



# 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:**

Prepared For: American Electric Power Service Corporation

Arcadis U.S., Inc. 7575 Huntington Park Drive, Suite 130 Columbus, OH 43235 United States Phone: 614 985 9100 Fax: 614 985 9170

Our Ref: 30136533

Everett Fortner III, PG Principal Geologist

then & D

Matthew J. Lamb Project Manager

net

Todd Minehardt, PE Principal Engineer

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# **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 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 Pittsburg Coal (i.e. No. 8 Coal), which marks the transition from the Monongahela and Conemaugh Formations. However, the Pittsburg 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 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

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 humaninduced 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.

Amos FGD LANDFILL-REVISED CCR LOCATION RESTRICTION EVALUATION - Revision 1

### 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.

SMINEHARD,

Printed Name of Registered Professional Engineer

Signature

2751 8

Date

Registration No.

Registration State

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# **Table**

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

	Top of Casing	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
Well ID	Elevation	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			it amor		it unior	n roo	it amor													
Downgradient																				
MW-1 <sup>a, c, d</sup> (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 <sup>a,c</sup> MW-3	719.90 825.00	40.40 NA	671.01 806.80	43.06 NA	668.35 NA	44.03 NA	675.87 NA	73.74 NA	646.16 NA	43.82 NA	676.08 NA	NM NA	NM NA	NM NA	NM NA	44.13 NA	675.77 NA	44.06 NA	675.84 NA	44.47 NA
MW-3 MW-3R <sup>a</sup>	786.70	NM	NM	NA	779.77	NA	NA	NA												
MW-3RA	788.21	NM	NM	NA	NA	NA														
MW-4 <sup>a</sup>	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 <sup>a,d</sup> (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 Upgradient	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
MW-6 <sup>a</sup>	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														
MW-7R <sup>a</sup>	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 <sup>b</sup>	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 <sup>a</sup>	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 <sup>a</sup>	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														
0502	761.46	NM	NM	NA	NA	NA														
0503	777.00	19.30	757.70	NA	NA	NA														
0504	777.30	6.10	771.20	NA	NA	NA														
0505 0506 <sup>a,c</sup>	912.89	88.40	824.49	NA 12 C1	NA CCR 4C	NA NM	NA NM	NA 42.04	NA	NA NM	NA NM	NA NM	NA NM	NA	NA NM	NA	NA CC7 C0	NA 11.12	NA	NA AA 52
0508	714.96 712.49	41.75	670.02 697.89	43.61 NA	668.16 NA	NA	NM	43.81 NA	667.96 NA	NA	NA	NA	NA	NM NA	NM	44.19 NA	667.58 NA	44.12 NA	667.65 NA	44.53 NA
0508	980.97	139.15	841.82	NA	NA	NA														
0509	826.75	22.25	804.50	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														
0512 <sup>a</sup> 0513 <sup>a</sup>	786.29 786.49	5.40 5.70	780.89 780.79	5.22 5.25	781.07 781.24	NA NA	NA NA	NA NA												
0514	950.65	25.85	924.80	5.25 NA	NA	NA														
0515	935.49	62.85	872.64	NA	NA	NA														
0517 <sup>b</sup>	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 <sup>a</sup>	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 <sup>a</sup> 0521 <sup>a</sup>	681.38	24.47	656.91	NA	656.86	NA	NA	NA												
0522 <sup>a</sup>	1006.48 903.54	56.33 67.30	950.15 836.24	58.05 70.17	948.43 833.37	NM NM	NM NM	54.10 65.32	952.38 838.22	NM NM	NM NM	NM NM	NM NM	NM NM	NM NM	56.31 65.90	950.17 837.64	56.33 66.84	950.15 836.70	56.38 68.77
0523 <sup>a</sup>	972.30	296.90	675.40	304.13	668.17	NA	NA	NA												
0524 <sup>a</sup>	699.14	5.33	693.81	5.61	693.53	NA	NA	NA												
0525 <sup>a</sup>	681.48	6.55	674.93	6.47	675.01	NA	NA	NA												
2101ss	934.75	NA	NA	NA																
2101s 2101i	934.80 934.70	NA NA	NA NA	NA NA																
21011 2101d	934.70	NA	NA	NA																
2102s	936.06	NA	NA	NA																
2102i	935.98	NA	NA	NA																
2102d	935.97	NA	NA	NA																
2103s	938.04	NA	NA	NA	NA NA	NA	NA	NA NA	NA	NA										
2103i 2105ss	938.02 994.59	NA NA	NA NA	NA NA																
2105s	994.49	NA	NA	NA																
2105i	994.60	NA	NA	NA																
2105d	994.80	NA	NA	NA																
2106	725.60	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

	Top of Casing	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
Well ID	Elevation	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		700 55			10.07		17.0		10.10	700.00	10.50			704.00	10.00	700 50		700.04		
MW-1 <sup>a, c, d</sup> (hydraulic monitoring only) MW-2 <sup>a,c</sup>	714.79 719.90	702.55 675.43	13.10 31.74	701.69 688.16	12.87 43.71	701.92 676.19	17.3 44.34	697.49 675.56	12.13 44.68	702.66 675.22	12.59 43.76	702.20 676.14	13.10 44.00	701.69 675.90	12.26 44.12	702.53 675.78	11.88 44.13	702.91 675.77	13.18 44.03	701.61 675.87
MW-3	825.00	NA	NA	NA	43.71 NA	NA	44.34 NA	NA	44.66 NA	NA	43.76 NA	NA	44.00 NA	NA	44.12 NA	NA	44.13 NA	NA	44.03 NA	NA
MW-3R <sup>a</sup>	786.70	NA	NA	NA																
MW-3RA	788.21	NA	NA	NA																
MW-4 <sup>a</sup>	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 <sup>a, d</sup> (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 MW-1802	738.32 712.69	703.33 658.77	NM NM	NA NA	35.42 53.84	702.90 658.85	42.5 35.8	695.82 676.89	34.97 54.09	703.35 658.60	34.80 53.55	703.52 659.14	35.55 54.10	702.77 658.59	35.80 53.96	702.52 658.73	35.08 54.02	703.24 658.67	35.17 54.04	703.15 658.65
Upgradient	712.09	030.77	INIVI		55.64	038.85	55.0	070.89	54.09	058.00	33.33	059.14	54.10	050.55	55.90	050.75	34.02	038.07	54.04	030.03
MW-6 <sup>a</sup>	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																
MW-7R <sup>a</sup>	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 <sup>b</sup>	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 <sup>a</sup> MW-10 <sup>a</sup>	935.39 911.43	899.94 813.03	26.91 98.83	908.48 812.60	30.6 141.7	904.79 769.73	30.52 98.8	904.87 812.63	38.34 98.45	897.05 812.98	30.64 101.88	904.75 809.55	28.13 98.49	907.26 812.94	28.56 99.36	906.83 812.07	31.70 98.58	903.69 812.85	26.94 98.66	908.45 812.77
Piezometers	911.43	013.03	90.03	012.00	141.7	709.73	90.0	012.03	96.45	012.90	101.00	609.55	90.49	012.94	99.30	012.07	96.56	012.05	90.00	012.77
0501	761.33	NA	NA	NA																
0502	761.46	NA	NA	NA																
0503	777.00	NA	NA	NA																
0504	777.30 912.89	NA NA	NA	NA	NA NA	NA NA	NA	NA	NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA
0505 0506 <sup>a,c</sup>	714.96	670.43	NA 43.89	NA 671.07	43.77	671.19	NA NM	NA NA	NA 64.34	NA 650.62	43.91	671.05	44.05	670.91	44.22	NA 670.74	44.21	670.75	44.18	670.78
0507	712.49	NA	NA	NA																
0508	980.97	NA	NA	NA																
0509	826.75	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 0512 <sup>a</sup>	826.67 786.29	NA NA	NA NA	NA NA																
0512 0513 <sup>a</sup>	786.49	NA	NA	NA																
0514	950.65	NA	NA	NA																
0515	935.49	NA	NA	NA																
0517 <sup>b</sup>	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 <sup>a</sup>	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 <sup>a</sup> 0521 <sup>a</sup>	681.38	NA	NA	NA																
0522 <sup>a</sup>	1006.48 903.54	950.10 834.77	51.44 66.27	955.04 837.27	53.97 53.86	952.51 849.68	NM NM	NA NA	56.46 68.90	950.02 834.64	55.88 67.80	950.60 835.74	56.03 65.83	950.45 837.71	56.34 67.35	950.14 836.19	56.52 66.24	949.96 837.30	62.87 66.18	943.61 837.36
0523 <sup>a</sup>	972.30	NA	NA	NA																
0524 <sup>a</sup>	699.14	NA	NA	NA																
0525 <sup>a</sup>	681.48	NA	NA	NA																
2101ss	934.75	NA	NA	NA	20.22	914.53	19.64	915.11												
2101s	934.80	NA	NA	NA	39.42	895.38	39.23	895.57												
2101i 2101d	934.70 934.68	NA NA	NA NA	NA NA	54.96 51.81	879.74 882.87	54.60 52.02	880.10 882.66												
2101d 2102s	934.68	NA	NA	NA NA	NA	NA NA	NA	NA	41.33	882.87	40.96	882.66								
21023	935.98	NA	NA	NA	79.61	856.37	78.51	857.47												
2102d	935.97	NA	NA	NA	103.41	832.56	87.82	848.15												
2103s	938.04	NA	NA	NA	47.88	890.16	39.39	898.65												
2103i	938.02	NA	NA	NA	82.72	855.30	75.76	862.26												
2105ss 2105s	994.59 994.49	NA NA	NA NA	NA NA	60.86 109.30	933.73 885.19	59.31 93.08	935.28 901.41												
21055	994.49	NA	NA	NA	117.72	876.88	96.10	898.50												
2105d	994.80	NA	NA	NA	179.81	814.99	178.00	816.80												
2106	725.60	NA	NA	NA	15.17	710.43	14.68	710.92												

#### 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

	Top of Casing	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
Well ID	Elevation	Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev	Depth to Water	GW Elev
	Lievation	ft TOC	ft amsl	ft TOC	ft amsl	ft TOC	ft amsl	ft TOC	ft amsl	ft TOC	ft amsl	ft TOC	ft amsl	ft TOC	ft amsl
Monitor Wells Downgradient															
MW-1 <sup>a, c, d</sup> (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 <sup>a,c</sup>	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	43.91 NA	NA	43.67 NA	NA	44.34 NA	NA	43.94 NA	NA	41.10 NA	NA	44.40 NA	NA	44.00 NA	NA
MW-3R <sup>a</sup>	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 <sup>a</sup>	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 <sup>a, d</sup> (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 <sup>a</sup>	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 <sup>a</sup>	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 <sup>b</sup>	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 <sup>a</sup>	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 <sup>a</sup>	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 <sup>a,c</sup>	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 <sup>a</sup>	786.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0513 <sup>a</sup>	786.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0514 0515	950.65 935.49	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA
0517 <sup>b</sup>			907.88	29.91	907.77				909.46	31.79	905.89	31.12	906.56		NA 004.70
0519 <sup>a</sup>	937.68 992.97	29.80 78.06	907.88	78.74	907.77 914.23	33.61 80.71	904.07 912.26	28.22 78.21	909.46 914.76	80.58	905.89	80.80	908.56	32.92 80.95	904.76 912.02
0520 <sup>a</sup>	681.38	NA	NA	NA	914.23 NA	NA	912.20 NA	NA	914.76 NA	NA	912.39 NA	NA	912.17 NA	NA	912.02 NA
0520 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 <sup>a</sup>	903.54	65.03	838.51	66.71	836.83	68.08	835.46	67.96	835.58	68.60	834.94	Dry	949.90 NA	68.91	834.63
0522 <sup>a</sup>	972.30	NA NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0524 <sup>a</sup>	699.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0525 <sup>a</sup>	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.

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 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

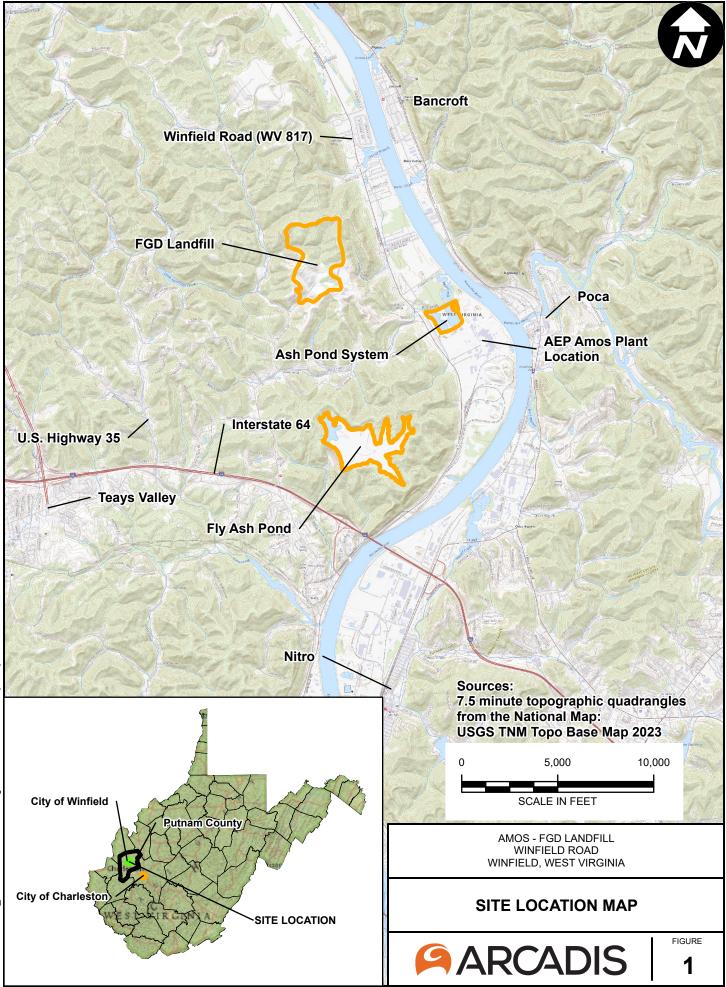
NA = well either abandoned or not installed

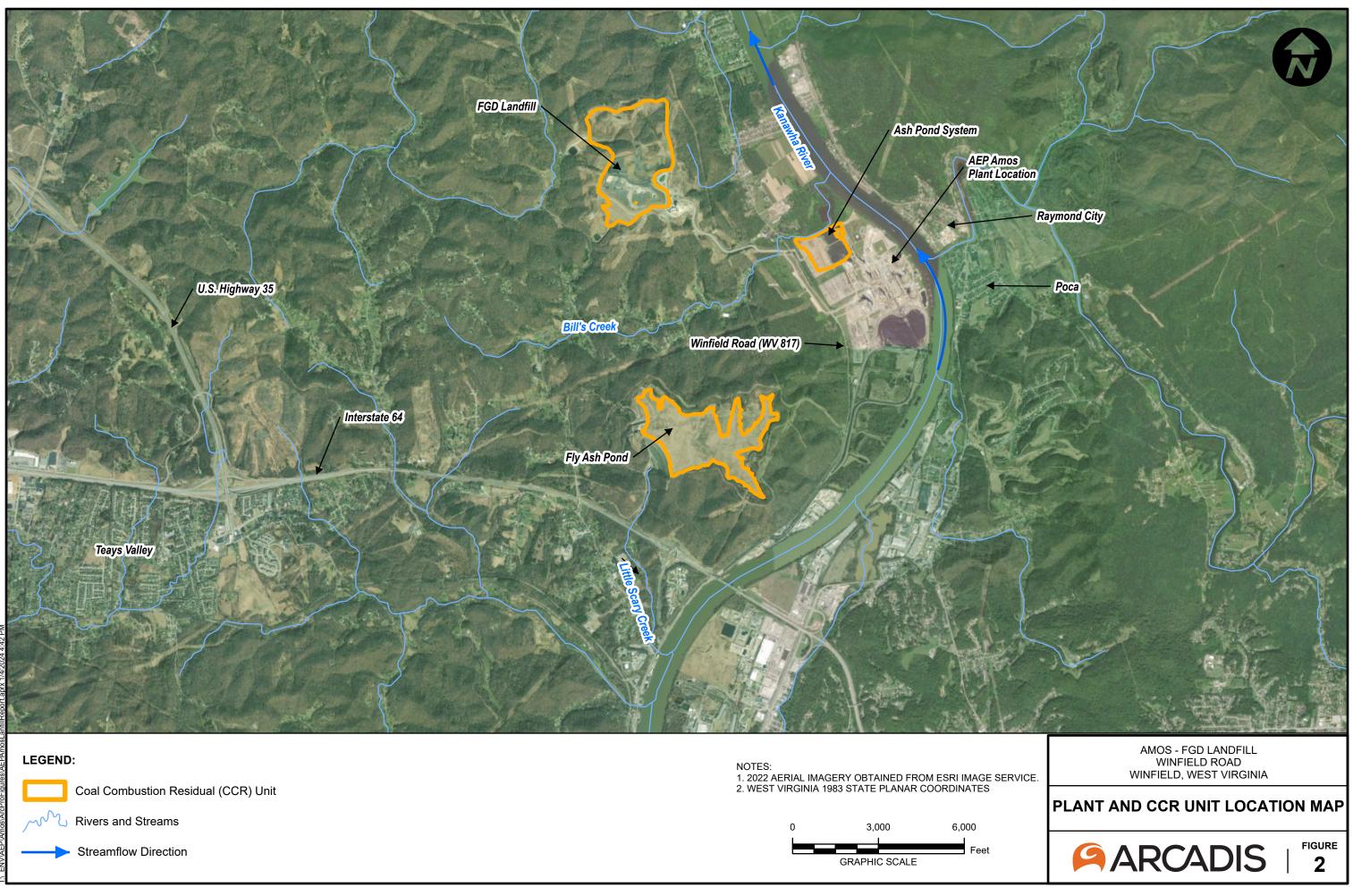
at time of gauging NM = well active but not measured

TOC = top of casing

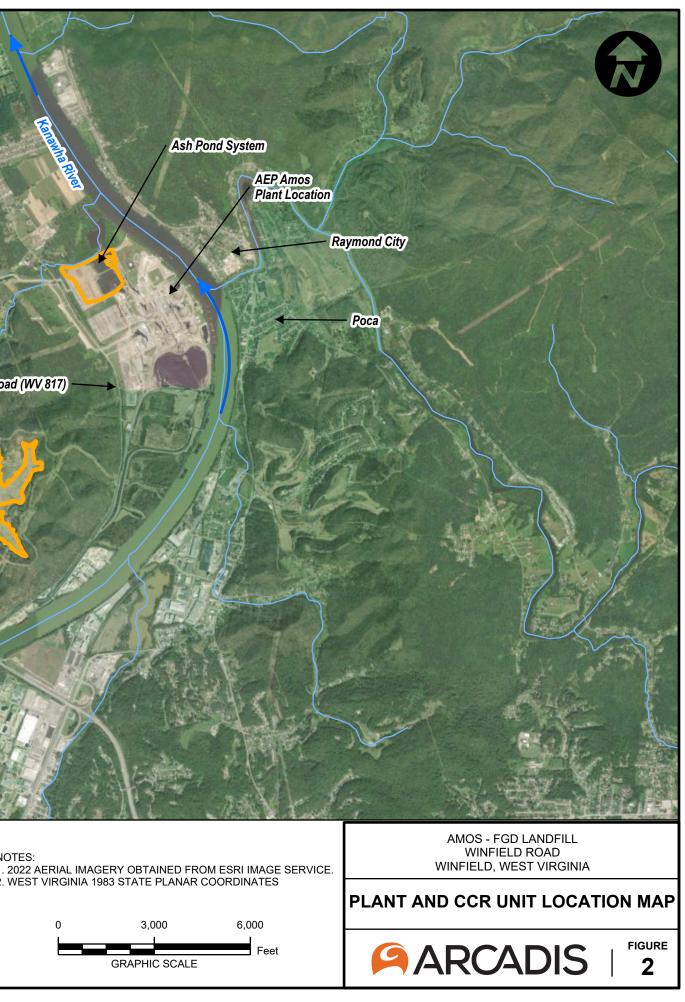


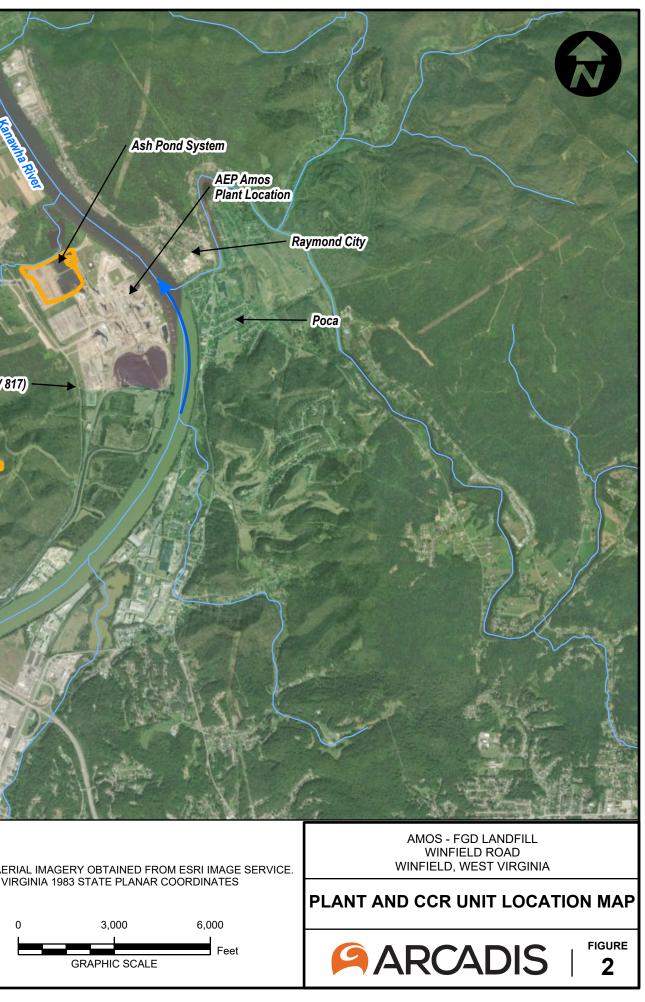


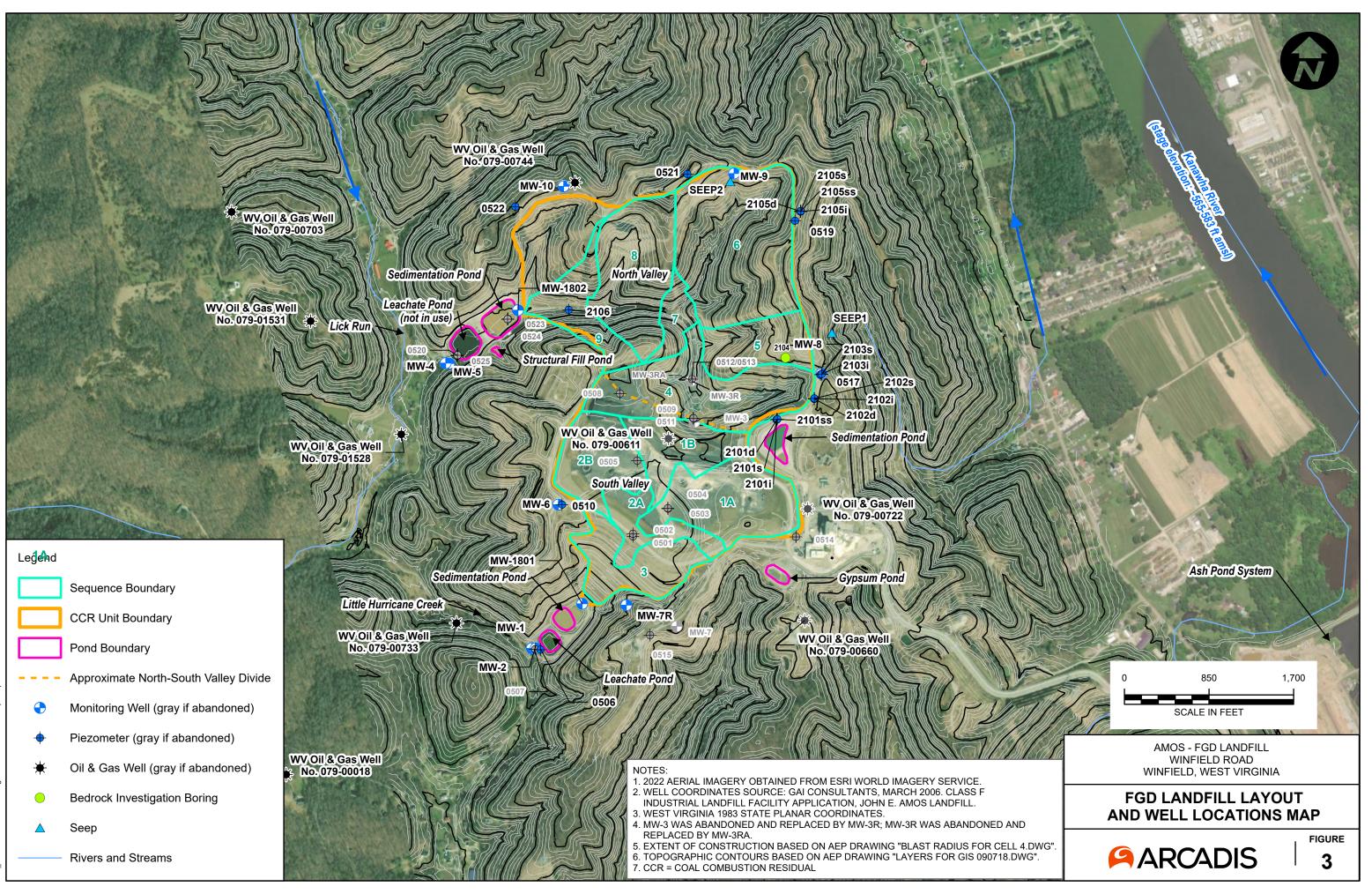


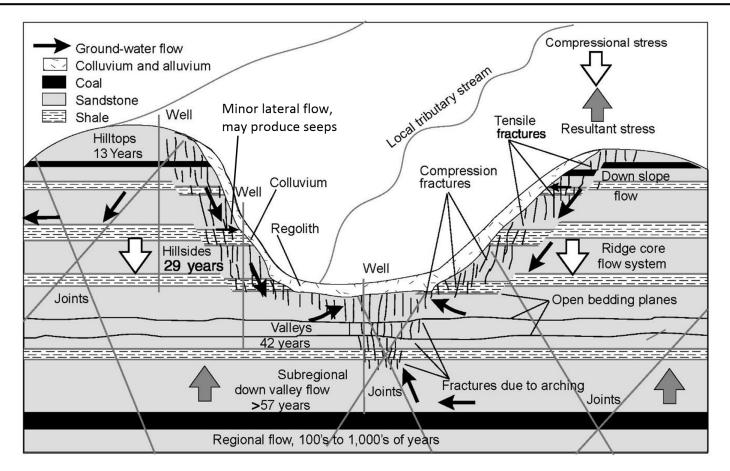












**Figure 3.** Revised conceptual model of ground-water flow in an Appalachian Plateaus fractured-bedrock aquifer including apparent age of ground water (Modified from Wyrick and Borchers, fig. 3.2-1, 1981 and Kozar, 1998).

#### 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.

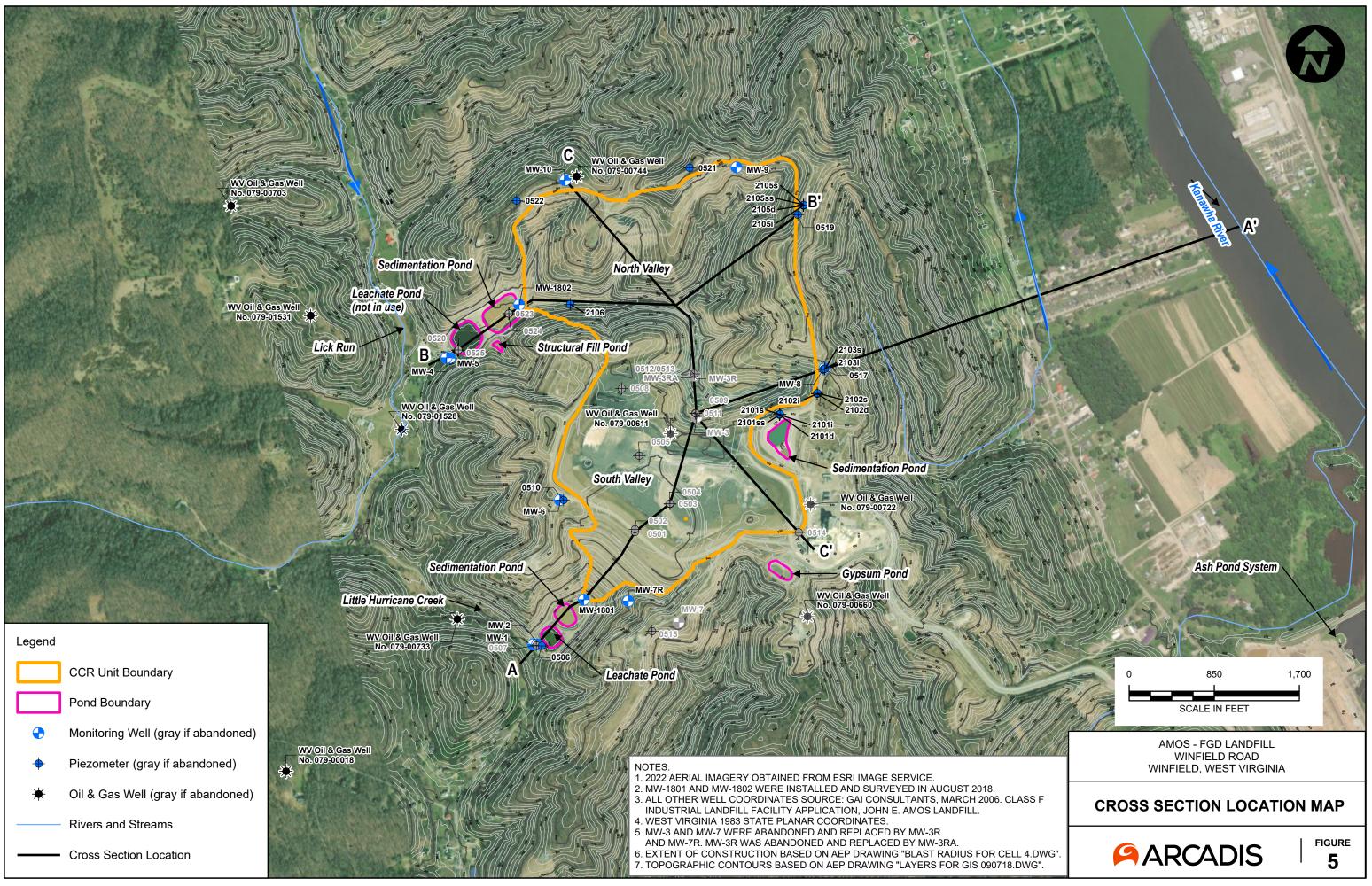
#### <u>Notes:</u>

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

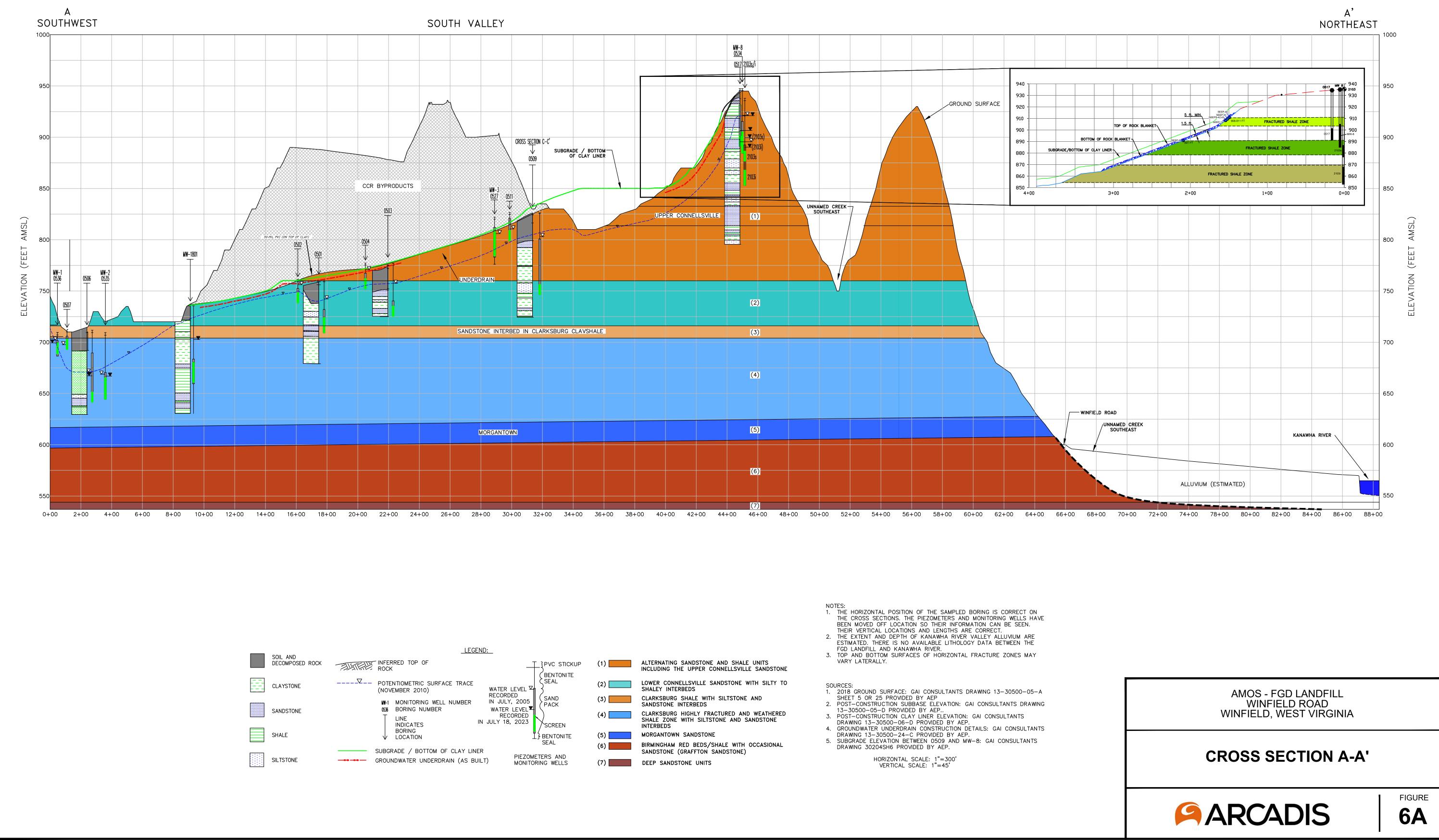
AMOS - FGD LANDFILL WINFIELD ROAD WINFIELD, WEST VIRGINIA

#### STRESS RELIEF FRACTURE SYSTEM CONCEPTUAL SITE MODEL

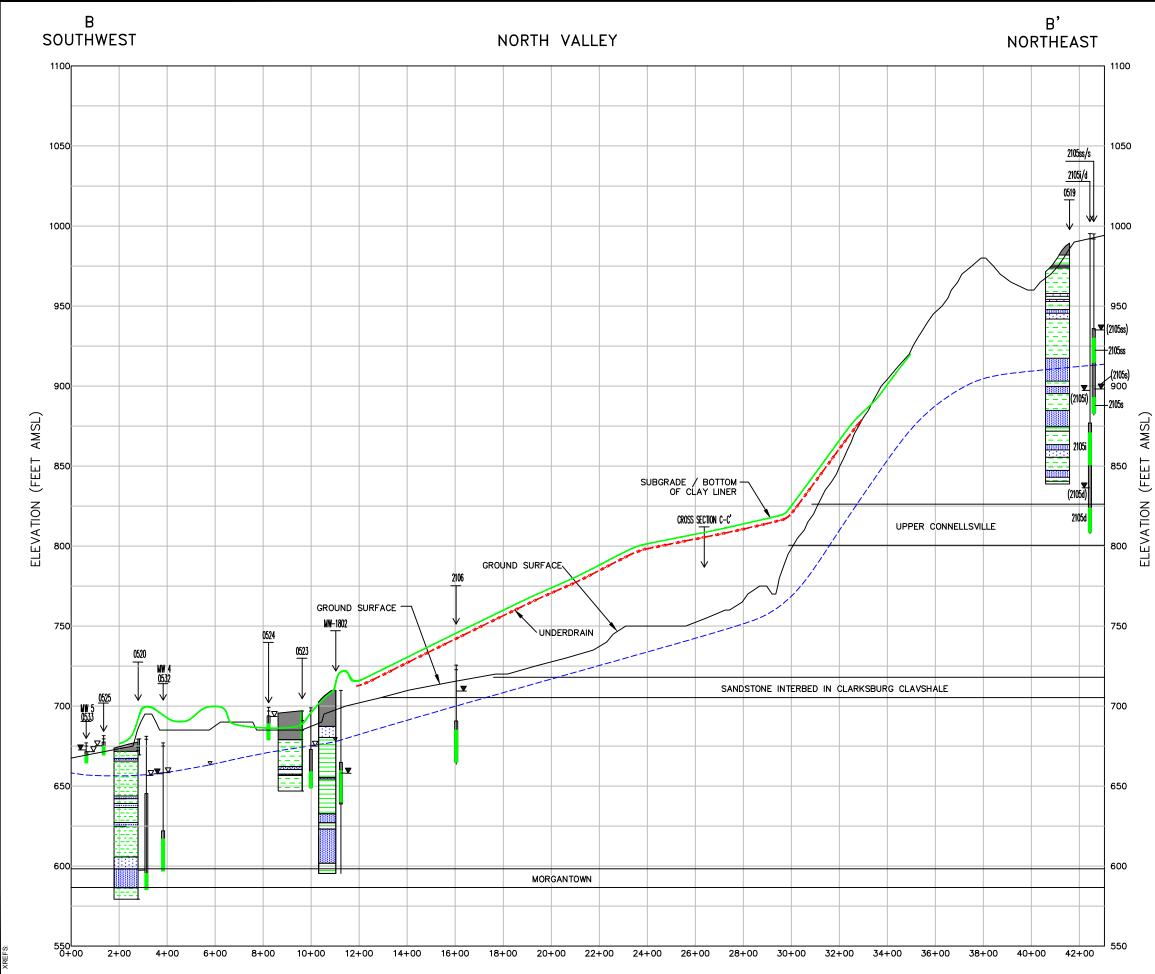




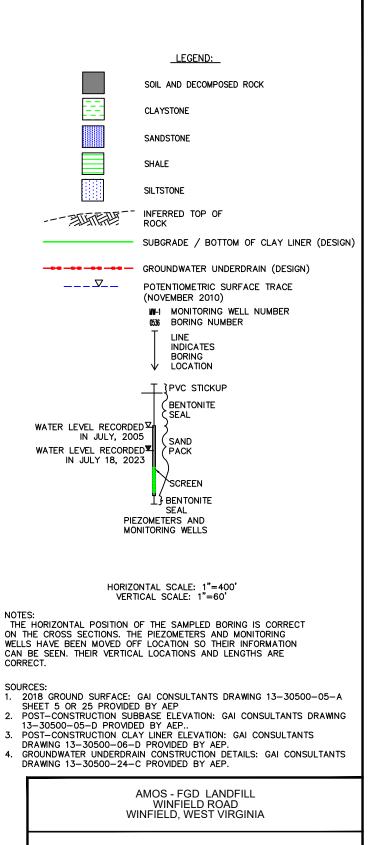
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			<ol> <li>NOTES:</li> <li>THE HORIZONTAL POSITION OF THE SAMPLED BORING IS CORRECT ON THE CROSS SECTIONS. THE PIEZOMETERS AND MONITORING WELLS HAVE BEEN MOVED OFF LOCATION SO THEIR INFORMATION CAN BE SEEN. THEIR VERTICAL LOCATIONS AND LENGTHS ARE CORRECT.</li> <li>THE EXTENT AND DEPTH OF KANAWHA RIVER VALLEY ALLUVIUM ARE ESTIMATED. THERE IS NO AVAILABLE LITHOLOGY DATA BETWEEN THE FGD LANDFILL AND KANAWHA RIVER.</li> <li>TOP AND BOTTOM SURFACES OF HORIZONTAL FRACTURE ZONES MAY VARY LATERALLY.</li> </ol>
BENTONITE	(1)	ALTERNATING SANDSTONE AND SHALE UNITS INCLUDING THE UPPER CONNELLSVILLE SANDSTONE	
(SEAL	(2)	LOWER CONNELLSVILLE SANDSTONE WITH SILTY TO SHALEY INTERBEDS	SOURCES: 1. 2018 GROUND SURFACE: GAI CONSULTANTS DRAWING 13–30500–05–A
( SAND ( PACK	(3)	CLARKSBURG SHALE WITH SILTSTONE AND SANDSTONE INTERBEDS	SHEET 5 OR 25 PROVIDED BY AEP 2. POST-CONSTRUCTION SUBBASE ELEVATION: GAI CONSULTANTS DRAWING 13-30500-05-D PROVIDED BY AEP
SCREEN	(4)	CLARKSBURG HIGHLY FRACTURED AND WEATHERED SHALE ZONE WITH SILTSTONE AND SANDSTONE INTERBEDS	<ol> <li>3. POST-CONSTRUCTION CLAY LINER ELEVATION: GAI CONSULTANTS DRAWING 13-30500-06-D PROVIDED BY AEP.</li> <li>4. GROUNDWATER UNDERDRAIN CONSTRUCTION DETAILS: GAI CONSULTANTS</li> </ol>
BENTONITE	(5)	MORGANTOWN SANDSTONE	DRAWING 13-30500-24-C PROVIDED BY AEP.
SEAL	(6)	BIRMINGHAM RED BEDS/SHALE WITH OCCASIONAL SANDSTONE (GRAFFTON SANDSTONE)	<ol> <li>SUBGRADE ELEVATION BETWEEN 0509 AND MW-8: GAI CONSULTANTS DRAWING 30204SH6 PROVIDED BY AEP.</li> </ol>



