, Address): Installer: AEP Dolan Lab Line 1: 4001 Bixby Road Line 2: City: Groveport State: OH Zip: 43125- Phone: 614-836-4200	
Section B: (all number fields must be in decimal format)		
1. Cap and Lock: 2. Protective Cover: 3. Monitoring Well Reference Point: 4. Borehole Diameter: 5. Ground Surface Seal: a. Material: concrete b. Installation Procedure: Formed 7' x 7' Pad Arrow Concrete 6. Surface Seal Bottom/Annular Space Top: 7. Well Riser: a. OD Well Riser: 2.25 inches. b. ID Well Riser: 2 inches. c. Material: PVC d. Installation Procedure: Hand Set w/Drill 8. Annular Space Seal: a. Material: bentonite powder - b. Installation Procedure: tremie pipe-gravity 9. Well Development Procedure: airlift - 10. Drilling Method Used: air rotary - 11. Annular Space Seal Bottom/Filter Seal Top: 12. Drilling Fluid Used: Yes Source: Water 13. Filter Pack Seal: a. Material: bentonite pellet b. Installation Procedure: Gravity Fed c. Volume Added: 100 pounds 14. Bottom of Bentonite Seal/Filter Pack Top: 15. Depth to Top of Screen: 16. Screen: a. Material: PVC b. Installation Procedure: Hand Set w/Centralizers c. Slot Size: 0.02 inches. d. Screen Length: 20 ft. 17. Filter Pack: a. Material: coarse sand b. Installation Procedure: Gravity 18. Well Depth: 19. Bottom of Filter Pack: 20. Bottom of Borehole: 21. Backfill Material (below filter pack): #4 Quartz 22. Decontamination Procedures: Niqui-Nox and High Pressure Water Pump 23. Special Circumstances and Exceptions: No Variance Number: 24. WV Contractor License No. 00015	YES Protective Cover Pipe 0 ft. 6 inches. 1 ft. 53.1 ft. 60.2 ft. 64.1 ft. 84.6 ft. 86.8 ft. 86.8 ft.	

Well No: 05-34/MW-1108

Project: John E. Amos Power Plant

Well Tag: 0275-33-05

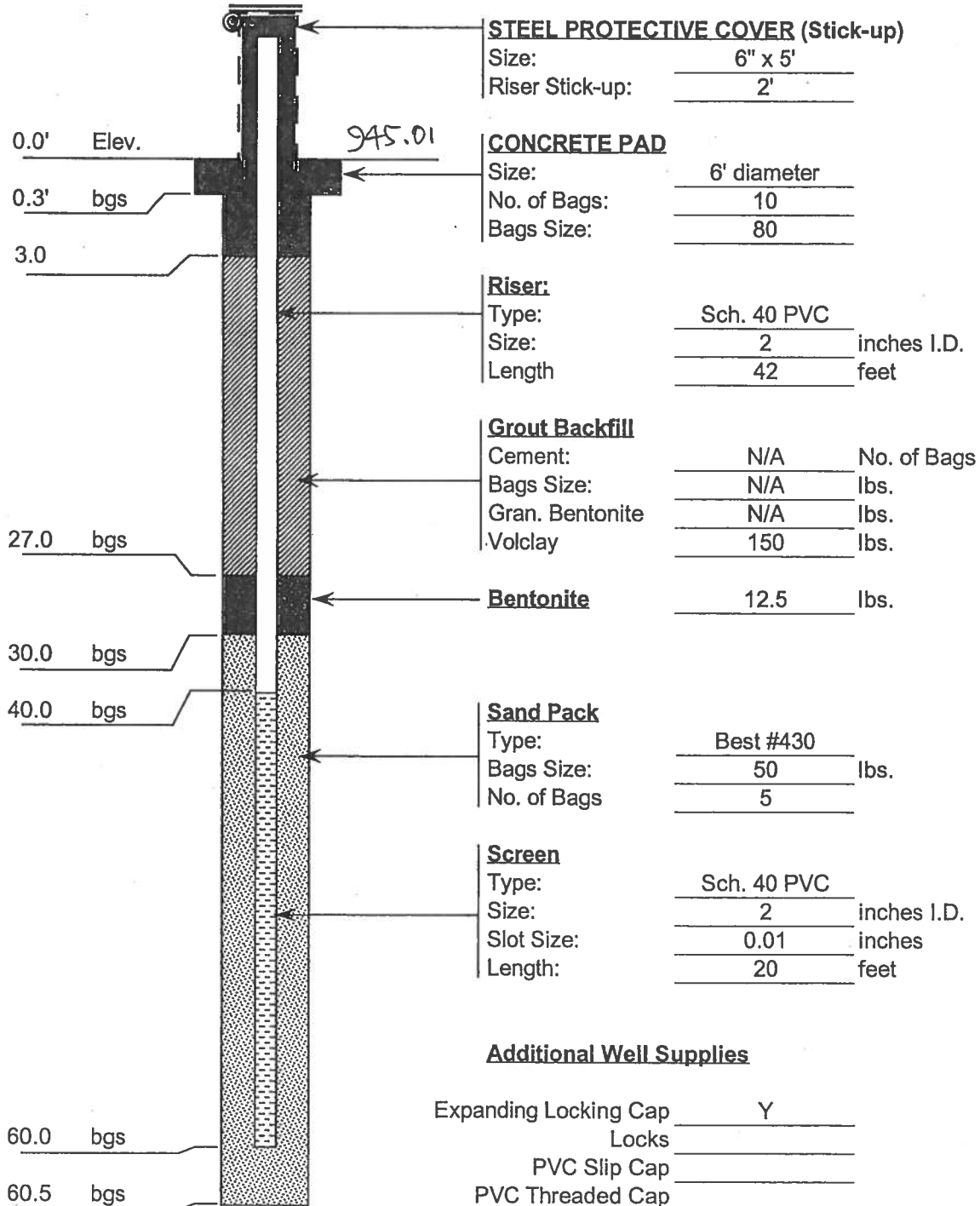
TTI Proj. No: 05639

Date Installed: 07/11/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 09.3"

Longitude: W 081° 50' 57.5"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

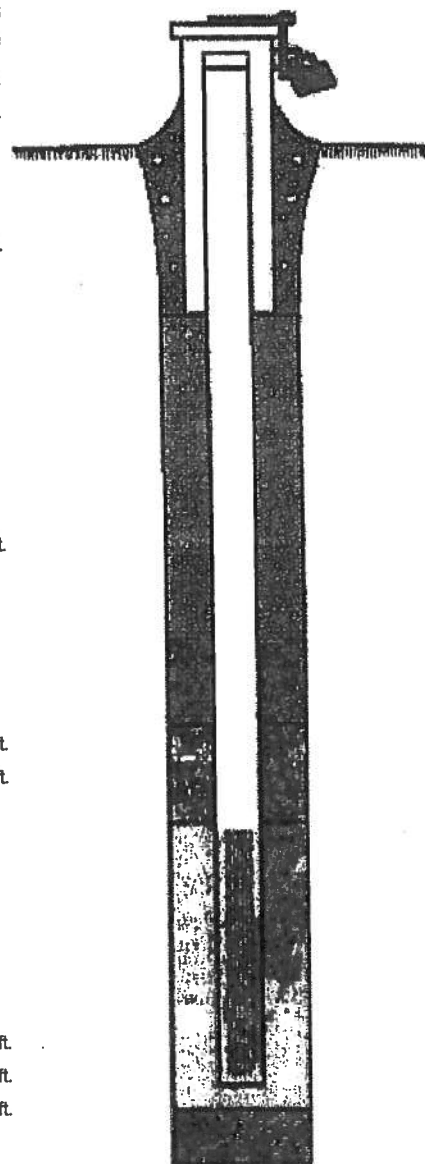
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0033-05

Site Name/Physical Address:		Well Registration No. WV00275-0033-05	Purpose of Monitoring Well:
Site: Proposed Landfill		Grid Location:	Monitor Groundwater
Line 1: Area 2/3		a. Latitude: 38 29 9 ..3	
Line 2: Blue Lick Road		b. Longitude: 81 50 57 ..3	
City: Windfield		c. Method Used: GPS	
State: WV			
Zip: 25213-		Company/Project Well No.:	
County: Putnam		05639/05-34-MW-11	
Well Owner (Name, Firm, Address):		Installed By (Name, Firm, Address):	Date Well Installed:
Owner: Tom Carroll		Installer: Vern Curtis / Douglas Novotny	07/11/2005
Line 1: John E. Amos Power Plant		Line 1: Terra Testing, Inc.	
Line 2: 1530 Winfield Road		Line 2: 260 Meadowlands Boulevard	
City: Windfield		City: Washington	Driller's WV Cert No.
State: WV		State: PA	WV00275
Zip: 25213-		Zip: 15301-	
Phone: 304-759-3156		Phone: 724-746-9100	

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
 - a. Material: concrete
 - b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
 - c. Material: PVC
 - d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
 - a. Material: high solids grout -
 - b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 27 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
 - a. Material: bentonite pellet
 - b. Installation Procedure: Gravity Fed
 - c. Volume Added: 12.5 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 30 ft.
- 15. Depth to Top of Screen: 40 ft.
- 16. Screen:
 - a. Material: PVC
 - b. Installation Procedure: Thru Augers & Open Bedrock Hole
 - c. Slot Size: .01 inches. d. Screen Length: 20 ft.
- 17. Filter Pack:
 - a. Material: medium sand
 - b. Installation Procedure: Gravity Fed
- 18. Well Depth: 60 ft.
- 19. Bottom of Filter Pack: 60.5 ft.
- 20. Bottom of Borehole: 60.5 ft.
- 21. Backfill Material (below filter pack): sand
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350



TESTING

Geotechnical & Environmental Drilling

Well No: 05-30/MW-9

Project: John E. Amos Power Plant

Well Tag: 0275-31-05

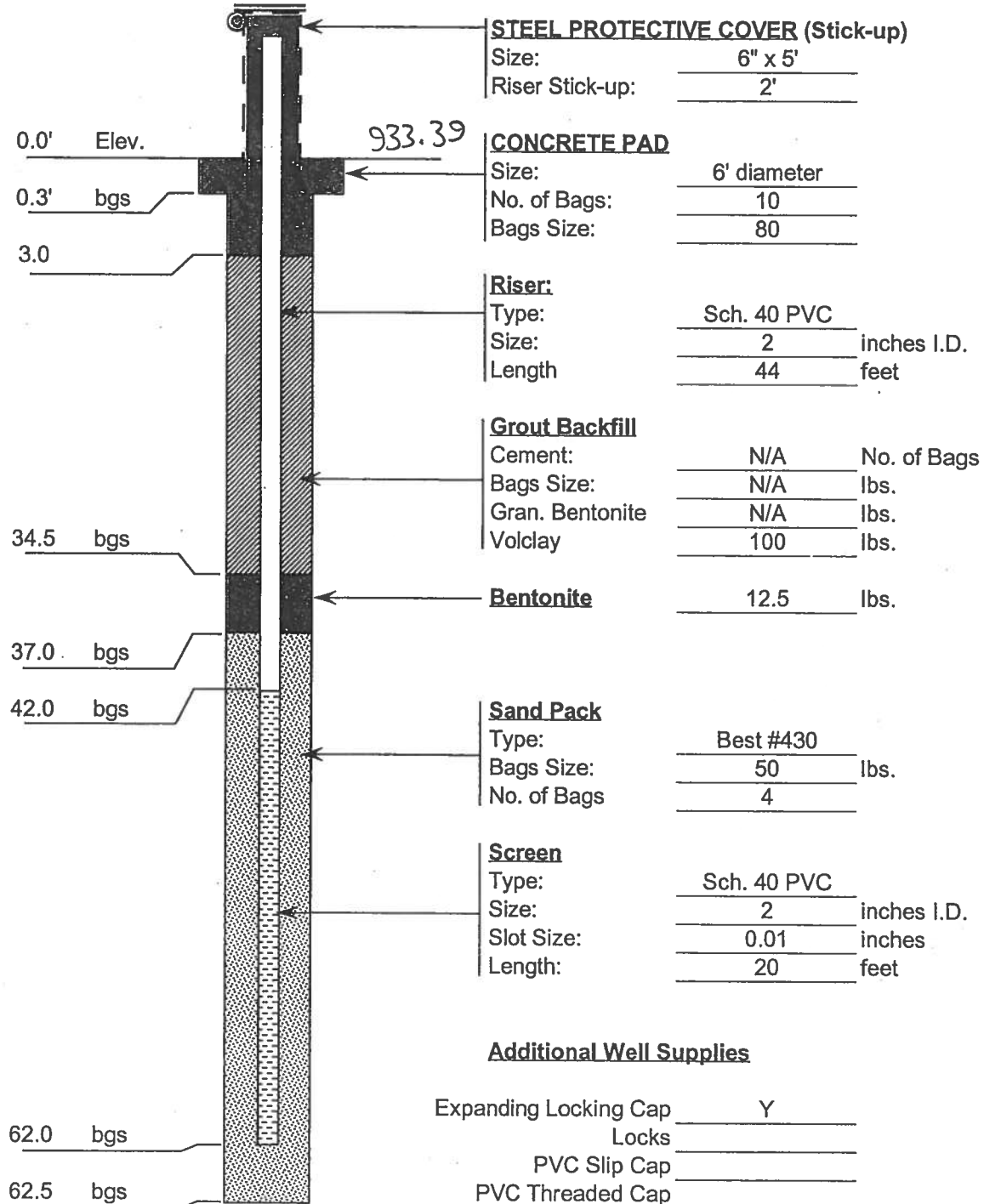
TTI Proj. No: 05639

Date Installed: 06/30/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 29.1"

Longitude: W 081° 51' 8.8"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

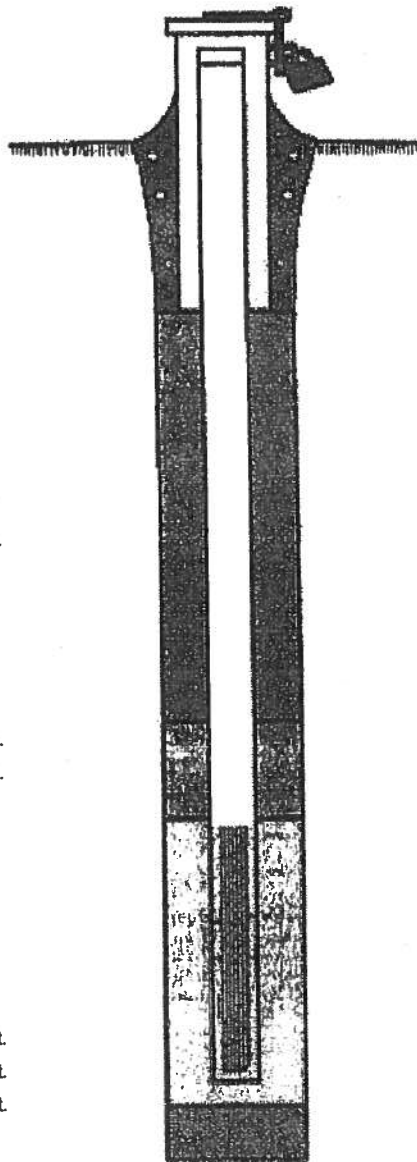
**State of West Virginia
Department of Environmental Protection**

**Monitoring Well Construction
Well Number: WV00275-0031-05**

Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213- County: Putnam	Well Registration No. WV00275-0031-05 Grid Location: a. Latitude: 38 29 29 .1 b. Longitude: 81 51 8 ..8 c. Method Used: GPS	Purpose of Monitoring Well: Monitor Groundwater
Well Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WV Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-30-MW-9 Installed By (Name, Firm, Address): Installer: Vern Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	Date Well Installed: 06/30/2005 Driller's WV Cert No. WV00275

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
a. Material: concrete
b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
c. Material: PVC
d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
a. Material: high solids grout -
b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 34.5 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
a. Material: bentonite pellet
b. Installation Procedure: Gravity Fed
c. Volume Added: 12.5 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 37 ft.
- 15. Depth to Top of Screen: 42 ft.
- 16. Screen:
a. Material: PVC
b. Installation Procedure: Thru Augers & Open Bedrock Hole
c. Slot Size: .01 inches. d. Screen Length: 20 ft.
- 17. Filter Pack:
a. Material: medium sand
b. Installation Procedure: Gravity Fed
- 18. Well Depth: 62 ft.
- 19. Bottom of Filter Pack: 62.5 ft.
- 20. Bottom of Borehole: 62.5 ft.
- 21. Backfill Material (below filter pack): sand
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350



Well No: 05-31/MW-10

Project: John E. Amos Power Plant

Well Tag: 0275-32-05

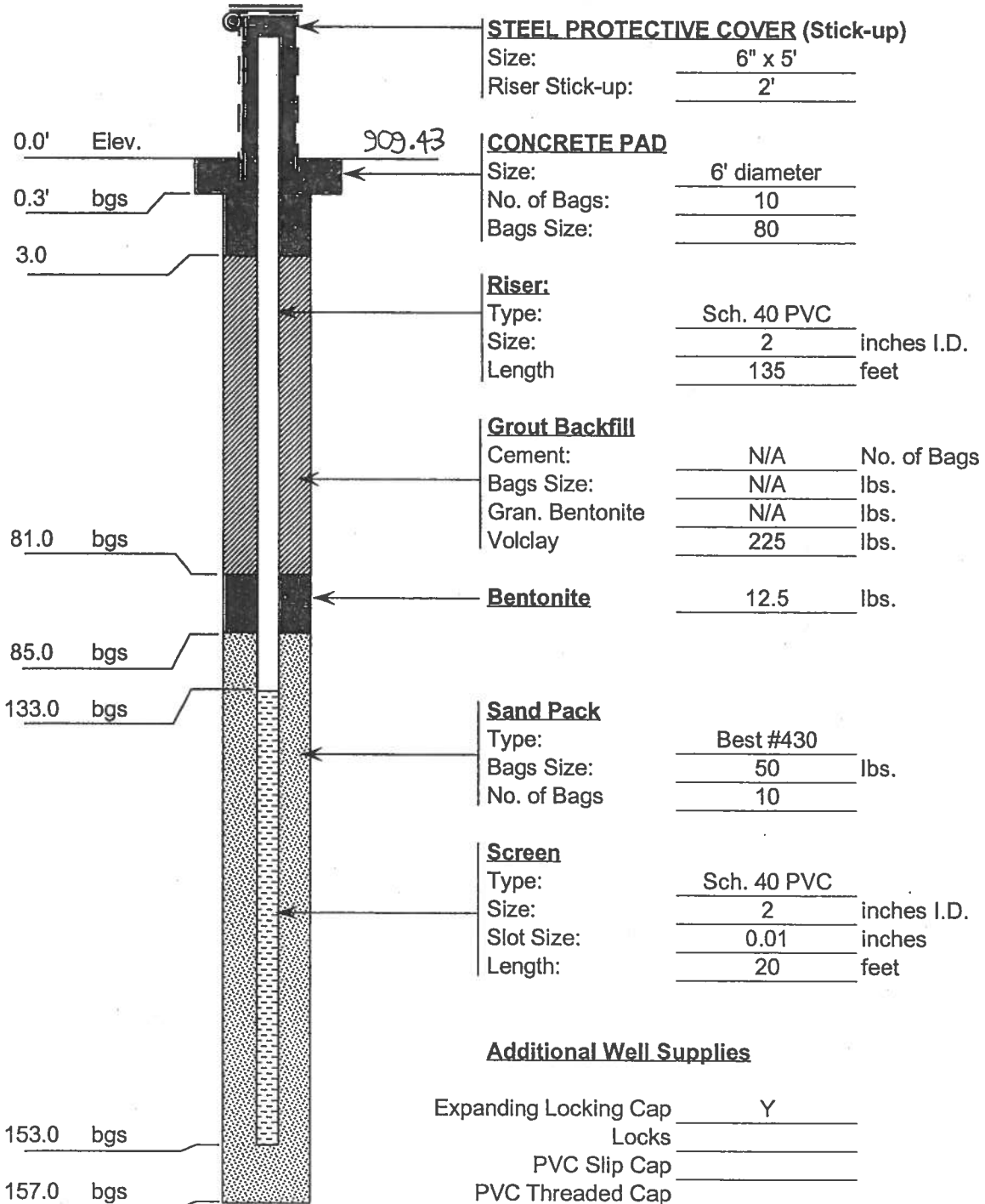
TTI Proj. No: 05639

Date Installed: 07/06/05

Client: GAI Consultants, Inc.