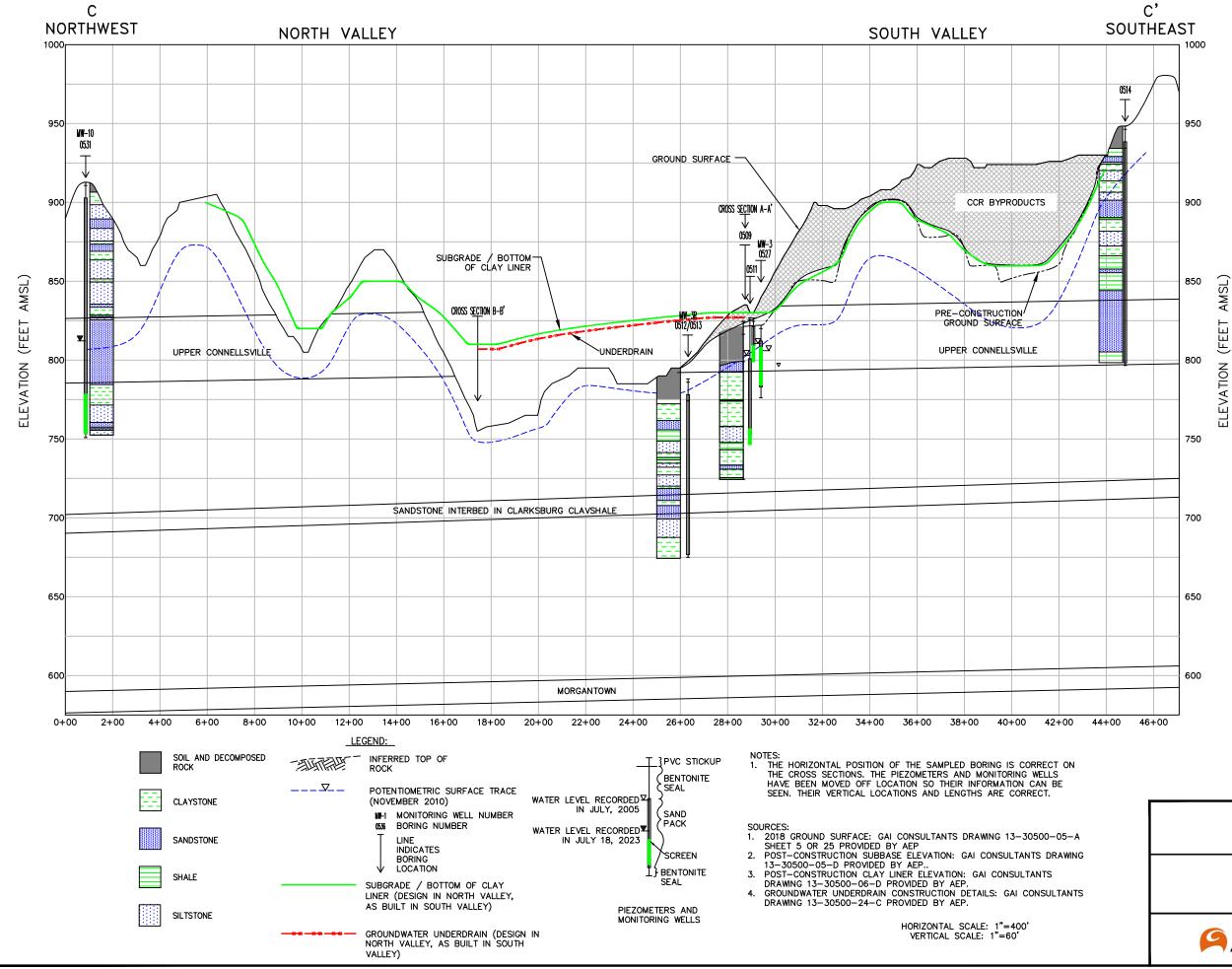
et Files/10\_WIP/10T\_ARC י אוווודון בטקטין דיטקטין ראווויברא 1999-AEP\_AMOS FGD LANDFILL\_WINFIELD\_WVP 20 און פעיכאודע פרסביבד



**CROSS SECTION B-B'** 



FIGURE

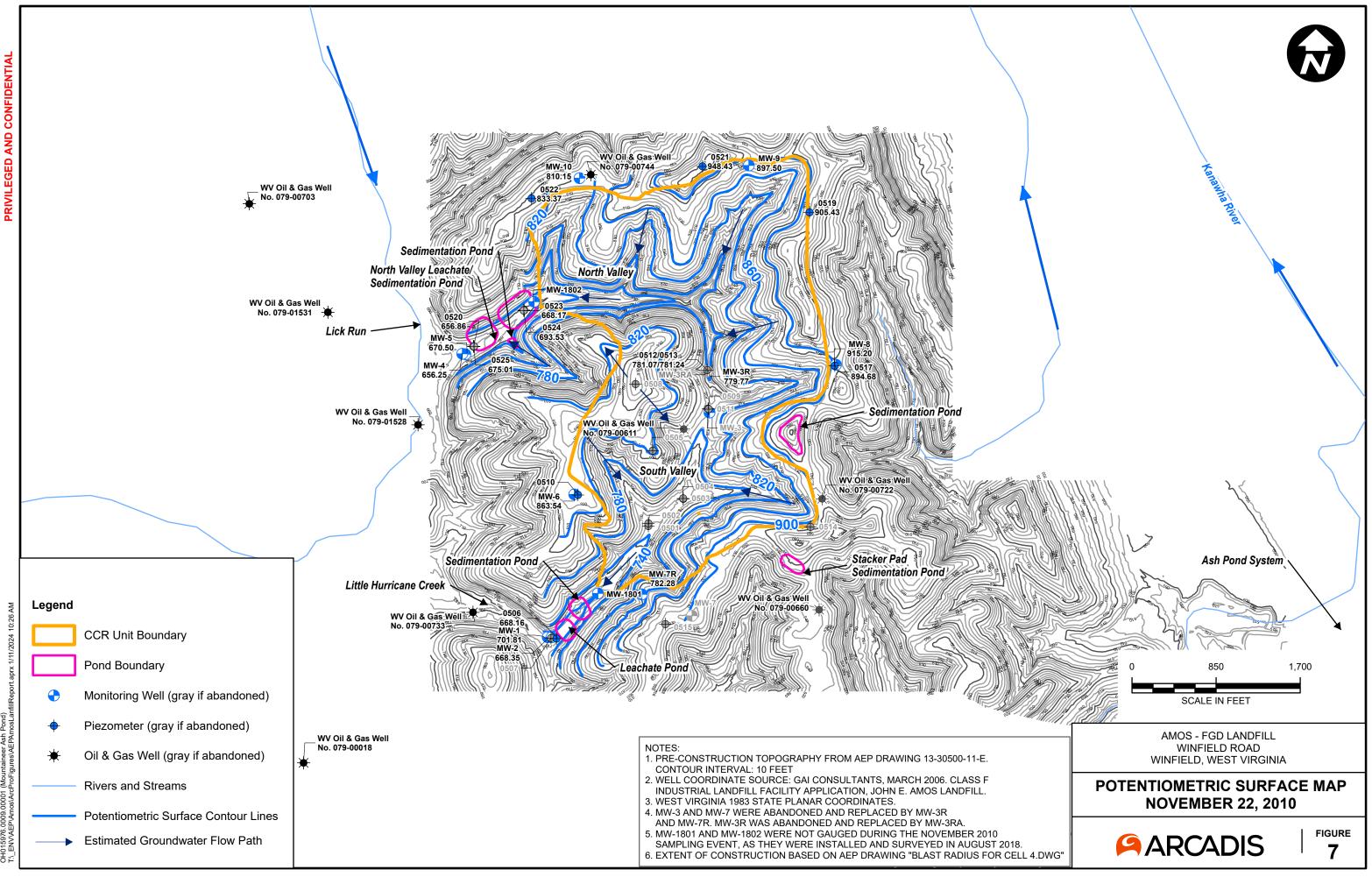






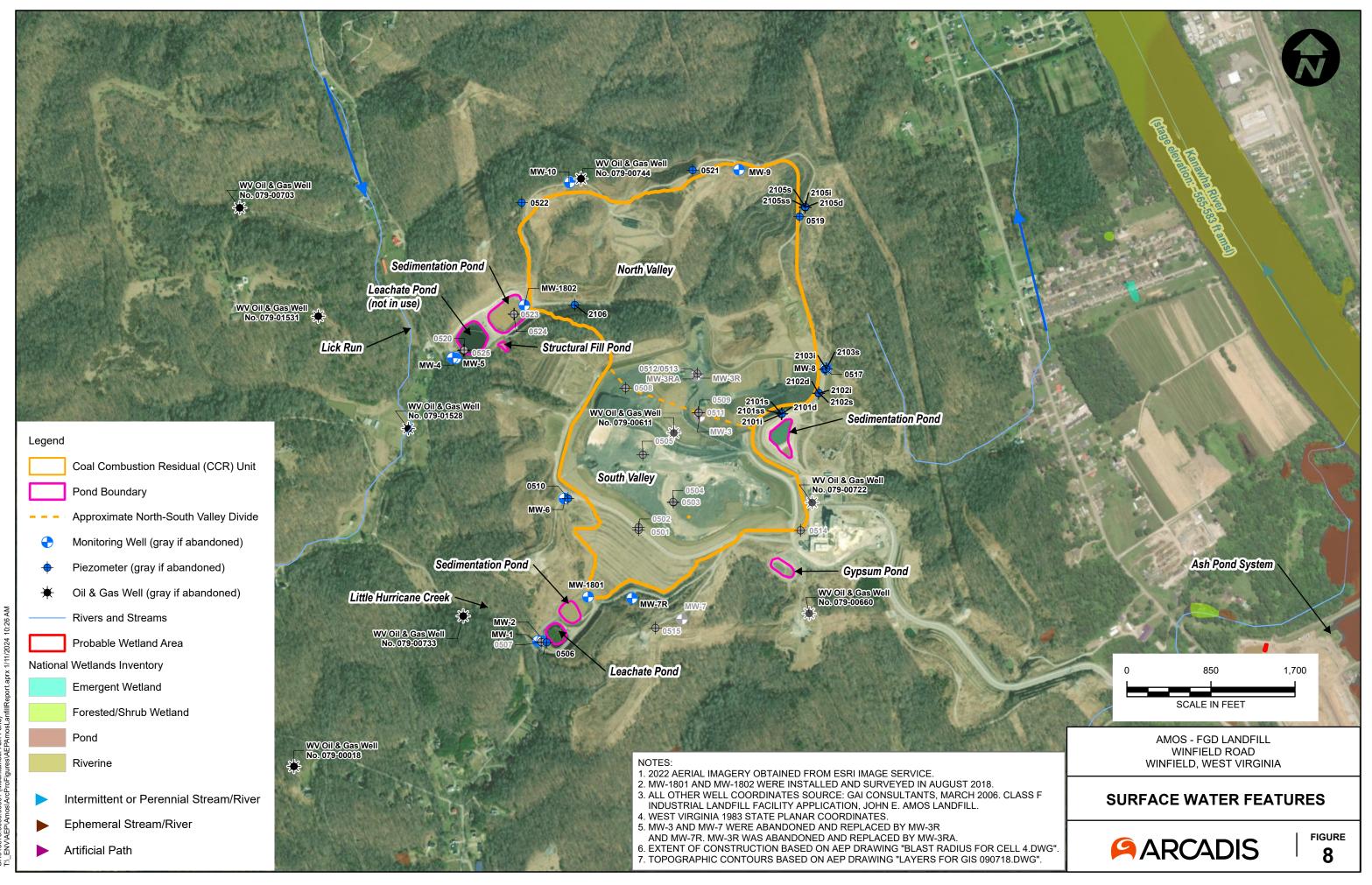
## **CROSS SECTION C-C'**

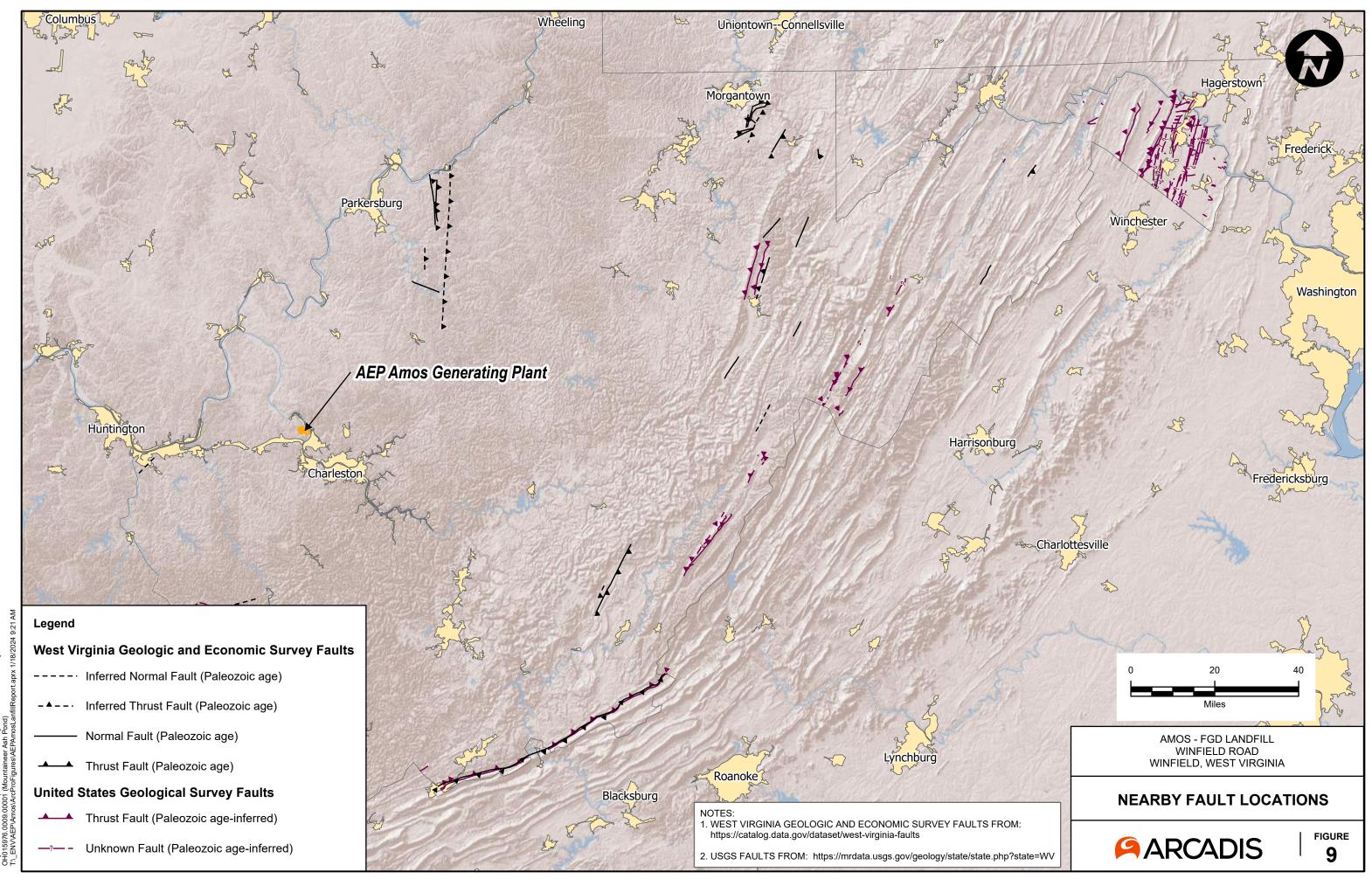
AMOS - FGD LANDFILL WINFIELD ROAD WINFIELD, WEST VIRGINIA

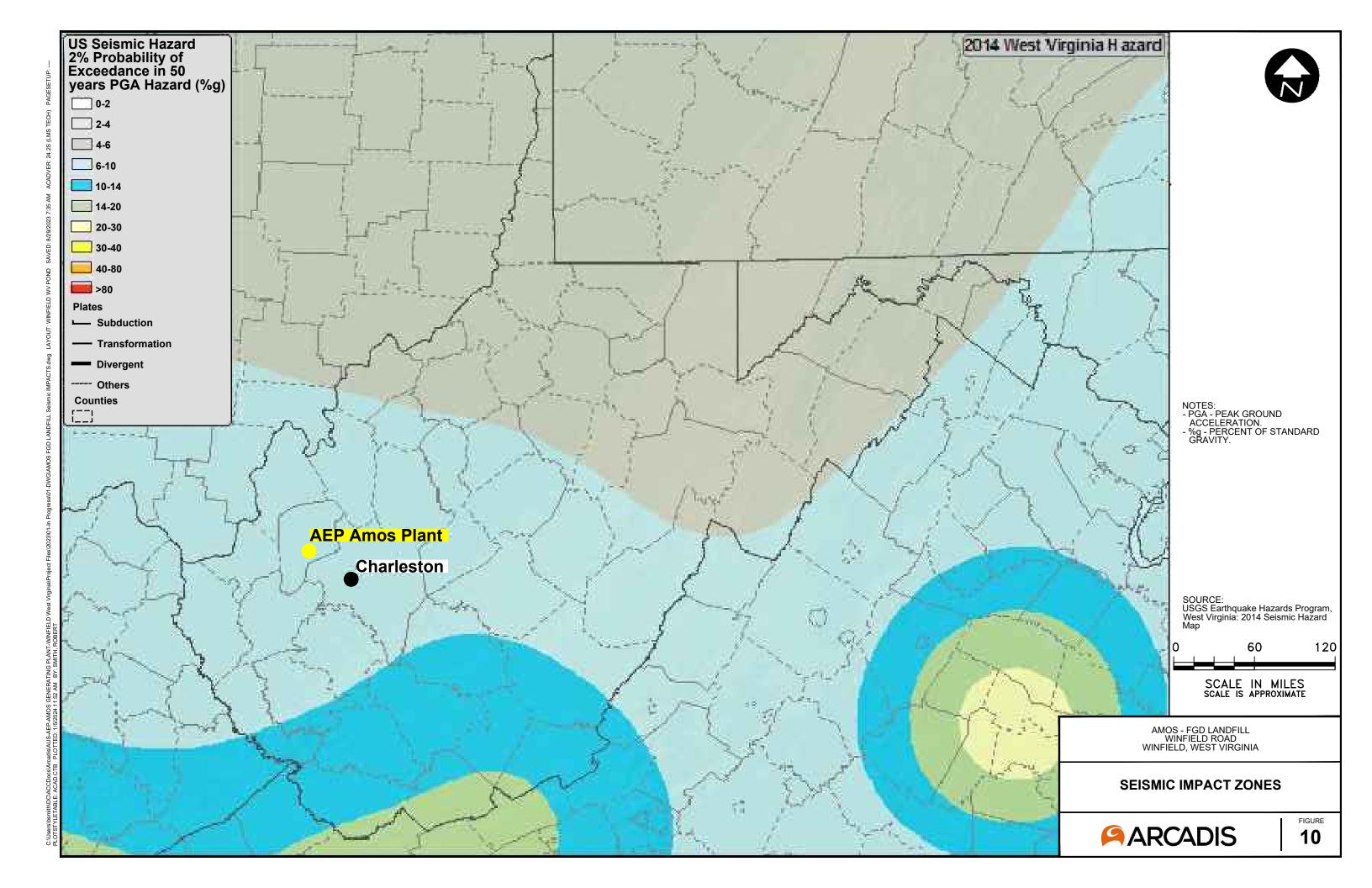


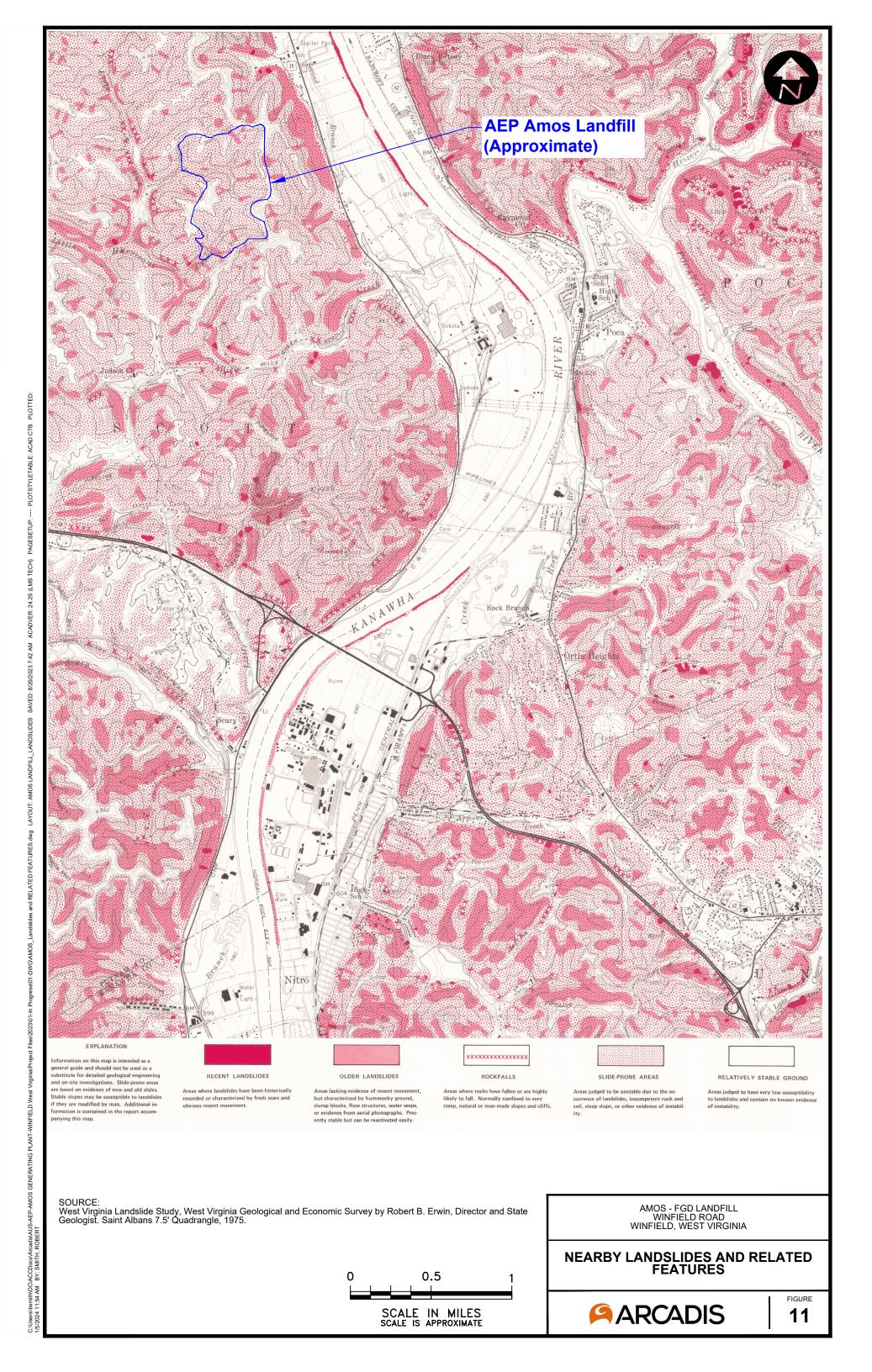
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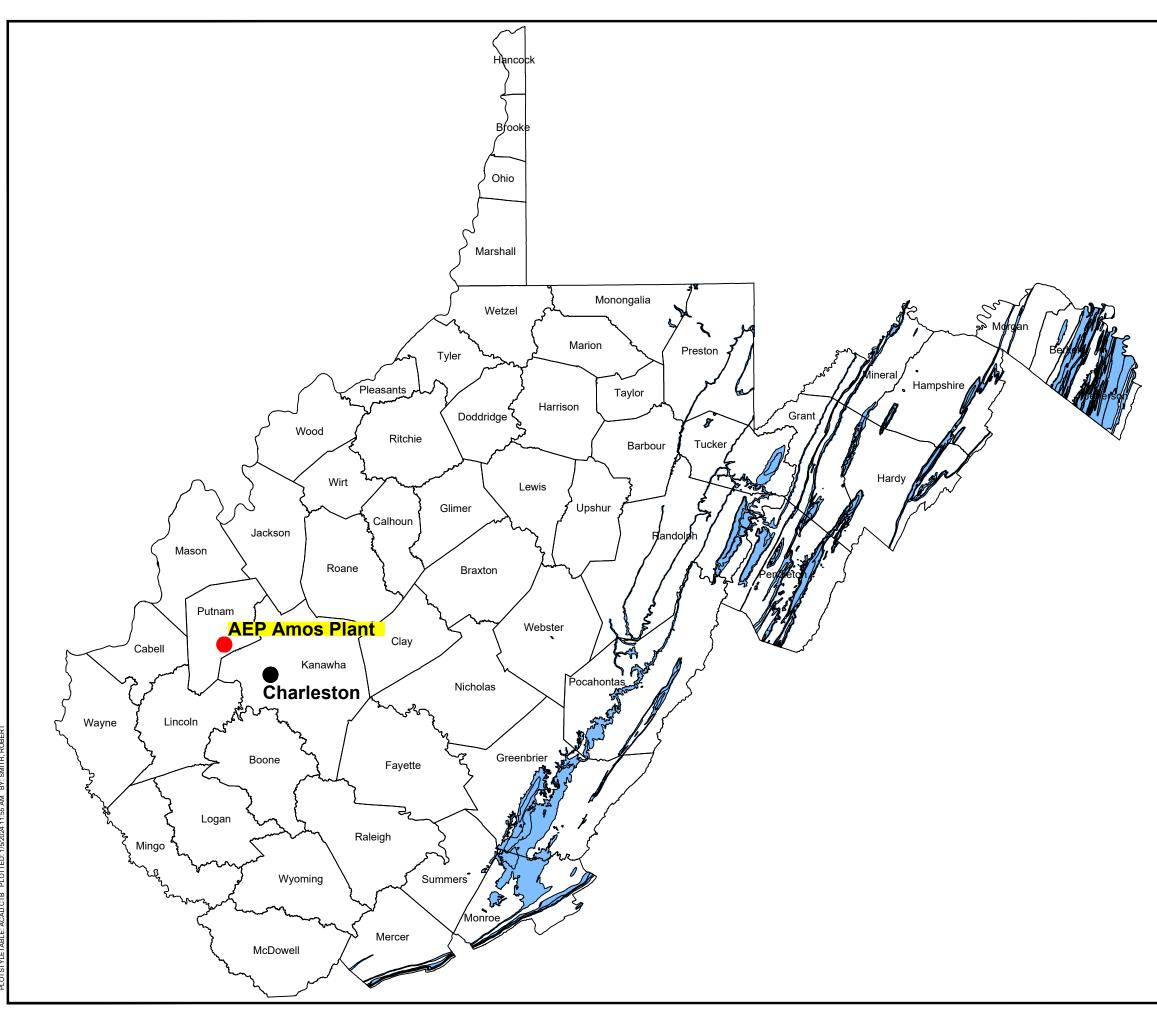
AKENS Ъ. Last Created By: K.Iv ineer Ash Pond) es\AEPAmosLan City: CITRIX Div/Group: IM/DV OH015976.0009.00001 (Mount: T:\ ENV\AEP\Amos\ArcProFigu

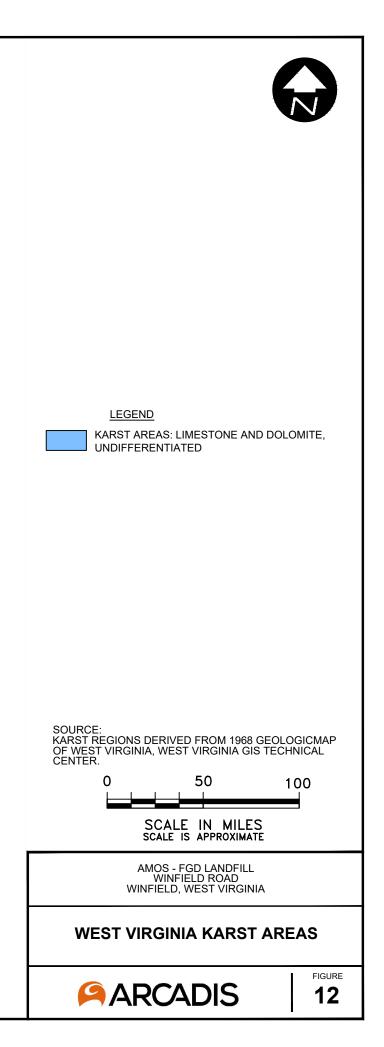














**Record of Changes** 

## **RECORD OF CHANGES**

Revision No	Revision Date	Description
0	10/5/2016	Original Location Restriction Evaluation Report
1	1/18/2024	Revised Report to include removal and reconstruction of eastern bowl of sequence 4 and associated additional borings 2101 to 2106. Text revised in Sections <b>2.2.3</b> -Construction and Operational History, <b>2.3</b> -Previous Investigations, <b>3.1.1.1</b> -Horizontal and Vertical Position Relative to CCR Unit, <b>3.2</b> -Compliance with Isolation Distance.
		Updated figures and cross sections with landfill sequences and borings 2101 to 2106 including <b>Fig3</b> -Landfill Layout and Well Location Map, <b>Fig. 4</b> -Stress Relief Fracture System CSM, <b>Fig. 6a</b> -Cross Section A-A', <b>Fig. 6b</b> -Cross Section B-B', <b>Fig. 8</b> -Surface Water Features.
		Updated <b>Table 1</b> -Water Level Data through October 2023 and <b>Appendix A</b> - Boring logs (added MW-7R well construction log, 2101 to 2106 boring/piezometer construction logs).
		Added Appendix D–Record of Changes.