GPS Location: Latitude: N 38° 29' 27.7"

Longitude: W 081° 51' 30.3"



Additional Well Supplies

Expanding Locking Cap	Y
Locks	
PVC Slip Cap	
PVC Threaded Cap	
PVC Bottom Plug	Y
Auger Plugs	
No. of 55-gallon Drums Used	
No of Guard Posts Used	

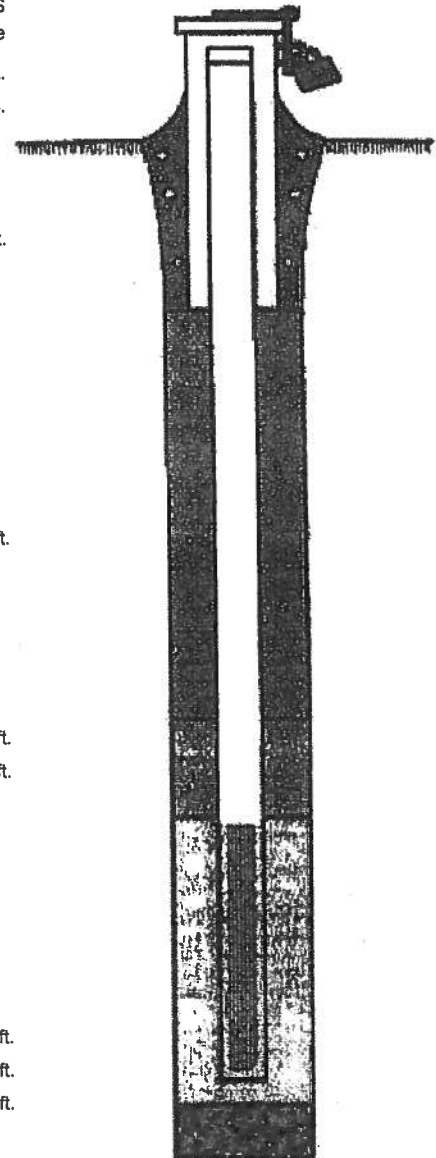
**State of West Virginia
Department of Environmental Protection**

Monitoring Well Construction
Well Number: WV00275-0032-05

Site Name/Physical Address:		Well Registration No. WV00275-0032-05	Purpose of Monitoring Well:
Site: Proposed Landfill		Grid Location:	Monitor Groundwater
Line 1: Area 2/3		a. Latitude: 38 29 27 .7	
Line 2: Blue Lick Road		b. Longitude: 81 51 30 .3	
City: Windfield		c. Method Used: GPS	
State: WV			
Zip: 25213-		Company/Project Well No.:	
County: Putnam		05839/05-31-MW-10	
Well Owner (Name, Firm, Address):		Installed By (Name, Firm, Address):	
Owner: Tom Carroll		Installer: Vern Curtis / Douglas Novotny	Date Well Installed:
Line 1: John E. Amos Power Plant		Line 1: Terra Testing, Inc.	07/06/2005
Line 2: 1530 Winfield Road		Line 2: 260 Meadowlands Boulevard	
City: Windfield		City: Washington	Driller's WV Cert No.
State: WV		State: PA	WV00275
Zip: 25213-		Zip: 15301-	
Phone: 304-759-3156		Phone: 724-746-9100	

Section B: (all number fields must be in decimal format)

- 1. Cap and Lock: YES
- 2. Protective Cover: Protective Cover Pipe
- 3. Monitoring Well Reference Point: 0 ft.
- 4. Borehole Diameter: 4 inches.
- 5. Ground Surface Seal:
 - a. Material: concrete
 - b. Installation Procedure: Hand Mixed
- 6. Surface Seal Bottom/Annular Space Top: 3 ft.
- 7. Well Riser: a. OD Well Riser: 2.38 inches. b. ID Well Riser: 2 inches.
 - c. Material: PVC
 - d. Installation Procedure: Thru Augers & Open Bedrock Hole
- 8. Annular Space Seal:
 - a. Material: high solids grout -
 - b. Installation Procedure: pour
- 9. Well Development Procedure: other - By Client
- 10. Drilling Method Used: percussion -
- 11. Annular Space Seal Bottom/Filter Seal Top: 81 ft.
- 12. Drilling Fluid Used: Yes Source: Air
- 13. Filter Pack Seal:
 - a. Material: bentonite pellet
 - b. Installation Procedure: Gravity Fed
 - c. Volume Added: 12.5 pounds
- 14. Bottom of Bentonite Seal/Filter Pack Top: 85 ft.
- 15. Depth to Top of Screen: 133 ft.
- 16. Screen:
 - a. Material: PVC
 - b. Installation Procedure: Thru Augers & Open Bedrock Hole
 - c. Slot Size: .01 inches. d. Screen Length: 20 ft.
- 17. Filter Pack:
 - a. Material: medium sand
 - b. Installation Procedure: Gravity Fed
- 18. Well Depth: 153 ft.
- 19. Bottom of Filter Pack: 157 ft.
- 20. Bottom of Borehole: 157 ft.
- 21. Backfill Material (below filter pack): sand
- 22. Decontamination Procedures: None
- 23. Special Circumstances and Exceptions: Yes Variance Number: MW-07-05
- 24. WV Contractor License No. WV002350






**WVDEP Monitoring Well &
Piezometer Closure Information**

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: B-0505

>> [Instructions for Use:](#)  [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Windows taskbar: 1:30 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: B-0505

Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)

Abandonment Procedure:

Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: B-0509

>> [Instructions for Use:](#) [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:28 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Abandonment Information

dep Abandonment Documentation
Well Number: B-0509

>> [Instructions for Use:](#)

Abandonment Information

Abandonment Type:
Borehole:
Monitoring Well: B-0509

Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)


Abandonment Procedure:
Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

<< Return Home | Log Out

Windows taskbar: 1:28 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: B-0511

>> [Instructions for Use:](#)  [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: Windows Start button, Internet Explorer, File Explorer, Media Center, Outlook, Word, Mail, System tray: 1:39 PM, 9/15/2016

https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Abandonment Information

dep Abandonment Documentation
Well Number: B-0511

>> Instructions for Use:

Abandonment Information

Abandonment Type:
Borehole:
Monitoring Well: B-0511

Condition of Well: Good
Reason for Abandonment: Landfill Expansion
Abandonment Date: 4/8/2008 (mm/dd/yyyy)



Abandonment Procedure:
Material Used: Coated .25" Bentonite Pellets
Procedure Used: Gravity - Hydrated above SWL - Used ~8# - Cut of
Total Well Depth: 26 ft. Height of Standing Water in Well: 17 ft. (if dry put 0)
Annular Space Type: Impermeable
Decontamination Procedure: None
Special Circumstances: No Number:

<< Return Home | Log Out

1:39 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: B-0512

>> [Instructions for Use:](#)  [Locate Address](#) 

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: Windows Start button, Internet Explorer, File Explorer, VLC, Outlook, Word, System tray: 1:33 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: B-0512


Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)

Abandonment Procedure:

Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: B-0513

>> [Instructions for Use:](#)  [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:34 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Abandonment Information

dep Abandonment Documentation
Well Number: B-0513

>> [Instructions for Use:](#)

Abandonment Information

Abandonment Type:
Borehole:
Monitoring Well: B-0513

Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)



Abandonment Procedure:
Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

<< Return Home | Log Out

Windows taskbar: 1:34 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: B-0523

>> [Instructions for Use:](#)  [Locate Address](#) 

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: Windows Start button, Internet Explorer, File Explorer, Media Center, Outlook, Word. System tray: 1:34 PM, 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: B-0523


Condition of Well: Good
Reason for Abandonment: 1" piezometer is no longer in use.
Abandonment Date: 4/16/2013 (mm/dd/yyyy)

Abandonment Procedure:

Material Used: 3/8" Coated Pellets / 15 lbs.
Procedure Used: Gravity / Pulled protector / Dug 3' / Placed clay cap
Total Well Depth: 50 ft. Height of Standing Water in Well: 22 ft. (if dry put 0)
Annular Space Type: Impermeable
Decontamination Procedure: Liquid Nox
Special Circumstances: No Number:

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: B-0524

>> Instructions for Use:  Locate Address

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Windows taskbar: 1:36 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: B-0524

Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)

Abandonment Procedure:

Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: BankeR75-2005-01

>> [Instructions for Use:](#) [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:42 PM 9/15/2016

https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Abandonment Information

dep Abandonment Documentation
Well Number: BankeR75-2005-01

>> Instructions for Use:

Abandonment Information

Abandonment Type:
Borehole:
Monitoring Well: BankeR75-2005-01

Condition of Well: Good
Reason for Abandonment: No longer in use
Abandonment Date: 4/25/2007 (mm/dd/yyyy)

Abandonment Procedure:
Material Used: 14.8 lbs of 3/8 Bentonite Coated Pellets
Procedure Used: Casing cut 30" below surface and dropped 3/8 Ber
Total Well Depth: 51.17 ft. Height of Standing Water in Well: 19.85 ft. (if dry put 0)
Annular Space Type: Impermeable
Decontamination Procedure: None
Special Circumstances: No Number: 05-01

<< Return Home | Log Out

1:42 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: BankeR75-2005-02

>> [Instructions for Use:](#) [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:41 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: BankeR75-2005-02


Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)

Abandonment Procedure:

Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: MW-3R

>> [Instructions for Use:](#)  [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:32 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: MW-3R

Condition of Well: Good

Reason for Abandonment: No longer in use.

Abandonment Date: 4/16/2013 (mm/dd/yyyy)

Abandonment Procedure:

Material Used: 3/8" Coated Pellets - 8 lbs.

Procedure Used: Pulled pump / Gravity pellets / Pulled protector / D

Total Well Depth: 50 ft. Height of Standing Water in Well: 12 ft. (if dry put 0)

Annular Space Type: Impermeable

Decontamination Procedure: Liquid Nox



Special Circumstances: No Number:

<< Return

Home | Log Out

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation
Well Number: P-0520

>> [Instructions for Use:](#)  [Locate Address](#) 

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: Windows, Internet Explorer, File Explorer, VLC, Outlook, Word, OneDrive, System tray: 1:37 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Abandonment Information

dep Abandonment Documentation
Well Number: P-0520

>> [Instructions for Use:](#)

Abandonment Information

Abandonment Type:
Borehole:
Monitoring Well: P-0520

Condition of Well:
Reason for Abandonment:
Abandonment Date: (mm/dd/yyyy)

Abandonment Procedure:
Material Used:
Procedure Used:
Total Well Depth: ft. Height of Standing Water in Well: ft. (if dry put 0)
Annular Space Type:
Decontamination Procedure:
Special Circumstances: Number:

<< Return Home | Log Out

Windows taskbar: 1:37 PM 9/15/2016

Browser address bar: https://apps.dep.wv.gov/webapp_dep/securearea/mwcd_water Site Address

dep Abandonment Documentation Well Number: P-0525

>> [Instructions for Use:](#) [Locate Address](#)

Site Address

Site Name/Physical Address:

Site:

Line 1:

Line 2:

City:

State:

Zip:

County:

<< Return Home | Log Out

Taskbar: 1:37 PM 9/15/2016

>> Instructions for Use:

Abandonment Information

Abandonment Type:

Borehole:
Monitoring Well: P-0525

Condition of Well: Good
Reason for Abandonment: No longer in use
Abandonment Date: 3/26/2015 (mm/dd/yyyy)

Abandonment Procedure:

Material Used: 1/4" Coated Bentonite Pellets 5 lbs
Procedure Used: Gravity - dug down 3', cut off, installed clay cap
Total Well Depth: 12 ft. Height of Standing Water in Well: 5 ft. (if dry put 0)
Annular Space Type: Impermeable
Decontamination Procedure: None
Special Circumstances: No Number:



**WVDEP Monitoring Well &
Piezometer Pending Closure
Information**

WVDEP Monitoring Well Piezometer Pending Closure Information
 AEP Amos Generating Plant - FGD Landfill
 Winfield, West Virginia



Facility	Reg #	Type	City	County	Well #	Latitude			Longitude			Method	Owner	Phone #	Date of Finish	Abandon Date	Reason for Install	Driller First Name	Driller Last Name	Certificate #
Proposed Landfill - Amos Power Plant	NA	AMW	Winfield	Putnam	B-0508	38	29	7.1	81	51	22.9	GPS	Amos Power Plant	304-759-3156	5/3/2005	8/22/2006	NA	Marvin	Roush	00015
Proposed Landfill - Amos Power Plant	NA	AMW	Winfield	Putnam	05639/05-28 MW 7	38	28	44.1	81	51	15.5	GPS	Amos Power Plant	304-759-3156	6/28/2005	8/22/2006	NA	Marvin	Roush	00015

Notes:
 Information provided by West Virginia Department of Environmental Protection as pending database upload.
 NA - Not Applicable
 GPS - Global Positioning System



**WVDEP Oil & Gas Well Closure
Information**

WVDEP Office of Oil and Gas - Well Search

Disclaimer: Per §22-6-6. Permit required for all well work; permit fee; application; soil erosion control plan.

(a) It is unlawful for any person to commence any well work, including site preparation work, which involves any disturbance of land, without first securing a well work permit from the director of the WVDEP Office of Oil and Gas.

The appearance of an API number on the web page does not signify that a permit has been issued. The API number is used as a tracking mechanism until the permit has been issued. Under no circumstances should well work be commenced without a signed permit.

Well API	Operator	Surface Owner	Well Number	Well Status	Well Type	Last Permit Issue Date
4707900611	MEADOWS Jr, S. L. PRODUCTION Inc.	APPALACHIAN POWER COMPANY	616	Plugged	Vertical	09/21/2007

The operator listed above is the CURRENT operator of the well.

This operator may or may not have recorded production for this well for the years listed below.

The production listed below spans this well's 5 last years, regardless of the operator who originally recorded a particular year's production numbers.

Well Lifetime Gas Production

No Production Reported

Well Lifetime Oil Production

No Production Reported

Well Lifetime NGL Production

No Production Reported

The West Virginia Department of Environmental Protection (WVDEP) makes oil and gas well information and production data available to the general public through this internet service free of charge.

The oil and gas related data originate from the information reported to the Office of Oil and Gas at WVDEP by West Virginia oil and gas operators. The WVDEP does not guarantee their accuracy, precision, or completeness.

Neither the West Virginia Department of Environmental Protection nor its staff members are liable or responsible for any damage or loss resulting from the use of these data or from inaccuracies contained in the data.

We encourage you to report any problems, inconsistencies, or errors noted in using this data to the Office of Oil and Gas so that we can correct them and provide better service.

Office of Oil and Gas
Department of Environmental Protection
601 57th St
Charleston, West Virginia 25304
Phone: (304) 926-0499
Fax: (304) 926-0452

WVDEP Office of Oil and Gas - Well Search

Disclaimer: Per §22-6-6. Permit required for all well work; permit fee; application; soil erosion control plan.

(a) It is unlawful for any person to commence any well work, including site preparation work, which involves any disturbance of land, without first securing a well work permit from the director of the WVDEP Office of Oil and Gas.

The appearance of an API number on the web page does not signify that a permit has been issued. The API number is used as a tracking mechanism until the permit has been issued. Under no circumstances should well work be commenced without a signed permit.

Well API	Operator	Surface Owner	Well Number	Well Status	Well Type	Last Permit Issue Date
4707900660	MEADOWS Jr, S. L. PRODUCTION Inc.	AMERICAN ELECTRIC POWER	2	Plugged	Vertical	09/08/2006

The operator listed above is the CURRENT operator of the well.

This operator may or may not have recorded production for this well for the years listed below.

The production listed below spans this well's 5 last years, regardless of the operator who originally recorded a particular year's production numbers.

Well Lifetime Gas Production

No Production Reported

Well Lifetime Oil Production

No Production Reported

Well Lifetime NGL Production

No Production Reported

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The appearance of an API number on the web page does not signify that a permit has been issued. The API number is used as a tracking mechanism until the permit has been issued. Under no circumstances should well work be commenced without a signed permit.

Well API	Operator	Surface Owner	Well Number	Well Status	Well Type	Last Permit Issue Date
4707900722	MEADOWS Jr, S. L. PRODUCTION Inc.	AMERICAN ELECTRIC POWER	3	Plugged	Vertical	09/08/2006

The operator listed above is the CURRENT operator of the well.

This operator may or may not have recorded production for this well for the years listed below.

The production listed below spans this well's 5 last years, regardless of the operator who originally recorded a particular year's production numbers.

Well Lifetime Gas Production

No Production Reported

Well Lifetime Oil Production

No Production Reported

Well Lifetime NGL Production

No Production Reported

The West Virginia Department of Environmental Protection (WVDEP) makes oil and gas well information and production data available to the general public through this internet service free of charge.

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Office of Oil and Gas
Department of Environmental Protection
601 57th St
Charleston, West Virginia 25304
Phone: (304) 926-0499
Fax: (304) 926-0452



Arcadis, Inc. 2018

**Boring and Well Construction
Logs**

MW-1801 and MW-1802

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

JOB NUMBER WV015976.0005
 COMPANY American Electric Power
 PROJECT Amos - FGD Landfill
 COORDINATES N 38.5 E 81.6
 GROUND ELEVATION 735.6 SYSTEM NAVD88

BORING NO. MW-1801 DATE 5/3/19 SHEET 1 OF 5
 BORING START 8/7/18 BORING FINISH 8/8/18
 PIEZOMETER TYPE PVC WELL TYPE OW
 HGT. RISER ABOVE GROUND 2.8 DIA 2"
 DEPTH TO TOP OF WELL SCREEN 50.4 BOTTOM 114.4
 WELL DEVELOPMENT Surge/Purge BACKFILL Bentonite Grout
 FIELD PARTY Zachary Racer (AEP) RIG Direct Circulation -
Wireline Core

Water Level, ft	▽ 21.0	▼	▼
TIME			
DATE	8/15/2018		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		5.0	6.5	50/4	3.6		5		CL ML	0-5': SILTY CLAY; 2.5YR 5/6 (red); moist; backfill material.		0-49': Riser
		6.5	8.0	48-23-15	3.6					5-6': SANDSTONE.		
		8.0	9.5	11-3-5	7.2				CL ML	6-6.3': SHALE; GLEY1 5/N (gray); dry; thin bedded; hard.		
		9.5	11.0	4-4-7	10.8		10		ML	6.3-6.5': SILTY CLAY; red; moist; hard		
		11.0	12.5	4-8-50/3	10.8				MH	6.5-8': SILT; 10YR 6/2 (tan); with sandstone and shale fragments; compacted fill material.		
		12.5	14.0	50/3					CL ML	8-9.5': CLAYEY SILT; 5YR 4/2 (brown); firm; moist; fill material.		
		14.0	15.5	50/4					CL ML	9.5-11': SILTY CLAY; 10YR 6/3 (brown) to brown clayey silt; dry; crumbly; fill material.		
		14.9	19.9		51		15		ML	11-12.5': SILTY CLAY; 5YR 4/2 (brown); moist; firm.		
										Note: Sandstone at 12-12.3'. 12.5-14': SILT, compacted; 10YR 7/4 (tan); very hard; dry; fill material.		
										14-14.5': SILTY SHALE material, weathered; mottled tan and dark brown; dry; very hard.		
										14.5-14.9': SANDSTONE; strong field strength; 2.5Y 6/2; fine-grained texture; massive structure; slightly to moderately decomposed; moderately disintegrated with Fe staining; fracture at 14.3-14.5'. 14.9-19.9': SHALE; moderate field strength; GLEY1 5/GY; fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated along bedding planes and fracture; vertical fracture with Fe staining at 15.5-16.5'.		