**Boring/Well Construction Logs and Closure Information** 

State of West Virginia Department of Environme	ntal 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	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
Owner: American Electric Power Line 1: 1 Riverside Plaza Line 2: City: Columbus State: OH Zip: 43215-	Company/Project Well No.: MW-7R         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 forma	t)	
1.Cap and Lock:	Destastiva	YES
2.Protective Cover:	Protective	Cover Pipe
3.Monitoring Well Reference Point:		0 ft. 6 inches.
4.Borehole Diameter: 5.Ground Surface Seal:		
a.Material: concrete		mentions of the participation
b.Installation Procedure: Formed 7' x 7' Pad Arrow Co	oncrete	
6.Surface Seal Bottom/Annular Space Top:		1 ft. 23
7.Well Riser: a.OD Well Riser: 2.25 inches. b.ID Well c.Material: PVC	Riser: 2 inches.	
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.Voiume 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 P	ressure Water Pump	
23.Special Circumstances and Exceptions: No Variance 24.WV Contractor License No. 00015	e Number:	



GAI Consultants, Inc. 2006

Boring Logs

B-0501 to B-0525 & MW-1 to MW-10 N 540558.4978

ELEVATIC	DN	GW	LO	HRS			BWEE DLANT ST, ALBANS, WI		ст NO. С 240384.42-
DATE	18-19 A	PA 2005		HRS CLAS	SIFIED BY	D	AN SANGER	PAGE	1 of <u>3</u>
							DESCRIPTION		
ОЕРТН (FT.)		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
1.5		S-1 NEL DL			V. LODSE	BROWN	SANDY SILT	ml	SLIGHTLY MOIST
3,0	1 3 3 1 1 3	S-2 REC 0,8 S-3 REC 0.9		-	LOOSE V. STIRF	BROWN	SANDY SILT AND SMALL KOCK FRAGS. SILTY CLAY	ml cl	SLIGHTLY MOIST + 2,0TSF
<u>4,5</u> (6.0	1 3 5 6	5-4 Aze. 0.8 S-5		-	V.STIFF	GRAY +	SANDY CLAY MUTIT	el	4 2.75 TSF WATER 26'
7.5	<u>ч</u> ч ч	AEL 1.3 3-6 REL 1.5			VISTIFF		SANDY CLAY MOIST	d	4 3.0 TSF
10.5	367	S-7 AEC S-P			U.STIFF	GRAN + BROWN MOTTLED GRAY +	SARDY CLAY MOIST	Л	# 3.0 T3F
12.0	8 <sub>10</sub> 3 <sub>7</sub>	1.3			V.STIFF HARD	BASWP MOTTLES GRAY + BROWN	SAANY CLAY MOIST SANDY CLAY DECOMP. CLANSTON	c1	₩ 3.75 T3F ₩ 4.5 T3F
13.5	4 4 6 10	REC. 1.5 5-10 REL. 1.5				ASTITUD GRAY + BLOWN MOTITED			
15.0	35	S-11 NEL 1.5			HARD	MOTTIES	SANDY CLAY: DECOMP. CLAYSTONS SANDY CLAY: DECOMP. CLAYSTONS	دا د/	* 4.5 TSF * 4.0 TSF
(8,5	3 4 4	5-12 REC 1.5			HARD	GMAY	SANDY CUAY: DECOMP CLAYSTONE	c1	-10 4.25 TSF
19,5	13	5-13 Rec. 1.5 5-14			HARD	G RAY GRAY, BLUE	SANDY CLAY: DECEMP CLAY STONE	<u> </u>	# 4.5 731
21.0	16 16 16 26/3.3	REC.1.5				BRAY BLUE BROWN MOTTLED		c١	-* 4.5 TSF
22.3	- 30/3.3	REL 1.3		12.3 18/18/11:	SOFT U.SOFT	GRAY CRAYE	DECOMPOSED SANDY CLAYSTOPE		201 51 101 - 10 - 00
					TO SPFT	MARONN MARONN MOTTLING	HIGHLY WEATHERED CLAYSTONE	BR	30° SLICHENS, DED FRAC- TURES AT 23.5, 13.8, 24.9
									LOW ANGLE FRACTURES AT 22.7, 23.0, 23.6, 23. 9, 24.0
	9,29.2	100%	71	27.4	¥	V	V	Y	24.2,24.5,24.6,25.2,26.0
					SOFT	GRAY	SANDY CLAYSTONE		26.3 27.7 28.0 28.4
				29.0	SOFT TO	G/4Y	ENTERGEODED SANOY SILT STORE AND SAND STORE		29.6 30,3 45 FLACTURE 27.25-27.4

BORING ADVANCED WING 51/4" FOLID STEM AUGERS, 4"& CASING, MQ-2 WIRELING CORING TOOLS

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1992 1945

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

gai consultants transforming ideas into reality



			2/3 GW					LAN	T	ST. ALBANS	, wv			GNO. <u>B-0501</u>
					HRS		1				<u> </u>	_PR	OJE	CT NO. COY0384,40-
DATE	18-19	·A	PR 200;	5	CLAS	SIFIE	DBY		1	JAN SANGE	ER	_ P/	٩GE	of
						<u> </u>				DESCRIPTION			-	
ОЕРТН (FT.)		CORE RECOVERY/RUN		ROD (%) OR TORVANE		SOIL DENSITY -	ROCK HARDNESS		COLOR	MATERIAL C	CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
ſ	2		3	4	5		5	ł	7		8	4	9	10
31.5	+	-		<b> </b>		mis	oFT	GR	AY		D SANDY SILTSTONE		<u>sr</u>	
	FΨ				1			· ·		OTZQHAZ QUA	NE ( (0+'T)	ļ		LOW ANGLE FRACTURES
		-							<u> </u>					33.6, 34, 4 36.0, 36.2
					34.4							L		36.7, 37.35 37.8, 38.0, 38.
	┥─┼╴	-				SOF	Ĩ	GRA	4 +	CLAYSTONE	Y	VE	2-	· 41.1,
		$\dashv$							ILED			60		30° FRACTURES 4 SUCKED
	10,0 10	0,0	1002	70										SIDES 35.4, 39.25, 39.75,
		-							<u> </u>		8	ļ		40.0, 41.3-41.5
		-		<u> </u>				ал. -						BROKEN ZONES 35.6-35.
	$\left  - \right $	-+							<u> </u>					40.0-41.0, 41.5-42.3
41,5	- +	-						<u> </u>	<u> </u>					
	I-Ψ				42.3	V	/		<u>v</u>		V			
						M. 5	FT	GA	-73.4	SANDSTONE		7P	iL.	WW ANGLE FRACTURE
	┼─╌┼─	_				m. II	ALD				ļ			42.3, 43.25, 48, 348
	$\left  - \right $	+												148.5, 50.2, 51.5, 51
		-	0.0					<u> </u>						52.2,52.7 53.4
	7.5 1	2. 0	93%	88.	×									
		-+			48.0	<u> </u>		10	/		V	13	·	
		_			40.2	5240		ÞK GN		SANDY CLAYSTON	•	В	<u>r</u>	<i>1</i> 0
		_				M. 101	FT TO	GR	AY	INTERBEDDED !	SANDSTONE AND	B	2	
51.5		_				M- HA	MO			SANDY SILTST	ONE			
		7												
		_			53,4					3				
		$\downarrow$				SOFT		GRA		SANDY TO SILTY	CLAYSTORE	VB	2-	LOW ANGLE FRALTURES
								Matt				Ba		53.7,54.05 54.3,54.
			00 8						-					55.4 55.55, 55.7 55.4
	9.3 10	0.	93%	31										56.35 56.5, 56.7 56.9
														57.2,58.0,53.5 58.9.59.
		-												60.6 60.85 61.35
							· ]		/ 7	1	· · ·	<u> </u>		BADKEN 2015 59.3-60.

REMARKS \*\*

~30" SUCHENSIDED FLACS. 54.4, 57,55, 57.9, 58.25

58.75, 61.1

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B-0501

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PROJEC									AN	Г	ST ALBANS, W	V			GNO. BOSDI
ELEVAIN						HRS		1		3					CTNO. COY0384.42-01
DATE	18-	IS A	PR 2-20	5			SIFIE	D BY		DA	N SANGER		P/	AGE	<u>3</u> of <u>3</u>
								-			DESCRIPTION				
DЕРТН (FT.)	BLOWS PER		ŝ	% ROCK RECOVERY	ŭ	<u> </u>	SOIL DENSITY -	CONSISTENCY OH ROCK HARDNESS	Ļ	COLOR	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	-	2	3		4	5		6		7		8		9	10
61.5						61.6									
		·					lc2	-1	Yeu	ADD J DAAY DW,/ PUE	CLAYSTONE HI CORE IS HIGHLY			2	61.5-65.9 AlPARENT ZONE & CONE LOSS BROKEN ZONE: 69.5:66.7
	5.6	<u>/ə.ə</u>	569	a	282						10				LOW ANGLE PRACTINES 66.9, 67.15, 67.3, 67.75, 67.85, 68.9, 69.1, 69.65, 70.6
71.5		>									•				30° SLICLENSIDED FLACTURE 69.9,71.1. 71.4, 74.2,75.0 BRUKEN 2015-72.3
	T.6	8.5	89	2	27	×									APPARENT WITE LOSS 72.3- 73.2 "LOW ANGLE FRACTURES
<u>80.0</u>						6.98					BOTTOM OF BOR	NG : 180.0'			2500 Kr 6 2 Harcines 14.55, 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, 79.75, 79.85, 79.7

REMARKS \*\*

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\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING	NO.	80501

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	- AREA	2/2	40	44	E AMO	≂ Aud	SE FLANT ST. AUGANS, WIN	2020	R-0502
EVATIO	ON 758	GW	L. 0	HRS					CT NO. COY0384,4
ATE	21 APR	2.005	-	HRS CLAS	SIFIED BY	5	on sanger	PAGE	of
			- 33				DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERVIRUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
5							AUGER WS SAMPLING		
							TO 22'		
			-				SET PIEZOMETER -		
9				~			TIP AT 21		
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				22.0			<u> </u>		
			<u> </u>	4		· · · ·	BOTTOM OF BORING: 22'		
				1					<u></u>
									8
			<u> </u>	1					
	1 1			1	1 1		1	1	
			<u> </u>	-					

REMARKS - DRILLED BY TEXARA TESTING INC. USING A SIMCO 4000 TZ TRACILINOUNTED ANUL

BILING ADVANCED USING 51/4/\$ SOLID STEM AUGERS

\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B.0502</u> (3-4)

N 540843.8055

E 1723858.5630 Grade El. 775.00

PROJECT	ALE	A 2/3	3	OHN	E. AM	os Bu	ER PLANT, ST.ALBANS, WV	BORIN	GNO. 0503
		  							CTNO. CO40384.42-0
DATE	10-16 0	, PA 2005		HRS				- PAGE	
DATE	10.17 14		-		SIFIED BY	DAN	SANGER	- FAGE	of
							DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERV/RUN		ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSÍSTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
1.5	W.91H W.0,Ц	5-1 Rec 1.0		1	V.LOOSE	BROWN	CLAYEY SILT	ml	MOIST
3.0		5-2 REC 1.1			V. LODSE	BROWN	CLAYEY SILT, TRACE SAND	ml	MOIST
	1 1	5-3	$\square$		V-SOFT	BLOWN	SILTY CLAY	cl	WET + 0.5
4.5	23	2.EC 0.1 5.4		}		CRA4+			
6.0	46	REL I.Y			HARD	BROWN	SAPDY CLAY	cl	SUGUTLY MULT + 4.5
7.5	36	S-5 AEC. D.4			M. DENTE	BROWN	SANDY SILT	1-	SUGUTLY MOIST
	3 912		-	1	1100	GLAY +			
9.2	33	REC. 1.2 5-7.		1	STIFF	MOTTER	SANDY CLAY: DECOMP. CLANSTONE	C	SLILHTLY MOIST, 44.515F
10.5		NEC.0.4 5-8			31111	GLAX+	SONDY CLAY IL U	01	MOIST # 3.75TSF
12.0	. 55	AEC. 112		•	HARD	AROWN MOTTLES	SANNY CLAY	c1	SLIGHTLY MOIST + 4.5 BF
	33	5-9	$\square$	1	HARD	GAAM +	SANDY CLAY "	a'l	SLIGHTLY MOIST #4.5 TSF
13.5	1 3	1.2c. 1.3 5-10				IN TILED	·····		
15.0	55	REL. 1.0			HARD	GRAY	SANDY CLAY "	U	SUGHTLY MOIST 4.STSF
16.5	334	5-11 REC 1.3			HARD	6404	SANDY CLAY " 1	01	SLIGHTLY MOIST 4.5 TSF
	12	2			<u>_</u> ;		·	,	• 6
18.0		AEL 114		{	V-STIFF	GRAY	SAMAY CLAY ; SOME SILT "	<u> </u>	MOIST, # 3.75 TSF
19.5	13	5-13 Réc. 1.3		1	V. STIGE	SAAN CHAY	SANDY CLAY, TRACE ORGANICS	<u> </u>	SLIGHTUR MOIST, * 3.75 TSF
21.0	<u>ب</u> چ	S-14 REC. 1.2			V.STIFF	DATLE	SANDY CLAY, TRACE ORGANICS	4	(1111-11-11-11-11-11-11-11-11-11-11-11-1
	22	5-15		1	LOUSE	BLUET	CLAYEY SAND, THACE AND FLAGMENTS	SC SC	SLIGHTLY MOIST > 3.573F MOIST
21.5	28	Rec 1.3 75-16 REC.0.9		23.4	SOFT	BLUE- GRAY	DECOMPOSED CLAY FTDNE FRAGMENTS		( <del>) - ()  </del>
2.3.4	50/2.4	REC-0.9		123,4 141M1- 24.0		GRAY		VBR	TOP OF ROCK 23.4
	Į			×1.9	M.S. FT	GRAY	SILTY SANDSTONE	VBA-	CLAY SEAM 24.7, 29 ?
					M. HARD			Ba	VERTICAL FRACTURES 23.4-24.4
		A	20						25.25-25.3,27.45-27.55
<u>.</u>	7.5 7.5	1002	35				P:		LOW ANGLE ALACTURES: 23.6
			-						23.8, 24.05 24.15, 24.3,
L	L			L	L .V	V I	¥	¥	24.4, 24.55 24.9 25.05 25.15

REMARKS .. DRILLED BY TERAR TESTING USING A SIMCO YODD TITLACK MOUNTED DRILL ALL. BOANS ADVANCED

USING 514 \$ SOLID STEM RUGERS NO CASING, NO-2 WIRELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0503

gai consultants

(B-5)



BORING NO. <u>B-0503</u> (B-5)

						F POWET	R PLANT ST. ALBANS, WV		
ELEVATIO	ON	G\	NL C					_PROJE	CTNO. CO40384.40.
DATE	18-19 A	PR 2-005		HRS CLAS		<u> </u>	N SANGER	PAGE	of
							DESCRIPTION		
DЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE BECOVEDVIELIN	SAMPLE NO., TYPE & RECOVERY OR % BOCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
30.9			+	30.7					25.25, 25, 3, 25, 35, 25, 5
	$\downarrow$ $\downarrow$		1	32.0	SOFT	GRAY		VBR-BR	25.55, 25.75 26.0, 26.15
	<u> </u>			1	SOFT	GRAN	SANDY CLAYSTOKE	BR	26.25, 26.5, 26.7, 26.95, 27.2
	$\left  - \right $			33.9		<u> </u>	V		27.35, 27.45, 27.85, 27.95,
	+			4	M.SSFT	GRAY	SANDY SILTSTONE	BR	28.5, 28,75, 29.15, 29.35
	10.0 10.0	100%	ררן	36.3	- *		V		29.7, 30.3, 30.4, 30.9 31.1
	<u> </u>				SOFT	GRAY	CLAYSTONE		31.4. 31.7 32.15, 32.4
	╂─┼─			-		GONI			327, 32.8, 33.4, 33.9 34.4
		<u> </u>		4		GADH + MAROON			35.1 35.5 35.9 36.7 36.9
1	+ $+$ $-$			4		LI LI LE LI			37.1 37.6, 38.0, 38.75
40.9	┢╋			-					39.2, 29.3, 39.5, 40.9
	$\left  - \right $	<b> </b>							41.6,42.3, 412.75,43.0,
	┨──┤──			42.5	<u> </u>		V		44.2,44.8,45.05,45.6
					MISOFT	GRAY	IN TERBEDDED SAN ON SILT STONE AND	BA	46,15,46.95,47.6,49.2
		0.00	-	ŧ ′			SNUDSTONE		49.4, 50.0
	8.99.1	98%	82	4			·	Sint	30° FRALTULES 28.85,
				47.4			V	V	39.35 42.7
	┥	<u> </u>	+		SOFT	MAROON	SANDY CLAYSTONS	BR-BL	BROKEN ZONE 40,9-41,6
			╀──			MOTTLED			
50.0				50.0	<u> </u>	*	V	V	
							BOTTOM OF BOLING 50.0		
								L	
			+						
				×					
		1	1						

REMARKS \*\* \_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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N 540840.0544

E 1723859.8367 Grade El. 775.40

		، ، کادید R			HRS				_PROJE	СТ NO. <u>Сочозъч.4</u> с
ATE	JAONI	T			CLAS	SIFIED BY	DA	n sianger	PAGE	1 of
				-				DESCRIPTION	-	
DEPTH (FT.)	BLOWS PER SIX INCHES OR	5 K	% ROCK RECOVERY	$\rightarrow$	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR .	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3		4	5	6	7	8	9	10 <u>10</u>
	· · · · ·		-+-					AUGER 1/6 SAMPLING TO 24' SET REEDMETER		
	<u> </u>		+	-				TO 24' SET PIEDOMETER TIP AT 23.2'		
									· · ·	
•	ļ									
	<u> </u>		_							
						· · ·				
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			+							8
										·····
<u> </u>										
	<u> </u>									
	<u> </u>		_							
		+		-					· -	
					(					
			_					·		240
										•
		+		-1:	240			V.		
								ROTTOM SEBORING: 24.0'		
		1								·
				-						

REMARKS - DRILLED BY TED IN TESTING WINGA SIMCO 4000 TZ TRACK MOUNTED DALL

BORING ADVANCED USING 5 1/4" \$ SOLID STEM AUGERS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. BOSOY

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E 172				de El		910.89	D PINH	T ST. ALBANS, WN	200	ING NO. BOSOS
			GW					SI, AUBAS, WY	_	JECT NO. <u>CO46384.4</u> 5
LEVAIN	JN		GW		HRS				_PHO	JECT NO. 00 10 30 110
ATE	303	.5 1	PL 2005	-		SIFIED BY	D	an sanger	PAG	iE of
	Τ							DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR	REMARKS*
1		2	3	4	5	· 6	7	8	9	10
	1 3		5-1			LOOSÉ	TAN	SANDY SILT, SUICHTLY NOIST	m	
1.5	5	3	REC 0.7 5-2							
3.7	מ		REC. 1.5			DENSE				DE COMPOSED SONOSTONE/
3.8	12 50	15.3	5-3 NER		3.8	J.DEASE	¥.	↓	¥	SANDY SHALE
		/			17191	SOFT	HALL	SANDSTONE HIGHLY WEATHERED	BR-VI	BR TOP OF ROLK: 3.8'
					6.2	VISOFT	TAN	SANDSTORE: COMPLETELY WEATHERED	VBR	
						N. SUFT	TAN	SAN DSTONE: MODELATELY WEATHERED	BR-B	IL VERTICAL DEALTHES C.2-6.
	7.2	7.2	1002	62		m. HARD		MICACEDUS, EINE TO MEDIUM GRAINED		LOW & FRACTIMES : 6.7, 7.25
				ļ						8.4,9.8, 11.2, 11.45, 11.6
11.0		$\rightarrow$			11.6					•
				-	11.00	VISSFT	TAP	SANDSTONE: COMPLETELY WEATHERED	VBA	
	<u> </u>							MICACEDUS FINE TO MEDIUM GRANED		
					14.0			<b>i</b>		
						SOFT.	TAN	SANDSTONE: HIGHLY WEATHERED,	BA	- LOW & FLACTINES: 14.0, 14.
	0.0	10,0	100%	36				MICACEDUS, FINE TO MEDINM GRAINED		14.3, 14.35, 14.45 14.55, 15.75
	ļ									16.5, 17.0
					18.5			v	VBR	
					10.0	V.SOFT	TBM	JANDSTONE: COMPLETELY WEATHERED		
						SOFT		MICACEDUS, FINE TO MEDIUM GRAINED		
21.0		<u></u>			21,0	Y	V		ł	
						SOFT	TAN	SANDSTONE : HIGHLY WEATHERED	BR	LOW & FRACTURES: 21.1,
								MICACEOUS, FINE TO MEDIUM GRAINED		223, 22.45, 22.55, 22.7, 23.0,
										23,1, 23.5, 23.75, 24.05
-				-				·		27.55
	8.7	10.0	872	55						
										STRIMED 30° FRAC-
								· · · · · · · · · · · · · · · · · · ·		TWRE 21.9

NING A SIMED 4000-TZ TRACK MOUNTED DRILL REMARKS BORING ADVANCED USING 514 SOLID STEM AUCERS, COMINGUES SPT, NO-2 W.RELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

25.

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B0505</u> (27)



ELEVATI	DN			GWL	_ 0	HRS	84.0					_PROJE	GNO. <u>B-DSD5 ("21)</u> СТNO. <u>CD4D384.40-01</u>
	_			-		HRS				[			2 of 7
DATE	20.	12	PR 200	<u>, c</u>		CLAS	SIFIED BY		DA	N SANGER		- TAGE	of
										DESCRIPTION			
DЕРТН (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS			MATERIAL CL	ASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2		3		4	5	6	. 7	7		8	9	10
31.2		$\mathbf{i}$				31.0			/	·	/		
							U.SOFT	TAN	1	SANDSTONE: COMPLET	ELY WEATHERED	VBR	
							M. HARD	BROI	ЧЧ	SANDSTONE: MODE		BR-BL	
										MICACEDUS MEDIN	nm GLAINED		
										,			70" HIGHLY STAINED
	10.0	19.0	100	2	41				,				FRACTURE 34,6+35,1
						36.5	SOFT TO	BLL	1 1E-	SHALE		BR	VERTICAL FRACTURE 35.7-30
							M. SOFT	CAA	ы				LOW & FRACTURES : 35.1.
-						39.2			/		1		35.3, 15, 45
1			77			40.9	M. SOFT	TAI	4	SILTSTONE		UBR	STAINED VERT. FRAL. 39.2-40
ЧІ,0						ผเว	M- HARD	DK G	LAY	SILTY SANDST	346	BR	HIGH & STAINED FRAKS:
							M. HARD	04	VÉ	SANDSTONE : W. FIN	E GRA NED		40.0-40.3, 40.55-40.7 .
						412							LOW X STRINGO FRAC 41,8
						43.7	/		-	k	<u> </u>		NEAR VERTICAL STRINGS
							M SOFT	BLU GA	E-	SILTY SHALE		VBR	FRALTURE 41.8-42.2
	p.0	10.0	1000	2	44		SOFT						HICH & STRIKED FRACTUR
			22			47.0	V		(		1		45.6-46.
							M.SOFT	OLIV	AAN	SANDS TONE FIN	is channed, some	BR	HIGH & STAINED FRACTURE
										CROSSBEDDIAL			49.5-49.9 52.7-52.8,
			L										54.15-54.3,55.7-55.9
51.0		$\searrow$											VERTICAL STAINED FAAC
										•••			TURE 51.5-52.2,
											· · · · · · · · · · · · · · · · · · ·		,
						55.4			/		<i>(</i>		
	10.0	D.0	100	6	36.		SOFT	GN	AY	SANDY SHALE		UBR-	
n I.					-			ы	r	a and a start of			VERTICAL STAINED GAALS
													59.1-56.7
												V	HIGH & + VERTICAL STAINED
				ſ			V			V	/	BR	FRAIMES 57.2-59.6

REMARKS \*\* \_\_\_

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0505</u>



PROJEC	<u>14</u>	EV	12/3	J	гч	E. AM	s Pou	NER PLANT ST ALBANIN		NG NO. B.0505
ELEVATIO	ON		GV	VL O	HRS	84.0				ECT NO. CJ40384.40-0
DATE	<u>کد- مد</u>	AP	A 2005	_	HRS CLAS		0,	W SANGER	PAGE	of
								DESCRIPTION	1	
DEPTH (FT.)		CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ŭ	۵.	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	_	3	4	5	6.	7	8 31	9	10
610	┼─∜				61.2	<u> </u>		V		30°STRINED FRAG. 60.3
	┼─╀	_		-		SOFT TO	GRAY	CLAY SHALE	BR-	HIGH & STAINED FLAC-
	+	, 1			{	M-SOFT			BL	THE AT 62
					155		MAROON MOTTLING			
	10.01	o.s	1002	52	66.1	MAHARD	CLAY	SUOLISHOL	ISL	
	+				66.9		GRAY -	CLAY SHALE	13A	HIGH & STAINED FRAL 66-5-66.7
					68.8	MINARD		SANDSTONE		4614 FLACTURE 67.7-67.9
					8.00			SHALY 17.7-68.8		VENTICAL FALKTURE 68.2-68.6
						VISOFT	BROW-	CLAY STORE - COMPLETELY WEATHERED	VBR-	<u>i</u>
71.0	╞─॑	Ч		+	ł .		GRAY	a (%)	BR	
		-			77.0	V				<u>*:</u>
					73.0			CLAYSTONE	BR	
		-	363			M-SOFT	CLAY	CUSISIONE	DR.	SLICKESSIDES 73.55
	10.2 11	2.3	1002	42		- 13F1	1			74.7.74.8.75.6.75.9
										76.5,77.077.35
	0		143		78.0	J.	v			VENETICAL STRINED
						MHARD	BROWN	SANDSTONE: FULE TO MEDIUM	BR	FRACTURE 77.7-80.5
						1	GRAY	GLAINED		
81.0										
	LΥ		35						BL	
									1.	
		_		<b>_</b>			V			15
	┟╌┠╴	_					BROWN			
	10.0 10	0.0	100%	76						
	┝─-┠-								BR	VERTICAL STAINED
	┼┼-	-					,			FRACTURE 87.5-88.8
						V	V	······		

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REMARKS \*\*\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>BOSOS</u> (27)

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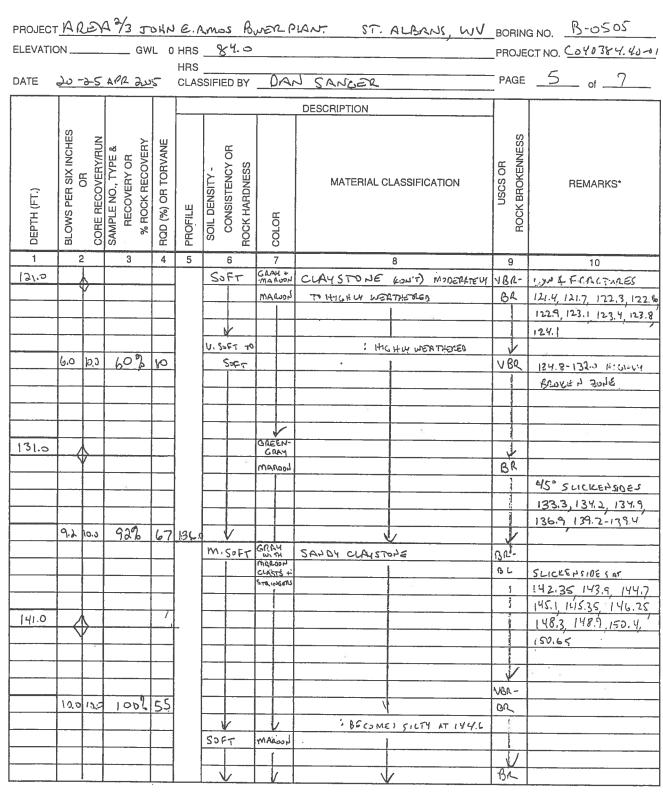
ELEVATI	ON		GW	/L 0	HRS	84.0		PLANT ST. ALBANS, WV	PROJ	ECT NO. 6040384.40.
DATE	20-2	51	APR 2005	-	CLAS	SIFIED BY	D	an sanger	PAGI	= <u>4</u> of <u>7</u>
		-			<u> </u>		0	DESCRIPTION		
DЕРТН (FT.)	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR BOCK BROKENNESS	REMARKS*
1	2		3	4	5	6	7	8	9	10
91.0		$\vdash$				M. HARD	BRUNN	SANDSTONE (CON'T)	-82-	<u>5</u> 2
									BL	43.8, 94-9, 95.1 95.2, 95.6
	10.3	10 0	100%	86			GRAY			
										8
610	$+ \phi$				101.5					
						SOFT	GRAM	SILTY SHALE	UBR	MULH OF COLE 15 PIECES 0.1-0.2'
	10.0 [0	0,0	1002	18				BECOMES SANDY AT 104.75		LUNX FRACTURES 101.4, 102.0, 102.5, 102.9, 133.4 104.3 LO4.5, 104.75
					108.7					VERTICAL FRACTURE 106.7
						M. HAAD	GRAY	SAPOSTONE: FINE GERINED		U.BARKEN ZONG 107,0-107.
111.0	$\vdash \oplus$									STAINED NEAR VERTICAL
		-+			112,2			V		FRACTURE 108.1-108.7
		+				SOFT TO M. SOFT		CLAYSTONE	VBR	//0
		+				111.0043	MAROON		·	45° SLICKENSIDE 112,9-113.
	9.2 10.		922			MISOFT	CRAY			N. BRAKEN ZONE 114.2-114.8
										LOW & FRACTURE D.8, 19.6
		-				SOFT	GRAY MALOON			120.4
		+				V	Maroon			

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. BOSOS



REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0505</u> (\*27)

gai consultants transforming ideas into reality



BORING NO. B-0505

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PROJECT	An	Ξ¥	2/3	DI:	IN E	F. Amus P.	Juren	PLANT ST. AL	AANS, WV	BORIN	GNO. <u>B-0505</u>
			GW								CT NO. C340384.40-01
	0.				HRS						6 of _7
DATE	20	9.2	RPR 2005	-	CLAS	SIFIED BY	1212	IN SANGER	•		of
					ļ	····-		DESCRIPTION			•
DEPTH (FT.)	BLOWS PER SIX INCHES		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY		<u> </u>	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CI	ASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	2	3	4	5	6	7		8	9	10
151.0	$\vdash$				151.5			\	·		. (19)
						T. HARD	GREEN-	SANDSTONE		BR	
				• • • •	153.2	MISSEF	GRAY	SANDY SHALE		BR	LOW& FEACTURE 153.4,
					1	1		SKRIN SHADD	•		153.65
	10.0	10.0	100%	86	156.1				1		45° FLACTURE 154.35- 154.5
					<u> </u>	M.HARD	GRAY	SHALLY SANDSTO	Ne	BR-BL	LOW & FRACTULE 157.35
					157.5	M-HARD		SANDSTONE			
161.0	$\vdash$	6				а. —		71			
L		ſ									
		ļ						77			· · · · · · · · · · · · · · · · · · ·
	<u> </u>										
		<u> </u>	0			┝──┾──					·
	10.0	10.0	100%	84			$\square$				
							× .				CLAYSEAM 167.55-167.70
					168.5		V.		K	V	w 2.
					1	M.SOFT TO	DE GAAY	CLAYSTONE	ſ	BA-	168.75, 169.85, 169.15
171.0					1	2011	0-64H			++-	169.20, 170.7, 171.2, 171.6,
1 110	$\left  \right\rangle$	$\overline{}$						•	1		174.8, 174.95
								· · · · · · · · · · · · · · · · · · ·	· ·		· · · · · · · · · · · · · · · · · · ·
					173.4	M.S.FT	GRAY +			BL	45°4 FRACTURE 169,75-
	·				1	M. HALD	MARDON		}		170,1,172,35,172,7
	9.3	19.0	932	6.1	]						LOW YSULKENSIDES 170.4,
											173.1;
											173.4
					179.2	1			Y	V	
						M. SOFT	MALOON	CLAYSTONE		BR-VBA	45°SLICKENSIDES 179.2-179.4 179.7
REMARKS	••										179.9-180.0

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING ...

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ELEVATI	ON		(	GWL	_ 0	HRS	84.0							GNO. <u>B-0505</u> CTNO. <u>CO40384.40-01</u>
DATE	20 -	- 761	APR 200	~		HRS			Δ.	AN SANGER				of
	<u> </u>		1			T			0.			· · · · ·		of
								1.	·	DESCRIPTION				
DEPTH (FT.)	BLOWS PER SIX INCHES	OH CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	. COLOR		MATERIAL C	LASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3		4	5	6	7			8		9	10
181.2	$+ \langle$	▶					MISOFT	marc	400	CLAYSTONE	1			LUW & SLICKENSIDE 181.9
				-									-	182.2, 183.2, 183.6, 184.
				+				+ - +				<u>  </u>		184.15, 184.4
	1			+		185.2					i	- 10	<b>k</b>	V.BROKEN 184.4-185.0
	10,0	10.D	1001	. 1	2	109.0	M. HARD			SANDSTONE	<u>V</u>	- VBI B		184,4-185.0
	1		1001		<u>.</u>			1000		3141231010		- 15		
	1			+	_			1+						
														CLAY SEAM 188.7
		~				190,0			,				1	Control and the second
191.0						ا٩ر٥	MISSFT	mari	40	CLAYSTONE	· · · · · · · · · · · · · · · · · · ·	B	Ľ	· · ·
		· ·					M.HALD	GM	64	SANDSTONE		B	L	
											1			¥
		. 2		_	_									
		0.0	1	_					-					
	<u>9.0</u>	1.0	1002	- 14	38			╞╌┼	-					
		1		+	_	160.1			_					
				+		198.1	M.SOFT	GRAL	1	Sin Ini or an	<u>/</u>			
2,00.0				+	-		NI SOFT	MALOC		SIANDY CLAYSTON		VBA Ba		SUCKENSIDES 198.45, 198.9,
				+			V		-+	BOTTOM JE BORIN	<u>k</u>			199.25, 199.35, 199.6, 199.8
									$\neg$	Dollour 2. Bowle	6. 6.00.0			
									-	· · · · · · · · · · · · · · · · · · ·				
									$\square$					
	<u> </u>		,	_					_					•
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\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

53

BORING NO. B-0505

N 539424.9688

E 1722518.6810 Grade El. 709.52

			GW					ELD T	st, RLBANT W		IG NO. <u>15-8506</u> ECT NO. <u>Co43384.43-0</u>
					HRS						
DATE	21	4	PR 2005		CLAS	SIFIED BY	1	A	SANGER	PAGE	of
									DESCRIPTION		
										1	
DEPTH (FT.)	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	5	COLOH	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	_	3	4	5	6		7	8	9	10
1.5	12	4	S-1 REC 0.6			LOUSE	BR	hwc	SANDY SILT SOME ORGANICS	ml	FILL
	4		5-2				RE	<u>5</u> .	:	ļ	
3,0	5, 35	-	Rec 0.9 5-3			M.DENSE	0	2000	SANNY SILT MOIST	m1	
4.5		e	Lec 1.5			M.DENSE	Re	- hwc	CLAND OF THE PLAN WILL C	mitcl	
6.0	83	2	5-4 AGC 1.5			11.02426	81	1 CALC	CLAMEN SILT /SILTY CLAY MAR.	M17C1	
0.0	45	7-1	5-5			M.DENS	ERE	لاسمة	CLAYEY SILT AND NOLK FRAGMENT		VADISE
7.5		a	Acc 0.2								
9.0		11	Rec. 0.6			N DENSE	1.50	Sylr)	CLATEN SILA AND LOLK FORGMENTS	1.1	WAST
12.5	7 12	5	S -7 REC 1.5						(DECOMPLED CLAYSTONE)		8
	16		8-8			<i>₹</i>	0		•••		
12.0	18	8	REC. 1.0	1.00		CENS	E	Sesuil	CLAVEY SILT AND ROCK FRAGMENTS	m.l	SUGUTUS Moise
13.5	8 11	8	5-9		1	A	040		(DELOM. ADSED CLAYSTONE)		
	22	-	5-10 Rec 1.2			DENSE	1	, <sup>1</sup> , 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	DECOMPOSED CLAYSTOPE	<u> </u>	<u>CCH</u>
15.0	1825	30	REC 1.2			V.DENLE	12	1-A-1	DECOMPOSED CLAYSTONE	ļ	<u>N.Con</u>
16.5		56	S-11 REC 115 5-12			U. DENSE	<u> </u>		DECOMPOICO CLAYITONE		DE
	12 50/5.			_		4,AM)					
18.0	50/5.	ĥ	NOL. 1.5		18,0 14121				DE CAMPOSED CLAYSTONE		Dry
	42 4.		120%	90		JOLL LO	AW	roon	CLAYSTONE	BL	LOW & FRANTURES
	-1-2 4.	-	100 10	-10		MUSSET					19.65, 20.05, 21.6
22.0		-					$\left  - \right $				
0.010	$\vdash \bigcirc$	-			-		$\left  - \right $				
							$\left  - \right $				
		$\neg$					$\left  \cdot \right $		: SANDY 24.7-25.4		BLIKEN ZUNE: 220-22.5
		$\neg$					S				YEAR EARCINE W/ SLICKEN
	9.6 10.	0	96%	86							SIDER 22,75-22.95
							-		: SANDY 27.4-29.4		LOW & FRACTORES
											24.6,
		-				V		!		+-V	45°% SLICKENSIDE 28.3. 28.

REMARKS .. DRILLED BY TERRA TESTING, ENC. WING & SIMCO 4000 T2 TRACK MOUNTED DRULL.

BARING ADVANCED USING 51/4" SOLID STEM AUGERS, 4"I.D. STEEL CASING, CONTINUOUS SPT. NQ-2 WIRELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

BORING NO. 3-0506

gaiconsultants

\*\* METHOD OF ADVANCING AND CLEANING BORING



BORING NO. B-0506

ELEVATIO	і <u>14</u> ОN _		<u> </u>	 WL	0 HRS	5 21	<u>د</u> 2،	romerc	ryan St	C. ALPSENS, WV	B P	orin Boje	GNO. <u>B-0506</u> СТНО. <u>Сочозку.4</u> .
					HRS	3							
DATE	22	-2	APR 200	-5	CLA	SSIFIE	DBY	F	JAN SANGER		F	PAGE	of
	Ι								DESCRIPTION		T	•	•
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY -	ROCK HARDNESS	COLOR	MATERIAL (	CLASSIFICATION		ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6	6	7		8		9	10
						SOFT	מוך	marood	CLAYSTONE	(UNT)		1	LOWY FRACTURES W/
32.0		<u>∧</u> .				M. 50	FT			2FALE WEATHERED	5		SLICKENSIDES: 32.65
	Ľ.	<u> </u>										$\overline{\mathbf{V}}$	33.0 33.25 33.75.
											P		34.05, 35.55, 36.65
										·	•		38.4
												1	45º FRACTURES "/
	9.9	10.0	992	58					: IRREGUL	AR CALLARGOW	F.		SLICKENSIDES: 36.9
										37.5-38.7			37.25-37.45.38.85-
					]					1	10	54	38.95
				Τ	7								
					7			10					
42.0		6			1						$\uparrow$		· · · · · · · · · · · · · · · · · · ·
					1						+	1 1	LOW & FRACTURES W
					1						+		SUCKENSIDES 42.4,
					1						+-		42.65 42.95,44,25
			_	1	1						+		45.25, 45.7, 45.9
	10.0	0.0	100%	76	1								47.75
					1								
					1						+-		3.7
					1						+-		150 4 FRACTURE: W
				1	51.0		/				+		FLICKEPSIDES = 48.6
52.0	/	$\sum$		1	51.7	M.St	T	GRAY	SANDY CLAYSTO	NE	+		
			·		1			MARUSH	CLAYSTONS		1.	F	48.8 49.0
				1	1		r					<u> </u>	LOWX FAACTURES W/
				1	54.9			GRAY:	SANDSTONE S	54.6-54.9	_		Surve 25.025:52.3,52.4
				1			-		SANGY CLAYSTON		B	÷+	
	10.0	10.0	100%	73	56.5	V	,		1015101	¥			53,5,54.2
	<u>``</u>			1	1	M-570	-	maam	CLAYSTONE				USERANDUERULA
	-			1	1		·			[	+		45" FRACTURES "/ SLICK.
		-+		+	1	<b>├───</b> ┟		¥					ENSIDES 53.55- 53.75

REMARKS \*\* \_

6

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING



0	دور SAMPLE NO., TYPE & SAMPLE NO., TYPE	-	HRS CLAS		-		SAJGER DESCRIPTION MATERIAL C			AGE	ст NO. <u>Сочозяч.42-с</u> <u>3</u> of <u>3</u>
BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	но	-		DESCRIPTION			•	<u> </u>
		м М		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS					S OR	KENNESS	
		м М		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS			MATERIAL C		S OR	KENNESS	
2	3	4	-		2	ruc lon			nsc	ROCK BROKENNESS	REMARKS*
- <u>k</u> ·		<u> </u>	5	6	7	7		8		9	10
- M - I		-	1.202.7	MUHARD	GR	<u> </u>	SHALY SILTST	one		<u>, L</u>	,
V			-								
					+	,			·		
			69.1		<u> </u>			• ·			
			]								VERTICAL FRACTURE
0.0 10.0	100%	76									64.7-65.7
											65° ELACTURE 65.9.66
							•				
			71.5			<u> </u>		V			
			72.7				SILTY SHALE	1	В	\$	LOW & FRACTURE 72.6
								V	Ro		
				MI JOPI	GRA	<u>n</u>	CCHITONE		1514	-15	3 Do FRACTURE W/SLICKEN
0.9 0.8	1002	78					: 13			$\left  - \right $	
											SIDE : 74.3
	3										8
			80.0	V	¥			/			
							BOTTOM OF B	SRIJG: 80.0'			
						_	· · · · · · · · · · · · · · · · · · ·				æ
								11			•
							······				· · · · · · · · · · · · · · · · · · ·
											· · · · · · · · · · · · · · · · · · ·
			*								
											•
			ľ			-+					· · · · · · · · · · · · · · · · · · ·
_	0.9 0.9	2.0 C   0.9 C.	2.0 7.0 1002 78	1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78       1002     78	M. HAAA M. HAAAA HAAA HAAA HAAAAAA HAAAAA HAAAA HAAAA HAAAAAAA HAAAAA HAAAAAAA HAAAAA HAAAAAAA HAAAAAAAA	100     100%     76       100     100%     76       100     100%     76       100     100%     76       100     100%     76       100     100%     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     78       100     100%       100     100%       100     100%	SI-11         M_ HΔAΔ         LT GRAY           M_ HΔAΔ         LT GRAY <t< td=""><td>No.         Image: Marked and State and Sta</td><td><math display="block"> \begin{array}{c ccccccccccccccccccccccccccccccccccc</math></td><td><math display="block"> \begin{array}{c ccccccccccccccccccccccccccccccccccc</math></td><td><math display="block"> \begin{array}{c ccccccccccccccccccccccccccccccccccc</math></td></t<>	No.         Image: Marked and State and Sta	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

## REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B.O.SOG

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N 539428.8146 E 1722523.7682 Grade El. 709.99



PROJECT       AREA 2/3       JONANE. ARM 35       JOWER ALANT       ST. ALEANT       BORING NO.       P. 0507         ELEVATION
DATE     24 APR 2005     HRS CLASSIFIED BY     DAN SANGER     PAGE     of       Image: Strain of the strain of strain
DESCRIPTION     SS       NUBLIC     BITOWS       SUBJOURS     SUBJOUS       MATERIAL CLASSIFICATION     SUBJUL       SUBJUL     SUBJUL </td
Image: Second state of the
1     2     3     4     5     6     7     8     9     10       AUGER W/A JLMPLING       TO 18 FT.       PIEZOMETOR INSTRUCT
AUGER W/D SLAPPLING       TO 18 FT.       PIEZOMETTE INSTRUCT
PIEZOTALITE INSTRUCED,
PIEZEMMENTED INSTRUCED.
18.0
BOTTOMOFBORING: 18'

REMARKS .. DRILLED BY TETARA TESTING USING A SIMIL YODO-TZ TANCK MONNTED DRILL

BOR HO REVANCED WITH STUD SOLD SOLD AUGERS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 30507

. .

N 541996.9754 979.22 Grade El. E 1723377.3436



PROJEC		EA 182	-2/3 J ± GW	VH C	) <del>( .</del> . A	.Mos Po 87,3	WER	PLA	NT ST.				GNO. B-0508 CTNO. CO40384.40-01
DATE			APR 200;		HRS		Y	IAL	SANGER				
	Τ						· · · · · ·		DESCRIPTION				
DEPTH (FT.)	BLOWS PER SIX INCHES		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	۲ ۲	PROFILE		AUCK HARUNESS	COLOR	. MATERIAL CLA	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	1.	2	3	4	5	6	-	7	8			9	10
-1.5 3,0	1 L 18 20 27	- 7   /5,4	5-1 AEC 1.0 S-2 REC 1.2			M. DENS. V. DENS			SILT AND DECON FRAGMENTS	mposed shale	2		SLIGHTLY MOIST
4.5	37 <sub>3</sub>	0 22 2/0.1	5-3 REC 1.3 5-1 REC 0.7	, ,	5.2	SOFT							
	67	5.7	1002	20		SOFT	RA	10	CLAY SHALE- WEATHERED		B	<u>e</u>	5.7, 6.25, 6.75, 6.9
10,9							tii						7.4 7.7 STAINED: 9.1, 9.6 RED STAINED-65" FRA-
					11.5	SOF.	T	<u>↓</u>	SILTY SHALE	V	12	K.	TMAE: 8.4-8.6 9.0, 10.4-10.7, 12.0-12.4
		<u>.</u>			13.7	5.57		H 7 LAN RH	SHALY SANDITON			1	LINK FRACTURE 12.9, 13.5
						30FT	-T	1	TO CLAY - WI	PRUM (ILT	<b>F</b> '		-BRIKEN 14.1-14.3 NEVETICAL CAACTURE 14.8-15.0
	9.7	10.0	97%	50	16.4			¥					LOWSF FEACTURES 15.6, 15.9
						SOFT			CLAY STONE		60	₹-8L	18.2, 18.45 17.0 17.3 18.2, 18.65, 20.6 VENTICAL FRACTURE 29.9.21.3
20.9													70° FAAC. "/ SLICKEPSIOFS AT 22.2-22.4
												¥	
	10.0	10.0	1008	64							B		
						V		V		/	ß	R	

REMARKS .. DRULED BY TERRA TESTIN INC. USINGA SIM CO 4000 -T2 TRACK MOUNTED ORICL

BORING ADVANCED USING 514 \$ SOLID FROM AUGENES CONTINUOUS SPT. MO-2 WILGLING CORING TODLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B.0508</u> (25)



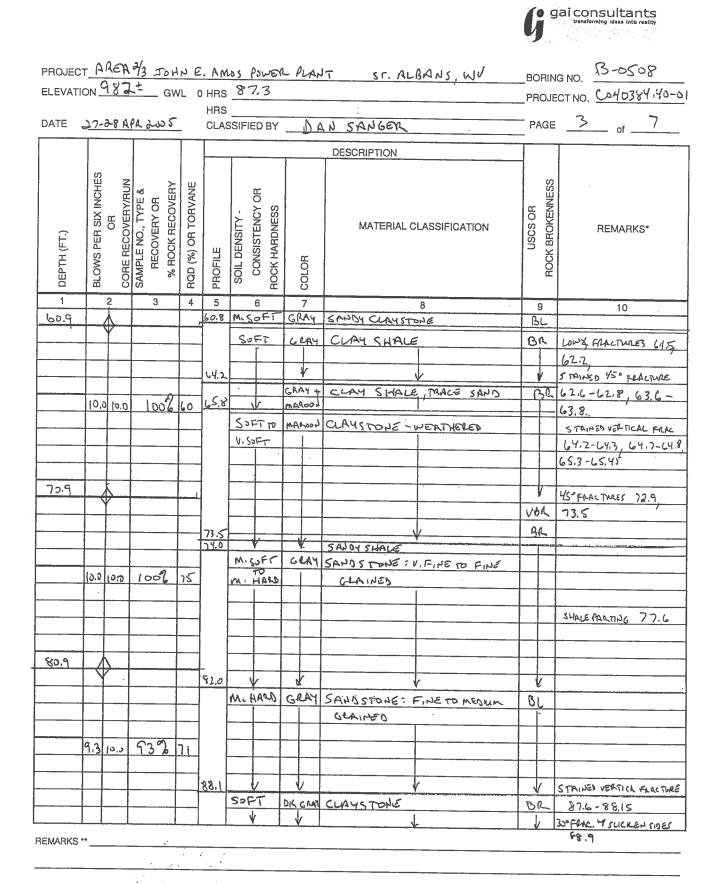
ELEVATIO	ом_9	182	± GV	VL (	0 HRS	87.3				PR		GNO. <u>B-0508</u> CTNO. <u>C040384.1</u> 3-
DATE	27-	281	1/R 2005	_	HRS CLAS			D	AN SANGER	P/	AGE	2_ of _7
				Т					DESCRIPTION			
DEPTH (FT.)	BLOWS PER	OH CORE RECOVERY/RUN		RQD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR POCK HARDNESS	· ] . · ·	_	MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	2	3	4	5	6		7	8		9	10
30.9	$\vdash$	<b>\$</b>		<u> </u>	-	SJFT	MAN	400,1	CUAUSTONE	NB	sn.	
					-					B	2	SLICKEISIDES 31.0, 31.15
	-				-							31.3, 31.5 32.4 33.
	<b> </b>		. 15 <sup>4</sup>		-							NEAN VERTICAL PARETURE
	<b>a</b> .				-					_		31.8732.1
	11.6	1:0.0	967.	165	-			1				70° FAAC "/ SLICKENSIDE
					-		GR	A4+				32.4-32.65
					38,5		MA	hoot	V		K	30° FRAC "/ SLICK. 34.
					-	MIS FT	01	vê-	SHALY SANDSTONE - V. FINE GRAINED	BA		LOW& FRACTICE 35, 8, 37,
					4		GM	Ay_				37.5 37.85
40.9	-				-							LOWY OR ANGE STAIN 50
	<b> </b>				-							FRACTURE 39.0
					-							NEAR VERTICALS MAINED
				1	_							FRACTURE 39,4-39.7
					1152							HIGH& FRACTURE 40.4
	10.0	12.0	100%	91	4 <u>5.3</u> 46.2	SUFT TO	BAN	141-	SARDY SHALE	50	1	SROKED 40.4-40.9
						M.SOFT	Gr	AY	SANDSTONE : FING TO MED.	BA	βL	LOW& FRACTURE 43.0
						M. HAR			CRAINED MICACEOUS		1	
										Bi		2) 2
52.9		$\mathbf{\mathbf{b}}$			51,2	V		r				
					51.9	M. SOFT	OLIV	ε	SANDY SHALE			
					]	MI SOFT P	opin	E-	SANDSTONE			
	·					M. HARD					8	8
					54.3 55.0	M. SSFT	OLIV		SAPOY SHALE		F	
	10.0	10.0	100%	87			MAN			R	R	BRUKEN ZONE 55.2-55.4
					1				1.			LOW & FRACTURE 56.6
					1	<u> </u>						57.75
				1	1		+					31.15
	<u> </u>			+	59.7		++			_		

REMARKS \*\* \_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0508</u> (25)



\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0508

(25)



ELEVATIO					HRS						CT NO. <u>CUY 03 84.40-0</u>
DATE	27-	28 A	PR 2005		CLAS	SIFIED BY		DAN SANGER	PA	GE	of
						ų.		DESCRIPTION		·	
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6	7	8	9	Э	10
99					-	SOFT	GRAY	CLAYSTONE (CON'T)	ß	R	45° SLICKENSIDED
					-		-				FRACTURES 92.0-92.1
					-						92.55-92.65
			 		-			· · · · · · · · · · · · · · · · · · ·			BRoken 92,9-93,2
	10.0	حور ا	100%	23	-		+ $+$				30° SLICESSIDED REACTILES
	10.0	100	100 10	-13/	96.4			V			AT 93.0, 93,25, 13.6,
					-	M-SOFT M. HARD	GRAY	SILTY FINE GRAINED SANDSTONE	BL		<u>93994,3</u>
				+	-	M. Har					45° ELACTURES 4 SLICKE
								· · · · ·			FINES 94.05 94.85
100.9				+		~	+				95.75
		$\sim$		+	101.1	S>FT	GAAY +	V.	Y		NEAR VERTICAL FRAC-
				+	118.2	MISSFT		CLAY STONE SILTSTONE	_		
				+	104.0	L.	GART	310131000	B		60° FRACTURE W/SUCKEN
				+	1	SOFF	MALOON	CI AUCONE	BA	_	5,0E 1016 -101.9, INTER
	10.3	10.0	100%	75	1052	MIHAND	moFTLE	CLAYSTONE SANDSTONE			SECTED BY 45° SLICKEN SIDE
		3			8.101	Pit Mrico	V	2124031046		,	VENTICAL FAACTULE (NO
				1	1	M. SOFT	GRAY	SILTSTONE	B		57AIHING) 105.4-106.8
					108.9		6			_	J. HIMMAS [05.4.106.6
						SOFT TO	MALOO	SILTY CLAYSTONE	[sa		30° 5-11-13
IDA	$\overline{\langle}$				1	M. SOFT	MOTTLED		B		<u> </u>
					112.3					-	28. 
					11, 11, 11	MI SOFT	GMM	SILTSTONE		_	SHALE PARTING 114.3
											11115 1414 (P 11115
					1.4.7		N/		++	_	
	10,0	10.0	1002	12	116.0	,	GRAY	SANDSTONE . FINE GRAINED			10 July 10 Jul
								SILTSTONE			
									11		
						1				,	

REMARKS \*\*\_

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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B-0508 (25) BORING NO.



PROJECT	ARE	n°	13 , JOH	12 5	T. AMO	s Power	PLANT	ST. ALBANS	WV	BORIN	GNO. <u>B-0508</u>
ELEVATIO	<u>Р_</u> ис	82	🛨 GV	VL C	) HRS	87.3				 PROJE	CTNO. CU40384,40-01
					HRS						
DATE	27-2	NP A	PR 2-001	5	CLAS	SSIFIED BY		DAN SANGE	NR.	PAGE	of
	1		·		1			DESCRIPTION		1	
										-	
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL C	LASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2		3	.4	5	6	7		8	9	10
120.9	$\downarrow \phi$			×	120.1	M. HARD	GRAY	SANDSTONE	800	BA	HEAVILY STAINED VENTICAL
	ľ				121.9				4		FRACTURE 120.2- 122.2
	╞╌╿			<b> </b>	123.4	M. SOFT	GRAY	SILTSTONE		BL	SHALE PARTING 1223
	┝─┤	_		<u> </u>	1	MILIAN	GAAY	SANDSTONE		BL	
	-				125.5			<u>*</u>			
	10.0	0.0	1006	85	-	MUSOFT	GAAY	ARGILLACEDUS	SILTSTONE	BL	
	-				-						
		_		<u> </u>	-						
	+						<u>     </u>				
	-			<u> </u>	4		- <b> </b>				
132.9	1 4	$\rightarrow$			4						
	<u>     ¥</u>	_		ļ	4						
	-				4			:132.8-133.4 MA	LOON CLAYSTONE		
	┝╌╿			<u> </u>	1			133.4- 134.0	SANDY		
				<u> </u>	1						
	10.0	10.0	100%	79	1						
				<u> </u>	137.4				k		
				<u> </u>	-	M, SOFTT MHARD	GRAY	SANDY SILT	STONE W/ THIN	BR	NERL VELTICAL HAAL
				<u> </u>	1	MHARD	·	INTERMITTERT			TURE (HOSTAINING)
				$\sim$	142.0		V	STRINGERS		L L	138,1-140.0
140.9					141.4	M.SOFT	GRAM	ARGILLACEOUS	SILISTONE	BR	SULCHENSIDES 141-2
	ĻΥ			<u> </u>	1 11-1	SOFT	GRAY - MAROOH YELLAN				LOW & SLICKENSIDES
	$\left  \right $						YELLOU				141.4, 142.0, 143.5
				<u> </u>	ं						30°SLICKENSIDES 142.3
				ļ	4		GRAY				142.5. 142.75, 144.9,
	10.0	10.0	1002	78	146.0				V		145.6
	┣┃			ļ	147.2	M. HARD	ERAY	SANDSTONEIN	ALLACEDUS		
				<u> </u>				INTERBEDDED :	SHALY SILTITONE		
						L		AND SILFY SHI			
1	L				150.0	Y			4	V	

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REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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PROJECT	AR	EA	2/3 50	2 Z Z	E.A	Mos	Pou	ver	- PI	ANT ST.	ALBANS WV	во	RIN	GNO. <u>B-0508</u>	
											PR	OJE	CTNO. 0040384.4.	12-01	
DATE	27-	28	APR 2005	-	HRS CLAS	SIFIED	BY		D	AN SANGER	R.	- PA	\GE	of	-
						DESCRIPTION									
ОЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY ROD (%) OR TORVANE			<u> </u>	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		COLOR		MATERIAL CLASSIFICATION		USCS OR ROCK BROKENNESS		REMARKS*		
1	2 3		3	4	5 150.0	6		7		B		9		10	
130,7	$\vdash \diamondsuit$					M. HARD		GRAY		SANDSTONE: FINE TO MEDIUM CARINED, MICREDUS		BL			
										GARINED MIC	l	-			-
			ά.t				-				3				
	10.0	l0.7	1002	100					· ·						
						- 2									
								<u> </u>	-						
												-			
160.9						-					· ·				
								-							
										ia -					-
															. 6
	10.0	10.0	100%	190								-			
											•				
		_								0		-			-
													$\square$		
172.9															
												·	Π	<u> </u>	
		173.0 V V		[	↓			V							
				M. SOFT GRAY		44	ARGILLACEOUS SILTSTONE		BR-BL PA		PARTING 173.4, 176-	25			
-											·		$\square$		
	10.0	19.0	100%	96	3			$\left  - \right $				-	$\left  - \right $		
					177,8		/		/		/				
				1		M. SOFT		LT GAAY		SHALY SANDSTONE: MICACEOUS		B		<u>-</u>	
		M. HARD					-	1							
													r		

REMARKS \*\* \_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0508



PROJECT	r <u>A</u>	REV 182	1 ª/3	J	DHI	NE.	AM	05 F	5 WE	n.	PLANT ST. ALBANS, WV			GNO. <u>B-2508</u> CTNO. <u>C240384.42-11</u>
						HRS				<u> </u>	JSANGER			of
		-0 1	1-20	<u> </u>										or
DЕРТН (FT.)	BLOWS PER SIX INCHES	OH CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	RQD (%) OR TORVANE	<u>a</u>	SOIL DENSITY -	ROCK HARDNESS	COLOR		DESCRIPTION MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	1	2	3	$\square$	4	5		6	7		8		9	10
<u>180.9</u>					1	184.3	- m. s	•ET	GRA	_	SILTSTONE			
						184.3	SOF	TP	GRI		SILTY CLAYSTONE	BR	-BL	
	C.Cl	().0	100	2	79	·	h. s	>FT	MORDI	40	: 50,004 187.3-188.8			45 SLICKEN SIDES 185.6- 185.75, 186.6-186.7 186.9-187.05
										_				30° SUICHENSIDES 1869
190,9											191.8-2005 MAEGULAL		V 5L	
									MARO		CALCAREOUS CLASTS AND STRINGERS THEOLOHOUT			
	[ <b>ð</b> .3	12.2	1002	-	76				GRA			+-		······································
								•					Y a	
200.9								/		/			$\checkmark$	
											BOTTOM OF BOL INL: 200.9'			

REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0508</u> (25) N 541748.6664 E 1724111.6219 Grade El. 824.40



PROJECT	AREA	3/3 50	ЧЦ	E. A	Mos Pow	er pu	ANT ST. ALBRIDS, WV	BORIN	GNO. <u>B-0509</u>
ELEVATIO	DN 82	<u> </u>	/L 0	HRS	53.4			PROJE	CTNO. 0040384.40-01
DATE 28	APR-02M	AY 2005	Z :	HRS CLAS	SIFIED BY	<u>(19, E fie</u> <u>D</u> A	n Last Line 1		of
							DESCRIPTION		·
								1	
DЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
1.5	12	5-1 REC 1.0		1		TAJ	SILTY CLAY MOIST	CI	. 7 0.75 TSF
	3	5-2		1					
3.0	4	AEL 112			STIFF	<u> </u>	V	V	¥ 1.5TSF
4.5	4810	5-3 REC 1.5		4	M. DENSE	<u> </u>	CLAYEY SILF: DECOMPSED	ml	·Day
		REC 1.5 3-4	-	1	¥	TAN+	CLAYSTONE	<u> </u>	
·6.0	9	REC 1.5		-	DENSE				DRY
7.5	67	5-5 REL 1.5 5-6			M. DENSE				Day
	12 15 15 16	5-6	-		VIL-CE			¥.	0
9.0	57	REC 1.4 5-7			V.STIFF V.STIFF		SILTY CLAY > DECOMPOSED	CI	SLICHTLY MOIST + 3.515F
10.5	10	REC. 115			v. sili-i-		. CCAYROFE		
12.0	11,5	5-8 REL 1.5			V. STIFF		· · · · · · · · · · · · · · · · · · ·		ч " ¥ 4.0 тъF
	97	5-9	$\vdash$	1	V.STIFF				- 7.0 TSF
13.5	10	AEC 1.5		1					A 7.0 1 3P
15.0	10	REC 1.5		1	VI STIFF		V : THALE AOLK FRAGMENT	·V	** ** 3.25 TSF
	491	5-11			MDENSE	5	CLAYEY SILT : DECONTOSED CLAY STONE	ml	L. 111
16.5	- <u>9</u>	122 1.5 S-12						N/	
18,0	812	AEC 1.5			STIFF		SILTY CLAY -DECOMPOSED CLAYSTONE	2	MOIST × 1.STSF
19.5	356	5-13		]	STIFF	- T		1	MOIST 41.75 TSF
17.2	4	5-14		1	¥.				
21.0	119	Mac 1.5			N-STIFF				MOIST \$ 2.25TSF
22.5	57	5-15 AZC 1.5			STIFF				MOIST # 2.0TSF
	6	5-10			V				
24.0	10	AEC 15			STIFF	N I	¥		MOIST X I.STSF
26.5	0.0, r. 7 14	5-17			MIDENSE	GLAY CAEEN-	DECOMPOSED SANDSTONE		
25.5	50/0.4	14EC 1.5 6-18 REC 89		25.9 11=11=7	V.DENSE	GREEN- GRAY		*	TOP OF ROLK: 25.9
	<b>Y</b>				SOFT	BROWN	SANDSTONE - HIGHLY TO COMPLETELY	VBR	·
	4.1 ( . 1	18%				- -	WEATHERE D		
	1.1 6,1	10%	0						
L			1	L	*	V	√		I

REMARKS .. DRILLED BY TERMA TESTING INC. USING A SIMCO 4000 TZ TRACK MOUNTED OLIL

BORING ADVANCED USING 514 SOLD STEM AUGERS, 4" I.D. STEEL CASING, NO-2 WIRELINE WRING TOOLS.

\* POCKET PENETROMETER READINGS

BORING NO. B-0509



ELEVATI	ON	32	<u>s + </u>	a VV L	0 HI	RS	33	1 1	50	Po	WERL	JLAYT	ST. ALB	ANS WI	/ <sub>ВС</sub> _ РР		IG NO. <u>B-0509</u> ECT NO. <u>C040384.4</u> 3
DATE 🔔	8-AP	1-02	MAY 2	w	CI CI	RS _AS		BY			· • • •	N SAN	10.50		- P/	AGF	of
													I DE K				
							<b></b>		1.		DESC	RIPTION			-		
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY ROD (%) OR TORVANE			SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS		COLOR		MATERIAL C	LASSIFICATIC	ЭN	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3	4	5	5	6			7			8			9	10
32.0						.				╞			1				
52.0	$\vdash 4$	$\rightarrow$			<u>, 32</u>	h	YOF.			-	CLAN	C-0.16	4		ļ_ ,	/	
				+	-	ŀ	1		[[[]]]	1000	CLAY	STONE			Br		
					-	ŀ			-	$\vdash$			•				
						Ī										$\vdash$	B
	7.1	(g))	71	44													
																	2
					_		V_			V	L						
				+	-	┝	M. Sol	F۲.	GRE	EN- QAY		. <u>'</u> 1R	AEGULIAR CA	LCAREJUS			
42.0					-	┝	-+			<u> </u>	L	5.0	175 1040 171	nh mi chi			5
90.0				+	-	+		-				( **	0 43()				
					1				_								LOW & FILLE MARLING
				+	1	┢											RUICEBANNES MELAN
				1	1		- †					·					44.4,44.55,46.2
	98	0.0	987.	70												-	46.45 46.95 117.4
																	(110
		_			- 49,-	$\downarrow$				,		1	)				2 - 2
	-+	_			50,4		M HAL	0	LTY	0.65	SAPD	TONG	233	en	1. 20		
52.0							W: SSP	5	G A G	EF-	CLAY	STUNE					
5 2.0	-{}	┝━┼	··		-	┢		-+	۵۳L	-7					N	1	¥.
		-+		+	53,9	$\downarrow$		-+							BR		•
	-+				1.5	1		_			<u> </u>	<u> </u>	Y				an al provinsional and
		-+		1	1	1	<u>n sif</u>	÷ľ		E H-			Y CLAY 170		BR-1		LOW & FARCTURES
	0.0 1	5,0	100).	85	1	F		+	-		C.L.F.		MARDIN CLAN	4.50 Calif	_		549,555,57.2,59.7
					1	L							6.7 TO 57.3				59.0,60.0
				<u> </u>							]					$\uparrow$	
					L		V		_						7		······

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

•

BORING NO. <u>B-0509</u>

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ELEVATI					2	1000	5 1	1								P	ROJI	ECT NO.	<u>C0403</u>	84.40
DATE 🚽	18 AP	2-0	2MAY	20	ي ج	CLA	SSIFIE	DBY			. 0/	シレ	SAN	JC	ER	. F	PAGE	3	of	
	1		<b></b>	_			<u>.</u>				DES							1.		
									1.			2111-1		_						
ДЕРТН (FT.)	BLOWS PER SIX INCHES	OR RECOVERVIELIN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY -	COCK HARDNESS		COLOR	9.1	MAT	ERIAL C	CLA	SSIFICATION	LISCS OR	ROCK BROKENNESS		REMARK	S*
1		2	3		4	5		6		7				8			9	<u> </u>	10	_
1 -						1		<u> </u>			CLAY	STO	JE (C0	N'	т)			LOW	4 FARIE	uitë s
62.0		\$.		-4										1			T		2.6 62-8.	
		ſ	<u> </u>						<u> </u>	<u> </u>	ļ			$\downarrow$				63.7 1	41,642	64.5
			<u> </u>						┣─	<u> </u>								64.9.1	15.2	
									<u> </u>											
	10.0	<u> </u>	:00	0	67	66.5	<u> '</u>	<u> </u>		¥				Y			<u>v</u>	17		
	10.0		100	10	-1		mis	770	GR	iny I	1797	al Bo	0000	5	ILTERONE AN	5 6				
				-+							1.12	155	101				1			
				-+						<u> </u>				_		_				
				-+	_							·		_						
120														$\downarrow$	·····		<u> </u>			20.
1220		2		+										_						
				-+-										4						000
				-+					_					_						
					-									$\downarrow$						
	10.2	10.2	100%	+	iz	76.6				<u></u>										
	101.0	19.01	100 6	+	14		1							¥			¥	2.2		
				+			M. HA	IRD	GR	AY	SAN	NO S	TONE	<u>-</u>		BI	_			
	_				-				-					+	34	0				10 13
										_				$\downarrow$		_				
82.0						81.2	¥		<u></u>					*	· · · · · · · · · · · · · · · · · · ·		r			
<u>.</u>		$\succ$		+	$\neg$		N.SOF	<u>1</u>	UK (1	141	SILP	1.0	52704	1_5	HALE	B			LICTURS	
				+		3.6										_		81.45 8	27, 83.	1 83.6
				+		ŀ	5255		GRA	7	CLAY	170	NE						FRACTU	
	_			+	-										0			83.9,84	1.1,84.2,	84.7,
	102		أتحرا	+.	77	ŀ						<u> </u>						85.1, 8.		·
	100	107	1001	-	-4	ŀ								_					Ac W/SLIC	icen 1145]
						╞			+	-			SE COME	5	SILTER 0875	_	$\square$	870-	87,2	
						ŀ		-+	V											

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0509

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gai consultants transforming ideas into reality

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ELEVATIO	DN 8	25	<u>+</u> G	WL		AMOS 53.4 16.0 SSIFIED BY		PLANT	PROJE	GNO. <u>Видъъ</u> стно. <u>Сачазку чъ</u>
	Γ							DESCRIPTION		
ОЕРТН (FT.)	BLOWS PER		SA	ROD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	1	2	3	4	5	6	7	8	9	10
<b>C</b> 2 <b>D</b>					91.0	<u> </u>	k.			
<u> </u>	$\leftarrow$				- <u>936</u>			SAUGTONE	BR	200000
	6,8	89	1002	62	98.9					30° FAACTURES 95.1 95.6,96.4,97.3 28.4,98.6 60° 56102603185 98.0-
120.2				-	10.0	Bh ila a A	CAMU	SILTY SHALE/SILTSTOPE	BL	58.2
			<u>8</u>		-			BOTTOM OF BOLING 100.0		· · · · · · · · · · · · · · · · · · ·
								- 21	jenst	
1921										
								5. 	1	
×		14								
					-					

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>3-0509</u> (ר)

N 540879 E 172279	95.65	04 (	Grade			5.74				ľ		ai consultants trasferming, ideas, inta-reality
	LEP	2/3 5	NI G	6. A	Mos	Pur	uar P	ANT ST. ALBANS W	//			
		01	4 V L.		0	, ,				_PR	OJE	ECT NO. CO40324.40 -
DATE <u>23~</u>	oym	AY 2000	5			BY		AN SANGER		- P/	٩GE	1 of
						_		DESCRIPTION			_	
DEPTH (FT.) BLOWS PER			ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	8	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6		7	8			9	10
1.5		S-1 Rec. 1.2	<u> </u>	4	4.6	3100	TAN	SANDY SILT		m	1	MOIST
2,	1	5-2		1			TAN					
		REC 1.3	+	4	M.DE.		GLA	CLAYEY SILT		M	1	SUGHTLY MOIST
4.5	7,0	5-3 Aec 1,2 5-4		-	U.ST	)[-+		SILTY CLAY	5	C		Dry
6.0 1		5-4 Rec. 1.3		]								
13,	2	S-5	+	1	U.ST		GRAY GRAY			<u> </u>		Den
7,5	2	Rec. 5-6 Rec. D.9		1			MAROON	SILTY CLAY: DECOMPOSED CLAYS	TONE			DRy
8,4 53	0.4	165 D.9		8.4	HAN	~	TELLOW	DECOMPOSED CLASSIENZ				TOP OF ADCK 8.4
23	2.3	1002	30	112121	<u>  Sof</u> 	7	O LIVE	IPTORBEDDED CLAY SHALE A		131	2	
10.7			1	1			1	WEATHERED	(			HEAVILY STAINED HIGH
			1	1	┝━┾			I I I I I I I I I I I I I I I I I I I				4 FRACTURE 9.4, 9.7
			1-	1	$\vdash$							LOWASTAINGO FANCTURES
		12		14.0								9.8 10.4, 10.7, 11.3, 12.6, 12.75
					M.SOF	-	BAOWN	SANDSTONE: WEATHERET		1	-	13.9,
10.0	10.0	100%	58	1	N. LTI					BA-	BL	
					ſ		1	~ 15.25, MICACEOUS, FINE MEDIUM GRAINED				CO2
		400						I I I I I I I I I I I I I I I I I I I			- 1	STAINED LOW & FRANCHAREN
											-	17.0, 17.3, 18.0
										-+		
20.7				<u>]</u> ]			V			- 4		
				22.0	SOFT	-	GAAY	CHAYSTONE		VB	e	
14					M.SOF	5	GLAY	SILTSTONE / SILTA SHAVE		BR		STAINED HIGH ¥
				23.9	¥		V			- ( 1	- +	FLACINAE (60.70°)
					SFT	·	T. GRAY	CLAYSTOPE		VBR		12.8-23.0
6,9	10,0	100 %	45				OK GRAY			Ba		SEAR VERTICAL PARTIALLY
						2	maria	0		Ť	+	STAINED FRACMLE 233-23.5
							_			-+	$\neg$	
											-	
					V			V		Ţ	, †	

REMARKS "DAILLED BY TERAA TESTING, INC. USING A SIMCO HODD-T2 TRACK MOUNTED DAIL

BORING ADVANCED WING 54" SOLID STEM AUGERS, 4"I.A. STEEL CASING, NO-2 WIRELINE CORNES TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0510 (26)



			2/3 304					PLA	NT				
ELEVAIN			GV	VL (		6					P	ROJE	ECT NO. <u>CO40384.41-0</u>
DATE	03-	04	NAY200	<u>×</u>	CLAS	SSIFIE	DBY			DAJSANGER	F	PAGE	of
										DESCRIPTION			· ·
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY -	ROCK HARDNESS	•	COLOR	MATERIAL CLASSIFICATION	LISCS OR	ROCK BROKENNESS	REMARKS*
1	<u> </u>	2	3	4	5		6		7	8		9	10
30.7		₽		+		305	T			CLAYSTORE (WHY) HIGHLY	80	LBL	
		· ·			1		<u> </u>	<u> </u>		WERTHERED		1	
								<u> </u>			4		
	┼──						<u> </u>						
	9.5		9500		35.0		<u> </u>	GAE	ENIEN	V	·	V_	
·	1.2	10.0	7.5-10	60				G	NAY	INTERBEDAED SILTY CLAYING		1-01	
	-					M. HE	1. 1.12			WITH CALCAREOUS CLASTS AN	<u>}</u>		60° FRACTURE 36.2-36.65
	-	-								SANNY SILTSTONE	-		
								F,	//			<u>V</u>	
40.7									4001	•		<u>BR</u>	
								-			_		
								GRA				<u>ي</u> ۱	
												-	<u> </u>
	0.0	10.0	100 %	91					,	· · · · · · · · · · · · · · · · · · ·			
								MAR	460		-		LOW & FRACTURE 45.8
								GLA	10				46.0, 48.0, 52.5, 52.6
												$\square$	53,5,55,1,55,5,57,85
50.7	$ \rightarrow $				.			$\neg$		2	1.		· · · · · · · · · · · · · · · · · · ·
											BI	-	·
											+	i l	
											-	$\vdash$	
													SLIGHTLY
	0,0	0.0	100%	76	[						+-		STRINED VETLALAL
													FRACTURE 55.75-54.1
											-		
								V		V			

REMARKS \*\* \_\_\_\_

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B-2510 (24)