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
 WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER A. Gillespie

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1801 DATE 5/3/19 SHEET 2 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/7/18 BORING FINISH 8/8/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		19.9	24.9	8-7-6	55					19.9-24.9': SHALE; moderate field strength; GLEY1 5/GY; fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated; moderately to intensely fractured. Transition to strong field strength, 2.5YR 4/4; fine-grained texture; massive structure to thinly bedded; slightly decomposed; slightly disintegrated; slightly to moderately fractured.		
		24.9	34.9	4-4-13	72		25			24.9-25.2': SHALE; strong field strength; fine-grained structure; massive structure to thinly bedded; slightly decomposed; slightly disintegrated; slightly to moderately fractured. 25.2-30.7': CLAYSTONE/MUDSTONE, highly weathered; very weak field strength; 10YR 5/3; very fine-grained texture with sandstone fragments; massive structure; highly decomposed; intensely disintegrated; unfractured.		
							30			30.7-32.5': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed; slightly to moderately disintegrated; slightly to moderately fractured. 32.5-34.9': CLAYSTONE/MUDSTONE; moderate field strength; GLEY1 4/104; fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately to intensely fractured.		
		34.9	38.3	4-5-8	36		35			34.9-38.3': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; moderately to highly decomposed; intensely disintegrated, mottling tan and gray; moderately to intensely fractured.		
		38.3	44.9	5-7-13-9-6-6	70		40			38.3-44.9': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; highly decomposed; intensely disintegrated; intensely fractured.		
		44.9	50.0	4-4-7-8	50		45			44.9-50': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with		

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1801 DATE 5/3/19 SHEET 3 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/7/18 BORING FINISH 8/8/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		44.9	50.0	4-4-7-8	50					tan, black, and gray; fine-grained texture; massive structure; highly decomposed; intensely disintegrated; intensely fractured.		
		50.0	55.0	4-4-5-4	50		50			50-56.7': CLAYSTONE/MUDSTONE; moderate field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; moderately to highly decomposed, becomes less weathered at 50.3'; highly disintegrated, highly mottled; moderately to intensely fractured.	49-52': Bentonite Pellets	52-53': Secondary Filter Pack 53-75': Primary Filter Pack
		55.0	59.8	5-7-5-36	52		55					55-75': Screen
										56.7-58': SANDSTONE, interbedded; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated along fracture; moderately fractured at 56.7' and 57.1-57.5'.		
										58-58.8': SHALE, interbedded; strong field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated along fracture.		
		59.8	64.8	8-5-4-4-7-5-5-4	60		60			58.8-59.2': SANDSTONE, interbedded; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated along fracture.		
										59.2-59.8': SHALE, interbedded; strong field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated along fracture.		
		64.8	74.8	4-5-4-6	76		65			59.8-60.7': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; unfractured.		
										60.7-63.9': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated with silt filled fractures; moderately fractured.		
										63.9-64.3': SANDSTONE; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; unfractured.		
							70			64.3-64.8': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed; moderately		

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1801 DATE 5/3/19 SHEET 4 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/7/18 BORING FINISH 8/8/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		64.8	74.8	4-5-4-6	76							
		74.8	85.0				75			64.8-74.8': SHALE, highly weathered at base; moderate to weak field strength along some bedding planes; 2.5YR 3/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated, becomes more limestone fragments last 1 ft, 3-5 cm; moderately to intensely fractured.		
							80			74.8-85': SHALE, highly weathered; weak field strength; 2.5YR 4/4 (red) with tan and gray mottling; fine-grained texture; massive structure; highly decomposed; highly disintegrated, mottled; intensely fractured.		
		85.0	95.0	5-4-4	120		85			85-92.7': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintegrated, calcite in light colored beds/thin; slightly fractured.		
							90					
							95			92.7-94.6': SHALE; moderate field strength; fine-grained texture; massive structure; slightly decomposed; slightly disintegrated, some mottling; moderately fractured.		
		95.0	105.0	7-4-4	120					94.6-95': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintegrated, calcite in light colored beds/thin; slightly fractured at 94.6-95'.		
										95-100.1': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintegrated; slightly fractured at 95-95.2'.		75-105': Bentonite

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1801 DATE 5/3/19 SHEET 5 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/7/18 BORING FINISH 8/8/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		95.0	105.0	7-4-4	120		100			100.1-101.5': SHALE and sandstone interbedded; moderate field strength; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; slightly fractured at 100.2-100.5'. 101.5-105': SHALE; moderate to weak field strength; fine-grained texture; massive structure; highly decomposed; moderately to highly disintegrated mottling with silt filled fractures; highly fractured.		
							105					
							110					
							115					
							120					

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

JOB NUMBER **WV015976.0005**
 COMPANY **American Electric Power**
 PROJECT **Amos - FGD Landfill**
 COORDINATES **N 38.5 E 81.9**
 GROUND ELEVATION **709.8** SYSTEM **NAVD88**

BORING NO. **MW-1802** DATE **5/3/19** SHEET **1** OF **5**
 BORING START **8/20/18** BORING FINISH **8/21/18**
 PIEZOMETER TYPE **NA** WELL TYPE **OW**
 HGT. RISER ABOVE GROUND **2.91** DIA **2"**
 DEPTH TO TOP OF WELL SCREEN **50** BOTTOM **114.4**
 WELL DEVELOPMENT **Surge/Purge** BACKFILL **Bentonite Grout**
 FIELD PARTY **Zachary Racer (AEP)** RIG **Direct Circulation - Wireline Core**

Water Level, ft	▽ 35.0	▽	▽
TIME			
DATE	8/21/2019		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
									GW	0-3.5': GRAVEL backfill; large rip-rap and smaller compacted gravels.		0-41': Bentonite Grout
		4.5	6.0	6-4-5	0		5		CL	3.5-4.5': SILTY CLAY; brown; moist; soft; backfill material.		
										4.5-6': NO RECOVERY, due to gravel blocking cutting shoe.		
		6.0	7.5	4-3-4	3.6				CL	6-17': SILTY CLAY; 7.5YR 4/3 (brown); moist; firm; compacted backfill material; becomes wet at 12.5'.		
		7.5	9.0	3-4-5	7.2							
		9.0	10.5	4-4-6	18		10					
		10.5	12.0	5-4-5	13.2							
		12.0	13.5	3-4-6	15.6							
		13.5	15.0	3-5-8	14.4							
		15.0	16.5	4-7-9	15.6		15					
		16.5	18.0	6-25-8	16.8							
		18.0	19.5	7-23-15	14.4				CL	17-17.5': SANDSTONE, weathered; GLEY1 7/N (gray); dry.		
										17.5-19.5': SILTY CLAY; GLEY1 6/N (gray) mottled with brown, red, tan; moist; soft; crumbles easily.		
		19.5	21.0	20->50/4	10.8				CL			

TYPE OF CASING USED

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

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
 WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **A. Gillespie**

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1802 DATE 5/3/19 SHEET 2 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/20/18 BORING FINISH 8/21/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		19.5	21.0	20->50/4	10.8					19.5-22.5': SILTY CLAY; GLEY1 6/N (gray) mottled with brown, tan; dry; soft; crumbles easily.		
		21.0	22.5	27-50/5	9.6							
		22.5	24.4	4	23					22.5-24': SILTSTONE; moderate to weak field strength; GLEY1 6/N; fine-grained texture; massive structure; highly decomposed; moderately to highly disintegrated with tan/brown mottling; moderately to intensely fractured.		
		24.4	29.4		22		25			24-24.4': SILTSTONE; weak field strength; 10R 4/4 (red) mottled; fine-grained texture; massive structure; highly decomposed; moderately to intensely fractured. 24.4-29.4': SILTSTONE; weak field strength; 10R 4/4 (red) mottled with tan, gray, and black; fine-grained texture; massive structure; highly decomposed; highly disintegrated, highly mottled; moderately fractured.		
		29.4	33.7	5-11-6	40		30			29.4-32.8': SHALE, weathered; moderate field strength; 10YR 4/4 (red) mottled; fine-grained texture; massive structure; moderately decomposed; moderately to intensely disintegrated; moderately fractured.		
		33.7	39.4	5-4-4-7-5	59		35			32.8-33.7': SHALE; moderate field strength; 5YR 5/4 (tan) mottled; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; moderately to intensely fractured. 33.7-39.4': SHALE; moderate field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; intensely fractured.		
		39.4	44.4	4-6-4-4	57		40			39.4-44.4': SHALE; moderate field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; intensely fractured.		41-44': Bentonite Pellets
		44.4	54.4	7-8-7-5-5-24-5	120		45			44.4-47.8': SHALE, highly weathered; weak field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure;		44-45': Secondary Filter Pack 45-71': Primary Filter Pack

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

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1802 DATE 5/3/19 SHEET 3 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/20/18 BORING FINISH 8/21/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		44.4	54.4	7-8-7-5-5-24-5	120					highly decomposed; intensely disintegrated; intensely fractured.		
							50			47.8-49.9': SHALE, less weathered; moderate field strength; 10R 3/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately fractured.		
										49.9-50.8': SHALE, interbedded with sandstone; moderate field strength; GLEY1 4/N; fine-grained texture; thinly bedded; moderately decomposed; slightly disintegrated; moderately fractured.		
										50.8-52.8': SHALE; moderate to strong field strength; 10R 4/3 (red); fine-grained texture; massive structure; slightly decomposed; moderately disintegrated; slightly fractured.		
										52.8-53.1': SHALE, interbedded with sandstone; strong field strength; GLEY1 4/5GY; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; unfractured.		
		54.4	64.4	8-12-5-6-7-4-4-4	114		55			53.1-54.4': SHALE; moderate field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately fractured.		
										54.4-55.4': SANDSTONE, interbedded with shale; moderate field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; slightly to moderately fractured.		
							60			55.4-57.1': SHALE, interbedded with sandstone; moderate field strength; GLEY1 4/3, 10R 4/3; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured.		
										57.1-64.4': SHALE, weathered; moderate to weak field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated with intense gray mottling; intensely fractured.		
		64.4	74.4	4-6-8-6-4-5-4-4-5	117		65			64.4-70.5': SHALE, highly weathered; moderate to weak field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately to intensely disintegrated with gray mottling; intensely fractured.		
							70			70.5-74.4': SHALE, interbedded with sandstone; strong field strength; 10R 4/3 (red) interbedded with GLEY1 4/N (gray-green); fine-grained		

50-70': Screen

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 AEP CIVIL ENGINEERING LABORATORY
 LOG OF BORING

JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1802 DATE 5/3/19 SHEET 4 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/20/18 BORING FINISH 8/21/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		64.4	74.4	4-6-8-6-4-5-4-4-5	117					texture; thinly bedded; slightly to moderately decomposed along some bedding planes; moderately disintegrated with silt filled fractures; moderately fractured.		
		74.4	84.4	8-7-5-5-14-8-7-22-12	120		75			74.4-77.1': SHALE, with some interbedded sandstone lenses; moderate field strength; 10R 4/3 (red); fine-grained texture; thinly bedded; slightly to moderately decomposed at some bedding planes; slightly disintegrated; moderately fractured.		
							80			77.1-82.7': SANDSTONE, with some red shale lenses; strong field strength; GLEY1 4/N; fine-grained texture; thinly bedded; fresh; moderately disintegrated, calcite reacts to HCl in light colored bands within 0.5' of surrounding contact lines, no HCl/calcite in fractures, no Fe staining; moderately fractured.		
		84.4	94.4	10-11-6-7-7-8-9-8-7-6-6-7-10	120		85			82.7-84.4': SHALE, with some interbedded sandstone lenses; moderate field strength; 10R 4/3 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. 84.4-86.7': SHALE, with sandstone lenses; moderate field strength; 10R 4/2 (red) with GLEY1 4/N lenses; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured.		
							90			86.7-89.2': SANDSTONE, with shale lenses; moderate field strength; GLEY1 4/N with 10R 4/2 lenses; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. 89.2-94.4': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded, micaceous; fresh; slightly disintegrated, some calcite in light bands, no staining, no calcite in fractures; slightly to moderately fractured along bedding planes; fracture at 92.8'.		
		94.4	104.4	7-4-5-4-9-9-8-5-11-5-6-10-19	120		95			94.4-104.4': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded, micaceous, cross-bedding at 94.4-94.8; fresh; slightly disintegrated, calcite in some light bedded planes, no calcite or Fe staining noted in fractures; slightly to moderately fractured along bedding planes.		

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

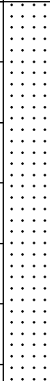
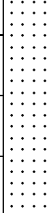

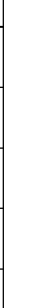
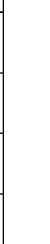
JOB NUMBER WV015976.0005

COMPANY American Electric Power

BORING NO. MW-1802 DATE 5/3/19 SHEET 5 OF 5

PROJECT Amos - FGD Landfill

BORING START 8/20/18 BORING FINISH 8/21/18

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
		94.4	104.4	7-4-5-4-9-9-8-5-11-5-6-10-19	120		100					
		104.4	114.4	15-6-21-6-4-4-8-8-6-4-13-5-7	120		105			104.4-108': SANDSTONE; strong field strength; GLEY1 6/N; fine to medium-grained texture; thinly bedded, micaceous, shale fragments; fresh; moderately disintegrated, calcite along entire sandstone void and shale fragments at base, calcite in void; slightly fractured.		
							110			108-108.9': SHALE, with interbedded sandstone; moderate field strength; GLEY1 4/N, 10R 4/3 bands; thinly bedded; moderately decomposed between bedding planes; moderately disintegrated along bedding planes; moderately fractured. 108.9-114.4': SHALE; moderate field strength; 10R 4/3 (red) with GLEY1 4/N mottling; fine-grained texture; massive structure; moderately decomposed; moderately to intensely disintegrated, mottling; moderately fractured.		
							115					
							120					

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Arcadis, Inc. 2021

**Boring and Piezometer
Construction Logs**

**2101ss, 2101s, 2101i, 2101d,
2102s, 2102i, 2102d, 2103s,
2103i, 2104, 2105ss, 2105s,
2105i, 2105d, and 2106**

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,737.317 E 1,724,959.605**

GROUND ELEVATION **932.04 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2101 SS** DATE **9/2/21** SHEET **1** OF **2**

BORING START **6/15/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.8'** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **19'** BOTTOM **29'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 20.61	▽	▽
TIME			
DATE	8/9/2021		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	4.1	9.5		5.3	96	5			(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray		0-11': Grout seal *Lithology from 2101 I/D borehole. 2101 SS installed in offset 6" borehole.
										(4.1-4.8 ft) SANDSTONE, fine grained to medium grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; weak field strength. (4.8-9.7 ft) SANDSTONE, fine grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; micaceous; moderate field strength.		
2	RC	9.5	19.5		8.5	80	10			(9.7-12.1 ft) SANDY SHALE, medium grained to coarse grained; reddish brown; highly weathered; very intensely fractured (few intact core segments); laminated; very weak field strength.		11-14': Bentonite seal
3	RC	19.5	24.5		3.9	67	15			(12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		14-15': Secondary Sand Pack (choker sand) 15-30': Primary Sand Pack
												19'-29': Slotted PVC (20-slot) Screen

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Mike Lutz**

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUNDARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINTAEP BORING LOGS (1).GPJ

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

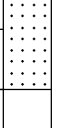




JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 SS DATE 9/2/21 SHEET 2 OF 2

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
3	RC	19.5	24.5		3.9	67				(19.8-24.8 ft) MUDSTONE, fine grained; reddish brown; moderately weathered; moderately fractured; medium-bedded; weak to moderate field strength. NOTE: Occasionally interbedded with shale.		
4	RC	24.5	30.0		5.2	71	25			(24.8-30.0 ft) SANDSTONE, medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous banding; weak to moderate field strength.		
							30			(28.2-28.5 ft) NOTE: Vertical fracture		
							35					
							40					
							45					

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,735.055 E 1,724,955.37**

GROUND ELEVATION **932.04 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2101 S** DATE **9/2/21** SHEET **1** OF **3**

BORING START **6/15/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

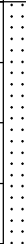
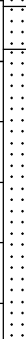
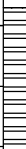
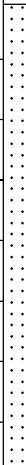

HGT. RISER ABOVE GROUND **2.86'** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **42'** BOTTOM **57'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 38.59	▽	▽
TIME			
DATE	8/9/2021		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	4.1	9.5		5.3	96	5			(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray		0-34': Grout seal *Lithology from 2101 I/D borehole. 2101 S installed in offset 6" borehole.
							5			(4.1-4.8 ft) SANDSTONE, fine grained to medium grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; weak field strength. (4.8-9.7 ft) SANDSTONE, fine grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; micaceous; moderate field strength.		
2	RC	9.5	19.5		8.5	80	10			(9.7-12.1 ft) SANDY SHALE, medium grained to coarse grained; reddish brown; highly weathered; very intensely fractured (few intact core segments); laminated; very weak field strength.		
							15			(12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		
3	RC	19.5	24.5		3.9	67						

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Mike Lutz**

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 S DATE 9/2/21 SHEET 2 OF 3

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
3	RC	19.5	24.5		3.9	67				(19.8-24.8 ft) MUDSTONE, fine grained; reddish brown; moderately weathered; moderately fractured; medium-bedded; weak to moderate field strength. NOTE: Occasionally interbedded with shale.		
4	RC	24.5	34.5		9.4	71	25			(24.8-42.5 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous banding; weak to moderate field strength. (28.2-28.5 ft) NOTE: Vertical fracture		
5	RC	34.5	44.5		9.8	69	35			(39.2-42.5 ft) NOTE: Medium grained	34-37': Bentonite seal 37-38': Secondary Sand Pack (choker sand) 38-58': Primary Sand Pack	
6	RC	44.5	49.5		4.1	0	45			(42.5-50.4 ft) SHALE, medium grained; gray with red mottling; highly weathered; moderately fractured; medium-bedded. NOTE: Interbedded with medium-grained sandstone.	42-57': Slotted PVC (20-slot) Screen	

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

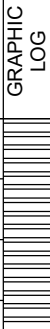
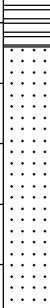
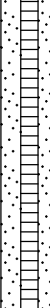
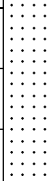
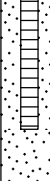
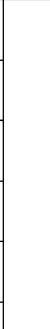

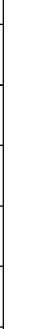



JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 S DATE 9/2/21 SHEET 3 OF 3

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
6	RC	44.5	49.5		4.1	0						
7	RC	49.5	56.5		6.9	94	50			(50.4-58.0 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous; moderate to strong field strength.		
8	RC	56.5	58.0		1.5	98						
							60					
							65					
							70					

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,732.909 E 1,724,951.574**

GROUND ELEVATION **932.04 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2101 I & D** DATE **9/2/21** SHEET **1** OF **6**

BORING START **6/15/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.73' (I) 2.71' (D)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **60'92"** BOTTOM **75'102"**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 56.95	▽ 104.06 (D)	▽
TIME			
DATE	8/9/2021	8/9/2021	

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	GB	0.0	4.1							(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray		0-54': Grout seal NOTE: 8" Borehole Diameter
2	RC	4.1	9.5		5.3	96	5			(4.1-4.8 ft) SANDSTONE, fine grained to medium grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; weak field strength. (4.8-9.7 ft) SANDSTONE, fine grained; brownish gray; moderately weathered; moderately fractured; medium-bedded; micaceous; moderate field strength.		
3	RC	9.5	19.5		8.5	80	10			(9.7-12.1 ft) SANDY SHALE, medium grained to coarse grained; reddish brown; highly weathered; very intensely fractured (few intact core segments); laminated; very weak field strength.		
							15			(12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		
4	RC	19.5	24.5		3.9	67						

TYPE OF CASING USED

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

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Mike Lutz**

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

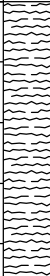
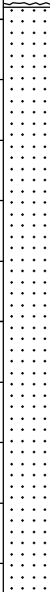
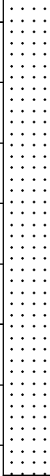
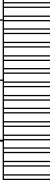
JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2101 I & D** DATE **9/2/21** SHEET **2** OF **6**

PROJECT **Amos - FGD Landfill**

BORING START **6/15/21** BORING FINISH **6/16/21**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
4	RC	19.5	24.5		3.9	67				(19.8-24.8 ft) MUDSTONE, fine grained; reddish brown; moderately weathered; moderately fractured; medium-bedded; weak to moderate field strength. NOTE: Occasionally interbedded with shale.		
5	RC	24.5	34.5		9.4	71	25			(24.8-42.5 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous banding; weak to moderate field strength. (28.2-28.5 ft) NOTE: Vertical fracture		
6	RC	34.5	44.5		9.8	69	35			(39.2-42.5 ft) NOTE: Medium grained		
7	RC	44.5	49.5		4.1	0	45			(42.5-50.4 ft) SHALE, medium grained; gray with red mottling; highly weathered; moderately fractured; medium-bedded. NOTE: Interbedded with medium-grained sandstone.		

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 I & D DATE 9/2/21 SHEET 3 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	RC	44.5	49.5		4.1	0						
8	RC	49.5	56.5		6.9	94	50			(50.4-59.2 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous; moderate to strong field strength.		
9	RC	56.5	64.5		8	98	55				54-57': Bentonite seal	
							60			(59.2-62.5 ft) MUDSTONE, fine grained; reddish brown; slightly weathered; moderately fractured; thick-bedded; moderate to strong field strength. NOTE: Occasional shale layers (<0.5' thick).		57-58': Secondary Sand Pack (choker sand) 58-77': Primary Sand Pack
10	RC	64.5	74.5		10	68	65			(62.5-85.8 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous; very weak to moderate field strength. NOTE: Interbedded with gray shale with occasional iron staining. (65-67 ft) NOTE: Shale layer.		60-75': Slotted PVC (20-slot) Screen
							70			(71-72.5 ft) NOTE: Very soft and fissile; highly decomposed.		