ELEVATI	ON	74		WL.	0 HR	is <u>56.</u>	0		JT ST, ALBONS, WV	PROJ	ECT NO. 2040384.40-
DATE	03-1	24 M	AY 2005		HR CL	ASSIFIED	BY	Dr	in sanger		= <u>3</u> of <u>9</u>
	1			T					DESCRIPTION		
→ DEPTH (FT.)	-	OR CORE RECOVERY/RUN	_	% HOUCK HECOVERY ROD (%) OR TORVANE			ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR BOCK BROKENNESS	REMARKS*
60.7		2, K	3	4	5			7	8	9	10
	1	Y		+-	7	M-SOFT		MAROON	INTERCOED CLAN IT ONE AND	BR-81	LOW & FRACTURES
					-			61447	SILTSTONE (CON'T)		61.1, 616, 62.0, 63.2 63.5, 63.75, 63.9 64.65, 65.0
	10.0	10.0	100 %	97							
			29		-						
73.7											
					-				ידר ביצע אר אור אור איז	0	
	10,0	10.0	100%	9(	2						
80.7	-4	2						1		BR	
											30" 51.0000 81.8 82 81.3,81.5, 81.8 82 82.7,82.9, 83.8,84.
	(0.5	6.0	190%	60	87.6						
			3			M. HARD	6	RAY	SANDSTONE FINE TO MEDIUM	BL	
	<u> </u>			5					GLANDED, MILACEDUS	4	

REMARKS \*\*\_

\* POCKET PENETROMETER READINGS

BORING NO.  $\frac{\beta - 0510}{(26)}$ 



ELEVATION									er f	'LA	NT ST	T. ALBANS, WU		IGNO. B-0510
DATE     D3-ref (mA1 30-5)     CLASSIFIED BY     DAX     SAN GER     PAGE     Y of       Image: Stand Processor     Image: Stand Procesor	ELEVATIC	DN		GWL				2						
State         NATERIAL CLASSIFICATION         Solution           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         1         1         1         1         1         1         1         1         1         1         1         1	DATE C	3-04 n	VAN 900	5		CLAS	SIFIED E	3Y _	D	A	N SANGER		PAGE	of
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$											DESCRIPTION			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			-	% ROCK RECOVERY		а.	ŵ	ROCK HARDNESS			MATERIAL CL	ASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		2	3		4	5		-				•	_	10
$[200,7] \land [100,7] \land [100$		$\models \mathbf{P}$		=+			M.HA	140	1	47	JANDIJONE	(ພ <sup>μ</sup> <sup>-</sup> Γ)	- IZL	· · · · · · · · · · · · · · · · · · ·
III.0         III.0         III.0         III.0         III.0           M.SEFT         GRAY         INTERBEDDED SANDSTONE AND BA- LOWE FRACTORE 112.4         BA- LOWE FRACTORE 112.4           M.MARD         SILTSTONE, SOME THIN SHALE         BL         114.4, 114.55         114.7, 119.1           IONO 10.0         IOOD         91         IIII.0         IIII.0         IIII.0	[P00]													
III.0         III.0         III.0         III.0         III.0           M.SEFT         GRAY         INTERBEDDED SANDSTONE AND BA- LOWE FRACTORE 112.4         BA- LOWE FRACTORE 112.4           M.MARD         SILTSTONE, SOME THIN SHALE         BL         114.4, 114.55         114.7, 119.1           IONO 10.0         IOOD         91         IIII.0         IIII.0         IIII.0			_										~	
III.0         III.0         III.0         III.0         III.0           M.SEFT         GRAY         INTERBEDDED SANDSTONE AND BA- LOWE FRACTORE 112.4         BA- LOWE FRACTORE 112.4           M.MARD         SILTSTONE, SOME THIN SHALE         BL         114.4, 114.55         114.7, 119.1           IONO 10.0         IOOD         91         IIII.0         IIII.0         IIII.0				-				$\neg$						
M-SOFT GRAY INTERBEDGED SAMDSTONE AND BR- LOWE FORCTORE 112.4 M-SOFT GRAY INTERBEDGED SAMDSTONE AND BR- LOWE FORCTORE 112.4 M-HARD SILTSTONE, SOME THIN SHALE BL 114.4, 114.55 114.7, 119.1 10.0 10.0 100% 91	110.7													
Image: Margin and Margin an		¥				112.0	V		V			$\downarrow$		
Muñas         SILTSTONE, Some THIN SHALE         BL         114.4, 114.55         114.7, 119.1           10.0         10.0%         91         1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>M-Soft</td> <td>-</td> <td>GRA</td> <td>14</td> <td>INTERBEDDED SO</td> <td>CHA SHOTLON</td> <td>BR-</td> <td></td>							M-Soft	-	GRA	14	INTERBEDDED SO	CHA SHOTLON	BR-	
					5		MHAR	2	-		SILTSTOPE, Son	E THIN SHALE	BL	114.4, 114.55 114.7, 119.1
					0,			-	_		UNITS	1		
		10.0 10.	<u>• 100'</u>	6	11			$\rightarrow$	+				_ _ _	
		$\left  - \right $		+				-+	+					
								-+	+			1		
							V		V				V	

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0510 (24)



PROJEC	т <u>. 14</u> /	lea	2/3	ANGE	6.A	MOS	Powe	21L	PLA	NT ST. ALBANS, WI	V	_во	RIN	GNO. B-0510
ELEVATI	ON _		GV	VL (	) HRS	30	0.0							CTNO. CO40384.40-0
DATE	03-0	DY M	2006 121	-	HRS CLAS		D BY		DA	IN SANGER				<u> </u>
										DESCRIPTION		Γ	_	
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ğ	PROFILE	ō	CONSISTENCY OR ROCK HARDNESS	<u> </u>	COLOR	MATERIAL CLASSIFICATION	N	USCS OR	ROCK BROKENNESS	REMARKS*
120.7		2 h	3	4	5		6		7	8			9	10
					121,5		T 70	GRI	A4 + R004	CLAYSTONE		BA VB		LOW& FRACTURES "/ SLICKENSIDES 122.35
			1.00		4	<u> </u>	<u> </u>			CLASTS+STAINGERS:1	122,6-			122.8, 123.35 124.2
	10.0	10.8	100%	47		<u> </u>				124.0, 135.0- 138	งก			124.7, 124.9, 125.4, 126.1, 127.65, 128.3, 129.1,
														130.1, 130, 45, 130,7 131.5, 131.5, 132.6, 134.5
122.0										- 78				135.2
130.7	$ \models $													HIGH & SLICKENSIDE 133.25-133.6
												_		
	10.0	10,0	100%	60						3				
140.7		5			<u>1421</u>								,	
						Misa	FT	GREE	N-	SILTY CLAYSTONE : INTERN	ALTOS			MOST PIECES 0.2-
								MANYELL	ow,	IMEGULAR CALCAREOUS CLAS			· `	o Long
										AND STRINGERS				
	10.0	12.0	100%	73										
							/		,				_	··

REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0510</u> (24)

					HRS	125 Powe 36-0					IG NO. <u>B-0510</u> ECT NO. <u>Со40384,40</u>
ATE	03-	۰ ۱	AY 2-005	-		SIFIED BY	DA	N SANGER		PAGE	6_ of 9
				-	<u> </u>			DESCRIPTION			
						T	Τ	DESCRIPTION	2		
DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK.RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL C	LASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6	7		8	9	10
152.7	$\neq$							SILTY CLAYST	DHE (CON'T)		
	+		· .		162 2						
					153.2	the second se	LT GANY	SANDSTONE : F	INE TO MEDIUM	BL	
								GLAINED, MEAC			
	19.0	10,0	100%	84			<u> _ </u> _				I PIELE OF CORE: 7.6
				-							
	+										
160.7	╞═┥							3			
					13						1 PIECE OF CONS 6.
						<b>3</b> 0					
्	10.0	10.0	100%	100					•		
									· · · · · · · · · · · · · · · · · · ·		
									· · · · · · · · · · · · · · · · · · ·		
_											
10 J	⊨	$\geq$									
	+		4								
	+										
					175.1	V	V		/	V	
	10.0	10.0	100%	53		SOFT TO	CAAY + MAADON	CLAYSTONE		VBK	MOST PIECES 0.2'
		<b></b>				M-SOFT	INANDR				~30°SLICKENSIDES
	- 10-										176.0, 176.35, 171.55, 177.
			· · · · · · · · · · · · · · · · · · ·						/		178,1, 178.45, 178.65, 179 60° SLICKENSIDES 17

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0510</u> (26)

gai consultants vansforming ideas into reality



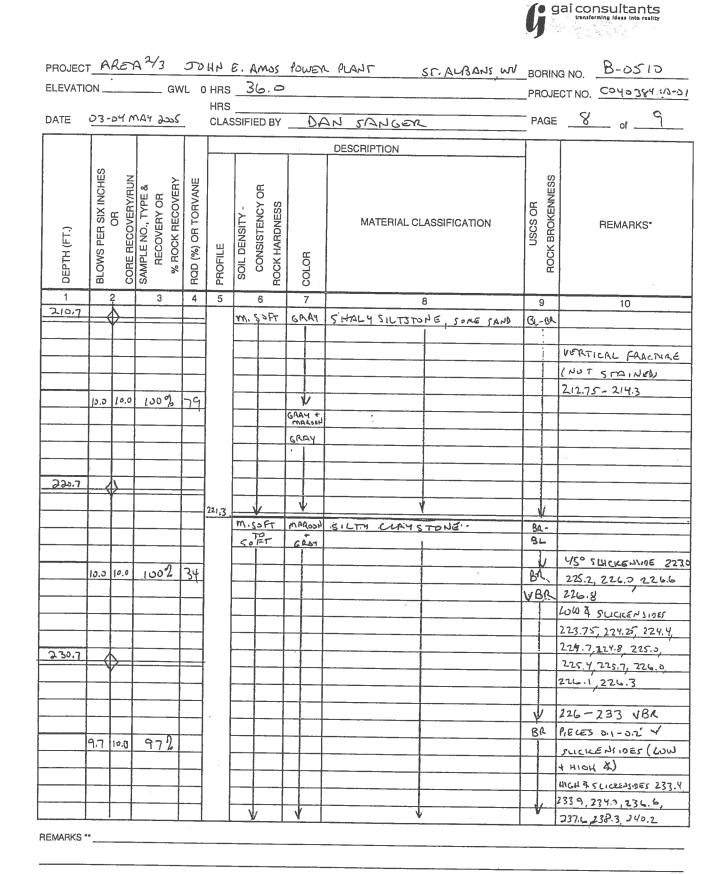
ELEVATIO	_ NC		0	WL	0 HRS	56.	0		PLANT ST. ALBANS, WV	PF	ROJE	CT NO. CO 40384.40
DATE	07-		MIGY 2.3	5	HRS			N	AN SANGER	P		7_ of 9
			1				- S-	0	AT STANGER			to
					-		-r		DESCRIPTION			
DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% HUCK HECOVEHY ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6		7	8		9	10
10011	╞═╡	≻		+	= 181.5				CLAYSTONE (CON'T)			
	-				-	M.JOF	Ť i	GRAY	SAN NY SILTSTONE	BA	BL	
	1				-							
					-		-+	-			-	
	10.0	100	1000)	, 84	185.8			V	L	<u> </u>		
						SOFT TO	> (	ACUDA	CLAYSTORE	G	A	LOW & SULCHENSIDES
						M-SOF1						187.3, 187.6, 187.8,
				_								189.0
10.0	-				190.2			<u> </u>	<u> </u>		1	
192.7	$\models$	$\rightarrow$		+	+	M. HA	5	T GAN	SILTY SANDSTONE	B	6	an reach an anna an anna an a' a' anna anna an anna a' a' tara
		[		-	-		$\rightarrow$					
										_		
			· · ·		194.0		- 6		¥		_	
	10.0	100	1009	4		MLSOFT		10 ALOON	INTERAGODED SANDY CLAYSTONE	BR		LOW & SLICKENSIDES 194.1
	10.0	10,0	1000		4		-+-		AND SILTSTONE	- 1		196.1. 196.75, 197.15,
				+	-							197.5, 197.85, 198.2,
					-1198,2_	MSOFT	6	RAY +	ENTERBEDDED SILTSTONE AND	BA	Q /	
					]	M. HAN					13=	
200.7		<u>}</u>								-		
					203.0			L			1	
					4	SOFT TO	m	hoop	SILTY CLAYSTONE	ß	R	LOUIA SLICILENSIDES
			0	-	-	N. SOFT	_					204.25,205.0,205.25
	0.0	10,0	1002	70	4					_ _		205.8, 206.7, 206.85
				+	-		+					207.25, 207,7 207.85
					-					-   -		
					12-01-1		-				_	

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\* POCKET PENETROMETER READINGS

BORING NO. B-0510 (26



\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0510 (26)



PROJEC	T_AA	Ler	2/3	:	301	17 6	E. AMO	s Adw	ER PLANT ST. ALBANS, WW		GNO. B-0510
ELEVATI	ON			GW	L O	HRS	36.2	<b>`</b>	·	_PROJE	CTNO. COY0384.40
	07		AL 1.	_		HRS					
DATE	0 5-	DYN	NAY 20	20 J		CLAS	SIFIED BY	<u> </u>	JAN SANGER	PAGE	9 of
									DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES	_	\$	% ROCK RECOVERY	RQD (%) OR TORVANE	ш.	SOIL DENSITY - CONSISTENCY OR POCK HADDALESS		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	2	3		4	5	6	7	8	9	10
	$+ \leq$	$\vdash$		=		t i	M.S.FT SOFT	+ GRAY	CLAYSTONE	VBA	
				_			SOFT	PURPLE			SULCHENSIDES
	+							+ +-		V.	
	$\left  - \right $									ISR.	30° SLICLEDSIDES
	0.5	10.3	100	2	56			+			APPROX EVER 3 4-0.5'
	1-10	10.5		~	ور						
										UBA	
						248.3	M.SOFT	4000Am -	INTERBEDDED SAMDY CLAYSTONE		
								GROY	APD SILTSTOPE	1.32-00	
250.7							×	- K	V	V	
									BOTTOM OF BORING: 250.7		
				_							
				_			· · · ·				
				_							
	+			-					· · · · · · · · · · · · · · · · · · ·		
								· · ·			
	+										
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	1										
	1									1	
REMARKS				_					2	1	

REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0510</u> (26)

N 541746.9425 E 1724116.3536 Grade El. 824.57 gal consultants traitamini less interesting

PROJECT	ARE	A <sup>2</sup> /3 :	JO H	INE	. Amos	Powe	R PLANT ST-ALBANS, WV		GNO. <u>B-0511</u>
ELEVATIO	DN NC	GW	/L C	HRS				PROJE	CTNO. <u>CDY0384.40-01</u>
DATE	03-04	MAY 2005		HRS CLAS	SIFIED BY	DA			of
9		1		1	·		DESCRIPTION		
								1	
DEPTH (FT.)		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	Ĕ		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	LOLOR .	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
				-			AUGER 46 SAMPLING		
							TO 26 FT PIEZOMETER INSTRUCED		
				1			MEEDMEIEN INSTRULED		
				1			TIP AT 25.5 FT		
				1					
				]					
									3
									÷.
								· ·	
									5 ·
			_						•
				26.0			V		· · · · · · · · · · · · · · · · · · ·
							BOTTON OF BORING: 26'		3
							- · _ • _ • _ • _ • _ • _ • _ • _ • _ • _		
			]						

REMARKS .. DRILLED BY TERRATESTING, ENC USING A SIMED 4000-T2 TRACK MOUNTERS MAIL

BONING ALVANCE D WEING SUL SOLID FOR ANGEND

\* POCKET PENETROMETER READINGS

B-0511 (8) BORING NO.

	101.763	6 Gr			784.29				9.0	Jai consultants transforming, lotes into reality
	<u>Γ ARE</u> NN 79	<u>A 73</u> 5±	<u> </u>	0 HN	E. AMOS S_216	POWER	R PLANT	ST. ALBANS, WV	, _BORIN	IG NO. B-05/2
				LIDO	-					ECT NO. 2040384.40-0
DATE	24-05	MAY 25	5	CLA	SSIFIED BY	· _ D	AN SANGER		PAGE	of
-			T			10	DESCRIPTION			
ОЕРТН (FT.)		50	ROD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		MATERIAL (	CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7		8	9	10
1.5				-	U. WOSE	15 ROWN	SILT, TRACE	ORGAPICS	ml	moise
3.0	2 2 2	S-2 REC 1.0			STIFF	Banal	5.010.00			
	23	5-3		+	LOOSE	BRANJ	SILM CLAY	SOME ROCK FLACMENTS	<u>c</u>	MOIST # 1.5 TJF
4.5	5	REC 1.7		1			Sparst SILL	JUTTLE MOOR FRACMENTS	m	SLIGHTLY MOIST
6.0	59	REC: 1.2		]	STIRF	GNAY +	SILTY CLAY, TR	ALE ROCK FRAGMENTS	cl	SLIGHTLY MOIST & 115T3
7.5	31	5-5 REL 0.8		· ·	M STIFF	Brown			cl	WET * 1.0TJF
	9	51	+	8.0		MARORN				
9.0	32	REC 1.5		$\left\{ \right.$	VIDENSE	MARDON + GRAY		AND SANDY SILT:	ym	DRY
10.5	43 32 32 32 36 13	S-7 Rac 1.5	-	1			DE COMPOSED	CLAYSTONE	gm	DRy.
/12.0	13		·	12.0		1			gm	DRY
12.0	50/0.0	S-9 Reco.		1=1=1):	MISOFT	GREEN- GRAY,	SILTY CLAYS		BR	TOP OF ROCK 12.0'
				1		MALODAJ	CLAT.	1	01	
					· ·	MOTTLES				
			<u> </u>						VBR	
				-					BR	
	10'0 10'0	100%	40	-2						
						$\left  - \right  $				
						┝┝┤			-	
22.0						+ + -			_ _	
				22.65				V		
					M. HARD	LT 61-104	SILTY SANOSTON	1	BL	
						[				
	0.0 100	1002	91	28,5		V		1		
					MISSET TH	GRAY	SILTY TO SANDY	SHALE	BR-BL	
					W HOUD			/	VI	· · · · · · · · · · · · · · · · · · ·

REMARKS - DRILLED BY TEXAA TESTING, INC. USING A SIMCO 4000 -T2 TRACK MOUNTED DRILL

BURING ADVANCED USING SY4" SOLID STEM ANGERS, 4" SA STEEL CASHE, NQ-2 WIRELINE CORNO TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0512

16



LEVATIO						HRS								CT NO. C. 4 D384.40-
DATE 2	<u>4- 0</u>	5 M	AY 20	-5		CLAS	SIFIED BY	1	1AC	SANGER			GE	of
										DESCRIPTION				
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		COLOR	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2		3		4	5	6		7		8	9	)	10
							M.SOFT W. HERD	6	244	SHALE (CON	<u>τ΄</u>	BR-	BL	
32.0	-4	$\vdash$				-	W. HERD							
		·								12				
	├ ┦			_										
					_	35.7		Ŀ	نة 1	13			-	
						5-11	¥							
	10.0	10.0	100	6	15		MISOFT	GØ	AT	INTERBEDDED		BI	_	
				+			M. HARD	8		AND SILTSTD	16 34	$\left  \right $		
					_			-						
42.0				+	<u></u>						· · · · · · · · · · · · · · · · · · ·	$\left  \right $		
72.0	$-\langle$	$\succ$		+		42.95			_					
	$\left  - \right $				†	14.15	<u>v</u>					BR	_	
	$\left  \right $	-			-	-	SOFT	DKC	LAY	CLAYSTONE			<u>`</u>	LOW & SUICKENSIDE 43.1
					$\neg$				194			$\left  - \right $		44.15, 45.0, 45.2, 45.8
	19,0		1009	. 9		46.0	W. 505-			V				
		1010	100 1	-+	-	47.6	M.SPET	GR		SANDY SHALE	· · · · · · · · · · · · · · · · · · ·	BA-A	_	
				_			SJET	MA	4001	CLAYSTONE		30		1 - 16 (4 4
						49.7					/			LOW & FRACTURE 49.0
				+			MI SOFT TO	LTC	SRAY	SANDY SILTSTONE		BC	-	
52.0							IN HARAS	$\left  - \right $	,			┼╌┼		
		$\succ$		-		52.25	M. SOFT			CLAY STONE	/	Ba	_	
				+			19.3007	TIMAG	10019	UNISIONE			4	LOW X SLICKENSIDES
				+-	-							$\left  - \right $	_	52.55, 53.0, 53.6, 53.85
							2					+		54.4, 54.65, 55,35
· · ·	9.9	0.0	990	,   🤋	5	57.1			,		,			
		1-1-		Ť	-		M. SOFT	LTI	JA-A4	I CEDDED JACKE	ANDY SILAIS ANA	B		
							M. HARD			SILTSTOPE	A DI JANGE PAIS	11		
					{		1					+		

REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-6512



ELEVATI	ои <u>"</u>	95	± GI	NL (	0 HRS	2.6		DLANT ST. ALBANS, WV		ECT NO. Coy 384,40-0
DATE	AV-A	c Mu	A 2702		HRS					3_ of 4
	1	> 111	1 2003			SIFIED BY		in sanger		of
						·		DESCRIPTION	_	
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6	7	8	9	10
	<u> </u>			+	-	M.SOFT TO	LT GRAY			
62.0	+	$\rightarrow$			6	M. HARD		SILTSTONE (LON'T)		
	<u>                                     </u>				ł			i CLAY STOPSE 62.7-6.3.2	VBR	•
					64.2		V	<u> </u>		
					65.1		MARDON	CLAYSTONE	BR	VERTICAL FRACTURE 64
	10.0	120	100%	94						64.6
	10,5	120	23313	197	1 '	M. HARD	LT GMAY		BL	
				+	1			MEDIUM GRANED, MICALEDUS	+	
				+	1				$\left  - \right $	
					1					10 th
72.0				1	1				╏╌╂╌	
					172.0				$\left  - \right $	
					73.3	M.SOFT	MAROON	SILTY CLAYSTONE	BA	VENTICAL FRACTURE 75.1-
					]		GARY			75.3
					76,5	V	V			45° FRACTURE 75.65
	10.0	(s.c)	100%	87		MHARD	LT GRAY	SANDSTONE : MICALEOUS	BL	
_										
				<b>_</b>				2		
				ļ						
85.0	-4	$ \rightarrow $		ļ						
				<u> </u>			-			18
							_			
					<u>85.0</u>	V	V	Y	V	
	98	10.2	98%	10		Mi SOFT	GAAY	SILTSTONE	BR	LOW & FRACTURES
	1,0	10.0	786	17			_ _			85.0, 86.35, 86.5, 88
										89.3
					89,7					
		1		<u> </u>	]					

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0512



PROJECT	г <u>А</u> ом _	AEY 795	a <sup>24</sup> 3	GW	лоц IL 0	HRS	2.	s Pou	nEV	n p	LANT.		_BC _PR	RIN OJE	G NO. CT NO.	B-05	512_ 384: ÷0-01
DATE	04-	051	nay 2	-005	-	CLAS	SIFIE	DBY		D	AN SANGER		_ P/	AGE	4	of .	4
					Ī						DESCRIPTION						
DЕРТН (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY -	CONSISTENCY OR ROCK HARDNESS		COLOR	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS		REMAR	KS*
1		<u>}</u>	3		4	5		6		7		8	+	9		10	
92.0							Whis.	5FT	1	4 LAY	INTERBEDDED		ß	R			
-12.0	$\vdash$				· · ·	ł	<u> </u>	<u> </u>		1	AND SILTSTE	<u>かんを</u>					
	`	[				{							-				
							8										
							<u> </u>	. –									
	17.3	10.0	100	no	67-	96.7	M. S.	V	011	V	Y	/		1			
			-			1		PT	GA	A4 +	CLAYSTONE Y	ALEOUS CLASTS +	B	2 1	2.72 51	CHENGO	61 97.0
										for s		TED LARE SURFALE				97.6, 9	
			1	2								10-5 CARE JURNALE	1-			59.35,	
				240													132.3
102.0	~/												Ι.	,	/	100.00	
													ß		109.15	- 109-5	109.75
												· · · · · · · · · · · · · · · · · · ·	1	Ī		<i>(</i>	/
				_													10 S
	6.8	e.8	85	2	52												
				_									1	1			
				_									BR	-			
			0														
110.0						115.0	Y	/	V				1	4			·-
											BOTTOM OF BO	ALNG: 110.0'					
										_							
							2					n					
														-+			
							•							$\rightarrow$			
			1			э –	_										
REMARKS *													L	ł			

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0512

.

N 542140.8876

E 1724101.7636 Grade El. 784.29

gal consultants avideming lease into reality

PROJEC	T ARE	n 2/3		044	E.A	M.J.S	Pow	OR PURAT ST. ALBANS, WV	BORIN	G NO.	B-0513
ELEVATI	ON	GW	/L 0	HRS					- PROJE	CT NO.	(040384.40-01
DATE	36 M	24 2005	-	HRS CLA	SSIFIED	BY _	Dr				of
								DESCRIPTION		·	
DEPTH (FT.)	BLOWS PER SIX INCHES OR CODE DECOVEDVIALIN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS		REMARKS*
1	2	3	4	5	6		7	8	9		10
								BORING NOT DRIVED			·
								LOG INCLUDED FOR CON-			
								TINUTTA AND COMPLETENES	,		
							•	PIEZOMETER INSTRUCED IN TAME BOLCHILL AT B-0512			
						+		· · · · · · · · · · · · · · · · · · ·			
	•										
REMARKS *	*										

\* POCKET PENETROMETER READINGS

B-0513 (10) BORING NO.

N 540555.6419 E 1725145.9412 Grade El. 948.40



PROJEC	T ARE	A2/3 :	TO HI	1 8,	AMOS PI	wer p	LANT, ST. ALBANS, WV	_BORI	NG NO. B-0514
ELEVATI	ON	GV	VL (					_PROJ	ECT NO. Carlo384.40-
DATE	09-10	m R:1 2005	. <u>.</u>		SSIFIED BY	DI	ANIEL SANGER	PAGE	= <u> </u>
	ł						DESCRIPTION		
DEPTH (FT.)		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
_1.5	44	5-1 A2C 50	- 1		LOUSE	BROWN	SILTY SAND, COME ROCK	sm	
	4	5-2	1				FRAGAL 1175		
3.0	_		ļ		V	V	↓		
4.5	25	5-3 REC 1.1		-	VI'STIFF	MAROON	SILTY CLAY	CI	* 3.5 TSF
	49	5-4	-	1					2 3.0 TSF
6.0	77	REC. 1.3		ł					
7.5	7								# 3.0 TSF
9.5	9 9	5-6 AEC 0.4			HARD		: DECOMPOSED		4245-77
	1213	5-7		1	1		1 CLAYSTONE		*> Y.5 r3F
10.5	15			10.5	DENSE	TRA	DECOMPOSED EANDY SHALE	<u> </u>	*>4.575F
120	1511	REC 1.4					DECOMPOLED EARDY SMALE	<u>gn</u>	
	2120	5-9							
14.2	22	R2C 1.5		111	U. DENSE	DKERNUN	DECOMPOSED SANDSTONE FRAGMENTS		
	V			मिति	SOFT		HIGHLY WEATHERED SHALL	SM VBR-	AFT A LINE AND NO.
					1		SANDSTORE / SANDY SHALE	BA	HEAVILU SMAINER
							IFERVILY STRIKED	r	14.3-14.5, 17.5-17.7
									18.2-18.3
	7.8 7,8	100%	45	19.3		/			STAINED 30" FRAME
				17.3	MIHARD	BASINA	SANDSTONE : STAINED TO		112 8 15.5, 15.65 16 1
						V	~ 22.2'		17.1, 17.6
22.0						GRAY			
		2		22,8	V	V	V	V	
	<u> </u>			24.2	N. SOFT	GRAY	SILTSTONE STRICTED 23.85-24.25	BR	LOWA STAINED FRACE 24.1,24.1.
						DK	ELAY STOPE / CALCAREONS	BR	LOW & STRIKED FRAGURE
					SEFT S	GRAY	CLASTS + STRINGERS	Ř	25.4, 26.6
	10,0 10.0	100%	62				· 5ADOY 25.8-26.25		LOW & FRACTURES 274
				28.2	V				27.8
					1	CAPY	ONA STATIS FORME OBO OSUSTAN	BR	
			[		1	V	シュレアシアのとこ	V	

REMARKS .. DRIVED BY TELLA TESTIN WSING A SINCE YOOD-TI TRACK MONNTED BRILL

BORING ANOVANCED USING 514" SOLID STEM AUGERS, U"S.D. STEEL CASING, NZ-2 WIRELINE COAING TOOLS

\* POCKET PENETROMETER READINGS

BORING NO. <u>B-0514</u> (22)



			01			5n 1	10 0		2 PUANT ST. ALBANS, WV		
ELEVAIN	JN		G\	WL (	HRS	32.1				PROJ	ECT NO. CO4138440-
DATE (	<u> 29-1</u>	01	MAY 200	<u>72</u>					DAY SANGER	PAGE	2 of
						······			DESCRIPTION		
ОЕРТН (FT.)	1 2 3 4		R R		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	_	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*	
1	2		3	4	5	6	7	_	8	9	10
32.0					34.8	M.SOFr	GA	<u>-</u> <u>A</u> <u>Y</u>	SHALE/SILTSTONE (WAT)	BR	Lov & FAACTURES 29. 31.0, 31.15, 32.9 33.45, 34.5
				+	54.0	SOFT	MARC		V	V	
	10.0	10.0 11.0 100% 51		52		35-1	10144(0	101	CUAYSTONE	1312	~ 30° FRACTWEES
									· · · ·		37.8, 39. 2, 39.8, 40. 41.15 41.35
42.0			····			N.					
12.0	-	$\succ$		+	42,0				V V		
						M. SOFT	621	47	ENTERAGEODED SONDY SHALE AND SILTSTORE	GR-	
		·						_	· · · · · · · · · · · · · · · · · · ·		
	<i>G</i> ,QI	10.0	8001	89	47.0		J	/	V		· · · · · · · · · · · · · · · · · · ·
						M. HARD	17 6	LNY	SHOTEDAAC	BL	
							1,5 5.	<u>}</u>			
		-									
52.0								-			
	Ý									+	
										+	
		_	1	0							
	j0°3	10,0	100%		57.g		-1		V	<u>  ]</u>	
		-+		+		m Satr	<u>۷</u> ۵۹۷	_	SILTY SHALE	1 AQ	*30° C - 14 (72
				+	59.3	M. SOFT			CLAYSTONE, SLIGHTLY CALCAREOUS	1 PX	~ 30° FLACTNES 57.9, 58.4

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

BORING NO. <u>B-0514</u> (22)



PROJECT	<u>1</u> A	REY	2/3,	Jor	INE	, km	ک کنا	100	ve	r plant s	T. ALBANS WV	_BOR	RING	3NO. B-0514
ELEVATIO	_ NC		G <sup>v</sup>	WL (	HRS	32	2.1					_PRC	JEC	CTNO. <u>C040384,40-01</u>
DATE	09-	-10	MAY 20	20	HRS CLAS	SSIFIED	) BY			DAN SANGE	R	_ PAC	GE	<u>3</u> of <u>5</u>
										DESCRIPTION		Τ		
DEPTH (FT.)	BLOWS PER	CORE RECOVERY/RUN		L K	PROFILE	SOIL DENSITY - CONSISTENCY OR	С С			MATERIAL C	LASSIFICATION		ROCK BROKENNESS	REMARKS*
		2	3	4	5	6		GAS			8	9	-+	10
62.0	R					M.S.	5	MAR	-	CLAYSTONE	(c) N'T) !	BR		Low & FAACTURES 59.5, 59.9, 60,4, 61.2
			100%	86				100 miles - 100 miles - 100 miles						4/5° FRACTURE 7 SUCKETSIDE 62.1-61.25 30° FRACTURES 62.6
	16.0	60	1000	186		M SOF	~ ~	C Q I	.u	CADY CLA	/SILTSTONE W			62.7,62.8,63.0,63.4
						M. HD					CALCAREOUS	BL		65.25, 65.5, 65.75 66.1,66.5
72,2		$\succ$			5 x5									3
å -					*						5-71.55, 72.0-72.4			SUICKENSIDES 71.4,72.0
				+	76.0				,				+	82
	10.0	10,0	1002	92			F7	-		CUAYSTOPE "!	NUMEROUS	BR	+	
								1		REBULAR CA				<u>8</u>
								GRA	4+	CLAST AN	STR-1HGERLS			
						<u> </u>	_	1100						
82.0	+	$\rightarrow$		+	82.2	<u> </u>			_	\\	V		_	
				+		M. SOI M. HA		GAR	<u>۲</u>		INTERMITTENT	Bi	-	
						m HA	<u>«୭</u>			CALCAREOUS ST	KINGELS, "E 2") SANDSTONES		-+	
											/ 34 - 33 10 10 25	X	+	VERTICAL FRACTURE
	10,0	10.0	100%	90								BR		86.6-87.6
· .		]										BL	$\rightarrow$	
								$\neg$				1		
L						¥		v		\ <b>`</b>	k	V		

•

REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0514

(22)



ELEVATI	ION	GV	VL 0	HRS	32.1	5414	WT ST. ALBANS, WV		GNO. <u>D-0317</u> CTNO. <u>C240384.40-2</u>
DATE	09-10 V	N AY 2005	•	HRS	SIFIED BY		)AN SANGER	PAGE	of
	8						DESCRIPTION		
DEPTH (FT.)		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ы В		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
92.0				93.0	m, Hato	LT. GRAY	24077042 V	AL I	
	10,0 10.c	1002	95		M.SOFT	GRAY	SILTY TO SANDY SHALE	ßL	
				•.•.			: CLAY SHALE 98.4-99.0	BR BL	Low & FRACTILES 984 986,98,95
102.0				104.3		MALOOF + CAAY MINTALOO			SUCKENSIDE 102.0 111.0 (~15°)
	10.3 10,0	100%	48		M. HALO		34,07204A2	···· B	
112.0									· · · · · · · · · · · · · · · · · · ·
	10.0 0.0		73						

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

BORING NO. <u>B-0514</u> (22)



		GV									NG NO. <u>B-JS14</u> ECTNO. <u>C040384.4</u> 0-
DATE	29-101	NAY 200	ŝ	HRS CLAS	SIFIE	D BY	DA	IN SANGER		PAGE	<u>5</u> of <u>5</u>
					1			DESCRIPTION			
рертн (FT.)	BLOWS PER SIX INCHES OR COBF RECOVERVIRI IN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY -	ROCK HARDNESS	COLOR	MATERIAL CL	ASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	<u> </u>	6	7	8	*	9	10
17.4 0					M.1	Laco	LI GRAS	SAPOSTONE:	MICALEDUS (CON'T)	BL	<u> </u>
122.0	{}		+	12							
			+	1							
			+	1							
				]							
	10.0 10.0	100%	GC								
			_	-			-				
					<u> </u>						
				-					· · · · · · · · · · · · · · · · · · ·		
132.0			+	1							
100	$ \rightarrow $		+	t							
				1							
92				]							
	10.0 10.0	100%	100								
			$\vdash$	{							
				1							
142.0			$\vdash$	1							
· · · ·	$\forall$		1	102 -		/	V	V	/	V	
				143.2	Mise	, FT	OK GRAY	CLAY SHALE		BQ-BL	
						ľ	1				230° FRACTURE YSLICK
	8.0 8.0	100%	87								1437,1463,148.8
											LOWA FR. HERVICE ING
150.0		<u> </u>	<u> </u>				V				

REMARKS \*\*

\* POCKET PENETROMETER READINGS

BORING NO. 13-0511/

N 53 E 17			-	rade l	El.	933.64			y	constrainty local into reality
PROJEC	ст <u> ()</u>	AGA	2/3 5	рну	E. Ar	nos powe	R PLAN	T ST. ALBANS, WU	BORIN	IG NO. <u>B-0515</u>
ELEVAT	10N		GV	NL (	0 HRS	42.3			- PROJE	ECT NO. COYO384.40-0
			•							
DATE	10 -	1 1	NAY 2005	5	CLAS	SSIFIED BY	<u>A</u>	N SANGER	PAGE	of
								DESCRIPTION	1	
ОЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS
1		2	3	4	5	6	7	8	9	10
1.5	1:	3	8-1 RE4 1.3			STIFF	BROWN	JANDY CLAY	cl	+ 1.5 TSF
			RE1 1.3 5-2	-	1	<u> </u>	BR-SWP.	ý	U	
30	7,	5	KEL 13	+	-	VISTIFF	GRAY	SAPPY CLAY	cl	# 2.5 TSF DAY
-1.6		20	5-3 Rec 1.2			05715	BROWN	DECOMPOSED SANDSTONE FRAGMENTS	L.	
5.4	30	12.4	5.4 nec. 0.9		5.4	MOENIE	BLOWN-	a second count	gc_	TOP OF TWOCK S.4
		-		+	10-10-1	SOFT	SAOWA		VAA-BA	
	31	4.9	739	40	1	M. SOFT TO M. HARD	BROND	Here's Oldest	BR	
			126	10	8.8		GRAY	34672		
10.3	1-			+		SOFT				0
	+	₽=		+	1		TAN	CLAYSTONE HIGHLY WEATHERED	VBR	~30" FM 1 100 - 1
	1-	· ·							BA	W/ STATISTICE !
				-	1				51	13.9
				-	1					
			-		1				BL	
	10,0	10.0	100%	65	1			· · · ·		
					17.3	V	V		T	
				-	11.5	MISFT	OLIVE.	CLAY SHALE MODERATELY TO		LOWA FRACING
	<u> </u>					SOFT	Gar	HIGHLY WEATHERED		TRACK SHADE
<del>}.0,3</del>				ļ						and the second s
					21.0	NC.		V		NEW VERTICE TO MES
				<u> </u>	22.2	M.DFT		SILTY SHALE	BR	FLACTORE PAR. 19.19
						73.67.67	ST. NY	SILTY SAND STORE : MICKEDUS	BL	
						M. HARD				3
			10.0							
	10.0	0,0	100%	83						
	<u> </u>						V			
							GRAY		_	
				L			V	V	V	¥)

REMARKS .. DRILLED BY TELLA TESTING USING A SIMIO 1000-T2 IRACK MAUNTED DRILL

BORLING ADVANCED USING STY SOLDSPERAUSERS. Y STEEL CASING, MD-2 WIRELINE COLING TOOLS

\* POCKET PENETROMETER READINGS

N 539572.1065

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 8-0515

gai consultants



ELEVAT	10N		G	iŴL	0 HRS	<u> </u>	2.3	100			, اد,	7.2-1357.267	s, wil			G NO. 🔄 CT NO. 🤇		
DATE	12-	1. 1	MAY 20	٥٢	HRS CLA	SSIFI	ED BY	,		AN SA	Nr.E.A			<sup>-</sup> PA	GE	2		7
	T																or	4
						1		Τ		DESCR	IPTION			+				
DEPTH (FT.)	BLOWS PER		S	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY -	CONSISTENCY OR ROCK HARDNESS		COLOR	ħ	IATERIAL C	CLASSIFIC	ATION	USCS OR	ROCK BROKENNESS	F	REMARKS	÷.
1 30,3		2 D	3	4	5		6		7			8		5	9		10	
		K				-		+	<u> </u>	SA	402504	E ((0)	(T)				AINED FERC	
	+				32.1		V DF?	GRI	V Rhod			<u> </u>		1	-	30.6-31	O, LOST	WATER
	1			+		- 2	1	MA	Rapid	1			HALE AND	UBR			FG-LITY.	
				1	34.3	-		GR	44 4			I MISPUL	WEATHERED		2		2.5, 32.9	,33.05
	8.8	10,0	882	51	]	20	FT	med		CUM	IONE			Br	2	34.0 34	.3, 35.1	
	_									<u> </u>	·							
					-	L			-						-1	·		
			8		-	L		<u> </u>	·									
40.3				+	40.8		<u> </u>											
	1						<u>¥</u>	+	Ľ			<u>V</u>		\		2		
					42.4	Mis Mit	iano		12.124	SVDOA	SILTSTO	NE		BR		VERT CKL		-41.1
								1	AY	<u>OLAV</u>		Name of the second	90 (1 (1 (1 <b></b>	<u> </u>		42-6		4 L 40 9
				+	-	Mis	1-1				TO NE "			BR			PFRACT	
	10.0	10.0	1002	63	1						GULAR				-	SUICILE	NSIDES	43.15
			_, • _ (a	100	1			f-,		<u>N010</u>	ALES Ar	x) 211211	suctes			yyiss, L		
					1		<u> </u>	MAN	400							47.75,2	12.6,44	1.85
					] .										-+	53.5		
								,		·				-+				
50.3	= 4	2						GR	NY	:	BECOMES	SANOY	AT SO.1	-	+	• W		
														-	$\uparrow$			
		-+			an -												18	25
	+				53,7	<u> </u>	<b>/</b>		+	<u>V</u>				V				2
	[0.0]		100%	az		mi s	OFT	GA	<u>64</u>	POYAZ	SHALE	L DIELM	1975295	BR	_			
		10.0	100 15					MAN	1-		( = 2 mm)	CALCA	LEOUS	- [	$\downarrow$			
										MODUL	Ĩ.	r:		_	-			
						5	ы. П	SA	37						+			
				1					-+						_			

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. 13-0515 (24)



ELEVATI	ON	24	GV	VL 0		42.3			_PROJ	ECT NO. COY0384.40-
DATE	10-	11 m	NAY 200	5	CLAS	SSIFIED BY	D	AN SANGER	- PAG	E <u>3</u> of <u>9</u>
				1	16			DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION		REMARKS*
1	2	2	3	4	5	6	7	8	9	10
7.2.3	0,0  10,0		100%					SANDY SHALE ( ωN'T) : MARION CLAYSTONE 62.5- 63.4 		Low & FRACTURES 63.0, 63.4, 68.0 (SLIGHT SLICKENSIGE) 08.6 VENTICAL FRACTURE 69. 69.6, 70.3-70.7 70.85-71.05, 74.8 75.176.25-77.4 LOW & FRACTURE 72.7, 79.4, 79.45 80.05
<u>X0.3</u>	9.2	10,0	929	72	83.5 87.7	SOFT N.SOFT	DK GAAY	CLAYSTONE CLAYSTONE SANDY SHALE	BA-BL	PITTED GRESUMFACE. LOWY FRACTURES <sup>W/</sup> SLICIKE SIDES & 3.4, 83.95 84.2, 84.55, 84.7 85.2 85.45 WIGH & FRACTURE WSLICKE

REMARKS \*\*\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u><u><u>R</u>-0515</u> (24)</u>



ELEVATIO	ON _		G	WL -	O HRS	42.3						PF		GNO. <u>B-0515</u> СТНО. <u>СЭЧЭЗ844</u>
					HRS	5			-					
JAIE !	<u>5-1</u>	1 147	2006 14	_	CLA	SSIFIED B	Y	ISA	IN S	ANGER		P.	AGE	of
									DESC	RIPTION				
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK BECOVERV					COLOR		MATERIAL CI	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1 <u>पंछ,उ</u>		2/	3	4	5	6	_	7			8		9	10
	+-	Y-		+	-	SOFT	20	5 RAM	CLA	Y SHALE	1	BL	-BA	
						M.SOFT								IRREGULAR FRACTURE WSLICKENSIDES 91.65-
					<u>94.4</u>			<u>V</u>			V		¥	92.05 (NO STAINING)
	10 3	100	100%	75	1	TO		CRAY	SHAL	U SANDSTO	NE " MICACEOUS			VERTICAL FRACTURE
	1-10	10.0	100%			millarn	+-	+				BL	ī	92.4-92.8, 93.35-
				1	1		+-	+	<u> </u>			,	-	<u>93.85</u>
					1		1-	1				BI		
				1	1							-1-0	1	,
100,3				$\vdash$	]							+		
					]						· · · · · · · · · · · · · · · · · · ·			
									15					
	10.0	12.0	1002	100										
				ļ										
			12				1_							
							-							
10.3	$\neg $													
		=				<b> </b>	+							
							+	-						
		-					+-			· SHALE	CLASTS 112.5-113.4			6
	-						+	$\left  - \right $						(41)
	10.0	11.0	100%	97				$\left  - \right $					-	
	· · ·		100 10		1.2.2	V				/				
					117.0	SOFT TO	+	LAY					4	
							166	1	LLA	SHALE		BR		V.BROKEN 118.4-119.1
						M. SOFT	+-							HIGH & RACTURE 119.0-119.2

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-OSIS



ELEVATIO	ИС		G	WL	0	HRS	42.	3						sens, w				(24038	
ATE	10-1	1 m	MY 20	5	1	HRS CLAS	SIFIED	BY		NA	h S	ANGER	2		F	PAGE	5	of	9
	T				Т			8								2			
DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	ROD (%) OR TORVANE		PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	-	COLOR			. CLA	SSIFICATION		ROCK BROKENNESS		REMARKS	×
1		2	3	4		5	6		1	7			8			9		10	
120.3		<u> </u>				20.5	m.s=	Fr	<u>G(</u>	LAY	SAND	1 SHAL	E	· · · · · · · · · · · · · · · · · · ·		3e	•		
					-#	22.6	√			V			Ý			V			
						+	M. SoFi M. HAR		1.50	AAY	SUTAL	Y SAND	אסדו	S: MICALEOU	: В	R			
	10.0	10,0	1002	6			m, 53 79 59F7	F.	GQ MA	TLED	CUAY	STONE			A	ζ		127.05.	
					-											4		~0.2-	
					-	-									V	BA_	Low & FO	ACTURE E	VERY
130.3		5				ŀ											0.1-0	.85'	
				+	-	ł												" SLICK	
		-		+		ł							+					31,25,13	1.3
				+		ŀ										+	131.75		
				+-		ŀ		-					+			+		EN ZONE	
	10.3	10.0	100%	32									+			<u>  .</u>		: NUMER	
		10	000 6	+	1	ŀ			MAM							$\left  \cdot \right $		LICKENSID	
				1	1				1.		······		+			$\left  - \right $		5 011-0	
					11	<u>38.S</u> -	Miszp.		64		CHAIL!		V	LOUS IRRELILA		*		LEDUSNOC	ULES
						f	<u> </u>	<u>`</u>						LES AND STLINGE		R-	137.2.	- 1380	
140.3	-4	$\succ$		-	-	ſ				•	0. 0.01	-cous	NOU.	CES MODIFICION					
					1											┼─┤			
					1	Γ			ĺ		·								
					]		_									+			
						F										┼┤			
	10.0	120	1002	9.1	]	ſ										+			
		$\square$											_		_	$\uparrow \uparrow$			
												CLAZ:	4 1	48.3-148.6,					
		_										. 1	49.	35-150.15					
							V	T	ł	c		1							

\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>3-0515</u> (21)

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						E. AMO		Sm	er plant	_BORIN	IG NO. <u>B-2515</u> Ест NO. <u>C24038441-</u> 2
					HRS						
DATE	10 -	· []	MAY 2	202	CLA	SSIFIED B		DA	N SANGER	PAGE	or
									DESCRIPTION		
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % DOCK DECOVERY	м		SOIL DENSITY - CONSISTENCY OR BOCK UNDENNESS		COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2 D	3	4	5	6		7	8	9	10
	<b> </b>	Ť		-	1		+-	-	SHALE (CONT)		
	10.0	0,61	100%	88					: SANDY 154.6- 155.7 157.0-160.2(F6N NODULES)		60° INEGULAA FRACTURE 155,2-155.5
<u>   (60,3</u>	=<				161.0	M. SOFT		A4+	CLAYSTOPE	BR- VBR	20-32,20,0000000000000000000000000000000
					164.7		-	<u> </u>			163.2, 163.35, 163.65
	10.0	6 <u>,</u> 0]	1009-	77		M. IDFT	CR	.A.Y	SADDY SHALE	BA-BL	164.0,164.1
170.3											
					171.7	V	1	/	V		
						M. HARD	LTO	44.4	SANDSTONE : MICACEDUS	BL	
					10110						
	12,2	10 0	(000).	100	174.8	Missfr					
1.	, • , •	10,0	1.00 /	1100		1 201-1	161	444	SANDY SHALE	BL	
								1			
						V		2	V	¥	

REMARKS \*\* \_\_\_

\* POCKET PENETROMETER READINGS

BORING NO. B-0515 (24)



						:AMOS 42.3	tower.	PLANT		IG NO. <u>B-0515</u>
		·····	GV	Υ <b>∟</b> (		<u> </u>		· · · · ·		ECT NO. <u>COY0384.40-</u>
DATE	10-11	MA	4 2005	_	CLA	SSIFIED BY	N	AN SANGER	. PAGE	7 of
					<u> </u>	-r		DESCRIPTION		· ·
DЕРТН (FT.)	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2		3	4	5	6	7	8	9	10
10015	<b>P</b>	+		<u> </u>				SANDY SHALE (CON'T)		
					184.0	3265	DKGNAY	CLAY STONE	· ·	
	10.01	0,0	100%	50	1	SOFT TO M-SOFT		- CRASIONE	VBR- BR	~30°JUICKEHSIDES
					]					EVENY 0.2-0.4'
		$\bot$					marcoord			
190.3					190.3					
19013	=					M.SOFT	GRAY	SILTY TO SANDY SHALE	BL-BR	LOWN FRACTURE
							marbor			194.1, 194.3, 195.0,
										196.05 , 196.4, 196.9
		_ -								197.6, 197.9
		_								
	10.0 10	0.0	100%	82						
	┝╌┼╸				197,0	V		V		30° RAACTURE 196.1
							MACON	CLAY STO HE	BA-VBA	39 SLICKENSIDES ~
	┝╌┟╸					MISOFT				EVERY D.4'
200.3					200.5				V	
	$\vdash \mathbb{P}$					MISSET	MALOOP	SILTY SHALE	BL.	GRADES INTO SILM
										SHALE
										· ·
		+			·			5+1		2
	10.010	0	002							
	10.0110		006	100	206,55					
				[		M.SUFT TO	CONH			
					ł	M. HARD	GRAY	SHALY SANDSTONE	BR	2
						M. UPRO		V SALIS STATE		~
	LI			1	l	- CLIN PILL	ITGRAY	SAND STONE	BR	

REMARKS \*\* \_\_\_\_

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B- 2515 (24)

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PROJEC	т <u>А</u>	LET	12/3	Jo	HNE	AM	os f	22WEV	2 (	PLANT ST.	ALBANS WV	ВС	RIN	GNO. B-0515
ELEVATI	ON		G	WL	0 HRS	<u> </u>	23	_						CTNO. CO40384.40-0
	10				HRS									~ <sup>C</sup>
DATE	10-1	1 mm	4 2-00 5		CLA	SSIFIE	D BY	_17	14	N SANGER		. P/	AGE	of
										DESCRIPTION	······································		÷	·
			1			T		1			·····			
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% HUCK HECUVEHY RQD (%) OR TORVANE	PROFILE	SOIL DENSITY -	CONSISTENCY OH ROCK HARDNESS	COLOR		MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	- REMARKS*
1 210.3		2	3	4	5		6	7			8		9	10
		$\rightarrow$			21013	M.S.	Fr	SAL	17	SAMOY SHALE		B	R	- 11 - 1933 - 2019 (d
<u> </u>	<b> </b>	·			_	m. H	AND							
	ļ				2120		<u>k</u>	<u> </u>		1	k		1	
				_	-214.3	Miro	Fr	MARO	69	SILTY SHALE		B	2	
					-	Mis	.FT	BAOW		CLAYSTONE		B		25-30" 5 LICKENSIDE
	10.0	10.0	100%	88	_	L		MARO	낀				1	215:0, 215,20, 215.5
		<u> </u>			1			morr	LED					216.15, 217,85, 218.1
		<u> </u>			-					. <u> </u>				60° SLICKENSIDE 215.3-
		<u> </u>			118.8		<u> </u>	V	_	<u> </u>	/		/	215.45
220.3	<u> </u>	<u> </u>			-	Mil	ARD.	LT GA	11	SHALY SANDSTON	E	B	e_	
					221.5	<u> </u>			_		r			20 
					-	Mi So	Fτ	MARO	F	SANDY CLAYSTO	34	B	R.	
					223.5		r			s				30'SLICKENFISE 123.1
					-	m. 50	FT	GRA	प	SANDY SHALE		BA.	-BL	
					-				$\downarrow$					LUW & FRACTURES
	10.0	18.0	100%	190	-				$\downarrow$					125.55, 125.8
					-				_					
						<u> </u>			$\downarrow$					
					229.7		,		4			_		÷:
230,3					<u></u>				+	1	/			
		Z		-		M. Sof	-1	GRAY,	+	CLAYSTONE		BR	_	20-30° SLICILENSIDE
						SOF	7	MANDO OLIVE	4		· · · · · · · · · · · · · · · · · · ·			229.9, 231.4, 231.5
														232,2, 232.4, 232.5
									_					233.0, 233.2, 233.8,
			1	r1					-					234.4.235.6.236.1
	0,0	6,0	100%	56					+					236.4 237.5, 237.9,
									_					238,9,239,1 239.6.
									+					239.8, 240.1
							_		_ -					
]						1		<u> </u>		V	r			

REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0515</u> (24)

24 v



PROJEC	T_AR	EA	a/3 J	рнр	6.4	(Ma)	Pow	ER	PLA	NT ST. ALBA	NS WV	ВС	RIN	GNO. <u>B-0515</u>
ELEVATI	ON		GV	VL C	HRS	42	3				· · · · · · · · · · · · · · · · · · ·	PF	OJE	CT NO. C240384,40-01
DATE	10-1	( mi	74 9 20 2	_	HRS CLAS	SSIFIE	D BY		Ð	AN SANGER		. P.	AGE	of
										DESCRIPTION			· · ·	· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	Ĕ	PROFILE	SOIL DENSITY -	ĥ		COLOR	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3	4	5	0		<u> </u>	7		3		9	10
		·				SSF.	T	MRA	4 60	CLRYSTONE	(()))		3R	.20-30° SLICKENSINE EVERN 0.1-0.3'
•	10.5	JD, O	100%	Ð							•			
250.3							(		/	· · · · · · · · · · · · · · · · · · ·	/			
										BOTTOM OF BOI	21, NG: 250, 3'			
										· · · · · · · · · · · · · · · · · · ·				
														¥ 
						ň								

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B-0515 (24)

N 540842.6369 E 1724930.8565 Grade El. 864.94



PROJECT	r <u>ARE</u> DN	A <sup>2</sup> /3 GW	JC 11 0	HRS	E. AM	os foir	ER PLANT ST. ALBANS, WU		GNO. <u>B-D516</u> ст NO. <u>С040384.4</u> 0-0
				HRS		<u>.</u> D			of
							DESCRIPTION		
ОЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
1.5	44	S-1 Rec 1.5			120SE	BROWN	SAPOY SILT, FEN MULK FLAGMENTS	ml	DRY
3.0 3.9	922	5-2 AEC. 1.2 5-3 Rec 0.9		3,9 TFIEIT:	W.DENJS	Browry	DEGMESSED CLAYSTONE	5 <sup>-</sup> M·9 <sup>M</sup>	Dry
							BURING CANCELLED		2
10							AND BACKFILLED		
					0				
							· · · · · · · · · · · · · · · · · · ·		
				ų.					
			-						
L									

REMARKS .. DRILLED BY TEALA TESTING, ENC USING A SIMCO 4000-T2 TRACK MONNTED DRILL.

BORING ADVANCED USING 514" SOLID FIFT AUGERS

\* POCKET PENETROMETER READINGS

B-0516 (23) BORING NO.

N 542185.2965 E 1725391.3276 Grade El. 945.55



	sample No., TYPE & Ab			Б		DESCRIPTION	-	of
2		OD (%) OR TORVANE		Б			-	
2		OD (%) OR TORVANE	IFILE	SITY - TENCY OR DNFSS			IESS	
2		OD (%) OR TORVANE	FILE	SITY - TENCY OR DNESS			IESS	
2 '3 - 4	1 2	L CC		SOIL DENSITY - CONSISTENCY ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
34	3	4	5	6	7 mArcon	8	9	10
	S-1 Rec. 115			VISTIFF	RED	SILTY TO SANDY CLAY (DECOMPOSED	cl	+ Z.STSF
57			1	V		CLAYSTONE)		
- <u>-7</u> 9 ·	Rec 0.8			STIFF	$\left  - \right $	V	<u>_</u>	* ISTSF
13	5-3 REL: 1.5 5-4			1JARD	+	DELOMPOSED CLAYSTONE		24.5 TSF
9	8-41 REC. 1.2					TRACE CALLAREDUS NODULES		
20	S-5		{				- -	2
IR	AEL 115		8.0					
542	AEC I.S	-		52430.V	YELLOW YALO	V.		
50/6.4	5-7 ARL 0.9		9,9	No.	Ne Ne	DECOMPOSED SANDYSHALE	<u>em</u>	
2.1	952	81	11-11-1	MisiEr	DLWE	SANDY SHALE	BR	
			<u></u>	M.HAND	LERAY		BR	The second of the second s
Y			12.9				DIL	
				M. SOFT	DLIVE- GAN	I INTERBEDDED SANDY SHALE	BR-	
						AND SHALY SANDSTONE	BL	STAINED -60° FRACTURE
						1	1	13.45-13.6, 19.05-19.3
10,0	1007	74						19.7-19.9, 20.2-20.5
┨──┤								·····
┠──┤								LOW & FRACTURES 14.3
┠──┤							8	15.25, 15.4. 15.65
				<b> </b>				16.9, 19.3, 20.1, 20.65
$\rightarrow$					- -	<u>.</u>		STRINED V. BROKEN
┠─┼					_ _	· SANO STONE 22.5 - 23.5		ZONE 19.3- 19.7
┝──┼			144	N				
		†	47.1					STAINED LOW & FRAC-
10,0	999	84			TRAKODA			TURES 22.35, 23.45
		0-1	<u> </u>			the second s		239, 24.15, 24.25, 25.0
10,0				702		- PHALY SHADSTONE - MICACEDUS		UBA 25.7-26.2
		{		MAAM	PAND .			
10			99% 84		JOFT .) 999% 84 27.1 V M-SOFT M-HARD V	.0 99% 84 27.1 J M-SOFT OLIVE- M-HARD GRAY	DOFT MAROON CLAYSTONE DOFT MAROON CLAYSTONE M-SOFT OLIVE- SHALY SANDSTONE-MICACEDUS M-HARD GRAY	50FT RAROON CLAYSTONE OR-

REMARKS ... BRILLED BY TECRATESTING USING & SIMCO LOUD-TZ TRACK MOUNTED BRILL

BORING ADVANCED USING 544" SOLID STEM ALGERS, 4"\$ STEEL CASING, MQ-2 WILELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0517



DATE		10	MAY 200		ЦО					ALAANS WV	PF	ROJ	ECT NO. COY0384.40-01
				5	CLA	S	ЗY		DAN SANGER		_		of5
			<u> </u>			·			DESCRIPTION		_		
DEPTH (FT.)	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERV				ROCK HARDNESS	COLOR		LASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	-	3	4	5	6		7		8		9	10
32.0		-		+-	-	M. HARI	0 0	<u>SRAY</u>	SAMOJONE	(C0H'T)		}	
					-					· · · · · · · · · · · · · · · · · · ·			STAILED LOUDS FRAC- TMLES 32.3, 34.15
				1-	36.2		+	t		1	+		
	10.0 10	6.0	100%	82		SOFT	. N	Anoor	CLAYSTONE		BR		20-30' 5LICKENSION
		-		ļ	_	1.4						6	36.7, 37.4, 37.8, 38,4
		-			-						VG		38.8,38.95 39.2
		-			40.5				· · · · · · · · · · · · · · · · · · ·	¥		<b>,</b>	
42.0		+			-	M. SEFT	- [	SPIAN		SHALE AND	B	2	
3.0-	$\neg$	+		+	1		_	+	SANDITONE				
		1			1						$\left  - \right $	_	120
					]								44.6 CLAYSERAM
	9.6 10	_	96%		-	<b> </b>		+	8				
	1.0 10	0.0	7610	176	47.6			1		V			
		+			1	M. HAL	0 45	GRAY		E TO MED GRAITED	B	E	
					1		+-		MICACEDUS		$\left  - \right $		
					1			1				-	
52.0									÷				
	¥-												VERTICAL FRALING
		+						-					(HO STRINING) 53.3-54.
·		+			55.7		_	1					
	0,0 10,		100%	10		M. HARD	51	Y4-A	CALCAREOUS SAN	No multi	V		LOW & FAACTURES 55.7
	0,0 10,		100 10	10		SOFT	_	<u> </u>			BQ		56.2,56.7,57.5, 58.1
		+				1047	GA	144	CLAY SHALE, S	DME SILT	BR		59.25, 59.55, 59.7, 60.0,
					59.7		1	V		/			60.25,

REMARKS \*\* \_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B 0517</u> (21)

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PROJEC	T <u>A</u>	2EY 148	2 2/3 ; ; ± GV	2.2 H	N E	AMO	<u>s p</u>	wε	RI	PLANT ST. ALBI	ANS, WV					
			Gv	V L		6 <u> </u>	. \		_			_PF	ROJE	CT NO. 🤶	24038	440-01
DATE	16 -	1) m	בכיר אא	_			DBY		1	DAN SANGER	•	P.	AGE	_ 3	- of	5
								<u> </u>		DESCRIPTION				·		
DEPTH (FT.)			SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	Ц Щ		ŭ	ROCK HARDNESS	<u> </u>	COLOR	MATERIAL CLASS	SIFICATION	USCS OR	ROCK BROKENNESS	R	EMARKS	*
1	2		3	4	5	+	6		7	8		+	9		10	
62.0					-	Sof	Γ	1 1	ANY	CLAY STONE		ß	R-	. <u>2</u> .3.3°	SLICKE	NSIDES
0.010	$\vdash$	$\rightarrow$			-			MAA	h co-			v v	BR	~ EVERY	0.2-0.4	1'
					-						· · ·	<u> </u>				
					1					· · · ·		_				
					1			-								
	10.0	10,0	100%	67	66.7		/			V		┝	∲	10		
					1	M. 14	ARD	- 0	AY	SILTSTONE WINTER			_			
					1	1			1	MEGULAR CALCA		BI	-			
					1								$\left  - \right $	Low & Fra		70.35
					1		•••••			NORWLES AND FT SOME SAND	ALINGETLS,			INTERSEC		
720					1					I I I I I I I I I I I I I I I I I I I			$\vdash$	45 RAAC		
	Y	$\rightarrow$			1							-		30° FRACI	nre 71.6	, - 71, 9
		_			1					······································						
					1		,			·····			$\left  - \right $	NEAR VER		ALAC -
					75.5	Sofa		MAQ		CLAYSTONE		1		THRE 72.		
	10.0	0.01	1002	79				100	1014	CUANSTOPE		Be VB		30° SUI		
					78.0	V	,		1					-CAEIDI	0.2-3.	3
						M. 101	FT	GN	4	SANAY SILTITONE "	1 INTORMITATION	BA-	K-			21 P
						M- 1-10		Ì		IRREGULAR CALCARE			00	~45° F4	413.00	0.7
										( 1/2") AND STRINGE				LARGE C		
82.0		$ \downarrow $			820	V		1				1		AF 78.		
	¥					SOFT	07	MARC	ha	INTELBENDED CLOY	STINE AND	BA	-	SUCKEN S		
<b> </b>						M. So	Fr	GAA	4	SANDY SILTSTANE (1		BL				
							•			0.9-1.5" 11 THILLIESS).						{
		_								IAREGULAR CALCARED						
l	10.01	0.0	100%	9.7						AND STRINGERS						
┝																
-								_	$-\downarrow$							
						V		V								

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0517</u> (21)



ELEVAT	10N	94	8 = 0	3WL	0 HRS	5 18,1			ANT, ST-ALBANS, UN		ECT NO. (240384.40-0
DATE	47 1			-	HRS	3 <u> </u>					
	10-1	1 M	24 2-00	5	CLA	SSIFIED B	Y _ D	2	SANGER	PAGE	= <u>4</u> of <u>5</u>
									DESCRIPTION	<u> </u>	·
DEPTH (FT.)	BLOWS PER		SA	% ROCK RECOVERY ROD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR	COLOR		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
	- 2	?	3	4	5	6	7		8	9	10
<u></u>			ļ		-	M. HAAD	LTG	44	SHALY SANDSTONE : MICALEOUS	BL-	
920	+	<u>}                                    </u>			-			$\rightarrow$		1.	
					-						
	+				-			$\rightarrow$	<u>.</u>		
				+	-		+-+	+			
	lo a	10.0	100%	. 90	-		+-	-+		+	
			10.070	<u>/ </u>	97.4	SOFT TO		=	V	V	
					1	MISSET	GRA-		SILTY SHALE	BR	LOWX FRACTURE 98.15
					1		1				98.8, 101.0
					1		+ +	+			12 Charactic Bick Con
32.0				1	101.8						W FARCTURE 99.1-99.1
	Ý			T	103.0	M. WARD	LT. 6 A	P4	SHALY SAND, STOPE	1,	
						MISOFT			FILTSTONE	BL	·
							1	1		5	
					136.0	V.					
	10.0	10.2	100%	94		MIJOFT	GRA	1	CAN SHOTED SILFSTONE AND		35 SLICKENSIDE 106
				$\square$	1387		MARDO	5	SANDY CLAYSTOPE		
		-+					MARO	0		V	н. Г
	┟──┟	-+			-		BROW	w	CLAYSTONE "I INTERMITTENT	BA	20-30 SLICHLENSIDES
	$\vdash$								ILREGULAR CALCAREOUS		109.2, 109.85,
112.0	⊢∜	$\rightarrow$			/12,0				NODULES LEVE'S AND STRINGERS	ł	110.75, 111.2, 111.45
	$\vdash$			+		MLSSFT TO	GRIBY		SANDSTONE WITH SOME SHALE	BL	
						M. HARD		1	SERMS TO 120.6		
		-+					-	+			
	12.0		100%	1.00							
	0.01		100 /0	1.00				+-			·
		-+						╀			
	-+							+			
	······				L		L		¥	¥	

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0517 (21)

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ELEVATI	ON 9	48	2* G'	WL (	HRS	18.1							3 NO. <u>B-0517</u> CT NO. <u>CO40384.40-0</u>
DATE	16-1	ארו	114 200	6	HRS		3V	Δ	AN SANGER		PA	GE	<u>5</u> of <u>5</u>
27112	<u>, , , , , , , , , , , , , , , , , , , </u>			<u>,</u>									
							-		DESCRIPTION				n - 16
DЕРТН (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK BECOVERV	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	COLOR	MATERIAL C	LASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	2	3	4	5	6		7		8	9		10
10					-	M. HA			SANDSTOHE	(()+.T)	BI	-	
122.0	+4	<u>}.</u>			-			T. CRAS				`	
					$\left\{ \right.$		+				<u> </u>		
					1		+			· ·			······
					1								
	10.0	10.0	1002	100	1				1				
					]								
					1		_						
				+	-		-	_					
132.0	+ - 4				1320		-+	4	V	r	V		
					-	M.SOFC		LAN	SANDY SHALE		BL		
												-	
				+	1360								
	10.0	10.0	100%	96		NULTAR		F GAAY	SANDSTONE				
					1		-						
				1	139.0			¥		1			
						N. SOFT	÷ (	LANY	SANDY SILALE				
					142,7	+							
142.0		$\rightarrow \mid$			142,0	M. SOFT	-	SRAY	SHALY SANOS		Y		
					1	M.SJAT	- 6	SRAY	SANDY CLAYS	340T	B	2	SLICKEN SIDES
						5-FT		14					142.3, 143.65, 144.2,
	┥	<i>ti</i> -		0.5			-ŀ	GRAY					144.7, 145.0 145.15,
	8.3	0,0	100%	45	146,0	W.SOF.	$\pm$	<u></u>	V Sura f	r		- 1	145.75. DUAING CORE EXTRACT
	$\left  \right $					W. SOF	<u>'</u>	SRAY	SILIJIONE		BL		CALCAREOUS PODULE
							+					-	146.0-146.2
150.0							+	$\checkmark$	BOTTOM OF BO				

REMARKS \*\* \_\_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0517</u> (21) ,

N 541508.473 1015.78 Grade El. E 1724947.2614



ELEVATION     DOS ±     GWL     0 HRS     (4/.2., BACKFILES)     PROJECT NO.     COY03384.46-3       DATE     17 MAY 2005     CLASSIFICB BY     DAJ 56/46-372     PAGE     1     d     3       DATE     17 MAY 2005     CLASSIFICB BY     DAJ 56/46-372     PAGE     1     d     3       Image: Strain of the strain of t	PROJEC	CT <u>A</u>	LDC	A2/3 J	14 C	IE.	AMaj	r Por	JE	2 82	ANT					G NO		
Image: Section of the sectio						HRS												
REMARKS*         REMARKS*           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2000000000000000000000000000000000000	DATE	<u>.</u>	MA	<u>Y 2005</u> T	<u>}</u>	CLA	SSIFIE	ED BY		DA				- P/	AGE	/	_ of	3
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											DESC	RIPTION		4				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $					Ĕ		Ś	2 2 2				MATERIAL CLASS	IFICATION	USCS OR	ROCK BROKENNESS	F	EMARK	S*
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	1	2			4	5					- 1-			1	9		10	
3.0       * 13       Acc 1.3       3.6         3.6       > 6001       \$3.6000       \$3.6000       \$3.6000       TDP of dealer       3.6000         3.6       > 6001       \$3.6000       \$3.6000       \$3.6000       TDP of dealer       3.6000         5.0       7.2       6.9%       0       0       0       0       0       0         1.0.8       0	1,5	15		Rec IN S-2		1	100	175	1512	<u>مىن.</u> ا	FINE	TV MEDIUM S	2 LAN	58	<u>}</u>			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			13	REC 1.3		26	M.D	ENSE										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	2,0	-	-	3-3 Rec. 0.0		11=11=11			401	رتساحسل		V						F
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	<u> </u>				+	1	SOF	<u>-r</u> 1	BR	<u>دسم</u> ا	SAN				BR			
Image: Solution of the second seco		5.0	7.2	69%	0							- COMPLETE	- WEAINERE			DROVE	CASING	10 10.8.
Image: Solution of the second seco								<u> </u>										
Image: Solution of the second seco		+							-									
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	10.8														,			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ļ											: NIGHLY	WEATHERED			PIECE	5 0.3-	
9.4 10.0       94% 46       :COMPLETELY WENTHERED VBR.       PIECES ± 0.2'         9.4       1       1       1         1       1       1       1         2       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1         20.8       1       1       1       1         20.9       18       1       1       1         20.9       1       1       1       1         20.9       1       1       1       1         20.9       1       1       1       1																		
												in MAI Com						
		9.4	10.0	94%	46							· Complete	ely weatherled	VB	n	PIECE	5 0."	2'
																· · ·		
						2									-			
	20.8					,									+			
															-+			
		1				ŀ			_						_			
		6.8	12.0	68%	18	t								-+	+			
						-			_	_								
						ŀ		, +				/		-¥	_			

REMARKS - DRILLED BY TERAA TESTING IN. USING A SIMCO YOOD-TZ TRACIL MOUNTED DAIL

BORING ROVANCED USING 514" SOLID STEMAUGERS, ""FREEL CASING, NQ-2 WIRELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0518</u> (29)



LEVATIO	01_NC 17_M	<u>112</u>	_ GN	/L (	) HRS HRS		4.2	- 130	CKF:	SANGE	<u></u> .		_PRO	ING NO. <u>8-0518</u> JECT NO. <u>2040384.40</u> IE <u>2</u> of <u>3</u>
									DESCR				-	· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN SAMPLE NO., TYPE & RECOVERY OR				Ø	CONSISTENCY OR ROCK HARDNESS	<u> </u>			_ASSIFICATIC	DN	USCS OR	REMARKS*
30.8		3	5	4	5	+	6	7 Yellow Blowd			8		9	10
	₩.	+				183	Fr	Blowy	10000	STONE (			NBA	
							1			, HIGHU	H WEATHER	LED	BL	
											1	· · ·		30.8-31.3
													$\vdash$	
	10.9 10	0 100	20	39	<u>.</u> .									
					36.8	1	V	V	Y	r			N.	
						Mis	0F7	CROWN	SAHOY	TO SILTY	SHALE		BR	- 30° STAINED /
					39.0			GRAI			V			FRIALTURES 37.6
						598		MAADON,	CLAY	STONE			BR	
40.8	-							YELLOW			1		1	SLICKENSIDESIHI.C
		<u> </u>						GRAY						41.3,41.7,42.9,43.6
														44.9,45.15,45.85,
													1	46.5,47.3,47.95
			~											48.15, 49.25, 49.8,
	10.0 10.0	100	6	64										50.15, 50.45, 50.8.
		2												51.1,51.4,51.8,522
		<u> </u>		_										52.75, 53.15, 53.
					ŀ									54.2;
50.8				_	ł			_						• I 🖳
0.10	$\Rightarrow$		=	=										• • • 7
		<u> </u>			ŀ									(* 
					ŀ			-						•
	-+				ŀ									
	1.5 10.0	95		,4	┝								-	
'	14,0	73			-	-+							V	
		<b> </b>			$\vdash$	-+							VBR	VERTICAL FRACTURE
			-+		ŀ									56.4-58.7
	-1-				┢	$\neg \forall$							_ _	
			L				[			- V	r		<u>v</u>	<u> </u>

\*\* METHOD OF ADVANCING AND CLEANING BORING

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B-0518 BORING NO.