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 I & D DATE 9/2/21 SHEET 4 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
10	RC	64.5	74.5		10	68						
11	RC	74.5	84.5		10	67	75			(72.3-73.2 ft) NOTE: Shale layer.		
										(76.8-77 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured; thin-bedded.		77-87': Bentonite seal
							80			(82.8-83.5 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured; thin-bedded.		
12	RC	84.5	94.5		10	86	85			(84.5-85.8 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured; thin-bedded.		
										(85.8-103 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; weak to strong field strength. NOTE: Occasionally reddish brown due to oxidation.		87-88': Secondary Sand Pack (choker sand) 88-104': Primary Sand Pack
							90					92-102': Slotted PVC (20-slot) Screen
13	RC	94.5	104.5		10	44	95			(96.5-100.8 ft) NOTE: Highly fractured.		

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 I & D DATE 9/2/21 SHEET 5 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
13	RC	94.5	104.5		10	44	100			(97.3-97.6 ft) NOTE: Very weathered, highly decomposed, intensely disintegrated, reddish brown		
14	RC	104.5	114.5		10	100	105			(103-128.7 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous.		
15	RC	114.5	124.5		10	100	115					
							120					

104'-144.5': Bentonite backfill

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2101 I & D DATE 9/2/21 SHEET 6 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/15/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
16	RC	124.5	134.5		10	78	125					
							130			(128.7-132.3 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; weak to moderate field strength. NOTE: more heavily weathered and fractured in upper 2.4'.		
							135			(132.3-136.3 ft) SANDSTONE, fine grained to medium grained; gray; fresh to slightly weathered; unfractured; moderate to strong field strength.		
17	RC	134.5	144.5		10	67	135			(136.3-138.4 ft) SANDSTONE, fine grained to medium grained; gray; fresh to slightly weathered; unfractured; thin-bedded; moderate to strong field strength.		
							140			(138.4-142.8 ft) SHALE, fine grained; reddish brown; slightly to moderately weathered; slightly fractured; moderately fractured; thin-bedded; weak to very weak field strength. NOTE: gray in upper 0.3'; chert nodules present.		
							145			(142.8-144.5 ft) SANDSTONE, fine grained to medium grained; gray; fresh to slightly weathered; unfractured; thin-bedded; moderate to strong field strength.		

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,946.401 E 1,725,330.822**

GROUND ELEVATION **932.97 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2102 S** DATE **9/2/21** SHEET **1** OF **3**

BORING START **6/16/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.97'** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **43'** BOTTOM **58'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 41.27	▽	▽
TIME			
DATE	8/9/2021		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	GB	0.0	4.0						GC	(0.0-1.5 ft) GRAVEL; some clay, silt, and sand; moist (1.5-2.5 ft) SANDSTONE, fine grained to medium grained; yellowish brown; highly weathered; medium-bedded; very weak to weak field strength. (2.5-7.2 ft) SHALE, fine grained; reddish brown; moderately weathered; intensely fractured; thin-bedded; weak field strength.		0-35': Grout seal *Lithology from 2102 I/D borehole. 2102 S was installed in offset 6" borehole.
2	RC	4.0	14.6		7.7	17	5			(7.2-18.6 ft) SANDSTONE, fine grained; grayish brown; slightly weathered; intensely fractured; thin-bedded; weak to strong field strength (strengthens downward). (8.5-8.8 ft) NOTE: Vertical fractures with iron staining.		
3	RC	14.6	24.6		9.3	35	15			(15-17.9 ft) NOTE: Vertical fractures with iron staining.		
										(18.6-24.2 ft) SHALE, fine grained; gray; moderately weathered; intensely fractured; thin-bedded to medium-bedded; very weak to		

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Mike Lutz**

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2102 S DATE 9/2/21 SHEET 2 OF 3

PROJECT Amos - FGD Landfill

BORING START 6/16/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
3	RC	14.6	24.6		9.3	35				moderate field strength. NOTE: Occasional sandstone seams.		
4	RC	24.6	34.6		8.5	48	25			(24.2-28.7 ft) SHALE, fine grained; reddish brown; highly weathered; intensely fractured.		
							30			(28.7-36.1 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; moderate to strong field strength. NOTE: Interbedded with thin shale layers. (30.1-30.3 ft) NOTE: Vertical fracture.		
5	RC	34.6	44.6		10	9	35					35-38': Bentonite seal
										(36.1-39.4 ft) SANDSTONE, fine grained to medium grained; brown to yellowish brown; fresh; slightly fractured; medium-bedded; strong field strength. NOTE: Occasional limestone or chert nodule.		38-39': Secondary Sand Pack (choker sand)
							40			(39.4-43 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength.		39-59': Primary Sand Pack
										(43-46.3 ft) SHALE, fine grained; gray; fresh; moderately fractured; thin-bedded; moderate to strong field strength.		43'-58': Slotted PVC (20-slot) Screen
6	RC	44.6	54.6		8.6	58	45					

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

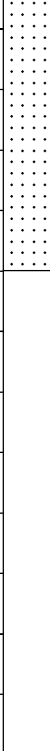

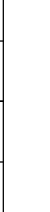
JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2102 S DATE 9/2/21 SHEET 3 OF 3

PROJECT Amos - FGD Landfill

BORING START 6/16/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
6	RC	44.6	54.6		8.6	58	50			(46.3-53.4 ft) SHALE, fine grained; gray to reddish brown; moderately weathered. (49.3-53.4 ft) NOTE: Moderate to highly decomposed, soil-like consistency, reddish brown. (49.9-50.8 ft) NOTE: Sandstone layer. (51.6-52.3 ft) NOTE: Sandstone layer.		
7	RC	54.6	58.0		3.4	73	55			(53.4-59.0 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength. NOTE: Occasional layers of strong shale (<0.5').		
							60					
							65					
							70					

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,942.346 E 1,725,328.869**

GROUND ELEVATION **932.97 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2102 I & D** DATE **9/2/21** SHEET **1** OF **6**

BORING START **6/16/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.90' (I), 2.89' (D)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **62/96'** BOTTOM **77/106'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	∇ 78.94 (I)	∇ 105.68 (D)	∇
TIME			
DATE	8/9/2021	8/9/2021	

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	GB	0.0	4.0						GC	(0.0-1.5 ft) GRAVEL; some clay, silt, and sand; moist		0-56': Grout seal
2	RC	4.0	14.6		7.7	17	5			(1.5-2.5 ft) SANDSTONE, fine grained to medium grained; yellowish brown; highly weathered; medium-bedded; very weak to weak field strength. (2.5-7.2 ft) SHALE, fine grained; reddish brown; moderately weathered; intensely fractured; thin-bedded; weak field strength.		NOTE: 8" Borehole Diameter
3	RC	14.6	24.6		9.3	35	15			(7.2-18.6 ft) SANDSTONE, fine grained; grayish brown; slightly weathered; intensely fractured; thin-bedded; weak to strong field strength (strengthens downward). (8.5-8.8 ft) NOTE: Vertical fractures with iron staining.		
										(18.6-24.2 ft) SHALE, fine grained; gray; moderately weathered; intensely fractured; thin-bedded to medium-bedded; very weak to		

TYPE OF CASING USED

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

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Mike Lutz**

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2102 I & D** DATE **9/2/21** SHEET **2** OF **6**

PROJECT **Amos - FGD Landfill**

BORING START **6/16/21** BORING FINISH **6/16/21**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
3	RC	14.6	24.6		9.3	35				moderate field strength. NOTE: Occasional sandstone seams.		
4	RC	24.6	34.6		8.5	48	25			(24.2-28.7 ft) SHALE, fine grained; reddish brown; highly weathered; intensely fractured.		
							30			(28.7-36.1 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; moderate to strong field strength. NOTE: Interbedded with thin shale layers. (30.1-30.3 ft) NOTE: Vertical fracture.		
5	RC	34.6	44.6		10	9	35			(36.1-39.4 ft) SANDSTONE, fine grained to medium grained; brown to yellowish brown; fresh; slightly fractured; medium-bedded; strong field strength. NOTE: Occasional limestone or chert nodule.		
							40			(39.4-43 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength.		
							45			(43-46.3 ft) SHALE, fine grained; gray; fresh; moderately fractured; thin-bedded; moderate to strong field strength.		
6	RC	44.6	54.6		8.6	58						

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2102 I & D** DATE **9/2/21** SHEET **3** OF **6**

PROJECT **Amos - FGD Landfill**

BORING START **6/16/21** BORING FINISH **6/16/21**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
6	RC	44.6	54.6		8.6	58				(46.3-53.4 ft) SHALE, fine grained; gray to reddish brown; moderately weathered. (49.3-53.4 ft) NOTE: Moderate to highly decomposed, soil-like consistency, reddish brown. (49.9-50.8 ft) NOTE: Sandstone layer. (51.6-52.3 ft) NOTE: Sandstone layer.		
7	RC	54.6	64.6		10	73				(53.4-63.4 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength. NOTE: Occasional layers of strong shale (<0.5'). (57.9-58.5 ft) NOTE: Moderate fracture .		56-59': Bentonite seal
8	RC	64.6	74.6		10	85				(63.4-64.8 ft) SHALE, fine grained; reddish brown ; slightly weathered; moderately fractured; medium-bedded; weak to strong field strength. NOTE: Possible slickensides, smooth, shiny, conchoidal fracture. (64.8-76.8 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; Moderate to strong field strength. NOTE: Occasional layers of soft, weathered shale (<0.1') at 68.9', 69.3', and 69.6'. (66.5 ft) NOTE: Becomes included with limestone or chert from 64.8 to 66.5'. (71 ft) NOTE: Becomes strong to very strong, slightly weathered to fresh.		59-60': Secondary Sand Pack (choker sand) 60-81': Primary Sand Pack 62-77': Slotted PVC (20-slot) Screen

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2102 I & D DATE 9/2/21 SHEET 4 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/16/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
8	RC	64.6	74.6		10	85						
9	RC	74.6	84.6		10	94	75			(75.6-76 ft) NOTE: Moderately to highly weathered, weak, reddish brown layer with natural horizontal fractures; sand content increasing. (76.8-80.9 ft) SANDSTONE, fine grained; gray; fresh; unfractured; thick-bedded; strong field strength.		
							80			(80.9-91 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; moderate field strength.		81-91': Bentonite seal
10	RC	84.6	94.6		10	88	85			(89-90.7 ft) NOTE: Reddish brown, moderately to intensely fractured.		
							90			(91-91.5 ft) SANDSTONE; gray; fresh; competent. (91.5-98.2 ft) SHALE, fine grained; gray to reddish brown; slightly weathered; slightly fractured; medium-bedded; moderate field strength.		91-92': Secondary Sand Pack (choker sand) 92-108': Primary Sand Pack
11	RC	94.6	104.6		9.7	76	95					96-106': Slotted PVC (20-slot) Screen

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2102 I & D DATE 9/2/21 SHEET 5 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/16/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
11	RC	94.6	104.6		9.7	76	100			(98.2-102 ft) SHALE, fine grained; moderately fractured to intensely fractured.		
12	RC	104.6	114.6		10	100	105			(102-117.4 ft) SHALE, fine grained; gray to reddish brown; slightly weathered; slightly fractured; medium-bedded; moderate field strength. NOTE: Interbedded with gray sandstone (see notes). (104.6-106.8 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		
							110			(108.4-109.3 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		
							115			(113.1-114.6 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		
13	RC	114.6	124.6		10	100	120			(117.4-129 ft) SANDSTONE, fine grained to medium grained; fresh; unfractured; medium-bedded; micaceous; very strong field strength.		

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 AEP CIVIL ENGINEERING LABORATORY
 LOG OF BORING

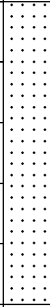
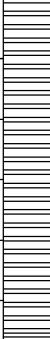

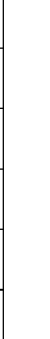
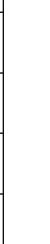
JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2102 I & D DATE 9/2/21 SHEET 6 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/16/21 BORING FINISH 6/16/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
13	RC	114.6	124.6		10	100						
14	RC	124.6	134.6		10	100	125					
							130			(129-134.6 ft) SHALE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; some observable sandstone; strong to very strong field strength.		
							135					
							140					
							145					

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 542,191.177 E 1,725,406.308

GROUND ELEVATION 935.46 ft SYSTEM NAD83/NAVD88

BORING NO. 2103 S & I DATE 9/2/21 SHEET 1 OF 6

BORING START 6/17/21 BORING FINISH 6/17/21

PIEZOMETER TYPE NA WELL TYPE OW

HGT. RISER ABOVE GROUND 2.47' (S), 2.45' (I) DIA 2"

DEPTH TO TOP OF WELL SCREEN 45'67" BOTTOM 58'82"

WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	∇ <u>57.15 (S)</u>	∇ <u>82.52 (I)</u>	∇
TIME			
DATE	<u>8/9/2021</u>	<u>8/9/2021</u>	

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	4.6	14.6		10	77	5			(0.0-0.5 ft) GRAVEL, fine to coarse; and sand, fine to coarse; brown. (0.5-15.2 ft) SANDSTONE, fine grained to medium grained; olive gray; slightly weathered; slightly fractured; medium-bedded; moderate field strength.		0-40': Grout seal NOTE: 8" Borehole Diameter
2	RC	14.6	24.6		9.9	80	15			(15.2-18.6 ft) SHALE, fine grained; reddish brown; moderately weathered; intensely fractured; thin-bedded; weak to moderate field strength. (18.6-26.8 ft) SANDSTONE, fine grained to medium grained; olive gray; slightly weathered; slightly fractured; medium-bedded; moderate field strength.		

TYPE OF CASING USED

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

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER Mike Lutz

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2103 S & I DATE 9/2/21 SHEET 2 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/17/21 BORING FINISH 6/17/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
2	RC	14.6	24.6		9.9	80				strength.		
3	RC	24.6	34.6		8.9	90	25			(26.8-31 ft) SHALE, fine grained; reddish brown; highly weathered; thin-bedded; weak to moderate field strength.		
							30			(31-37.2 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; banded; some observable sand; strong field strength.		
4	RC	34.6	44.6		10	100	35			(37.2-40 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; micaceous; banded; strong field strength.		
							40			(40-42.6 ft) SHALE, fine grained to medium grained; gray; slightly weathered; moderately fractured; medium-bedded; sandy; weak to strong field strength.		40-43': Bentonite seal
							45			(42.6-56.2 ft) SHALE, fine grained; reddish brown to gray; moderately weathered; intensely fractured; thin-bedded. NOTE: weak to moderate field strength.		43-44': Secondary Sand Pack (choker sand) 44-59': Primary Sand Pack
5	RC	44.6	54.6		9.5	82						

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2103 S & I DATE 9/2/21 SHEET 3 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/17/21 BORING FINISH 6/17/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
5	RC	44.6	54.6		9.5	82	50					
6	RC	54.6	64.6		10	81	55					
							60			(56.2-66.1 ft) SHALE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; moderate to strong field strength. NOTE: Occasional sandstone layer (<0.5'). (58.7-58.8 ft) NOTE: Thin fracture (<0.1') of weathered shale, washed out in core.		59-64': Bentonite seal
7	RC	64.6	74.6		10	67	65					
							70			(66.1-69.6 ft) MUDSTONE, fine grained; reddish brown; moderately weathered; moderately fractured; medium-bedded; some shale; weak to moderate field strength. (66.3 ft) NOTE: Highly weathered from 66.1' to 66.3'.		64-65': Secondary Sand Pack (choker sand) 65-84': Primary Sand Pack
										(69.6-80.2 ft) SHALE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; sandy; micaceous; nodules present (chert or lime); strong field strength. NOTE: Becomes less sandy with depth.		67-82': Slotted PVC (20-slot) Screen

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2103 S & I DATE 9/2/21 SHEET 4 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/17/21 BORING FINISH 6/17/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	RC	64.6	74.6		10	67						
8	RC	74.6	84.6		10	72	75			(73.8-75 ft) NOTE: Reddish brown zone of weak shale, moderately weathered, thin bedded; very friable below 74.1'. (75.9-76 ft) NOTE: Reddish brown zone of weak shale, moderately weathered, thin bedded. (78.9-80.2 ft) NOTE: Reddish brown zone of weak shale, moderately weathered, thin bedded.		
9	RC	84.6	94.6		9.8	76	80			(80.2-103.2 ft) SHALE, fine grained; gray; fresh; slightly fractured; medium-bedded; nodules (lime or chert); strong field strength. (83.2-86.6 ft) NOTE: Gray micaceous sandstone, fine to medium grained, fresh, strong field strength.		
							85			(86.6-87.2 ft) NOTE: Gray to reddish brown shale, intensely fractured, moderately weathered. (88.5-90.4 ft) NOTE: Gray to reddish brown shale, intensely fractured, moderately weathered.		
10	RC	94.6	104.6		9.8	72	90					
							95					

84'-134.6': Bentonite backfill

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2103 S & I DATE 9/2/21 SHEET 5 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/17/21 BORING FINISH 6/17/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
10	RC	94.6	104.6		9.8	72	100			(97.4-101.8 ft) NOTE: reddish brown shale, intensely fractured, slight to moderately weathered, thin to medium bedded.		
11	RC	104.6	114.6		10	97	105			(103.2-120.4 ft) SANDSTONE, fine grained to medium grained; gray; fresh; unfractured; medium-bedded; strong to very strong field strength. (105.6-106.7 ft) NOTE: Gray shale.		
12	RC	114.6	124.6		10	100	115			(115-118 ft) NOTE: Angled sandstone.		
							120			(120.4-134.6 ft) SHALE, fine grained; gray; fresh; unfractured; medium-bedded; strong to very strong field strength.		

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2103 S & I DATE 9/2/21 SHEET 6 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/17/21 BORING FINISH 6/17/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
12	RC	114.6	124.6		10	100						
13	RC	124.6	134.6		10	100	125					
							130			(130.8-132.6 ft) NOTE: Gray sandstone.		
							135					
							140					
							145					

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 542,356.375 E 1,725,041.563

GROUND ELEVATION 931.21 ft SYSTEM NAD83/NAVD88

BORING NO. 2104 DATE 9/2/21 SHEET 1 OF 6

BORING START 6/22/21 BORING FINISH 6/22/21

PIEZOMETER TYPE NA WELL TYPE NA

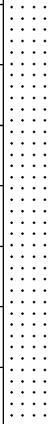
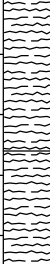
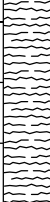

HGT. RISER ABOVE GROUND NA DIA NA

DEPTH TO TOP OF WELL SCREEN NA BOTTOM NA

WELL DEVELOPMENT NA BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	<u>▽</u>	<u>▽</u>	<u>▽</u>
TIME			
DATE			

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	3.0	9.6		4.6	28	5			(3-10.1 ft) SANDSTONE, fine grained; tan and black (banded); moderately weathered; moderately fractured; thin-bedded; moderate field strength.		No well installed
2	RC	9.6	14.6		4.7	45	10			(10.1-12.6 ft) MUDSTONE, fine grained; red; fresh; moderately fractured; thin-bedded; moderate field strength. (11.6-12.6 ft) NOTE: Becomes weak, slight to fresh decomposition, moderately fractured; thick-bedded.		
3	RC	14.6	24.6		9.1	49	15			(12.6-18.1 ft) MUDSTONE, fine grained; tan to gray; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		
										(18.1-19.2 ft) SHALE, fine grained; Gray-green; moderately weathered; unfractured; laminated; weak field strength.		

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER Alan Gillespie

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2104 DATE 9/2/21 SHEET 2 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/22/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
3	RC	14.6	24.6		9.1	49				(19.2-27.4 ft) MUDSTONE, fine grained; red to gray; fresh; moderately fractured; massive; weak field strength.		
4	RC	24.6	34.6		8.1	79	25			(27.4-28.5 ft) MUDSTONE, fine grained; gray; moderately weathered; moderately fractured; laminated; weak field strength. (28.5-39.7 ft) SANDSTONE, fine grained; gray to green; slightly weathered; slightly fractured; massive; strong field strength.		
5	RC	34.6	44.6		9.2	56	35			(35.8-36.4 ft) NOTE: Sandstone becomes medium grained.		
							40			(39.7-44.2 ft) SANDSTONE, medium grained; gray; slightly weathered; massive; strong field strength.		
6	RC	44.6	54.6		8.4	72	45			(44.2-45.6 ft) MUDSTONE, fine grained; gray; moderately weathered; moderately fractured; thin-bedded; moderate field strength.		

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

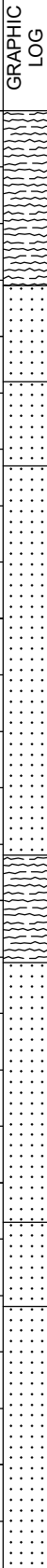
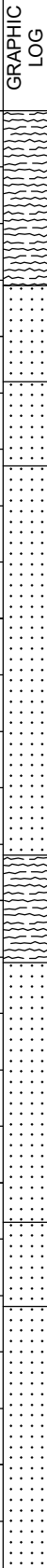
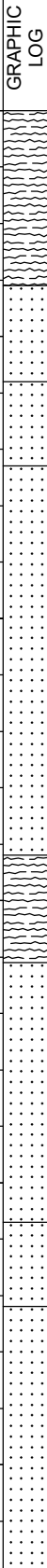
JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2104 DATE 9/2/21 SHEET 3 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/22/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
6	RC	44.6	54.6		8.4	72	50			(45.6-49.1 ft) MUDSTONE, fine grained; red; moderately weathered; moderately fractured; thick-bedded; shaley; moderate field strength.		
										(49.1-50.8 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; massive.		
										(50.8-52.3 ft) SANDSTONE, fine grained; gray; moderately weathered; moderately fractured; thin-bedded; shaley.		
										(52.3-59.2 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; massive; strong field strength.		
										(59.2-61.1 ft) MUDSTONE, fine grained; red; moderately weathered; moderately fractured; thin-bedded; shaley.		
7	RC	54.6	64.6		9.6	74	55			(61.1-65.7 ft) SANDSTONE, fine grained; gray to red, mottled; slightly weathered; slightly fractured; thin-bedded; shaley.		
										(65.7-67.2 ft) SANDSTONE, fine grained; gray to red, banded; moderately weathered; moderately fractured; medium-bedded . NOTE: Interbedded with shale.		
8	RC	64.6	74.6		9.9	65	70			(67.2-73.2 ft) SANDSTONE, fine grained; gray; slightly weathered; moderately fractured; strong field strength. NOTE: Interbedded with shale.		
										(61.1-65.7 ft) SANDSTONE, fine grained; gray to red, mottled; slightly weathered; slightly fractured; thin-bedded; shaley.		
										(59.2-61.1 ft) MUDSTONE, fine grained; red; moderately weathered; moderately fractured; thin-bedded; shaley.		

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2104 DATE 9/2/21 SHEET 4 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/22/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
8	RC	64.6	74.6		9.9	65						
							75			(73.2-80.1 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; thin-bedded; strong field strength.		
9	RC	74.6	84.6		9.8	80				(80.1-81.6 ft) SANDSTONE, fine grained; gray with red banding; moderately weathered; moderately fractured; thin-bedded; shaley; moderate field strength. (81.6-84.1 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; thin-bedded; strong field strength.		
							85			(84.1-86.4 ft) SILTSTONE, fine grained; red with gray banding; moderately weathered; moderately fractured; thin-bedded; moderate field strength. (85.4-86.1 ft) NOTE: Thin layer of sandstone.		
										(86.4-86.9 ft) MUDSTONE, fine grained; gray; moderately weathered; moderately fractured; thin-bedded; sandy; moderate to weak field strength. (86.9-89.4 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
							90			(89.4-98.5 ft) MUDSTONE, fine grained; mottled; moderately weathered; moderately fractured; medium-bedded; moderate to weak field strength.		
11	RC	94.6	104.6		9.5	75						

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2104 DATE 9/2/21 SHEET 5 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/22/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
11	RC	94.6	104.6		9.5	75	100					
12	RC	104.6	114.6		10	85	105			(98.5-124.6 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
13	RC	114.6	124.6		10	90	115			(114.3 ft) NOTE: Sandstone becomes medium-grained and medium-bedded.		
							120					

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



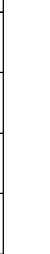
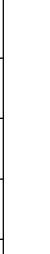

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2104 DATE 9/2/21 SHEET 6 OF 6

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/22/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
13	RC	114.6	124.6		10	90						
14	RC	124.6	134.6		10	77	125			(123.6 ft) NOTE: Sandstone is shaley, fine-grained, gray/light gray (mottled), no fractures. (124.6-126.1 ft) SANDSTONE, medium grained; slightly weathered; unfractured; thin-bedded; strong field strength. (126.1-133.7 ft) SHALE, fine grained; moderately weathered; moderately fractured; thin-bedded; weak field strength.		
							130			(133.7-134.6 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength.		
							135					
							140					
							145					

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 543,830.171 E 1,725,193.696

GROUND ELEVATION 991.72 ft SYSTEM NAD83/NAVD88

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 1 OF 5

BORING START 6/23/21 BORING FINISH 6/23/21

PIEZOMETER TYPE NA WELL TYPE OW

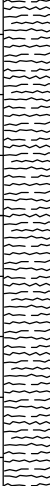


HGT. RISER ABOVE GROUND 2.78' (SS), 2.69' (S) DIA 2"

DEPTH TO TOP OF WELL SCREEN 61'98" BOTTOM 76'108"

WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	<u>▽75.08 (SS)</u>	<u>▽107.68 (S)</u>	<u>▽</u>
TIME			
DATE	<u>8/9/2021</u>	<u>8/9/2021</u>	

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	6.4	14.5		4.1	59	5			(6.4-16.6 ft) MUDSTONE, fine grained; tan; highly weathered; slightly fractured; medium-bedded. NOTE: Interbedded shale lenses, red, weak to moderate field strength.		0-53': Grout seal *Lithology from 2105 I/D borehole. 2105 S & SS installed in 8" borehole.
2	RC	14.5	24.5		6.8	51	15			(16.6-18.1 ft) SANDSTONE, fine grained; gray; slightly weathered; moderately fractured; thin-bedded; strong field strength.		
										(18.1-20 ft) MUDSTONE, fine grained; tan/red/black mottled; highly weathered; moderately fractured; medium-bedded; weak field strength.		

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER Alan Gillespie

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 2 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
2	RC	14.5	24.5		6.8	51				(20-26.1 ft) SHALE, fine grained; red with tan/gray mottling; slightly weathered; slightly fractured. NOTE: Sandstone nodules throughout.		
3	RC	24.5	34.5		5	66	25			(26-26.1 ft) NOTE: Highly weathered. (26.1-34.5 ft) SHALE, fine grained; gray-green with light gray nodules; moderately weathered; intensely fractured; medium-bedded. NOTE: Light gray sandstone nodules throughout (typically 1-2 cm, occasionally 10-12cm).		
4	RC	34.5	44.5		9.9	56	35			(34.5-37.8 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Reddish coloring along bedding planes.		
							40			(37.8-41.8 ft) SANDSTONE, fine grained; gray with red banding; moderately weathered; moderately fractured; medium-bedded; moderate field strength. NOTE: Interbedded with shale.		
							45			(41.8-49.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
5	RC	44.5	54.5		10	65						

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 3 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
5	RC	44.5	54.5		10	65						
							50			(49.3-64 ft) MUDSTONE, fine grained; red with gray/tan mottling; moderately weathered; moderately fractured; medium-bedded; moderate field strength.		
												53-56': Bentonite seal
6	RC	54.5	64.5		7.1	56						
							55					56-57': Secondary Sand Pack (choker sand)
												57-80': Primary Sand Pack
							60			(58.6 ft) NOTE: Becomes more weathered and fractured: moderate to weak field strength, moderate to highly weathered, moderately fractured, medium-bedded.		
												61-76': Slotted PVC (20-slot) Screen
7	RC	64.5	74.5		7.4	58						
							65			(64-73.4 ft) MUDSTONE, fine grained; dark red; highly weathered; moderately fractured; thick-bedded; moderate field strength.		
							70					

Continued Next Page

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 4 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	RC	64.5	74.5		7.4	58						
8	RC	74.5	84.5		9.4	87	75			(73.4-74.5 ft) SANDSTONE, fine grained; gray with red mottling; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with mudstone. (74.5-75.1 ft) SHALE, fine grained; red; moderately weathered; moderately fractured; thin-bedded; moderate to weak field strength. (75.1-82 ft) SANDSTONE, fine grained; gray; moderately weathered; intensely fractured; thin-bedded; strong field strength. NOTE: Moderate to high disintegration at contact (82.0'). (78.8-80.8 ft) NOTE: Calcite deposition and iron staining at fracture. (80.8-81 ft) NOTE: Weathered shale.		
9	RC	84.5	94.5		9.9	67	85			(82-83.2 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded; moderate to strong field strength. NOTE: Interbedded with red shale. (83.2-86.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. (86.3-92.7 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with gray-green shale. (87.5 ft) NOTE: Becomes red shale interbedded with gray sandstone; moderate to weak field strength, thinly bedded, moderate weathering, slightly fractured. (90.1 ft) NOTE: Shale becomes more sandy and transitions to sandstone.		
10	RC	94.5	104.5		9.3	44	95			(92.7-94.7 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. (94.7-100 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with shale. (94.9-95.5 ft) NOTE: Heavy calcite deposits.		80-93': Bentonite seal 93-94': Secondary Sand Pack (choker sand) 94-110': Primary Sand Pack

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 5 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

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SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
10	RC	94.5	104.5		9.3	44	100					98-108': Slotted PVC (20-slot) Screen
11	RC	104.5	110.0		5.5	87	105					
							110					
							115					
							120					

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 543,825.103 E 1,725,192.735**

GROUND ELEVATION **991.72 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2105 I & D** DATE **9/2/21** SHEET **1** OF **8**

BORING START **6/23/21** BORING FINISH **6/23/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

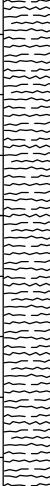



HGT. RISER ABOVE GROUND **2.69' (I), 2.89' (D)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **120'/167'** BOTTOM **140'/182'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	∇ 135.96 (I)	∇ 180.33 (D)	∇
TIME			
DATE	8/9/2021	8/9/2021	

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
1	RC	6.4	14.5		4.1	59	5			(6.4-16.6 ft) MUDSTONE, fine grained; tan; highly weathered; slightly fractured; medium-bedded. NOTE: Interbedded shale lenses, red, weak to moderate field strength.		0-112': Grout seal NOTE: 8" Borehole Diameter
2	RC	14.5	24.5		6.8	51	15			(16.6-18.1 ft) SANDSTONE, fine grained; gray; slightly weathered; moderately fractured; thin-bedded; strong field strength.		
										(18.1-20 ft) MUDSTONE, fine grained; tan/red/black mottled; highly weathered; moderately fractured; medium-bedded; weak field strength.		

TYPE OF CASING USED

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

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

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

RECORDER **Alan Gillespie**

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2105 I & D** DATE **9/2/21** SHEET **2** OF **8**

PROJECT **Amos - FGD Landfill**

BORING START **6/23/21** BORING FINISH **6/23/21**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
2	RC	14.5	24.5		6.8	51				(20-26.1 ft) SHALE, fine grained; red with tan/gray mottling; slightly weathered; slightly fractured. NOTE: Sandstone nodules throughout.		
3	RC	24.5	34.5		5	66	25			(26-26.1 ft) NOTE: Highly weathered. (26.1-34.5 ft) SHALE, fine grained; gray-green with light gray nodules; moderately weathered; intensely fractured; medium-bedded. NOTE: Light gray sandstone nodules throughout (typically 1-2 cm, occasionally 10-12cm).		
4	RC	34.5	44.5		9.9	56	35			(34.5-37.8 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Reddish coloring along bedding planes.		
							40			(37.8-41.8 ft) SANDSTONE, fine grained; gray with red banding; moderately weathered; moderately fractured; medium-bedded; moderate field strength. NOTE: Interbedded with shale.		
							45			(41.8-49.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
5	RC	44.5	54.5		10	65						

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

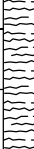
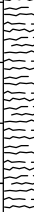
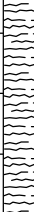
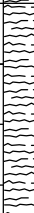
JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 3 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO			%						
5	RC	44.5	54.5		10	65						
							50			(49.3-64 ft) MUDSTONE, fine grained; red with gray/tan mottling; moderately weathered; moderately fractured; medium-bedded; moderate field strength.		
6	RC	54.5	64.5		7.1	56						
							60			(58.6 ft) NOTE: Becomes more weathered and fractured: moderate to weak field strength, moderate to highly weathered, moderately fractured, medium-bedded.		
7	RC	64.5	74.5		7.4	58						
							65			(64-73.4 ft) MUDSTONE, fine grained; dark red; highly weathered; moderately fractured; thick-bedded; moderate field strength.		
							70					

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 4 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	RC	64.5	74.5		7.4	58						
8	RC	74.5	84.5		9.4	87	75			(73.4-74.5 ft) SANDSTONE, fine grained; gray with red mottling; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with mudstone. (74.5-75.1 ft) SHALE, fine grained; red; moderately weathered; moderately fractured; thin-bedded; moderate to weak field strength. (75.1-82 ft) SANDSTONE, fine grained; gray; moderately weathered; intensely fractured; thin-bedded; strong field strength. NOTE: Moderate to high disintegration at contact (82.0'). (78.8-80.8 ft) NOTE: Calcite deposition and iron staining at fracture. (80.8-81 ft) NOTE: Weathered shale.		
9	RC	84.5	94.5		9.9	67	85			(82-83.2 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded; moderate to strong field strength. NOTE: Interbedded with red shale. (83.2-86.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
							90			(86.3-92.7 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with gray-green shale. (87.5 ft) NOTE: Becomes red shale interbedded with gray sandstone; moderate to weak field strength, thinly bedded, moderate weathering, slightly fractured. (90.1 ft) NOTE: Shale becomes more sandy and transitions to sandstone.		
							95			(92.7-94.7 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. (94.7-100 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with shale. (94.9-95.5 ft) NOTE: Heavy calcite deposits.		
10	RC	94.5	104.5		9.3	44						

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 5 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
10	RC	94.5	104.5		9.3	44	100			(100-107.2 ft) MUDSTONE, fine grained; red with gray mottling; highly weathered; medium-bedded; moderate field strength. NOTE: Calcite nodules (2-3cm) at upper contact (100-101').		
11	RC	104.5	114.5		10	87	105			(106.4-107.2 ft) NOTE: Becomes shale-dominated, with interbedded mudstone; gray with red mottling, thinly bedded, moderately weathered, moderately fractured. NOTE: fractures and calcite deposits at 106.7' to 107.2'.		
							110			(107.2-120.4 ft) SANDSTONE, fine grained to medium grained (0.25-0.5 mm); gray to light gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
12	RC	114.5	124.5		10	57	115				112-115': Bentonite seal	
							115				115-116': Secondary Sand Pack (choker sand)	
							115				116-142': Primary Sand Pack	
							120			(119.2 ft) NOTE: Calcite nodule (5 cm) and fractures.		
							120			(120.4-127.4 ft) SHALE, fine grained; gray with red/tan mottling; moderately weathered; moderately fractured; thin-bedded; moderate field strength.		120-140': Slotted PVC (20-slot) Screen

Continued Next Page

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 6 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
13	RC	124.5	134.5		9.6	81	125					
							130			(127.4-136.3 ft) SANDSTONE, fine grained; light gray; moderately weathered; slightly fractured; thin-bedded; strong field strength. NOTE: Calcite deposits throughout with calcium deposits near contacts (127.4-127.8' and 130.0-131.1'). (132-132.3 ft) NOTE: Thin shale layer, red, highly weathered, moderately fractured.		
14	RC	134.5	144.5		9.5	85	135					
							140			(136.3-144.8 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded; strong field strength. NOTE: Calcite veins and nodules throughout.		
							145			(143.8-144.8 ft) NOTE: Interbedded with shale.		
15	RC	144.5	154.5		10	91	145					
										(144.8-149.9 ft) SANDSTONE, fine grained; gray to light gray; moderately weathered; thin-bedded; strong to very strong field strength. (147.2-147.5 ft) NOTE: Calcite veins.		
											142-162': Bentonite seal	

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 7 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
15	RC	144.5	154.5		10	91				(149.9-151 ft) SHALE, fine grained; red with gray mottling; moderately weathered; slightly fractured; thin-bedded; moderate to strong field strength. NOTE: Calcite veins at top and base contacts.		
16	RC	154.5	164.5		10		155			(151-154.5 ft) SANDSTONE, fine grained; gray to light gray; moderately weathered; thin-bedded; strong field strength. (153.9-154.5 ft) NOTE: Interbedded with shale.		
							160			(154.5-163.2 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength. (156.1-163.2 ft) NOTE: Interbedded with red shale.		
17	RC	164.5	174.5		10	79	165			(163.2-166.2 ft) SANDSTONE, fine grained; gray to light gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. NOTE: Fractures and calcite veins at base contact.		
							170			(166.2-170 ft) NOTE: Interbedded with shale, moderately weathered and fractured.		
							175			(170-180 ft) SHALE, fine grained; red to dark red; moderately weathered; moderately fractured; thin-bedded; moderate field strength.		
18	RC	174.5	184.5		9.8	91						

162-163': Secondary Sand Pack (choker sand)
 163-184': Primary Sand Pack

 167-182': Slotted PVC (20-slot) Screen

Continued Next Page

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2105 I & D DATE 9/2/21 SHEET 8 OF 8

PROJECT Amos - FGD Landfill

BORING START 6/23/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
18	RC	174.5	184.5		9.8	91	180			(177.6-178.8 ft) NOTE: Interbedded with sandstone, red/gray/tan mottled, highly weathered, weak. (178.8-180 ft) NOTE: Shale becomes gray-green.		
19	RC	184.5	194.5		10	97	185			(180-184.5 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. (184.5-185 ft) SHALE, fine grained; gray-green; moderately weathered; slightly fractured; thin-bedded; sandy; moderate to strong field strength. (185-194.5 ft) SANDSTONE, medium grained; dark gray; fresh; unfractured; thin-bedded; strong field strength.		184'-194.5': Bentonite backfill
							195					
							200					

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 542,837.390 E 1,722,861.693**

GROUND ELEVATION **722.64 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2106** DATE **9/2/21** SHEET **1** OF **5**

BORING START **6/22/21** BORING FINISH **6/23/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.94'** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **37'** BOTTOM **57'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 48.35	▽	▽
TIME			
DATE	8/9/2021		

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
0	RC	3.0	9.6		4.3	37						0-29': Grout seal NOTE: 6" Borehole Diameter
							5			(3-3.5 ft) MUDSTONE, fine grained; red-gray mottled; highly weathered; intensely fractured; medium-bedded; weak field strength. (3.5-4.1 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. (4.1-6.3 ft) SANDSTONE, fine grained; moderately weathered; intensely fractured; medium-bedded; moderate field strength. NOTE: Interbedded with mudstone. (6.3-10.1 ft) SANDSTONE, fine grained; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
1	RC	9.6	14.6		4.3	42	10			(10.1-16.8 ft) MUDSTONE, fine grained; red to reddish gray (mottled); highly weathered; moderately fractured; moderate to weak field strength.		
2	RC	14.6	24.6		10	63	15			(16.8-27.2 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded; strong field strength.		

TYPE OF CASING USED

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

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **Alan Gillespie**

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUNDARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPI

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2106 DATE 9/2/21 SHEET 2 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
2	RC	14.6	24.6		10	63				(20.3-20.6 ft) NOTE: Shale lens. (21.5-21.6 ft) NOTE: Shale lens.		
3	RC	24.6	34.6		10	41	25			(27.2-33.7 ft) SHALE, fine grained; gray with red banding; moderately weathered; slightly fractured; medium-bedded; moderate to weak field strength. NOTE: Interbedded with mudstone.		
							30					29-32': Bentonite seal
												32-33': Secondary Sand Pack (choker sand) 33-59': Primary Sand Pack
4	RC	34.6	44.6		4.2	43	35			(33.7-56.5 ft) MUDSTONE, fine grained; red/tan/gray mottled; highly weathered; moderately fractured; medium-bedded; weak field strength.		
							40					
							45			(44.6 ft) NOTE: Becomes less weathered, moderate field strength.		37'-57': Slotted PVC (20-slot) Screen

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\ISOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2106 DATE 9/2/21 SHEET 3 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
5	RC	44.6	54.6		4.4	36	50					
6	RC	54.6	64.6		9.6	76	55			(52.4 ft) NOTE: Becomes less weathered, less fractured, tan coloring dominates.		
							60			(56.5-67.9 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded. NOTE: Interbedded with red sandy shale.		
							65					
7	RC	64.6	74.6		9	39	70			(67.9-89.6 ft) SHALE, fine grained; red with gray mottling; highly weathered; moderately fractured; weak field strength.		
												59'-104.6': Bentonite backfill

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

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2106 DATE 9/2/21 SHEET 4 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
7	RC	64.6	74.6		9	39						
8	RC	74.6	84.6		8.7	51	75					
							80			(79.1 ft) NOTE: Becomes less weathered, moderate field strength.		
9	RC	84.6	94.6		9.7	64	85					
							90			(89.6-94.3 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength. (92.7-92.8 ft) NOTE: Highly weathered. (93.7-93.8 ft) NOTE: Highly weathered.		
10	RC	94.6	104.6		9.7	69	95			(94.3-99.8 ft) SHALE, fine grained; red; moderately weathered; slightly fractured; moderate field strength. NOTE: Interbedded with gray sandstone.		