(29)

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LEVAN		<u> </u>	VL (	D HRS HRS	<u>14.2</u> ,	ISACKI	FR PLANT, ST. ALBANS, WV =ILLED	_PROJE	CT NO. CO40384.40-
DATE	12 MAY	12005	-	CLAS	SIFIED BY		AN SANGER	PAGE	<u>3</u> of <u>3</u>
							DESCRIPTION	T · · ·	
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERYIRLIN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
60.8	$  \rightarrow$			1	SOFT	MAQUONI	CLAUSTONE (CON'T)	BR-	
				62.8		PURPLE		VBR	
	4.2			610		VELWY'	V		
5.2					M.Sofr i	CRAY	SANDY SILTSTONE W/ CALCANEOUS	BA-	
				6,2,2		4	NODULES AND SMINGERS	BL	
					-		BOTTOM OF BORING: 65		
									·
									· · · · · · · · · · · · · · · · · · ·
				Ì					
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REMARKS \*\* \_\_\_\_

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0518 (29)

N 543732.8856

E 1725136.5233 Grade El. 991.07

PROJEC	т <u> </u>	LEY	7 2/3, -	J D H	IN E	AMO	5 Por	NERI	PLANT ST. ALBANS, WV	BO	RING	ANO. B-0519
ELEVATI	ON		GV	VL. (		328	5			_PR	OJEC	CTNO. <u>Co40384.4</u> ).
DATE	17-1	91	NAY 201	25	CLA	SSIFIED BY		ANSA	NGER	PA	GE	of
								DES	CRIPTION	1		
DЕРТН (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR		MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2		3	4	5	6 V.LOUS	7	+ - TOP	8	9		10
1.5	2	ろ	S-1 Rec. 1.2								=	
3.0	18	-	5-2. Rec. 1.3		1	LOOSS M.DENSE		1. 24-	DY SILT	M		
	7 10		5-3		1	1		51	LT TRACE CLAY	+	-+	
И, 5			AEL 1.2 5-4					1 31	LT, TRACE CLAY			
6.0	17	30	Rez. 1.0			DENSE	BROWN		LOMPOSED SHALE	GM	(+	· · · · · · · · · · · · · · · · · · ·
7,4	284		S-5 REC 1.3		7.4	VIDENSE				1		
					TEALE	SOFT	BROWN		SHALE : COMPLETELY	VB	R	TOPOFROLK 7.4
	3.1	5.1	100%	0			GRAY	1	NEATHERED			NUMEROUS LOW &
10.5		=				-		+		+		FRACTURES
	[ <b>-</b> ]¥				0		+	+ · ·		+		HIGHLY BROKEN ZONE
			-							┼╌╂		8.1-8.7
					13.7	V			V			
					14.7	SOFT	2		STONE: COMPLETELY WEATHERED	BR	1	HIGH & FRACTURE 13.7
	9.5 1	0.0	95%	49	15.5	MIHARS	MARIO	<u> </u>	STONE	84	-	
						SOFT	MU HELLO MOTTLIN	CLA	YSTONE : HIGHLY	BR	•	30° SLICHENSIDES
		-+							WEATHERED			18.7. 19.4. 19.85
											-+	23.0,23.3 23.6
20.5											_	23.9 24.35
	L T					SOFTPO			SOME CALCANEOUS	$\left  \cdot \right $	+	
						MISPET		1	NO DULES			
						V			1.00000			45° FRACTURES 22.2
		_				MISOFT	GRAY				+	in the contract of the
	12.0 1	0.0	1002	60			*					
		+					GRAY 4 MAROON	1	· PIECES 0.2-0.4' LOPG			MAINED 20-30" FRAL-
		-					MALOON				-	UNES 24.7, 25.2, 25.8,
								L				6.0

REMARKS .. DRILLED BY TERRA TESTING USING A SIMCO 4000-T2 TRACK MOUNTED AFILL

BU LING ADVANCED USING 514" SOLID STEM AUGERS, 4"STEEL CASING, NO-2 WILELINE CONING TOOLS

\* POCKET PENETROMETER READINGS

BORING NO. B-0519

\*\* METHOD OF ADVANCING AND CLEANING BORING



								LANT ST ALBANS, WU		GNO. B-0519
ELEVATIO	DN		G	WL (				·	PROJE	CT NO. <u>CO40384.41-</u> 0
DATE	17-	ig M	NAM 200	<u>55</u>	HRS CLAS		DA	N SANGER	PAGE	2_ of _5
							,	DESCRIPTION		
DEPTH (FT.)	BLOWS PER	OH CORE RECOVERY/RUN		<u>ه</u>		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		$\sim$	3	4	5	6	7	8	9	10
					31.4			CLAMSTONE (LON'T)	VBR	
<u> </u>						MISSFT	OLIVE- GRAY	SANDY SILTSTONE	<u>B</u> A	STAINED LOW &
	†				33.2	SOFT TO	GRAY	CLAY SHALE		ALACTIME 32.2, 33.0, 33.3
					35.1	MI SOFT				34.3, 34.8, 35.1, 35.45
	10.0	10.0	100%	58	36.4	MISOFT	OLIVE-	SAPOY SILTSTO NE		
	L				26,1	SOFT TO	MADOP		BR-	
						MISOFT	GARY		BL.	
							2			
40.5					4					
					41.5			V		20° SLICKENSIDE, 40.5
						N. 110.00				70°56104623102 4110-4113
					43.8	M.HAND	GARY	SANDSTONE : MICACEDUS	Br-Br	
				1-		H.SOFI	GRAY	SHALY SILTS FORE, SOME SAN		NEAR VENTICAL FRACTURE
	10,0	60	100%	51	1	1		- THICH SIGTS FORE, SOME SAM	9 154	42,85 - 43.8
					47,4	v				
					9	M, SOFT	GRAM	SILTY CLAYSTONE	BR	
						1	HOPPAM		1	20-30° SLICKELSINES
50.5				-			DH GRA-			48.65, 49.6 50.2
		$\geq 1$								50.8,52.9,53.2.
										53.5, 54, 2 54.8
							243		·	55.3, 55-6, 55.8, 56.0
	<u> </u>	_								48.65, 49.6, 50.2 50.8, 52.9, 53.2, 53.5, 54, 2 54.8, 55.3, 55.6, 55.8, 56.0 51.6, 57.0, 57.4, 87.8, 58.1, 58.4, 59.2
	10.3	10.2	100%	62						57.8, 58,1, 58,4, 59,2
	10.0	10.0	100 (	123				I		
						V	V	1		

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REMARKS \*\* \_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0519 (20)



ELEVATI	ON		GV	VL (	0 HRS	32.	35		ALANT ST A				Coyo384.43.
DATE	17-	19	NAY 2005		HRS	SSIFIED BY	,		AN SANGER				of
								3					
						1			DESCRIPTION		-		
DEPTH (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		COLOR	MATERIAL CI	ASSIFICATION	USCS OR ROCK BROKENNESS		REMARKS*
1	2		3	4	5	6		7		8	9		10
5:00	$\pm 4$	$\geq$		+	1	SOFS TO	M	NOON	CLAYMONE	(LON'T)	32	20'-3	D' SLICKENSIDES
					-	MISSER	_	1			4		~ 0.2: 0.5'
	ļ			<u> </u>	-						VBR		
				-	-		$\vdash$				BR		
	00		- 79		-				22				
	8.1	12.2	87%	41	-		+						
					{			+					
	┼──┤				-	<u> </u>	1-	- 17			VBR		
			2		1		+	+				30° s	LICKENJINES
72.5		$\overline{\boldsymbol{\Sigma}}$		<u> </u>			┼─						,71.7
		-			71,9		+	V			BR	VEILINCA	IL RUACTURE
					1111	MA C. ET			SAPDSTOPE ; U	E Viceourico	BR-BL	10.5-	.70.8,719-72
		-			1	M. Harr		1	AGULACEOU		BK-BL	· · · · · · · · · · · · · · · · · · ·	
					1		ᡩ		CROSS BEDRIN				
	100	IU .0	100%	78	1		$\uparrow$		I AREGULAR CA		+		
					]				NODILLES				
					]						++-		
									Ð			VERTICA	AL FRACTURE
80.5	<u>                                     </u>												78.8, 50.0-00
1617	= 4	≻┤					-						
	┠╴╶┦					<u> </u>	-	$\left  - \right $					
							-				<u>   </u>		
							╂—			·			
	10.0		100h	al				$\left  - \right $					VENTICAL FRA
	10.0	0,0		72	86.2	¥	_		V	l	V	TURE	84.3-85.3
		-+				MisoFr	1	+	5 APOY CLAYST	340	BR		·
							GA	JAN I			+ $+$		CKENTIDE 88.5,
					89.6		+	¥ l	SHALY SANDST	/		89.15	

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>3-0519</u> (20)



PROJEC		REF	12/3	70	HN é	: Amos	POWER	PLANT ST. ALBANS, WU	BORIN	GNO. B-0519
ELEVAT	10N		G	iWL	0 HRS	32.5	85			CTNO. CO40384.40-01
					HRS					
DATE	17-	<u>15 r</u>	MAY 2-20	5	CLA	SSIFIED BY	<u> </u>	AN SANGER	. PAGE	4 of 5
								DESCRIPTION		
	CHES	NI	చ	NE		Н			ESS	
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1 90.5		2	3	4	5	6	7	8	9	10
	1	$\mathbf{F}$			1	M. SOFT TO	LT GAAY	SHALY SANDSTONE (CONT)	BR	10-20' FRACTURIES
		·	ļ		-	M.HARD				91.1,91.55,92.0
					-					52.4, 52.6, 93.1
					94.0		CA ON I	<u>v</u>	V	
	-		100%		95.9	MISSET	MAROON	SANDY CLAYSTONE	BR	VENTICAL FRACTURE
•	10.0	15.0	100%	20			<u> </u>		¥	92,6-93.1,943-94.6
			<u> </u>		-	1	4	CLAYSTONE	BR-VBA	20-30' SLICKEASIDES
	+				-	TO SOFT				EVERY ~ 0.1-0.3'
					-					
100.5		K			1			·	V	100.5-102.7 1204
	$\rightarrow$	K_			Ŧ				VBR	BLAKEN ZONE, HEAVILY
	+				-					STAINED 100.5-101.7
					-		GRAY	· · · · · · · · · · · · · · · · · · ·		
· · · · · · · · · · · · · · · · · · ·					104.5					
	100	10,0	100%	0	1	11 1250				
	10.0	10.0	100 1	120	1 ·	M.SOFT M. HARD	LT.GMAY	SITALY SALOSTOLE	BR-BL	
						M. HARD				
				+	1					
	1			1-	1		- -			
110.5	$\vdash$	5			Elp.S		V			
		r 1		+		M. HARD	15 6 6 64	SANDS TONE : MICRIEOUS	BL	
				1-		1	0.3.41	38493 10F - ; // 10160000		110.5-114.7 - 1 PIECE
				1	1					
					114.7					
	10.0	10.0	10000	77		M. SOFT	GNAY	SANDY SHALE		
		İ				1		i state	BL	VERTICAL FRACIURE
					117,5	M. FOPT	GRAM +	CLAY STONE		115.25 - 115.75
							MARDON +	LLMY DIANC	BA	10-30 SLICKEASIDES
							MOTTLED			EVERY 20.3-0.5'
	**		,		L	<u>_</u>		V.		

REMARKS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0519</u> (20)

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							32.85				,	PF	ROJE	GNO. 13-0519 CTNO. 2040384.4/3-
ATE	17-	19 N	114 20	25		HRS CLAS	SIFIED BY		. DAr	SANGE				<u>5</u> of <u>5</u>
	Τ				Τ		•		DES	CRIPTION				•
ДЕРТН (FT.)	BLOWS PER SIX INCHES	OH CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% HOUN HECOVERY	RUU (%) UH I UHVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR		MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1		2	3	1	4	5	6	7			8		9	10
		·					MSOFT	MAROD	i CL	AY STOPE	(csr) T)		5A- 5A	. 23-32" SLICKENSIG N. EVENY 0.1-6.3'
	[9.0]	٥.دا	1002	4-	2	125.9			,	1	1 124.2-125.1			4. 
							Millars	UTCASY	Sid	ALY SAPOST	240 1	<u> </u>	r 1	ROD IPTHIS UNI
					<u></u>	129.15				<u> </u>	<u>v</u>		L.	
130.5				+-	_		MISSET	GRAY"		ERBEDDE		ß	A	
								Mattlin	1	LYSTORE I	AND SILTSTONE			
				+	-,	33.8						+	<u> </u>	
	10.2	10,0	100%	17		35.3	M.SOFT		CLI	SHOTZYE		 U P	ж	
						35.5	M. SOFT		1	DY CLAYST	DHE WITH		52	LOW & FRACTURE
							MHARD	1 1			EDUS NODULES	1		136.05 136.4, 136.
				+	-					STLINGE				137.3, 137.9, 138.4,
							V	1				-		1-6.1, 101-0
143.5							M.SOFT	MAROON						
	ļ				_1	42.0	4	1	<u> </u>	1	<i>i</i>	\		
				+			M. SOFT	LTGRAY	SHA	UH SANOST	٥، کو	<u> </u>	3L	
	_			_			M. HARD	<u> </u>						
	10.0	10.0	100%	80	5						STONE SEAM	+	-	
	110.0	10,0	1004	10	-1'-	46.3	M.SOFT	GRAM	50.		1-144.65			
				+	-	47.4		MARJUN	1	Y STONE		ß	<u>14</u>	VERTICAL FLACTURE 147.2
				+	-4	48.8		- HERINGOF		1 STONE	`			<u> </u>
50,5						ľ	MUHARD	GRAY	SAPO	M CHNIE COL	ALLY SAJOSTONE	R	L	

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>β-0519</u> (کم)

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N 542378.3755

679.31

gal consultants trailfaming Jacob Intereality

1	PROJEC	т <u>А</u>	LEP	3 =	ЮЫr	) E,	Amos Po	wer f	LAN	ST. I	AUBANS W	_во	RIN	g no. <u>B</u>	-252	<u></u>
	ELEVATI	ON		GV	VL C		18.6					_PR	OJE	ст но. 🧲	04038	1.40-01
	DATE .	: 2	3 m	127 2-205	-	HRS	SIFIED BY	DA	5 5	ANGER	· · ·	- PA	GE	1	. of	4
[		T		<u> </u>	Т		·		DES	CRIPTION		-		· · ·		
												1				
	DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	. color		MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	R	EMARKS	•
-	1	+	2	3	4	5	6	7			8	2			10	
ŀ	_1.5	1 3	3 4	S-1 AEL 1.5 5-2			STIFF	Maawood			"D LOCKFRAG -	C	l	.+ 2.0	RF	
ŀ	3,2	4 4	1	S-2 REL. 1.5					n n	reners				1025		
t		5		5-3							·			+2.5.		
ŀ	4.5	5	_6_	R. 1.5 5-4				V				N	r		<u></u>	
+	6.2	6	12				M. DENSI	BLOWH	CLA	1EY SILT AND	ONGANICS	m		•		WET
ł	7.5	12	3 <u>5</u>	5-5 REC. 1.5 5-6 REC 0.1		7,6	V.DELSE	GRAY+ MARION		1	4					
t	7.6	50/0	7	5-6 1160 01		1,9		MARION		OMPOSED C	LAY STONE	9m VBQ		TOP OF		
t		4.4	4.4	100%	12		1			CRAY 1		VUK	131	MOST P	leces of	5, =
ŀ	12,0	$\vdash$				12.0	*	V	\ \	1		ł	/			
ł						13.7	SOFT	GRAY	SA	NOY SHALE	: WEATHERED	VBR				·
ł							SOFT	marcook	C. A.	YSTORE	V	BR			A. C.	
ľ							1		CUA	4JIDFE	· · · · · · · · · · · · · · · · · · ·	131		VERTIC 16.6-1		ciwe
								GRAY		CALCARE	OUSNOULLES 16.0-16.5				2. 1	
$\left  \right $		9.3	10.0	937.	51					, 2842A						
ł								· •								
t	······································							MAROON			······································			20" 5610	REMEND	· 19.75
I	22.0										<u></u>					
														•		
$\left  \right $													_			]
ł														30° 6	<u></u>	24.11
		9.2	0,C]	92%	65									30° SICK		
L														27,7,28.	4672	0112
L							4		1	Y		V				

REMARKS . DRILLED BY TERRA TESTING, INC. USING A SIMCO YOOD-TZ TRACK MOUNTED DRILL

BORING ADMINED USING 5/4" SOLID STEM AUGERS, "STEEL CASING, NO-2 WIRELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u><u>R-0520</u> (15)</u>

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		2/3,J				PSWER	PLANT ST. A	PANE, WU		IGNO. <u>B-0520</u> ЕСТ NO. <u>C040384:40-01</u>
				HDS				··		
DATE	23 n	NAY 2005	5	CLAS	SIFIED BY	DA	IN SANGER	•	PAGE	2 of
							DESCRIPTION			· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CL	ASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7		3	9	10
20	<u> </u>		<u> </u>		SOFT	MAADON	CLAY STONE (C	(דיבס	BR	
32,2										
				-						
			+	1						
				35.5			Y	y		
· ·	9.9 10.0	99%	117	37.2	MIHARD	IT GOAN	SHALY SANOSTONE /S	CANNY FLARS	BL	
	1. 11			31.2			CLAYSTONE	10.01 31400	BR	
				İ	ł			1	I	
21				40.2	V			/		
				1-11-4	M. HAAD	LT GAAY	SHALY SANDSTONE /S	ADDY SHALE	BR	VENTICAL FRACTURE
42.0				111-2						40,4-41.0, 42,0-42.3
	<u> </u>		L	41.7		V.		<u>/</u>	V	
			ļ		M. SOFT	MANDON	INTERBEDDED S	ANDY CLAYSTONE	BR-BL	-
			<u> </u>		M. HARD	GRAY	AND SAMOY SHI			· .
			1.1-				( SOIS') SANDST	TONE UNITS,		
	10'9 10'9	100%	85				FEW IAREGULAR			
							NODULES AND	ATRINGERS		
									<b> </b>	
52.0				52.1				/		
	Y			<u></u>	M. HARD	LT GRIAY	SILALY SANDSTO	34	BL	
				ડપ.વ	V	V		,	J	
				27.9	MISOFT	madood	CLAYSTONE YN	IMEROUS IRAELULAR	RL-BI	SLICKENSIDES 56.1,
						GREEN-	CALCAREOUS NO		1	56.5, 56.75, 57.0
	10,0 10,0	100%	81			GARY	STRINGERS			60.7,61.0 61.3
	-									
					¥.	N	V	4	V	

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0520</u>

34



PROJEC	т <u> </u>	REF	1 <sup>2</sup> /3	Job	1 N E	-: AMO	5	PSW	er.	PLANT, ST. ALBANS, WV					
			0			) <u>10.4</u> }					Pi	ROJE	ECT NO.	040	384.40-0
DATE	්ථ	31	NAY 22	05	CLA	SSIFIED	BY	1	Dr	W SANGER	P	AGE	3	of	<u> </u>
										DESCRIPTION					
DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS			MATERIAL CLASSIFICATION	USCS OR	ROCK BROKENNESS		REMA	RKS*
1		2	3	4	5	6		7		8		9		10	
122		<u> </u>			4	M.So F	7	MALC T GLA		CLAYSTONE (LON'T)	e	SR.			
620	$+ \langle$	<u>}-</u>			-										
					-	<u> </u> -		$\left  \cdot \right $							
					1	┝╌┼		┝╌┼			+				
					66.2				1						
	10.0	10.0	10000	75		Miso	-7			SANDY CLAYSTONE, FEW			•		
					]	1		1	<u> </u>	SANDY SILTSTONE SERMS	- 13				
					]					1					
											+				
72.0				-							+-				
		<u> </u>			73.6	-V		/			Τ,				
		_													
						M. S.FT		GRAY		INTERBEDDED SILTSTONE AND	BR	FBL			
							-+		_	FINE GRAINED SANDSTONE					
	10.0	100	100%	96											
			19-10	1.6					-			┝─┤			
				+			-+	+	-						N2
					81.1	V	$\neg$	V			+	$\overline{\mathbf{v}}$			
82.0						MCHAR	0		AY	SANOSTONE	ß				
	$\neg$				-	1	-	1		A					3
											+-				
				8											
	_														
	9.9	10,0	99%	100			_		$\downarrow$						
		-	<u>.</u>	┞	-		-	V	-						
	1					¥		V		V	N	/			

REMARKS \*\* \_\_\_

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• POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. 8-0520

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PROJEC ELEVATI	T <u>ALEY</u> ON	+ <sup>2</sup> /3	VL (	14 E	: AMDS	POWER	2 PLANT, ST. ALBANS, WV		GNO. B-0520 CTNO. CO403840, 40-
	23 MI			HRS		Ď,			of
							DESCRIPTION		· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	согов	- MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
A1.0					MUAN	LT GARY	SANDSTONE ( (ON. 7 )	BL	29
12.0	$+ \oplus$			ł	<u>├</u>				
								·	
•	7,6 8,0	95%	' <b>Դ</b> ?						3
				97.8					
				041.0		GRAY +			
30,5					MISSFT		CLAYSTONE	BR	
					¥	. *	BOTTOM OF BORING: 100'		
							1201 VM 0F 1301-186 100		
							0		
							· · · · · · · · · · · · · · · · · · ·		
								<u> </u>	
						<u>├</u>			e 2
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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-2523 з.

N 544199.5521 Grade El. 1004.35 E 1724054.5791



ELEVATION	PROJEC	TARE	A 2/3	TOH	NE	Amos	İsw∈n	- PLANT ST. ALBANS, W	BORIN	1GNO. B-0521
DATE     A3     MAY 3.05     CLASSIFIED BY     DA.J     SA/2622     PAGE     I     of       B     B     B     B     B     B     B     B     B       C     B     B     B     B     B     B     B       C     B     B     B     B     B     B       C     B     B     B     B     B     B       C     B     B     B     B     B     B       C     B     B     B     B     B     B       C     B     B     B     B     B     B       C     C     C     C     C     C     C       C     C     C     C     C     C     C       C     C     C     C     C     C     C       C     C     C     C     C     C     C       C     C     C     C     C     C     C     C       C     C     C     C     C     C     C     C       C     C     C     C     C     C     C     C       C     C     C     C     C <t< td=""><td>ELEVATI</td><td>ON ~100</td><td><u>53</u> G</td><td>WL</td><td>0 HRS</td><td>246</td><td></td><td></td><td></td><td></td></t<>	ELEVATI	ON ~100	<u>53</u> G	WL	0 HRS	246				
Signed by the second	DATE	23	MAY 200	5	HRS CLA	SSIFIED BY	DA	N SANGER	PAGE	of
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							1	DESCRIPTION		· · · · · · · · · · · · · · · · · · ·
$\begin{array}{c c c c c c c c c c c c c c c c c c c $						s DF	<u> </u>	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				4	5				+	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	1.5	3			~		BADWH-			. × 3.0 TSF
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	30	7,4	14= C. 1.7		1.			SAPDY SILT, FEW SHALE FRAGMENTS	ml	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		50/0.4	5-3,144 0,	3	3.4	V.DEJSE		NECOMPOSED SADON SHALE		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				+	-			SILTY SHALE STUE SOLD	RA.	STALLER LICETIAL
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				+			1	01406 Sweet South C 11015	1214	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					1				- -	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		7.0 7.0	100%	40	1					
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $				-	1					Pro 0 rt
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	10.4				10.3	M-SDCC	AA julia		<u> </u>	0.51 7.55
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				1	1	1		SMACE		PIERE
M-NARS         BADDS TO JE: MEDIUM GRAI, JED         DL           IDO         IDO         78         IDO         DL           IDO         100         78         IDO         IDO         DL           IDO         100         78         IDO         IDO         IDO           IDO         100         78         IDO									-010	1 ( E LE ) 0,1-0,4
$\begin{array}{c c c c c c c c c c c c c c c c c c c $					13.3	MANDED	D Q ANIN-	¥		2
$\frac{20.4}{10.0} = \frac{10.0}{10.0}			1		1	1		ANNUS TONE MEDIUM GRAIPED	BL	
$\frac{20.4}{10.0} = \frac{10.0}{10.0}		100 100	Loog	170				· · · · · · · · · · · · · · · · · · ·		
10.0 WD 1006 92 29.25,28:45 28:85,29:35 29.85,30:15,30.3 UELTICAL 5 MINES			100 10	1/0						
10.0 WD 1006 92 29.25,28:45 28:85,29:35 29.85,30:15,30.3 UELTICAL 5 MINES					1					
10.0 WD 1006 92 29.25,28:45 28:85,29:35 29.85,30:15,30.3 UELTICAL 5 MINES										
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10.0 100 100 100 12 29.2,28.45,28.85,29.35 29.25,30.15,30.3 UENTICAL STRIPED										
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29.85, 30.15, 30.3 UELTICAL 5 MARED										
29.85, 30.15, 30.3 UELTICAL 5 MARED		10.0 10.0	100%	92						LAWX FORETIST
29.85, 30.15, 30.3 UENTICAL STAINED									1 1	
UELTICAL STAINED					l					
					ŀ					
					Ì	¥	V			FLACTURE 29.3-29.7

REMARKS . DALLED BY TELLA TESTING, NC. USING & SIMCO YOOD-TZ TRACK MOUNTED. DAIL

BORING NO VANCED USING 514 SOLID STEM AUGERS, 4" STEEL CASING, NO-2 WILELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0521 (13)

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BORING NO. <u>B-0521</u> (19)

51**.** 

PROJECT	AR	EA	43, -	rour	s E.	·AM:	s P	ove	r f	LANT ST. ALB		-		GNO. 13-0521
ELEVATIO	ON <u>10</u>	<u>00</u>	<u> </u>	VL 0		29.								CTNO. <u>COY038440-01</u>
DATE	23	m	2005 24		CLAS	SSIFIE	D BY		DAM	) sanger	·	- PA	GE	of
						1		1.		DESCRIPTION			•	· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)	BLOWS PER SIX INCHES		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	R R	ш.	SOIL DENSITY -	ROCK HARDNESS	1	COLOH	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	_	3	4	5	+	6		7		8		9	10
		_				M. H	AND L	1	WN-		MEDIUM GRAINED	B		
<u> </u>							<u> </u>	161	A4	MICALEDI	AS (LONIT)	ŀ	-	ALL BREAKS ARE
											·	1		MECHANICAL - CONS IN 4' AND 6' PIECES -
									$\vdash$			1—		BADKE DURING HANDLING
	10.0	10.0	100%	100			,						-	
										ф.				
								<u> </u>						
40.4							[	L	2	•				
		_						<u> </u>						
								┣—		78				2
				$\left  - \right $										
	12.2	10.0	100%	100				<b>_</b>						•
	0.0	. 0, 0		150										
		-												
			-		i									
5014		$\succ$												
														•
														·····
	9.7	10.0	972	<b>64</b>										
														£)
·		$\dashv$												
														0.05 CALBONACEOUS SURLE
		_1				\	/	4	1	V	l	N	/	· Ar 59.8

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING



					HRS	24.6		DAN	SANGER				_3 of _3
						·			DESCRIPTION		-		
DEPTH (FT.)	BLOWS PER	OH CORE RECOVERY/RUN	_	ŭ ŭ	_	SOIL DENSITY - CONSISTENCY OR		COLOR	MATERIAL CL	ASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1 60.4		2 D	3	4	5	6	- 81	7 606-		8	9		10
		Р <u> </u>				MHAND	+	GALY	SUCAUS	( copt. T)	BL	-	
					64.0	V M.SOFT	LT	×	SANDY CLOUSTONE M		V Ba		
	9.6	10.0	96%	58	66.5			MAY	SILTY CLAYS	TONE		4	
				<u> </u>			╧	*					
				+	-		m	μαση	CLAYSTONE				30°51102EATIDES 66.75, 67.
					1		╋						69.0 68.25, 68.4, 68.6, 69.
70.4				+	70.4	V	+	¥.		N.			69-45, 69.7, 70.3, 70.4
									BOTTOM OF BORG	46:70.4			
		_			-							$\downarrow$	
				-			┿					_	
				123			+-						<u>16</u>
					]								
										·			
. <u>-</u>											:	·	85
							+					_	6
	<u> </u>						+		•			+	
							1		*			┼	
												$\uparrow$	
				<u> </u>			_						•
												+	:
							+					╋	
							1	-+					

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\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0521 (19)

E 172						901.64					
PROJEC	T_A	140 1	- 13	JV		E. AMOS	Prive	T- PLANT	ST. ALBANS, WU	BORI	NG NO. <u>B-0522</u>
ELEVATI		02	<u> </u>	<b>WL</b>	0 HR	s_ <u>&gt;</u> 6,	8			PROJ	IECT NO. CO40384.4
DATE	24-	25 M	A4 200	5	HR: CLA	S	Y D	ANSANGER		PAGI	E of
	Γ							DESCRIPTION			0,
DEPTH (FT.)		CORE RECOVERY/RUN		% ROCK RECOVERY ROD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR	COLOR	MATERIA	L CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	12		3	4	5	6	7		8	9	10
1.5	22	3	S-1 REL D.L		-	V.STIFI	FMAROO	1 SILTY CL	R4	C1	+ 3.5 TSF
	3		5-2						~		
3.0	1	ى	Rec. 1.2	·	-3.4						
4.2	18 38	3	5-3 REC 1.		4.2	11	E OLIVE	DECOMPOSED	SANDY SHALE	¥	
		Ê			1/2/1:		OLIVE	INTERBEDDE	SALOY SILALE AN	3 BR	LOW & FRACTURE
				_	4	M.SOFT	GRAY	SHALY SAN		1	1.7, 51, 6.1, 6.25,
	1.7				_					° –	6.95, 7.35
	6.3	6.3	100 2	6							STAINED 30" FRA
					_						THE S.Y
12:5		_			_			28			VORTICAL STAINED
		Ż									FLACTURE 8.85-9.2
							_				STAINED LOW & FR
											TULES 10,8, 11.6, 12.
					1						12.65, 14.7, 14.9, 15,
					_					V	15.3.15.9,16.05
	10.0	0.01	100%	36	_					VBR	16.45, 16.5, EVENLY 0
		_			4					BR	TD P. 3 16.5-
					_				8		
				ŀ	4						
20.5					200	<u> </u>	V		¥	V	· · · · · · · · · · · · · · · · · · ·
		≿‡			1	SOFIN	MALOON	CLAYSTON	٤	BR	
					4	V.SOFT	CRAY			<u>.</u>	
					4	<b> </b>				V	
					-					BL	-
					-	<u> </u>	1			V	
	8.8	10.0	88%	146	1					WBR-	
					27,3	<u> </u>		23	¥	BR	
						MIHALD	GRAY	SHALY SAND	STONE	BR	STAINED VERTICAL
-		1		1	1	1 1	1 1		1		FAACTURE 27.0-28

REMARKS .. DAILLED BY TERRA TESTING INC USING A SIMCO 4000-T2 TRACK MOUNTED DAILL

BORING ADVANCED USING 54" SOLID STEM AUG2LS, 4" STEEL CASING, NQ-2 WIRELINE CORING TOOLS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0522</u> (1.0)



PROJEC	т_:/	LE	A 2/3	, Jc	542	E. AMOI	r Pow	ER PLANT ST. ALBANSWI	/ BORIN	GNO. <u>B-0522</u>
ELEVATI	ON _	10,	<u>₹</u> GV	VL (		56.8			PROJE	CTNO. CO 40384.40-01
DATE	24-	25 M	LAY 200	5	HRS CLAS	SSIFIED BY		DAN SANGER	PAGE	of
				Τ		·		DESCRIPTION		· · · · · · · · · · · · · · · · · · ·
DEPTH (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2	3	4	5	6	7	8	9	10
	$\vdash$	$\geq$		<u> </u>	31.1			· · · · · · · · · · · · · · · · · · ·		
		· ·		<u> </u>		VISOFT	MAROON	CLAYSTONE.	VBR	NO RECOVERY IN
		-			-					THIS UNIT
					{					
<u> </u>	21	10.2	3.64	24	1					
			<u> </u>	01	1					· · · · · · · · · · · · · · · · · · ·
				1-	37.5	M.JJFT	OLIVE	THITELBEDDED CLAY TONE AND	V	
						T T	GRAY	SANDY SHALE	BA	WW & FRACTURES
					1		1	· [		41.45, 41.7, 41.9, 43.7,
40.5	$\vdash$	$\geq$								43.8, 56.8, 48.4, 49.4.
	L									50.0,50.9,51.1 51.4,52.2
			- 20						e have C	STAINED HICH & FRAL-
				<u> </u>					1	MRE3 45.5-46.5
			0							47.4-47.9 48.7-
	10.0	10.0	100%	56						48.95
							-   -			
		_								
50.5		5-1					$\left  - \right  - \left  \right $			
		r	0.40			V				
				-	52-3	MISFT	OLIVE-	SANDY SHALE	BR	LOW & FRALTURES 52.7.
						1	GRAY		1	53.9, 543, 54, 65, 55, 1 56.4
						-				57.45, 59.3
	19.0	10.0	100%	30						STAINED LOU & FRACTURE
										53.45, 55.75-55.9, 56.5
					57.9	<u> </u>	V	¥	¥	57.1,58.4 60.0
						SOFTTO	maasor	CLAYSTONE	BR-	HILH & STRIJED FRACTURE
						W. SPFT	GRAY	¥	UBL	58.7.593

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REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. 3-2522



LEVAII		02	± GV	VL C	HRS		5.8						ECT NO. <u>COYO384,40-1</u>
ATE	<u>24.</u>	1	hay 2005	-	CLAS	SIFIE	D BY		DAN	SANGET	٤	PAGE	: <u>3</u> of <u></u>
						1			DESCI				s.
ДЕРТН (FT.)	BLOWS PER SIX INCHES	CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR	ROCK HARDNESS	color		MATERIAL C	CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	!	3	4	5	6	3	7			8	9	10
60.5	+	$\geq$			60.7						•	=	
		· .				Mil	oft	GMM	SAN	DY SHALE		BR	STAINED LOWY FRAL-
					63:0	-		4		8	¥	!	TULES 60.75 61.0
					64.9	misi		mA hoor		Y STONE			61.5, 61.9
		140			-	Misc	26T	CLAY			STONE / SANDY	_	HEAVILY STAINED NEAR
	10.0	10,0	100%	36	}				SIT	ALE		_	VERTICAL FRACTURE 65.35-67
													2067' 100% WATER LOS
													STAINER VERMONL FAN
													TURE 68.1-68.7,69.2-
70.5					70.4					•	<u>V</u>	NBR	70.3
		Z			1			MANOON	CLA	1 STOLE	· · ·	BR	
								GRAY					VERTICAL FRACTURE
											·		74.6-76.5
												NBR	
	10.0	10.0	1002	61								BR	
	12.00	·	1000	101	.							1	
				1									
										: SAL	104 78.5-80.5	BA	
									[		1 10:3 80:5	1.01	LOW& FAACTURE 80.
80.5	-	$\succ$											81.2, 83.1, 83.7, 84.5
									·		······································	VBR	U.BLOKEN 2015 \$1.3-83.
									<u>_</u>				
								DIL GLAY	1			V.	
								1			•	BR	HICH & FRACTURE 84.2-
	10,0	10.0	100%	57	86.1	V	1	V		1		1	84.45
						M. So	FT	GRAY	SILT	STONE		BR	LOW& FRANKE 87.1, 87.6
										4		1	88.3,
													NERF VETTICEL STELLED
in the second second							r		[				FRICTURE 88.5-89.2

REMARKS \*\*

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>β-0522</u> (1.9)



PROJECT		601	<sup>2</sup> /3 =	<u>501</u> GW	よう i	<u>e. av</u> hrs	<u>ron</u> S	ANN:	er (	PLA	N-	ST. ALBAN	15, WV		BO		G NO.	B- Co	-052	2-
DATE			LAY 20			HRS						NGER							of	
									1.		DESC	RIPTION					·			
DЕРТН (FT.)	BLOWS PER SIX INCHES	OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	щ		S	CONSISTENCY OR ROCK HARDNESS	<u> </u>	COLOH		MATERIAL CL	ASSIFICATION		USCS OR	ROCK BROKENNESS		REN	/ARKS*	
1 90.5		2	3		4	5 90.0		6	<u> </u>	7	<u> </u>		·		9				10	
	~							IARD		MAY	SHA	LY SA205.	TO NE MICACE	:045	Bu	-				10
	6,61	0,0	1001	),	93					-				· ·						
100.5																	2			
						a														
	10.0	12'0	1001	5	٩٢							· SHALE	107,0-107,6(	BA)					v.	
110.5		→ →											BBLES/CHITS 6-109.8							<u> </u>
											· · · ·						•		61	
	10,0	10,0	1001	。 c	15															
										-	0									9

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0522</u> (13) ж.



PROJEC ELEVATI	T_A	RE	A 2/3	J.H WL (	i∤ €. ) HRS	Amas 56.8	BWER	RANT ST.L	MBANS, WV	BORING	ано. <u>B-0522</u> стно. <u>Сочозвч.4</u> 0-01
DATE	24-	، ک <i></i>	MAY 200	5	HRS			AN SANGER			_5 of
[	1			_	7			DESCRIPTION			or
							1	DESCRIPTION			
ДЕРТН (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		MATERIAL C	LASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
120.5		2	3	4	5	6	7		8	9	10
		Y .		-	1	M-HAM HAND	LT GALLY	SANOSTONE	( corit )	BL	
						1			<u> </u>		
									[		
	12.0	10.0	1.202	100		\$					
	10,0	10.0	(,)) 6	GCN							·
											1
		120									
130.5								· · ·			
	$\vdash$	<u> </u>		- 5-						_	
				+							
											64
L								<i>i</i> i			
	10,3	lo.0	100%	00							3
				$\left  - \right $							
								· · · ·			
140.5											
1905		$\geq$									
								·			21
					ŀ				2		
					ł						
	[0 .J	10.0	100%	col							
					ļ						
					-						
					ł				/		
	. 1		l	<u>I</u>						W I	

## REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. B-0522

Ξ.