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

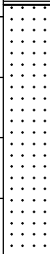

JOB NUMBER 30080156

COMPANY American Electric Power

BORING NO. 2106 DATE 9/2/21 SHEET 5 OF 5

PROJECT Amos - FGD Landfill

BORING START 6/22/21 BORING FINISH 6/23/21

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		FROM	TO									
10	RC	94.6	104.6		9.7	69						
							100			(99.8-104 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
							105			(104-104.6 ft) SHALE, fine grained; red; moderately weathered; moderately fractured; medium-bedded; moderate to weak field strength. NOTE: Highly weathered at 104.4-104.6'.		
							110					
							115					
							120					

AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 541,732.909 E 1,724,951.574**

GROUND ELEVATION **932.04 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2101 I & D** DATE **10/8/21** SHEET **1** OF **1**

BORING START **6/15/21** BORING FINISH **6/16/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

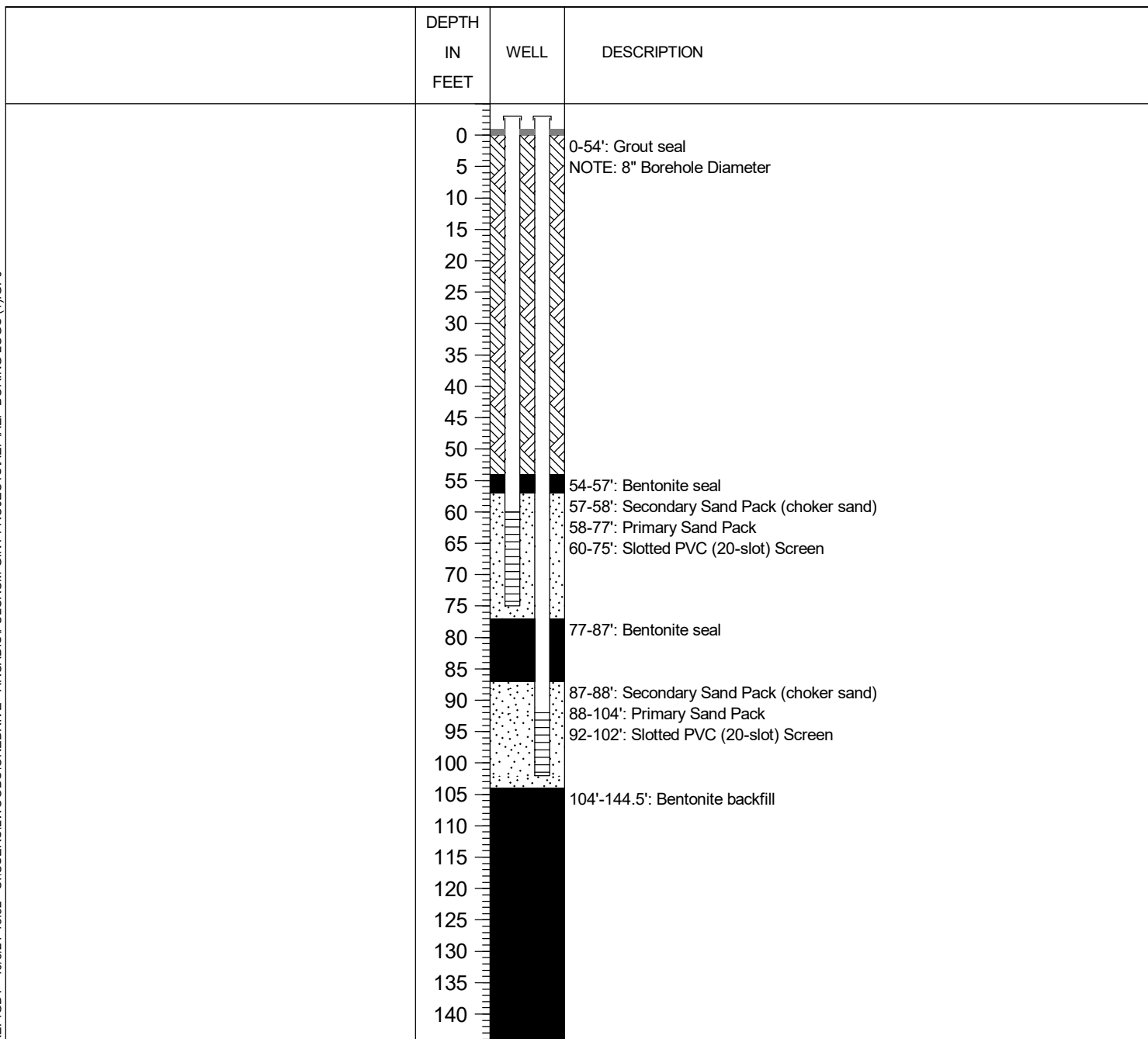
HGT. RISER ABOVE GROUND **2.73' (I) 2.71' (D)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **60'92"** BOTTOM **75'102"**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 56.95	▽	▽
TIME			
DATE	8/9/2021		



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

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 Mike Lutz

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\ILWOODS\ONEEDRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 541,735.055 E 1,724,955.37

GROUND ELEVATION 932.04 ft SYSTEM NAD83/NAVD88

BORING NO. 2101 S DATE 10/8/21 SHEET 1 OF 1

BORING START 6/15/21 BORING FINISH 6/16/21

PIEZOMETER TYPE NA WELL TYPE OW

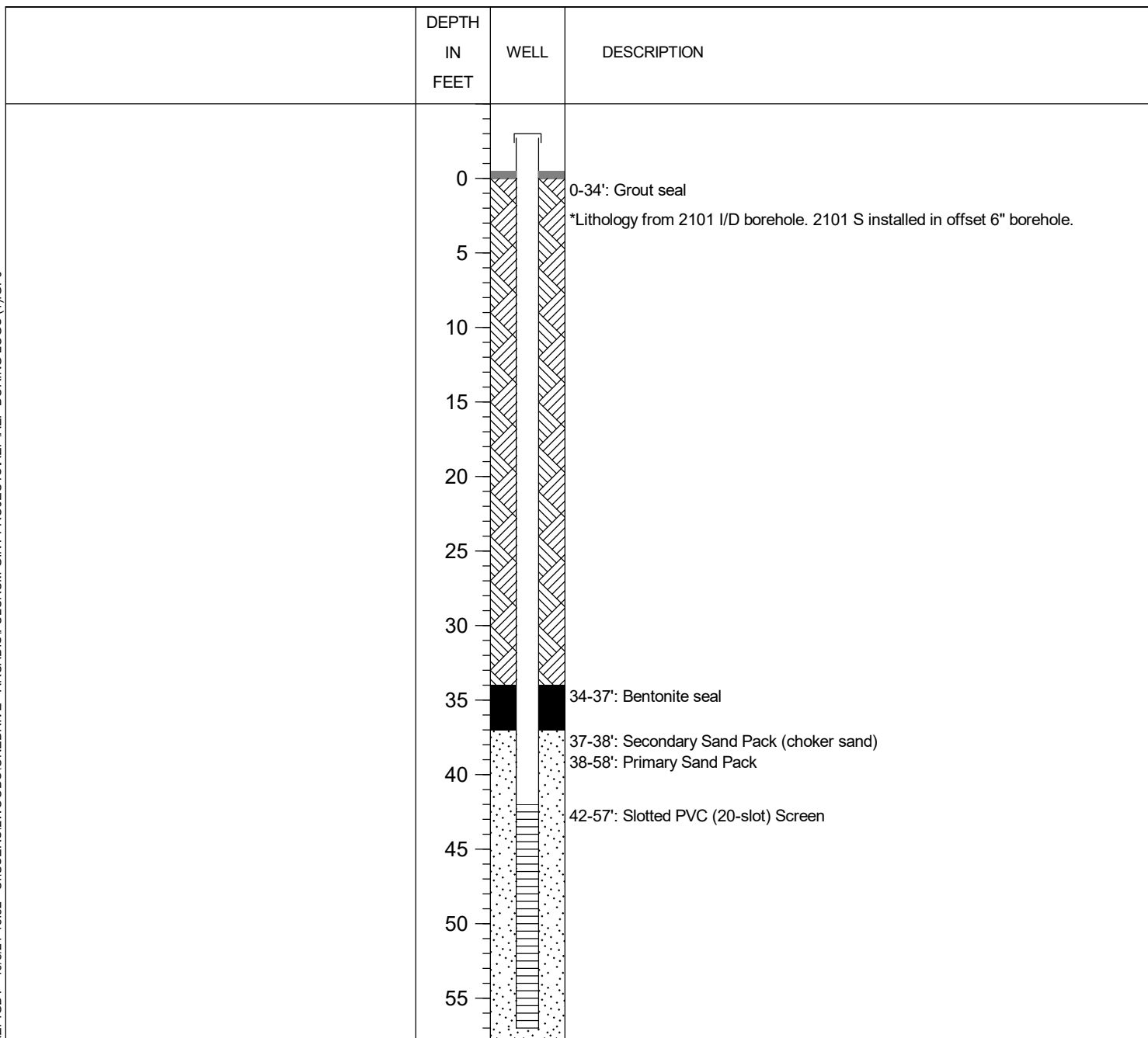
HGT. RISER ABOVE GROUND 2.86' DIA 2"

DEPTH TO TOP OF WELL SCREEN 42' BOTTOM 57'

WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	▽ <u>38.59</u>	▽	▽
TIME			
DATE	<u>8/9/2021</u>		



TYPE OF CASING USED		
NA	NQ-2 ROCK CORE	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
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"	RECORDER <u>Mike Lutz</u>
NA	AIR HAMMER 8"	

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODS\ONEEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2101 SS** DATE **10/8/21** SHEET **1** OF **1**

PROJECT **Amos - FGD Landfill**

BORING START **6/15/21** BORING FINISH **6/16/21**

COORDINATES **N 541,737.317 E 1,724,959.605**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

GROUND ELEVATION **932.04 ft** SYSTEM **NAD83/NAVD88**

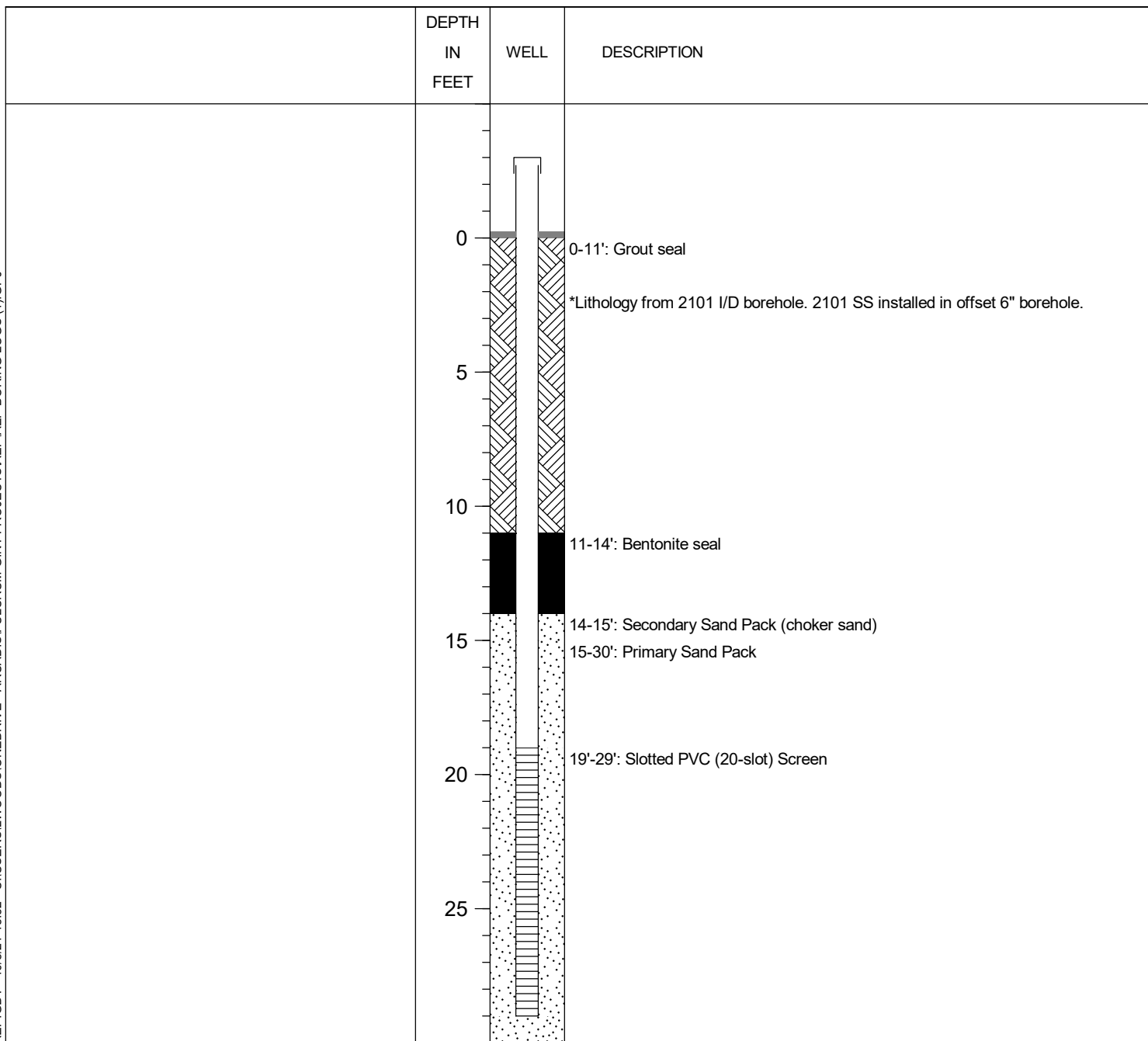
HGT. RISER ABOVE GROUND **2.8'** DIA **2"**

Water Level, ft	▽ 20.61	▽	▽
TIME			
DATE	8/9/2021		

DEPTH TO TOP OF WELL SCREEN **19'** BOTTOM **29'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**



TYPE OF CASING USED			
NA	NQ-2 ROCK CORE	PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC	
NA	6" x 3.25 HSA		
NA	9" x 6.25 HSA		
NA	HW CASING ADVANCER	4"	WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NA	NW CASING	3"	
NA	SW CASING	6"	
NA	AIR HAMMER	8"	RECORDER Mike Lutz

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODS\ONEEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

BORING NO. **2102 I & D** DATE **10/8/21** SHEET **1** OF **1**

PROJECT **Amos - FGD Landfill**

BORING START **6/16/21** BORING FINISH **6/16/21**

COORDINATES **N 541,942.346 E 1,725,328.869**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

GROUND ELEVATION **932.97 ft** SYSTEM **NAD83/NAVD88**

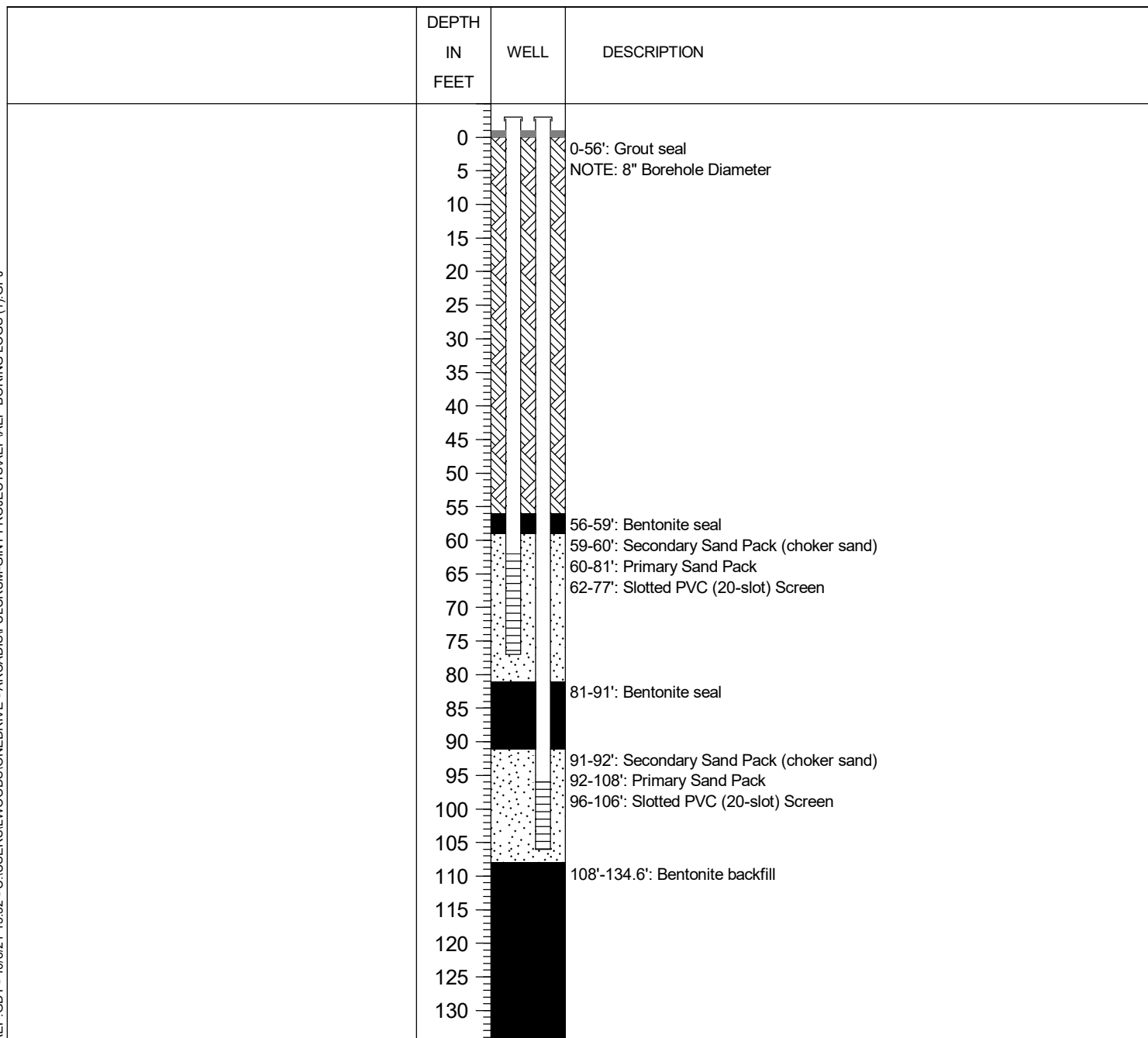
HGT. RISER ABOVE GROUND **2.90' (I), 2.89' (D)** DIA **2"**

Water Level, ft	▽ 78.94	▽	▽
TIME			
DATE	8/9/2021		

DEPTH TO TOP OF WELL SCREEN **62/96'** BOTTOM **77/106'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**



AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODSON\DRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

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 Mike Lutz

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 541,946.401 E 1,725,330.822

GROUND ELEVATION 932.97 ft SYSTEM NAD83/NAVD88

BORING NO. 2102 S DATE 10/8/21 SHEET 1 OF 1

BORING START 6/16/21 BORING FINISH 6/16/21

PIEZOMETER TYPE NA WELL TYPE OW

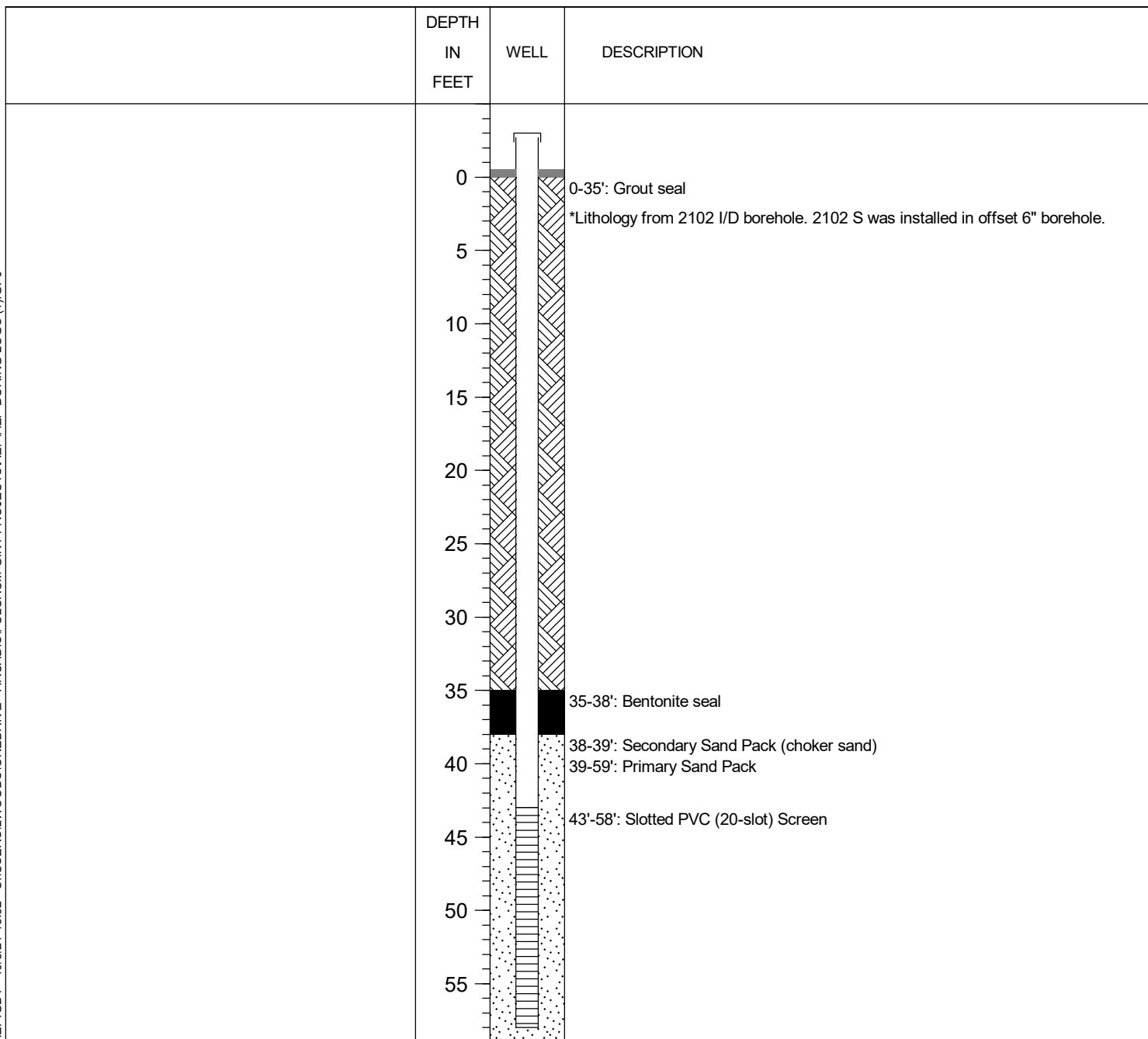
HGT. RISER ABOVE GROUND 2.97' DIA 2"

DEPTH TO TOP OF WELL SCREEN 43' BOTTOM 58'

WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	▽ 41.27	▽	▽
TIME			
DATE	8/9/2021		



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

PIEZOMETER TYPE:	PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
WELL TYPE:	OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
RECORDER	<u>Mike Lutz</u>

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODS\ONEEDRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 542,191.177 E 1,725,406.308**

GROUND ELEVATION **935.46 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2103 S & I** DATE **10/8/21** SHEET **1** OF **1**

BORING START **6/17/21** BORING FINISH **6/17/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

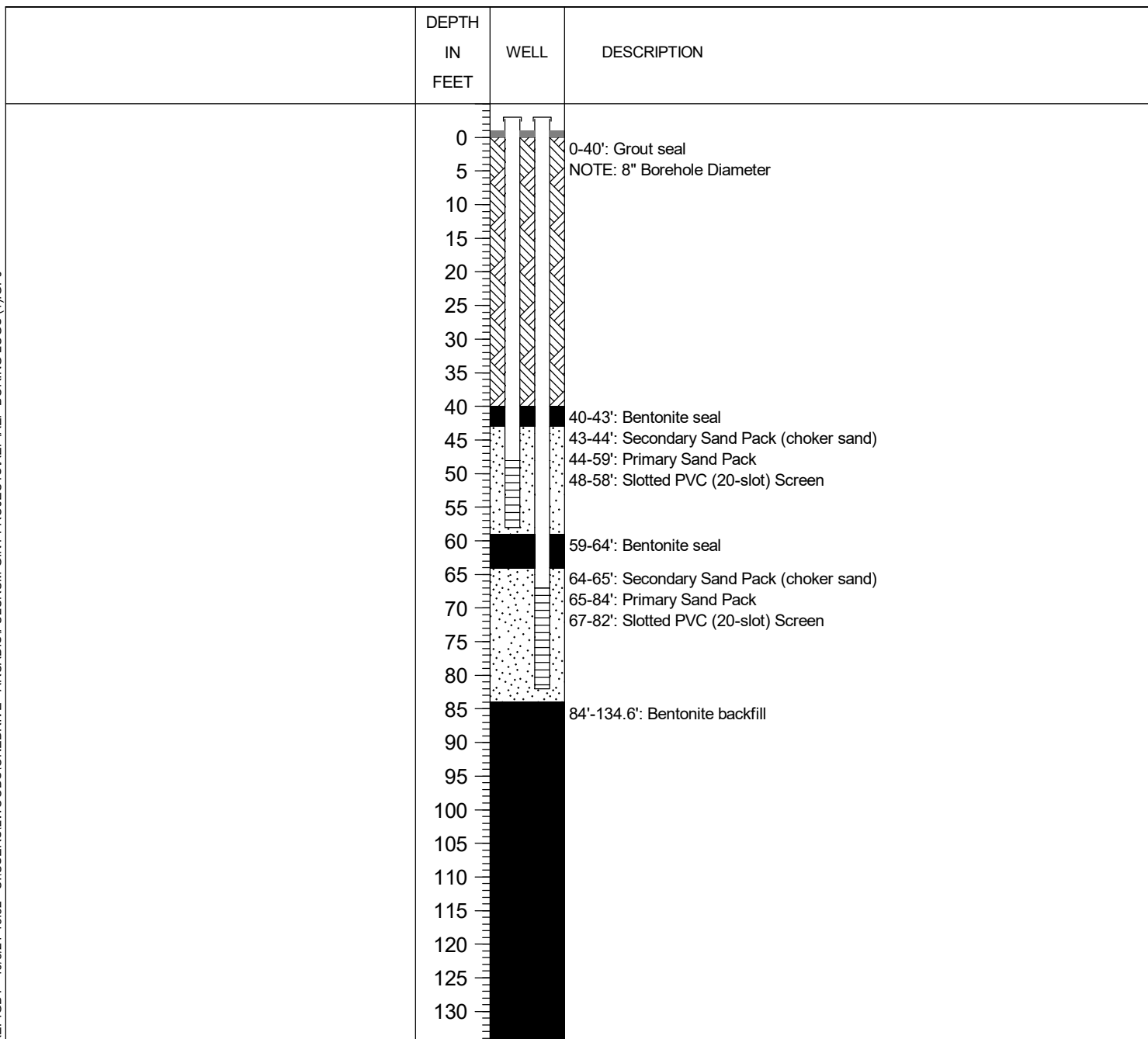
HGT. RISER ABOVE GROUND **2.47' (S), 2.45' (I)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **45'67"** BOTTOM **58'82"**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 57.15	▽	▽
TIME			
DATE	8/9/2021		



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

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 Mike Lutz

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\ILWOODS\ONEEDRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 543,825.103 E 1,725,192.735**

GROUND ELEVATION **991.72 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2105 I & D** DATE **10/8/21** SHEET **1** OF **1**

BORING START **6/23/21** BORING FINISH **6/23/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

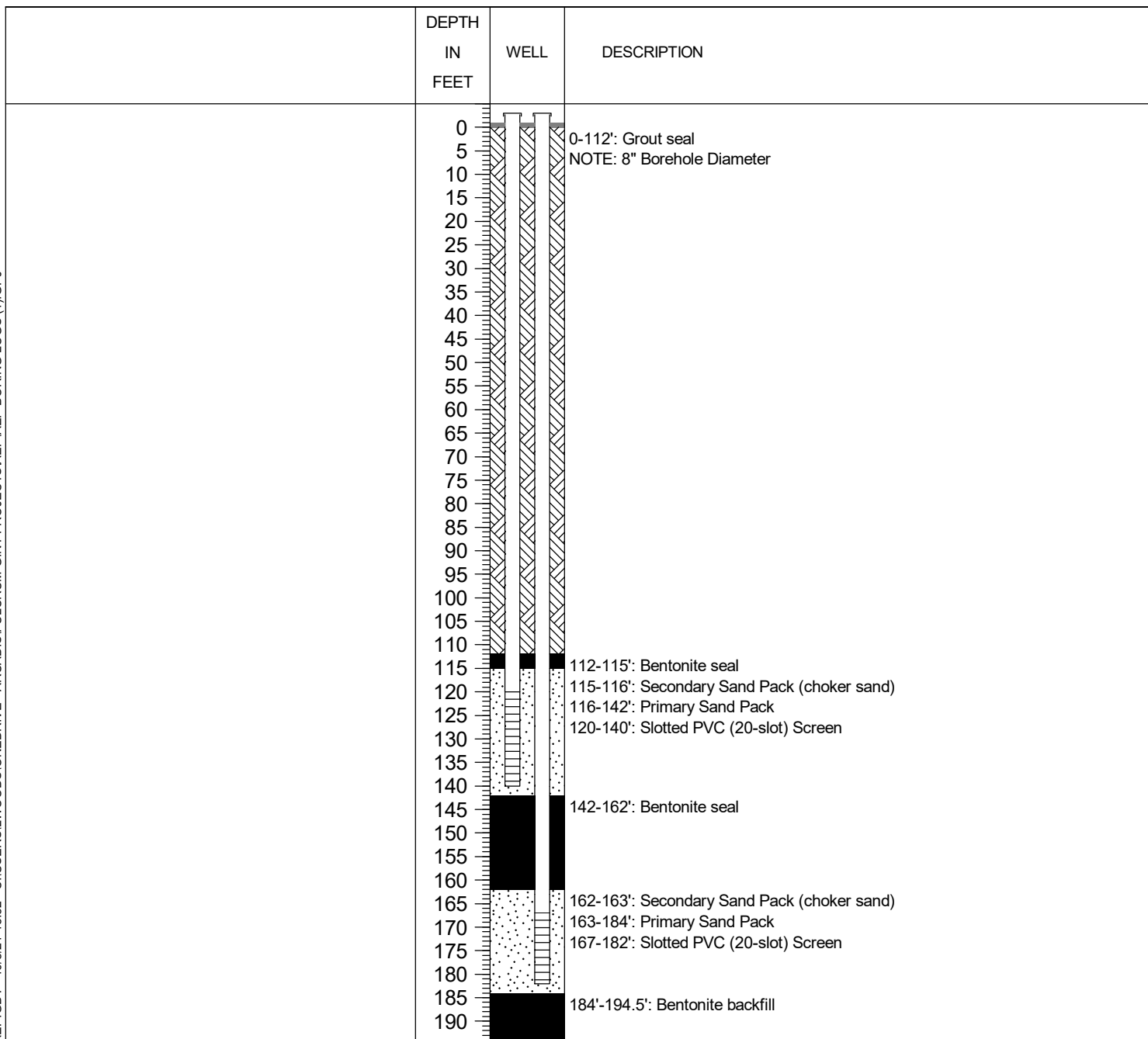
HGT. RISER ABOVE GROUND **2.69' (I), 2.89' (D)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **120'/167'** BOTTOM **140'/182'**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 135.96	▽	▽
TIME			
DATE	8/9/2021		



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

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 Alan Gillespie

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODS\ONEEDRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER **30080156**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 543,830.171 E 1,725,193.696**

GROUND ELEVATION **991.72 ft** SYSTEM **NAD83/NAVD88**

BORING NO. **2105 SS & S** DATE **10/8/21** SHEET **1** OF **1**

BORING START **6/23/21** BORING FINISH **6/23/21**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

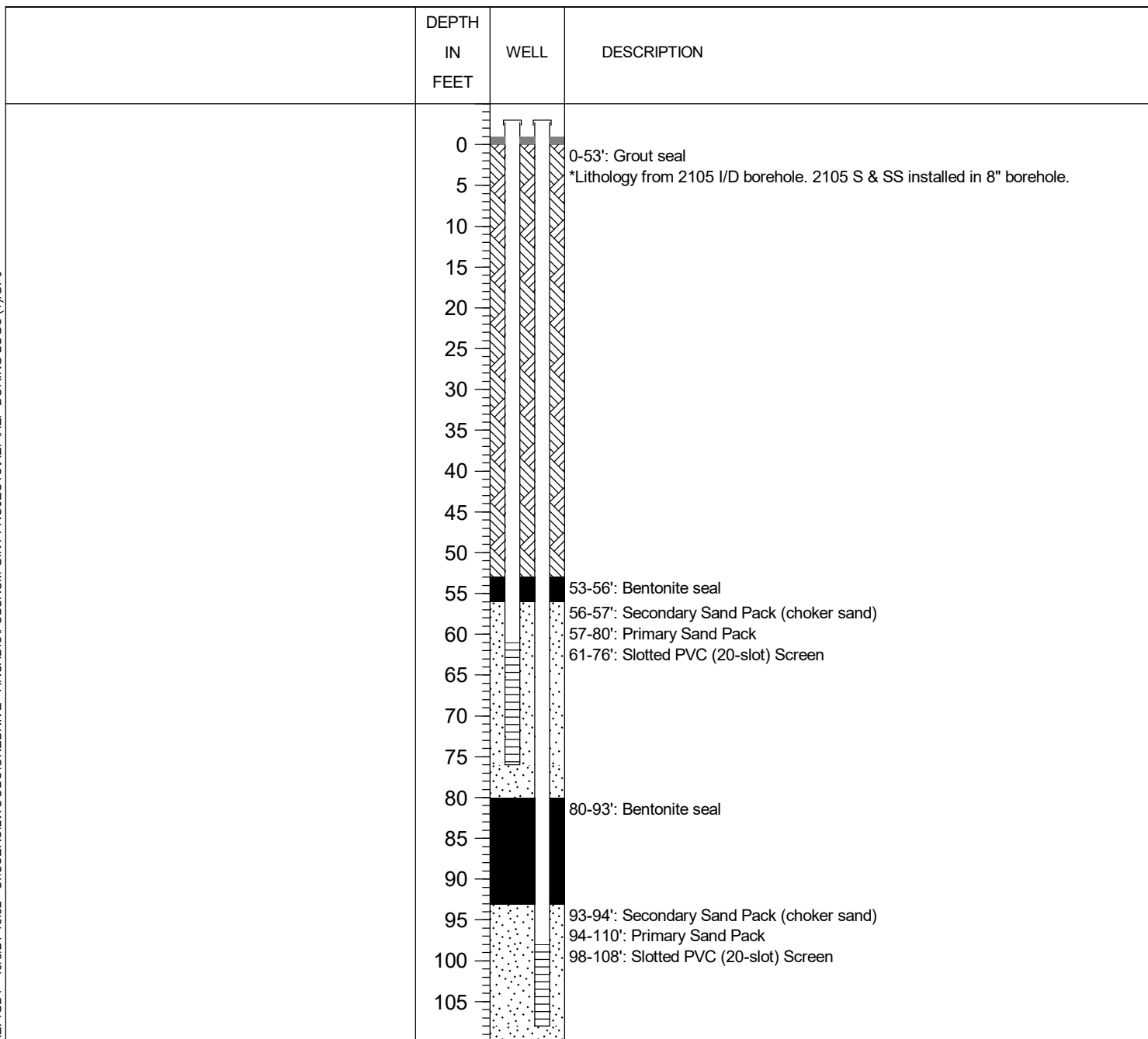
HGT. RISER ABOVE GROUND **2.78' (SS), 2.69' (S)** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **61'98"** BOTTOM **76'108"**

WELL DEVELOPMENT **Purge/Jet** BACKFILL **Bentonite Grout**

FIELD PARTY **Zack Racer (AEP)** RIG **Wireline Coring**

Water Level, ft	▽ 75.08	▽	▽
TIME			
DATE	8/9/2021		



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

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	Alan Gillespie

AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\WOODS\DRIVE - ARCADIS\FULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

COORDINATES N 542,837.390 E 1,722,861.693

GROUND ELEVATION 722.64 ft SYSTEM NAD83/NAVD88

BORING NO. 2106 DATE 10/8/21 SHEET 1 OF 1

BORING START 6/22/21 BORING FINISH 6/23/21

PIEZOMETER TYPE NA WELL TYPE OW

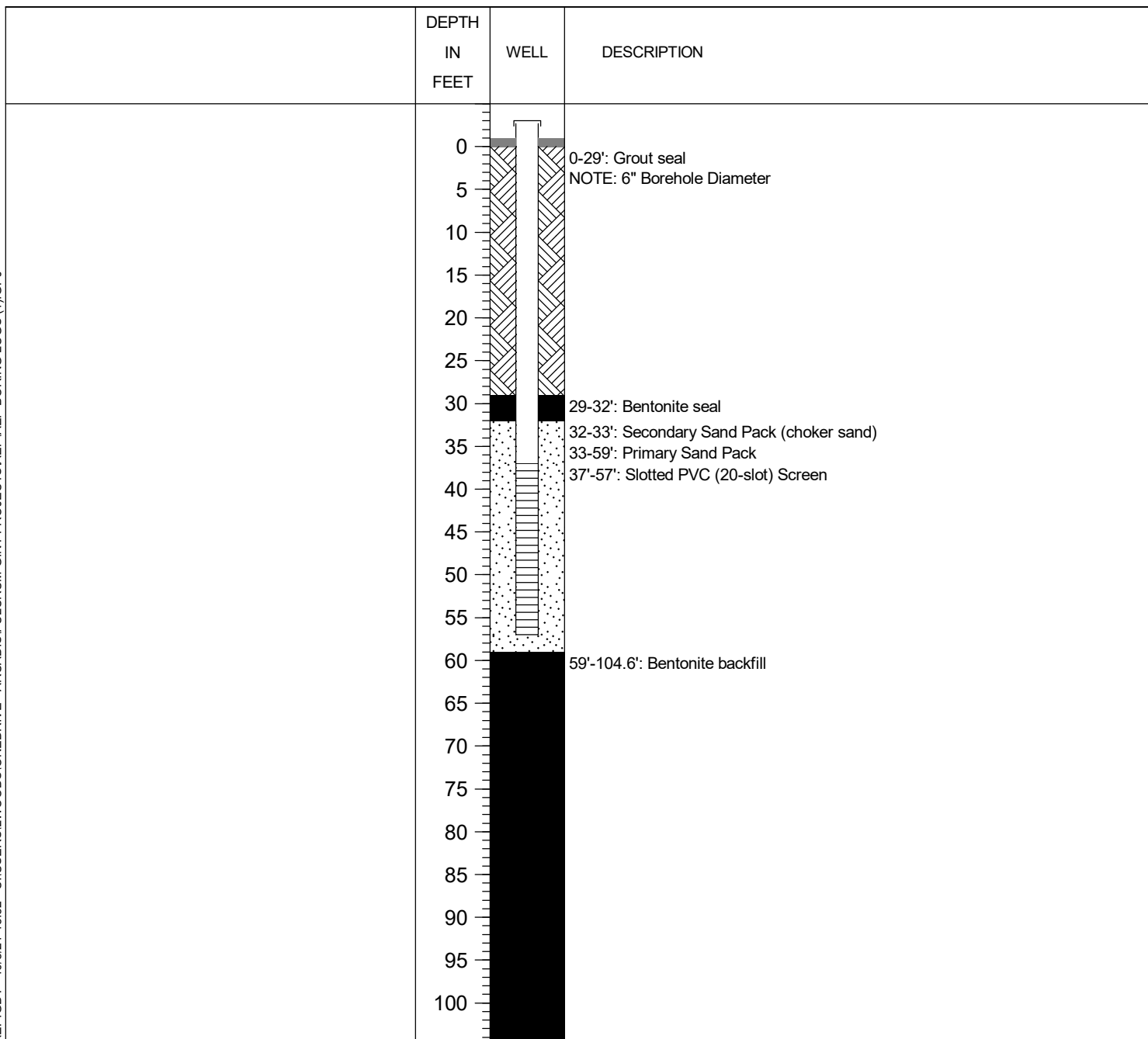
HGT. RISER ABOVE GROUND 2.94' DIA 2"

DEPTH TO TOP OF WELL SCREEN 37' BOTTOM 57'

WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout

FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

Water Level, ft	▽ <u>48.35</u>	▽	▽
TIME			
DATE	<u>8/9/2021</u>		



AEP WELL CONSTRUCTION - AEP_GDT - 10/8/21 15:32 - C:\USERS\ILWOODS\ONEEDRIVE - ARCADIS\IFULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ

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

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC
WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
RECORDER <u>Alan Gillespie</u>

Appendix C

Well Survey

Prepared for:

ARCADIS U.S., INC.-Columbus
630 Plaza Drive, Suite 600
Highlands Ranch, CO 80129



Water Well Report

FGD LANDFILL

WV

PO #: WV015976.0004

ES-124909

Thursday, July 20, 2017

Table of Contents

Geographic Summary	3
Maps	
Summary Map - 0.5 Mile Buffer	4
Topographic Overlay Map - 0.5 Mile Buffer	5
Current Imagery Overlay Map - 0.5 Mile Buffer	6
Water Well Details	7
Database Definitions and Sources	8
Disclaimer	9



Geographic Summary

Location

WV

Target location is 0.405 square miles and has a 3.4 mile perimeter

Coordinates

Longitude & Latitude in Degrees Minutes Seconds NA

Longitude & Latitude in Decimal Degrees NA

X and Y in UTM NA

Elevation

NA

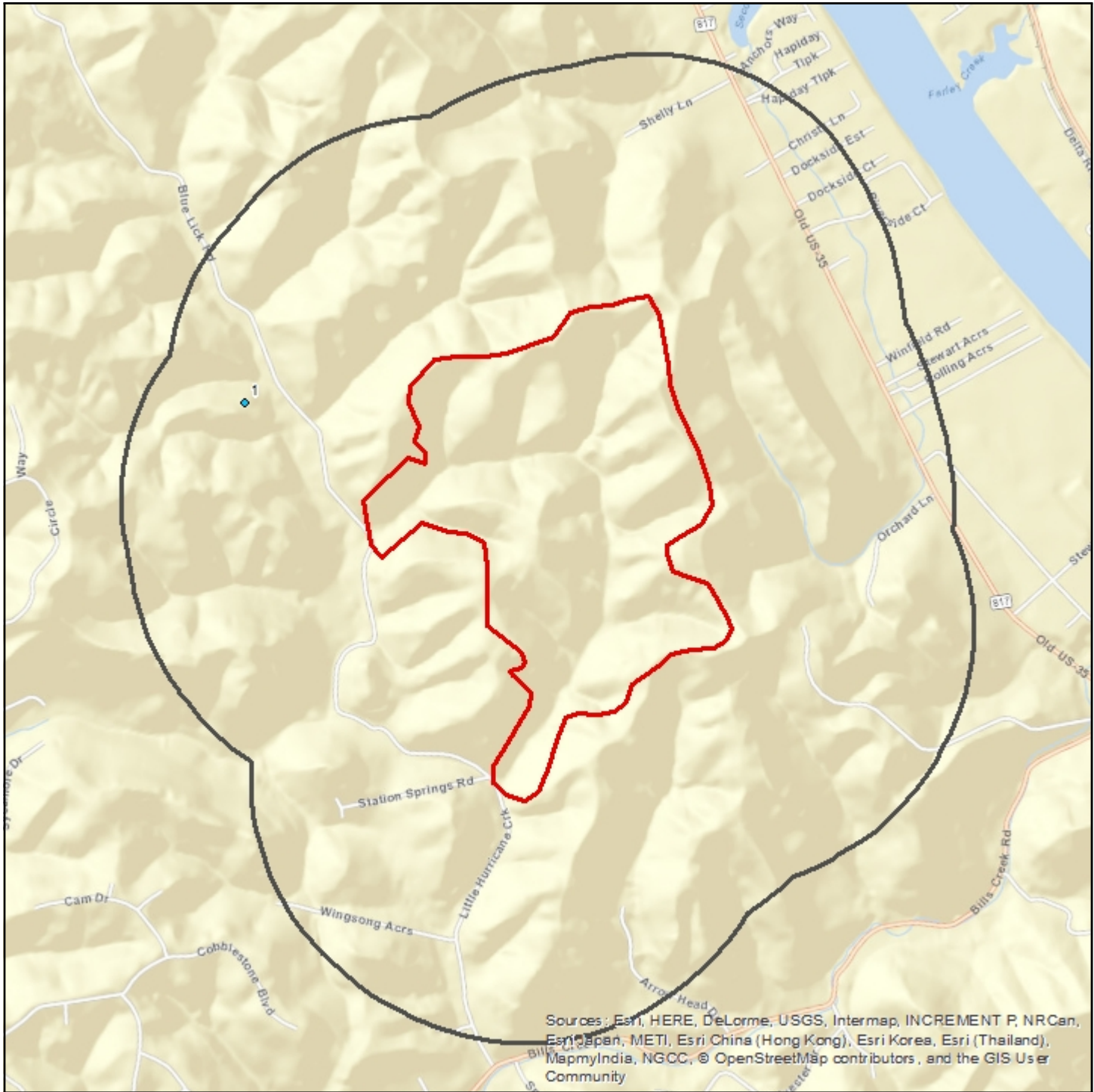
Zip Codes Searched

Search Distance	Zip Codes (historical zip codes included)
Target Property	25213, 25070, 25109, 25124, 25560
0.5 miles	25213, 25070, 25109, 25124, 25560

Topos Searched

Search Distance	Topo Name
Target Property	Saint Albans (1980)
0.5 miles	Saint Albans (1980)

Summary Map - 0.5 Mile Buffer



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

FGD LANDFILL

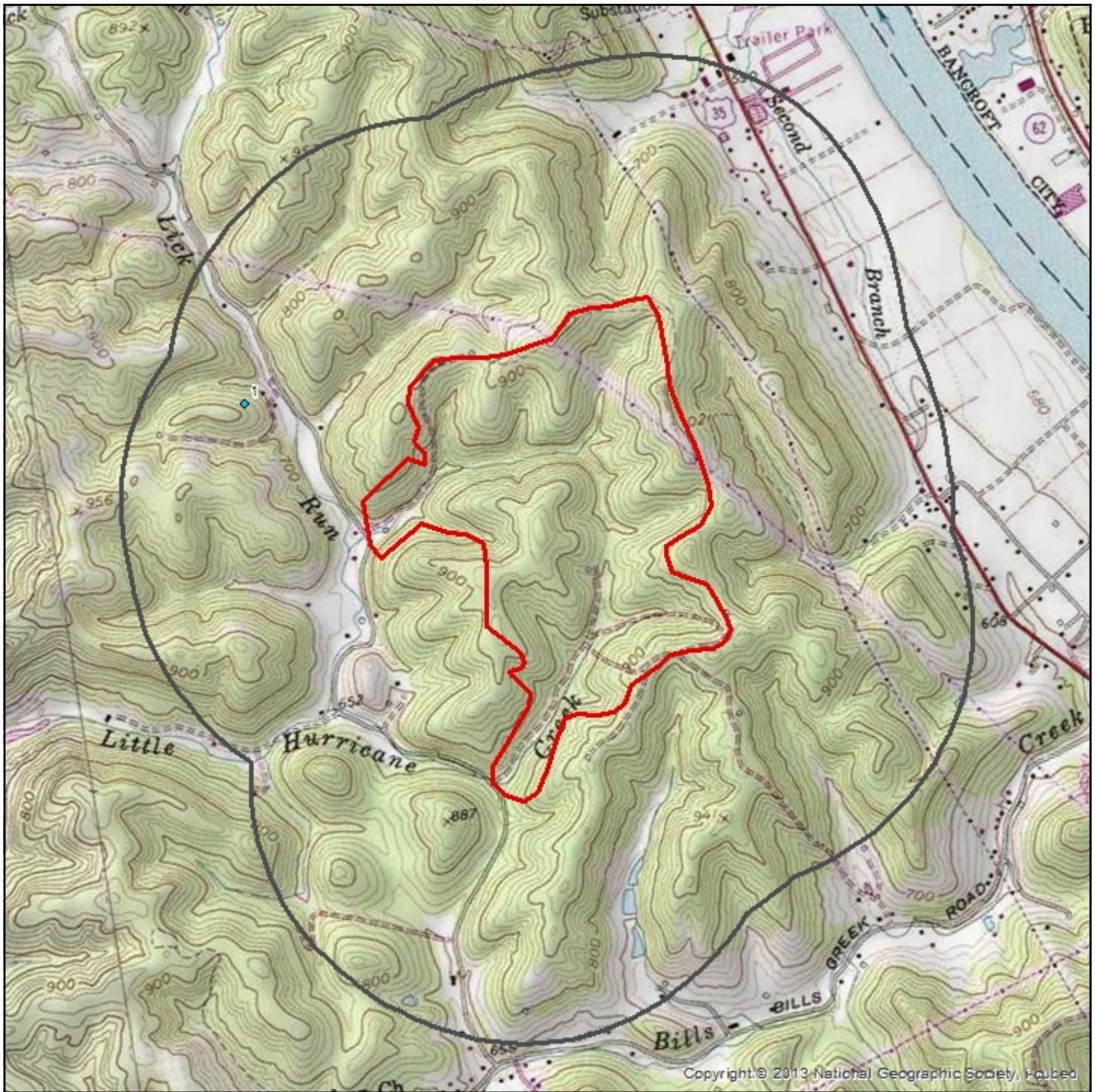
- Well
- Target Property
- Well Cluster
- Search Buffer

1 : 19,000
 1 inch = 0.300 miles
 1 inch = 1583 feet
 1 centimeter = 0.190 kilometers
 1 centimeter = 190 meters



Lambert Conformal Conic Projection
 1983 North American Datum
 First Standard Parallel: 33° 00' North
 Second Standard Parallel: 45° 00' North
 Central Meridian: 96° 00' West
 Latitude of Origin: 39° 00' North

Topographic Overlay Map - 0.5 Mile Buffer



Copyright © 2013 National Geographic Society, Inc.

FGD LANDFILL

- Well
- Well Cluster

- Target Property
- Search Buffer

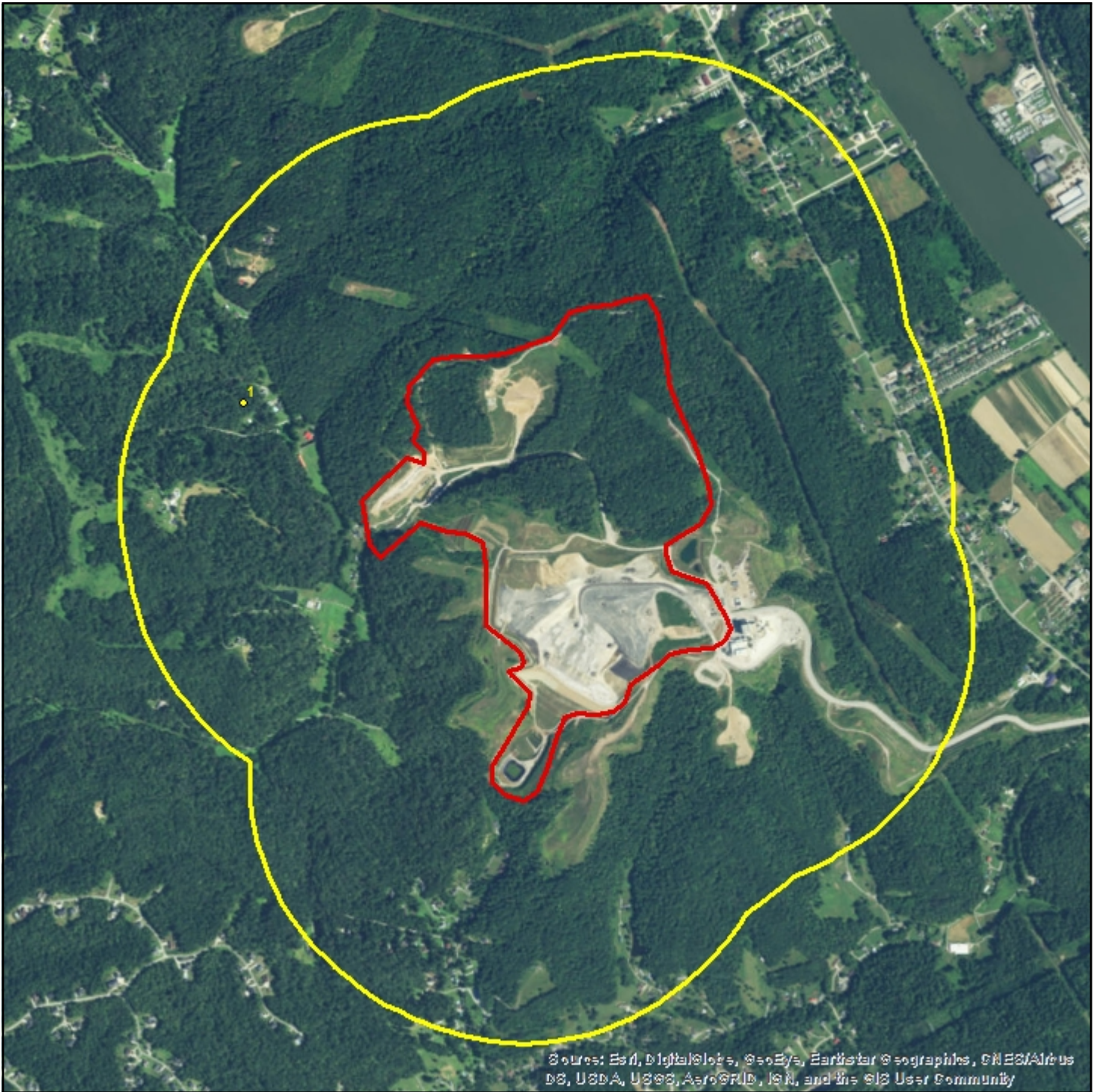
Target Property Quad Name(s)
Saint Albans (1980)

1 : 19,000
1 inch = 0.300 miles
1 inch = 1583 feet

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33° 00' North
Second Standard Parallel: 45° 00' North
Central Meridian: 96° 00' West
Latitude of Origin: 39° 00' North



Current Imagery Overlay Map - 0.5 Mile Buffer



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FGD LANDFILL

- Well
- Well Cluster
- Target Property
- Search Buffer

1 : 19,000
1 inch = 0.300 miles
1 inch = 1583 feet
1 centimeter = 0.190 kilometers
1 centimeter = 190 meters



Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33° 00' North
Second Standard Parallel: 45° 00' North
Central Meridian: 96° 00' West
Latitude of Origin: 39° 00' North



Water Well Details

Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
1	USGS-382926081520101	WW USGS	USGS	Not Reported	91	01/01/1953	-81.8668	38.490646	763 ft	N/A

Well Summary

Water Well Dataset	# of Wells
WW USGS	1
Total Count	1



Dataset Descriptions and Sources

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
WW USGS - USGS Water Wells	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Semi-annually	04/18/2017	04/18/2017	05/07/2017	04/18/2017

Disclaimer

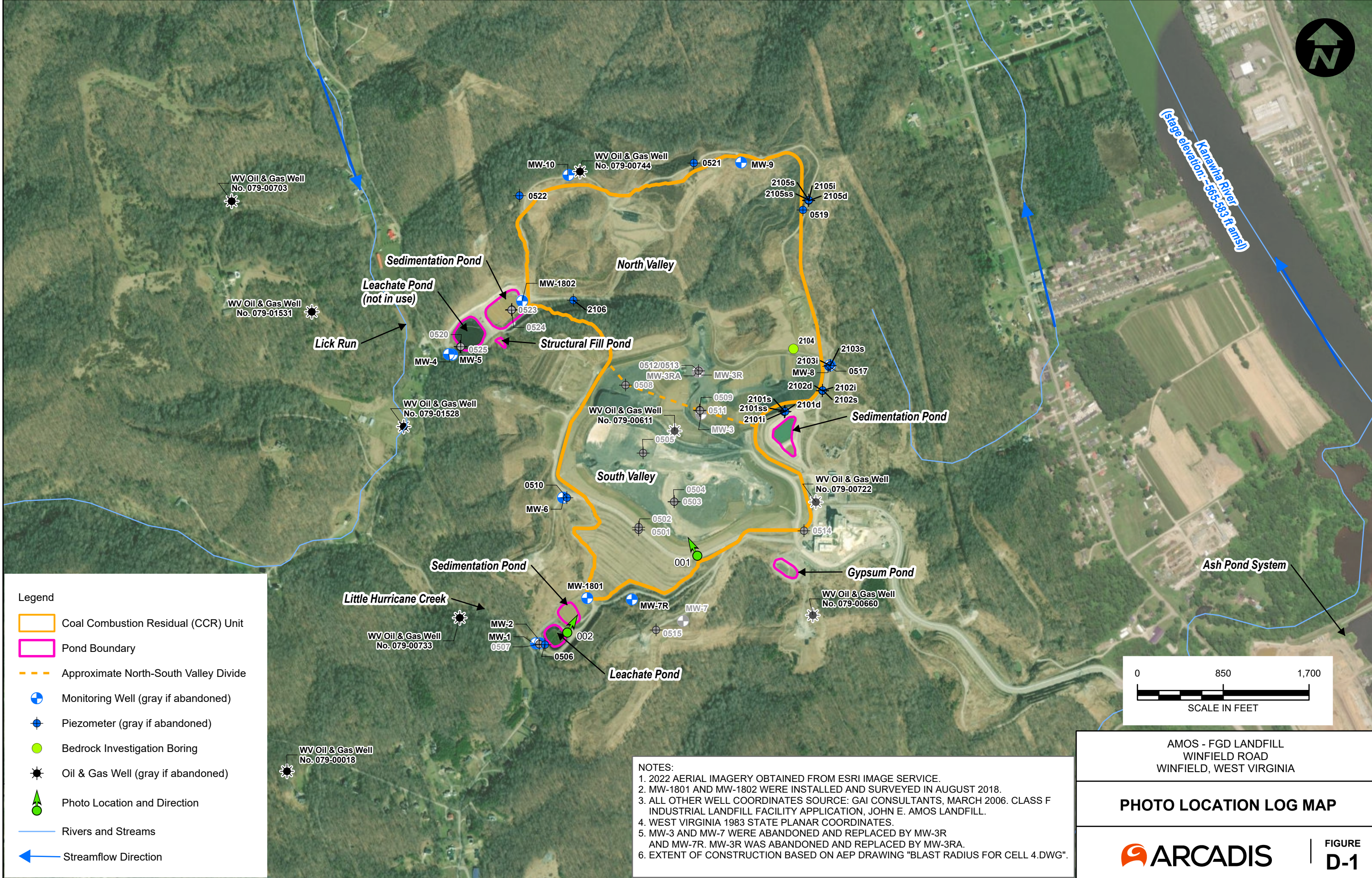


The Banks Environmental Data Water Well Report was prepared from existing state water well databases and/or additional file data/records research conducted at the state agency and the U.S. Geological Survey. Banks Environmental Data has performed a thorough and diligent search of all groundwater well 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 D

Photographic Log

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: AKENS
 Oh:015976.0009.00001 (Mountainier Ash Pond)
 T:_ENV\AEP\Amos\Acrc\Figures\AEP\mos\lanfill\Report.aprx 1/18/2024 1:17 PM

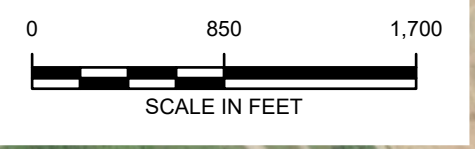


Legend

- Coal Combustion Residual (CCR) Unit
- Pond Boundary
- Approximate North-South Valley Divide
- + Monitoring Well (gray if abandoned)
- ⊕ Piezometer (gray if abandoned)
- Bedrock Investigation Boring
- ☼ Oil & Gas Well (gray if abandoned)
- ▲ Photo Location and Direction
- Rivers and Streams
- ← Streamflow Direction

NOTES:

1. 2022 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. MW-1801 AND MW-1802 WERE INSTALLED AND SURVEYED IN AUGUST 2018.
3. ALL OTHER WELL COORDINATES SOURCE: GAI CONSULTANTS, MARCH 2006. CLASS F INDUSTRIAL LANDFILL FACILITY APPLICATION, JOHN E. AMOS LANDFILL.
4. WEST VIRGINIA 1983 STATE PLANAR COORDINATES.
5. MW-3 AND MW-7 WERE ABANDONED AND REPLACED BY MW-3R AND MW-7R. MW-3R WAS ABANDONED AND REPLACED BY MW-3RA.
6. EXTENT OF CONSTRUCTION BASED ON AEP DRAWING "BLAST RADIUS FOR CELL 4.DWG".



AMOS - FGD LANDFILL
 WINFIELD ROAD
 WINFIELD, WEST VIRGINIA

PHOTO LOCATION LOG MAP

FIGURE
D-1

Photo No. 001	Date: 8/11/2015	
Direction Photo Taken: Northwest		
Description: Landfill.		

Photo No. 002	Date: 8/11/2015	
Direction Photo Taken: Northeast		
Description: Landfill and sedimentation pond.		

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