PROJECT	г <u>А</u> ом <u>С</u>	102	1 <sup>2</sup> /3 : ± gv	<u>701</u>	) HRS	- AMOS ( 56.8	SWER		PROJE	CT NO. (2343384.43-3)
DATE .	<u> 24-</u>	<u>as n</u>	IAY 2005		CLAS	SSIFIED BY	DA	N SANGER.	PAGE	of
							· · ·	DESCRIPTION		
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	۲ ۳		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
150.5	$\equiv$	2	3	4	5	6	7	B SANDSTOHE (100-T)	9	10
		<b>·</b>				S>FT	MARDON C RAY,		BR	
				1	1	1	PURPLE		1	330 SLICKENSIDES 153.05
					154.5		j.	NC NC		153.6, 154.0
					124.2	M. SOFT	GLAY	INTERPEDOED SANDY SHALE	BL	
·	10.0	b.o	100%	75		M. HAND	LT. GRAY		1	
								· · · · · · · · · · · · · · · · · · ·		
										14
					ł		·			
160.5		5			1		<u>↓</u>	· · · · · · · · · · · · · · · · · · ·		94) 
					1					
			~				+ +			
	10.0	10.0	1002	100						
										·
										Q 8
170.5										
		$\geq$								
								а <b>:</b>		
					173,2	V	V		V	
					1747	SOFT	GRIAY	CLAY SHALE	BL	
	12.2		100%	71						
	10.0	10.2	100 10	12		S.FT	DH GROY	SILTY TO SANDY CLAYSTONE	BR	20-35 SLICKENSIDES
							MAROON			175.0, 175.4, 175.55, 176.1,
										176.6, 177.35, 177.65, 177.5
								STAINGERS 179.4-1800		178.35, 179.15, 179.4,
						<u>v</u>	· · · · ·	Y JININGERS 1/7.4-18010	1	L <u></u>

REMARKS \*\* \_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-3522</u> (18)

8



LEVAI			<u> </u>	iWL.	0 HRS	<u> </u>	5		PROJI	ECT NO. 494338449
	<u>4</u> 4	- 4- 2	MAY 200			SSIFIED BY	<u>DA</u>	N SANGER	PAGE	= <u>7</u> of <u>9</u>
						1	<del></del>	DESCRIPTION		•
DEPTH (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR	% NOCK RECOVERY ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2	3	4	180.0	6	7	8	9	10
		¥.			$\neg$	MISSFT	GRAY	SHALY SILTSTONE	BL	
	+				183.0					
	+				1.0 5.0	M. SOFT	MOUDU	CLAY STONE	V	2020
						SOFT	GRAY		BL- BR	30° SLICKEISIDES AT 185.1, 185.3, 185.5,
	10,0	10,0	100%	78	3		1	5	1	186.4, 186.7, 187.0, 187
					_					187,55, 188.1
					188.6					
					-			¥	V	
190.5	$\vdash$				-	SOFT TO	maroon +	INTERBEDDED CLAYSTONE AND	BL	
				+	1	111.5561	GRAY	SANDY SHALE, SOME SANDSTONE	4	
				$\uparrow$	1				$\left  \cdot \right $	
					]					
	<u> </u>									100
	10.0	0.01	100%	90	4					
					-					
					1			¥		
										2
0015	$\neg$	$\geq$			200.5				Ŷ	
						M.SOFT	MAROON	CLAYSTONE	Ra-RI	20-30" SLICKENSIDES
		-+					GRAY			202.3, 202.65, 202.9
										203.2, 203.45, 203.7
{	10.0		100%	0/		_				
	10,0	10.0	190.1	86	206.5	¥				
						I AAAA	GRAY	SANDY SILTSTONE	BL	
					209.7	V	V		┝━╏─┤	

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0522 (:s)



PROJECT	<u>AR</u> DN <u>9</u>	<u>67</u> 02	2/3 _01 ± GW	12 E.	HRS	56,8	εh	PLA	ST. ALBANS, WV		NG NO. <u>B-0522</u> ECT NO. <u>C270384142-21</u>
DATE 🖨	24-2	s m	29 Juos	-		SSIFIED B	1	DA	n srager	PAGE	<u>8</u> of <u>9</u>
				Ι					DESCRIPTION		
ДЕРТН (FT.)	BLOWS PER		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	<u> </u>	PROFILE	SOIL DENSITY - CONSISTENCY OR		COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1 210.5	2		3	4	5	6		7	8	9	10
					-	M. HORI	> 17	. GRAY	SANDSTONE: FINE TO MEDIUM GRAHED MULACEOUS	BL	
	10,0	10.0	100%	100							
					220.0		+-	• •	· · · · · · · · · · · · · · · · · · ·		
220.5	$\exists$	$\geq$				M.SoFI	- 10	00000, 2004, 10, PL2,	CLAYSTONE	BR	
			0.98			SOFT		GRAY	: SILTY 220-225'		
			100%								
	10.0	0,0	100 %				╋				225-250.5-
							+	+	CALCAREOUS NODALES		CORE PIECES 0.2-0.4 120-30" SLICKED SIDES
									227,5-235,5'		
230:5	=	$\succ$						_			
							-				
	0.0	0.0	100%								
											·

REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0522 (18)



PROJEC	т <u> да</u> ол <u>9</u>	57 02	2/3, 5 + GV	<u>ظرحا</u> ۷∟ ۵	HRS	56,	8 8	JER P	WANT, ST. AI			IG NO. <u>B-0522</u> ECT NO. <u>C040384,40-01</u>
DATE	24-	<u>2-5 r</u>	MAY 2005	-	HRS CLAS	SSIFIED E	BY	D	AN SANGER		PAGE	9 of
	Τ					1			DESCRIPTION	·····		
DEPTH (FT.)	BLOWS PER SIX INCHES		SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY		<u> </u>		ROCK HARDNESS	COLOR	MATERIAL	CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1 240.5		$\frac{2}{2}$	3	4	5	6		7 MAR302		8	9	10
	$\vdash$	<u> </u>				M. SOFT		MARODA GLAY, PURPLE GREEV	CLAYSTD.	IE (CON'T)	BR	CORE AVECES 0,2-0,4'
					ĺ			GREAT				1/20-30° SULCERSIDES
	-					┝──┼─						
	10.0	10.0	100%			┝━┼╸	-					
	1	10.0	100 %					-				
								2				5
							-			: 511-4 247.8-248,9		
250.5									<u> </u>		-	
									BOTTOM OF G	30RING: 250.5'		
							-					
			8	$\left  - \right $			-					
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							1					
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										(A.)		
							+					
		-					+					
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REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 3-0522

E 1722	742.2422 2248.6749			-	696.90				4)	gal consultants innifiende Beas Interestor
PROJEC	r_ARE	10 243	, P	ЧНО	E. An	rus	POWENL PLANT	STALBANS		NG NO. <u>B-0523</u>
	ON	GV	ÝL (	) HRS	220			)/	PBO.	ECT NO. 279384.4
				HRS						
	24 May	12005		CLA	SSIFIED BY		DAN SANG.	ER ·	PAG	E of
						1	DESCRIPTION			
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR .	MATERIAL CL	ASSIFICATION	USCS OR	REMARKS*
1	2	3	4	5	6	7		8	9	10
7.5	1	S-1 REC 0.7			V. LODSE	BROWN	SILT, SAME	ciny	ml	
	2 ' 44	5.2	1	2.0	<u>v</u>			ł		
3.0	1	ARE 1.2		Ļ	LOOSE					
4.5	1.5	5-3 REC 0.6		4		┝╌┝━	CLAYEY SILT			
	43	5-4		1.		<u> </u>	FRAGMENT	1		
· L.O	14	REC.0.5		6.0	¥	<u> </u>		l/		· .
7.5	7	5-5 REL 93			STIFF	BROWN		LTY CLAY AND	ml-cl	MOIST X 2.0 TS
9.0	8 6	5-6	-			GEAY.				
	85 510	RES 1.5 5-7		-	V.STIFF		SILTY CLAY - 5			# 3.073F
10,5	10	REC 1.1					CLAYSTO	NE		
	1338	5-8						/		
12.0	1023	REL. 0.6		12.0	HARD		N THE REAL PROPERTY AND A DECEMBER OF A DECE	<u>/</u>	++	+> > Y.S TSF
13.5	23	S - 9 REC. 1.3			V. DENSE	GRAY	DECOMPOSED	CLAYSTONE	gm-gc	·
	34	5-10	-			+ YELLOW				
150	1728	REC 0.9					· · · · · · · · · · · · · · · · · · ·			
1615	- 28	5-11 AEC. 0.8				<u> </u>				
7.9	38	5-12 REC 0.4		17,9				·		
1.1	500,4	REC DIT		ांस	V	V	V	r 19. andret te, eyed birg, 3	<u>.</u>	TOPOFROCK: 17.9'
	3441	839			SOFT		CLAY STONE :1		BR-BI	- LOW & FRACTURE
	11150	07:0	49			BRown	NERTHEN	250		19.5,20.3, 20.5
27.2						GRAY			<u>    </u>	21.0,21.2
							· · · · · · · · · · · · · · · · · · ·			45° FLICKENSIDE
										20.5-20.65
							· · · · · · · · · · · · · · · · · · ·			
									┨	LOW & FLACTURES
				ŀ		-				23.6, 24.55, 24.85
	10,0 10.0	1002	88	ŀ			· · · · · · · · · · · · · · · · · · ·		+	26.4 27,9 29.1.
	10,0 10,0	100 00	28	ŀ						30.3, 30.6, 31.2,
				-						

REMARKS - DRILLED BY TENAR TESTING INC USING A SIM LO LOOD - TZ TRACK MOUNTED DRILL BORING ADVANCED USING 54" SOLID STEM AUGERS, 4" STEEL CASING, NO.-2 WIRELINE CORING TOOLS.

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. <u>B-0523</u> (13)



PROJEC	T ARE	A2/3 JT	DHN	E. 1	Wiss Ps	WER	PLANT, ST. A	KBANE, WU			ANO. <u>B-0523</u>
ELEVATI	ON7	<u> </u>	VL C		22.0				PR(	OJE	CT NO. Co \$10384 40-0
DATE	24 mc	N 2005	-		SSIFIED BY	1	AN FANGER		PA	GE	<u> of </u>
					1		DESCRIPTION				
ОЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERVIENT	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE		SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	. color	MATERIAL C	LASSIFICATION	USCS OR	ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7		8	9	)	10
2	<u>      ]                                </u>	<u> </u>	-		SOFTP	MAROON	CLAYSTONE	(CO) (T'460)	BR	<u> </u>	
320			· ·	34.7	M.SDEF	GANY V		/	· ·		WW& FM. CTURES 34.0, 34.5, 34.7
				7.6	M.SOFT	GRAY	SHALY SANDSTON	e			
	10.0 10.0	1000)	125	36.5	SOFT	MAROON	CLAYSTONE		VP	2-	LOW Y FRACTURES
	·			32.5					BI		37.05, 37.9, 38.1
				********	M. LOFT	GRAY	SIJALY SANDSTON	16	BI		/ / /
	┨──┤──			40.3	M. SAM	<u> </u>			V	I	LOW & FRACTURE 39.95
42.0					SOFT	WANDY	CLAYSTONE		B	2	nanaran ber ara ang penditi talah mantengah danan
40.0	┼			-		GAAY					LOW& FRACTURES
							·		_ _	_	40.5 40.6 40.8, 40.9
											41.1, 42.4, 43.3 13.45
	0.8 0.8	1200	73				· · ·				43.7
	010 020	1,00 10	-2								33 SULLENSIDES
					· · ·		······································				42.75, 43,9, 44.2,
				×						$\rightarrow$	<u>44,4,44,1,44,85,45,0</u> 45,75,48,0,49,4
50.0					V	V		/	-  ↓		VER TO AL FLIC 42.0-48.0
							BOTTOM OF B	5R126 : 50.0'	- <u> ``</u>		Are an international and and
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## REMARKS \*\* \_\_\_\_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. <u>B-0523</u> (13) \_

PROJECT A Rea % JDH/J E . Amas Poursek PLANT         ST. ALBANS, M.M.         BORINA NO. B. • 0524           ELEVATION		2745.0961 22251.414		Grade	El.	6	96.91				) Pe	al consultants verification lease into reality
HRS       CLASSIFIED BY       D/A/L & A A/GETC       PAGE       I         01       01       01       01       01       01         01       01       01       01       01       01       01         01       01       01       01       01       01       01       01         01 </td <td>PROJEC</td> <td>TAREA</td> <td>2/3 5</td> <td>NHU</td> <td>E./</td> <td>Am D</td> <td>os A</td> <td>WE</td> <td>R</td> <td>PLANT ST. ALBRANS, WY</td> <td>BORIN</td> <td>GNO. <u>B-0524</u></td>	PROJEC	TAREA	2/3 5	NHU	E./	Am D	os A	WE	R	PLANT ST. ALBRANS, WY	BORIN	GNO. <u>B-0524</u>
DATE     25 mA Y 2005     CLASSIFIED BY     DAA 7 A Juggy     PAGE     1     of       Image: Strate of the strate of th					HRS							
SHANNEL         NATERIAL CLASSIFICATION         SSEARCH           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         1 <td>DATE</td> <td>25 mA</td> <td>4 2005</td> <td><u> </u></td> <td>CLA</td> <td>SSIF</td> <td>IED BY</td> <td></td> <td></td> <td>DAN SANGER</td> <td>PAGE</td> <td> of</td>	DATE	25 mA	4 2005	<u> </u>	CLA	SSIF	IED BY			DAN SANGER	PAGE	of
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								<u> </u>		DESCRIPTION		•
10         3         9         10           AllGER W/d. SamPLINE         To 18 Fr         10           INPSTRIL PIEZEMETER,         INPSTRIL PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,         10           INPSTRICT, PIEZEMETER,         INPSTRICT, PIEZEMETER,					-	SOIL DENSITY -	CONSISTENCY OR ROCK HARDNESS	_		MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	1	2	3	4	5	ļ	6		7		9	10
Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Symmetric Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price Price         Image: Stratule Price <t< td=""><td></td><td></td><td></td><td></td><td>-</td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td>· ·</td></t<>					-	<u> </u>						· ·
The AT 18 Fr       SEE BORING B-0523 FOR SOIL       DESCRIPTIONS       DESCRIPTION		·			-							
					$\left\{ \right.$	-		+			<u>3</u>	
					1			+				
18.0					1			+				
18.0     18.0				+	1			+		112-321210 113103		
18.0     18.0				1	1			1				
18.0     18.0					]							
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18.0     18.0												
18.0     18.0												
18.0     18.0				ļ				<u> </u>				
BOTTOM OF BORING: 18,0 Fr				<u> </u>								
BOTTOM OF BORING: 18,0 Fr												
BOTTOM OF BORING: 18,0 Fr	1.0							<u> </u>		<u>v</u>		
	18.0				18.3							
Image: Section of the sec										BUTTOM OF BORING: 18,0 Fr		i) (i)
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REMARKS .. DRILLED BY TEMPAR TESTING USING A SIMCO 4000-TZ TRACK MOUNTED DRILL

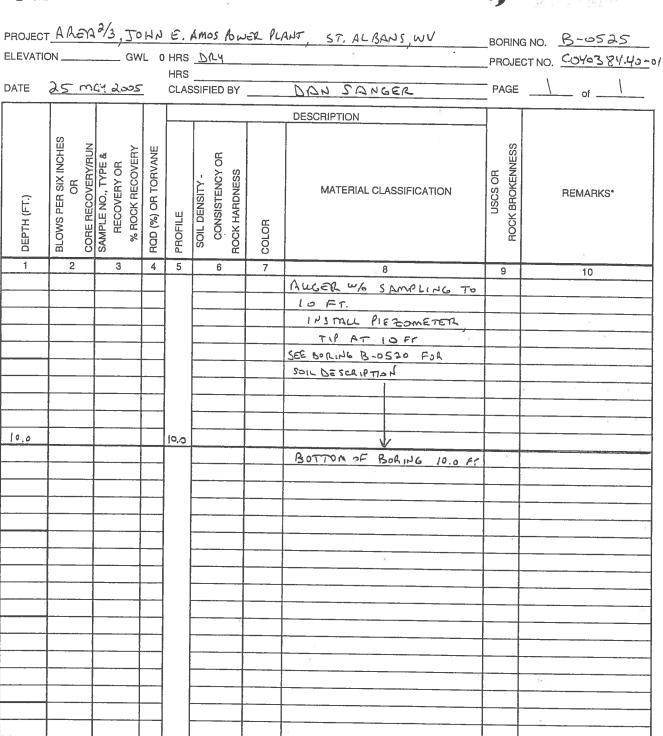
BALING AGUARACED USING 5 14" SOLID STEM AUGERS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-052-1

N 542379.9472 E 1721745.3670 Grade El. 679.43



REMARKS .. DRILLED BY TENRA TESTING, INC. USING A SIMCO 4000-TZ TRACK MOUNTED DRILL.

BOLING ADVANCED USING 514" SOLID STEM AUGERS

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. B-0525 (16)

gai consultants

E 17539					709.57 To				
PROJEC					E.AI	nos	PIWER Plant		GNO. 0536 (MW-
			24	HRS	13.8				CTNO. 6040384,40
DATE	7-12	-05				TR	Gower	PAGE	of
•							DESCRIPTION	- ·	
DЕРТН (FT.)	BLOWS PER SIX INCHES OR CORF RECOVERVIELIN	SAMPLE NO., TYPE & RECOVERY OR	% HOCK HECOVERY RQD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	. 2 .	3	4	5	6	7	8	. 9	10
		5		6.9		Red BR	Clayer Silt and Rock Fragments - Trace Sand	*	10 Start 1:35 Moist
						BR	Sond and Rock Fragments		
				0.0			Sond and Noch Fragmenis		Damp RF72" p
						Red	Clayry Silt and Rock		Moist RF<2"0
				11.0		BR	Fragments		moist hFill p
· · ·						Red	Decomposed Claystone		Darmp.
									Dry @ 14'
				19.0			V		4
			+				Bottom @ 19.0'		Finish 2:00
			<u> </u>	3			Installation		
							Lostallation		Materia
							Sand 19.0 to 18.0'		10/0
							10 Schen 18:0 to 8,0'		10' Serrer , cap
							Sand 18,0' to 6,0'		9 Bags Sond
						·	Bentonite Pellets 6.0' to 3.0'		10 Bags Concrete Mix
							water added to pellets		16x5'ster! Casina
			<u> </u>				19'stekup puc		
			┨──┤				2.3' shek up Stool Casing		
					· ·		~		
		· · · · · · · · · · · · · · · · · · ·	$\left  - \right $	'  -					
		4	$\left  - \right $	ŀ					•
			†	ŀ					
				ŀ				9	
				Ī					
					·	3			
	4 14",	n Hall	law	<u>م</u>	ALLETT		19.0, 4000-TZ SIMCO T		0:11

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0536 (mw-1)

BOJECT	Are	۵.	21	2	Т	:) <u>.</u>	F	Δ.,		Power Plant		0505/100
										Fower Flam:		NG NO. 0535 (MW
LEVATIO	лч <u> </u>										PROJ	ECT NO. <u>CO40384,40</u>
ATE	7-12	J-1	ZC		21		<u> </u>	5.2'	TR	Gower	PAGE	= <u>l</u> of
		-			-	1						of
										DESCRIPTION		
i	ES	_										
	BLOWS PER SIX INCHES OR	CORE RECOVERY/RUN	<u>م</u>	% ROCK RECOVERY	ROD (%) OR TORVANE			Ю		-	USCS OR ROCK BROKENNESS	
	≦ ×~	ž	je je	Š	NA N			SS C≺		2 2	E N	
<u>,</u>	R SIX OR	影	SAMPLE NO., TYPE & RECOVERY OR	Ë	ĨĔ	а. С	- YTISNED LIOS	CONSISTENCY OR ROCK HARDNESS		MATERIAL CLASSIFICATION	USCS OR BROKEN	REMARKS*
E	E -	ŭ	ΧŠ	ĸ	b b	Ш.	La la	SIS1 ARE				
H	MS	ш Ш	L H	ĥ	8	E		й ну	Б		ÌŠ	
ОЕРТН (FT.)	BLO	ö	SAN	%	D D D	PROFILE	<u>S</u>	ΰÿ	COLOR		Ĭ	
1	. 2	+	3	_	4	5		6	7			
		╈				<u> </u>		<u> </u>	Red	8	9	10
		╋				1			BRR	Clayey Silt and Rock	-   ·	Moist Start 8:4
		╈				10.0			T	Fragments -trace sand		RF 72" 4
		+				10.0			Red			
		+				18.0				Decomposed Claystone		Dry
		┢	<u> </u>			20,0			Red	weathered Claystone		TOR 18.0
		╈						_	BRS			Amarer to 20.0
		╧			_	13,0			Red	Fine Grain Sandstone W/ Interbedded Claystone		
		╈					130	rd	Gravy	Interbedded Sandstone &		
									10	Sil-stone -frw thin Red		· · · · · · · · · · · · · · · · · · ·
		╈				39,0				Claystone Seams		
		╈				<i></i> ,			Red	Claystone	+	
		╈				દુન, છે				City Stant		few sec. of molit
									(srav/	Siltstone/shale	1.	costings le 42.0
		T				58.0			V I			water conder to the
		Τ				60.0	·		Red	Clayston-e		ABROCH AN LONGER (LO
		T							Group	Silfstone		Moist cuttings boic
					_	:25			10	<u>SUTSION</u>		@ 62 wort 15 min
		T				ſ		8		Bottom @ 62.5		water im hale
		T								00,000 20210		End 10:35 AM
		T				ľ						
										Installation	+	
		Τ				ſ				Sand 62.5 to 62.0'	+	Materials 20' z" \$ PVC 3cm
		Т				ľ			ξ.	Screen 62.0' to 42.0'		
• ]		Γ				ľ				Sand 62.0'to 37.0'		4 Bags Sand 1/4 Bucket Relled
						Ī				Bentovite Pellets 37.0-34.0	+	H B. a Walaker Helle
		Γ				F				Pellts into water	+	4 Bags Valctay grad 10 Bag Course to MIX
		Γ				ľ				Volclay to 4.0'	·	IN DOG LOWINCIE MIX
		Γ				F				Concrete 40 to 0.0', 6' p Pad		
				-		- F				steel Casing 2.1' Stickup 0 20°, 4"\$ Air Rotary to		<u> </u>

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0535 (MW-2)

	ON					Dry.	<u>vio</u>	Power Plant		GNO. <u>OS27 (MU</u> CTNO. <u>CO40384.40.</u>
		1		48	THRS	17.0				
DATE	6-2	4-0;	5		CLAS	SSIFIED BY	1	2 Gower	PAGE	of
•						-		DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES OR COBF RECOVERVIAL IN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	. 2	3		4	5	6	7	8	9	10
							Red	Silty Clay		Start 10:15 AW
					2.0		BR.	V Charles Charles		Damp
				_	, 12.0		BR	Clayer Silt		Dry
							Red-	- Silly Clay to Decomposed		Dril, slow
					120		BR.	claystone		augering
	25				~ _					damp at =16
•					2 <u>5.5</u>	·	Gray	Weathered sandstone-with		moist at 25'
	3				20.4		BR	fine mica grains		Auger Refusal 25
				$\neg$	30,4		Rea	Siltsbure		6-27-05 WL=1
					41.0			20175704-2		e 8:30 AM
					•	8		Bottom @ 41.0		Finish@ 9:00m
					·					Clean hale 9:00 to
	·						<u> </u>	Installation		11:00 . Drilling
								Pellets 41 to 32,5'		while drawing 4110
								Sand 32.5 to 32.0		Material
				$\neg$			<del>  .</del>	20'Screen 32.0'-12.0'; 14" cop		20'z" à screen
			+			•••••		32.0 to 9.0 Sand Bentonite pellets 9.0 to 9.0		à caps 12 bags sand
								rbucket water poured on pellets		1 bucket pelle
								Volclay grout to 3.3'		Va Bag Volclay
							10	Volclay grout to 3.3' Concrote Mix 10 Bags		10 Bags Concrete Mi
			-+	_				5' steel pipe 6" & 2.5' stickup		6"x5' Steel Casing
				$\neg$				2' pvc stick up 2.5' steel Casing stick up		
	8			$\neg$	ŀ			213 Steel Casing Mick up		

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0527 (MW-3)

	3086.04							VC Riser El. 676.36	<u>n</u>	al consultants
			GWI	L O	HRS	19.2'	•	ower Plant		а NO. <u>0532 (mw·4)</u> ст NO. <u>С040384.40</u> .01
DATE	7-7-	15		ડ્રન	HRS	17.9'	10	Gower	- PAGE	
	<u>`</u> `				CLAS T	SIFIED BY	11		- FAGE	of
								DESCRIPTION		
ДЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	.2	3	_	4	5	6	7	8	9	10
					2.0		BR	Sandy Silt		Domp start 9:45
		i.t			6.0		BR	Sand and Rock Fragments		Domp
			-+		<i>φ</i> ,0		BR	of shale		
					9.0		DK.	Sandy Clay-some Rock Fragments of Soudspre		RF<2" p, Moist
							Red	. Decomposed Claystone		Auger to 10.0' refusal Damp TOR 10.0'
								weathered claystone		Damp, TOR 10.01
					12,5		Ý			
			_				Gray	Siltstone Interbedded with		· · · · ·
			$\perp$				Red	Claystone/clayshale		
			$\perp$		41.0		V			
						G.	Gray	Silt shale/Sil-stone-trace		· ·
			_	_	49,0		Y	Red scams of claystone .		
			+			soft	Red	claystone		
			_	-	53.0		×			The Print Pr
					-		Red			
		<u></u>			<u>68.0</u>		Gray	claystone Giltstone		
					70.0	2	J,			Net cuttings lust
							Grav	Sandstone		dust@ 58.0 ( water from hole by 62.0 '
					78.5		V			More water ( 71.0!
							V	Bollom @ 78.5'		File and C Trio.
					[			7. 1		· · · · · · · · · · · · · · · · · · ·
								Installation		Materials
•								Sand 7815 to 7810', 20'		4Bass Sand
				_				Screen 78.0 to 58.0' Sand		1/2 bucket pellets
			_		-			7510 to 53, Bertonite to		2 bags volclay quit
					ŀ			49.0' Volclay growt to 3'		10 Bays Concrete Mix
								Concrete to 0.0, 6'd Pad		6"x5' strel Casing
L								PUC stickup 1.6, steel 2.1		ł – – – – – – – – – – – – – – – – – – –
REMARKS *	· 444 II	<u>) HSI</u>	<u>A</u> 1	01	0.0	<u>4"¢ #</u>	tir Ro	tay 10.0' to 78.5', Simco mg.	4000	O-TZ Track Rig
Doug	Novo	try	Ωr	11/1	-	Terra	Test	MQ.		
d		£			1			0		

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\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0532 (MW-4)

N	542305.96	
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Grade Ei.

674.84 Top of PVC Riser El. 676.84

gal consultants uniforming losse into radius

PROJECT	r Areo	્ટ	13	J	6	m	E				BORIN	GNO. 0533 (MW-5)
								~/			PROJE	CTNO. <u>CO40384,40,0</u>
	DN			24	-	HRS	8.	6'				
DATE	7-7-	05			1	CLAS	SIFI	ED BY	TR.	Gower	PAGE	of
		Τ		T			•			DESCRIPTION		· · ·
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORF RECOVERVIALIN	SAMPLE NO., TYPE &	<ul> <li>RECOVERY OR</li> <li>« ΒΟΛΚ ΒΕΛΟΛΙΕΒΥ</li> </ul>	A ROD (%) OR TORVANE	_	o PROFILE	SOIL DENSITY -	Description of Consistency OR ROCK HARDNESS	. Hotos	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
	2	+	3	4	-	5		0		8	9	10
	<u> </u>			+	-	20			BR	Sandy Silt		.Domp 🔅
		+		+	┼	<u>3.0</u>			BR	Sanda d Provi Engine de		Pamp
	•	+	12	+		60				Sand and Rock Frequents.	· · ·	1 P WINF
		1		+	ľ				BR	Sandy Clay and Rock Fragments Decomposed Claystone		Moist
		1			1	9.0			V	Fragments	·	
			_		_	10.2			Red	Decomposed claystone		Dry
										Buttom @ 10,2'		
÷		<u> </u>					<u> </u>			Installation.		Material
		<u> </u>			_				•	3" sand to 10.0		4 Bag Sand
					_					3" sand to 10:0" 5' screen w/ cap 10.0-5.0"		1 Va Bucket Pollets
					_		<u> </u>			50md 10.0 to 4.0"		10 Bass Luncrete Mix L'x 5 Steri Casing
		$\vdash$		+	-		<b> </b>			Bentonite Pellets 4.0-3,0		6"x 5 Steri Casing
		+			-					Cemment 3.0'- o', c'ppad 2' stick up pVC 2.2' stick up steel Casing_		•
		+		+	┥					2 Stick up por		
		+		┼╴	-					did sick up preel casing_	· ·	
	1			+								
				1-								
										· ·		
												•
												·
	20 				_		ļ				ļ	· · · · · · · · · · · · · · · · · · ·
		-			_							
				+	-					22.		· · · · · · · · · · · · · · · · · · ·
	-			+	-					· · · · · · · · · · · · · · · · · · ·		
		-		+	-							
14	1	1	<u> </u>				L	- 1	C		L	1
REMARKS	Nov	11		<u>&gt;*</u> 0-	. 11	125	10	·2, Taxi	$\sum_{n}$	co 4000 -Ta Thack Rig	·	

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\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

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BORING NO. 0533 (MW-5)

LEVATI				. GV	L C	HRS	6	2.5'	in we	r Plant	_BORIN _PROJE	GNO. 0526 (MW 6 CTNO. 0940384.40
ATE	6-	23	- 0 5	755	י}-רש -	CLAS	SSIFI		TRO	FOWER	PAGE	of
•	1									DESCRIPTION		· · · · · · · · · · · · · · · · · · ·
<b>DEPTH (FT.)</b>	BLOWS PER SIX INCHES	ORE RECOVERY/RUN	SAMPLE NO., TYPE &	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY -	CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1		2.	:	3	4	5		6	7	8	9	10
									Red	Clayey Silt .		Start 9:00 AM
						10.5			Brn.	↓		
					├		<u> </u>		Yellow	Highly weathered siltstone	<u> </u>	
						13.5	<u> </u>		BR	tofine grain claystone		
				•			<u> </u>		Lt Bra	Sandstone		Augentor 14
	+								Gray	C 25		Air Hammer 14 togi
	1-		<u> </u>			28.0			Grad			8 /10 min in soudstone
	†					-101-			Gran	shale		
	1					30.0	<b> </b>		10.04	July 1		
	1								Red	Claystone		
						36.0				L'any start a		
									Gray	Sand stone		
	$\top$					38.0			10107			
-									Grow/	Interbedded shale and	1	
					₩	76.0		<u> </u>	Red	siltstone/fine sandstone		Water encountered
										water @ 76		Q76'
						91.0					·	End II: SOAM
									•	Bottom of Baring Callo		
										Bottom of Baring C91.0' Installation		material
										Cleanhole 11:30-12:25		9
	ļ									Stabilize watere 62.55 2:00		•
	<u> </u>	-				120			1	Place bontonite pellets 91.0"		2 buckets bentonite
										to 78.5', Sand 78.5' to 78.0' Set 20' screen @ 78' to 58'		4 Sulbs bags sand
•	<b> </b>									set 20' screen @ 78'tr 58'		2/25010 bag volctay
	<b> </b>									B" screen capon end, stick up		10 Bags Concrete Mix
										2.3' Sond 78.0 to 55' bentonite pellets 55' to 50'		6"x 5" steel casing
										bentonite pellets 55 to 50		· · · ·
										Volcay grout to 4.0 6-29-05		
	1							•		Concrete to surface, 2.5 Steel Sticky	4	

SIMED 4000-To Track Rig, Doug Novotny Driller, Terra Testing

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0526 (MW-6)

	ON					tour			GNO. <u>0528 (MW-</u> CTNO. <u>C040384.4</u>
							······································		CINO. <u>CU70307.1</u>
DATE	6-27	-05	_	CLAS	37.0 SSIFIED BY	TRG	rower	PAGE	of
			Τ				DESCRIPTION	1	· · · ·
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERVIRIIN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	. 2	. 3	4	5	6	7	8	9	10
	· ·					BR	Silly Sand and Sandstone		Start 3:50 PM
			ļ	2.0		V	Rock Fragments		10rv/
	ļ	~				Yellow	Decomposed Sandstone		Dry
				6,0		BR	*		Auger Refusal @ 6.0'
		2	<u> </u>			Gray	Sandstone		Dry
				an 0	Hard	BR Gray	18.0' to 22.0'		
				201.0	nure	BR	Siltstone		\$1/min
	1					Gray	SINSING		•
						Red	from 24'		Water Encountered
		1				Gray			@ 40.0'
				<u>ຣຽ,</u> ຮ					End 5100 PM ·
		<u>a</u>					Bottom e 55.5'		Clean with air
			۶	•					Undill S: 40PM
							Installation		
									Materials
							20' Screen 52.0 to 32.0'		4 bag sand Vy bucket pellets
							Sand 52.0 to 30.0'		2 Bags Volclois
							Bentomite Pellets 30.0'to 28:0'		1.0 Bags Concrete
							Bucket of water on Pellet >		6" & steel Casin
							Volclay Growt to 3.3; 3.3 of		5' total Irigth
							Concrete. Pad 6' diameter		
•							2' sticking PUC		•.5
							2.5' stickup steel casing		
				-			· · ·		
				ŀ					

\* POCKET PENETROMETER READINGS

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\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0528 (mw-7)

							os P	surer Plant		GNO. 0534 (MW-8
LEVAIN	ON	·····	GW	1157	HRS LDC	23.81			PROJE	CT NO. <u>COYO 384, 40</u>
ATE	7-11-	02		40	CLAS	SIFIED BY	TR	Gourt	PAGE	of
	7	T						· · · · · · · · · · · · · · · · · · ·		
	]		Ì					DESCRIPTION	-	
<b>DEPTH (FT.)</b>	BLOWS PER SIX INCHES OR CORF RECOVERVIRI IN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	ROD (%) OR TORVANE	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3		4	5	6	7	8	9	10
							Red	Silly Clay		Start 11:00 AM
	<u> </u>	54			6,0		N V			moist
	ļ						Red	Decomposed Claystone	_	Dry/
					9,0					·
							Gran/4 BR	Sandy shall / Sandstone Med Grain.	·	TORIO.D
	+				23,0		Red	Claystone		10:30 and Rotany.
					26,0		KC G	Cinystone		Slight Hammening
		- 22			28.0		BR	Sandstone/sand, shale		· · · · ·
					10	Hard	Gray	Sandstone		
	3. N				]		BR	C 34		U.s.
					37.0	1	-	*		
		ļ					Red	Claystone		Moist@top 6"
	·	<u> </u>			41.0	<u>ं</u>				Moist autimas bac'
					1	Hard	Gray	Sandstone / Sandy shale	·   ·	× 1/2 of all' Run
									- <u> </u>	
					60.5			*		End 12:35PM
						<u> </u>	<u>↓ ¥</u>	Bottom @ 60.5'		ENG 121 53 PM
	-			-	1			Dortom C 60.5	·	
					1			Installation		Materia
					1			60.5 to 60.0'Sand		20' Screen, Zenp
					]			3" cup on bottom 20' Screen		
								Screen 60.0 to 40.0;		5 Bags Band 1/4 Bucket Rellet
								Sand 60,0 to 20.0',		38mgs Volclay
		<u> </u>						Bentonite Pellets to 27.0	·	11 Bags Concrete Mix
1.6451		·						Volclay Growt to 3.0"		LL BAGS Concrete Mix & "x 5" Stel Casing
				<u> </u>				Concrete 3.0 to 0.0', 6' & Pad		
		<b> </b>				L	ļ	2' stick up of NC 2.5' Stick up of steel Casing		<u> </u>

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\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0534 (mw-8

N 544221.98

933.39 Top of PVC Riser El. 935.39 Grade El.

qaico its

EVATI	ON	C	GWL	0 HRS	47.4'		·	PROJE	CTNO. <u>CO40384.4</u>
ATE	6-30	205	2	- HRS	30.2'	<u> </u>	Gower		
~					SSIFIED BY	1.1 N	Gower	-	i of1
•					•		DESCRIPTION		
	S								
	HH N	~	┟		щ			ESS	
		E E			, X 0			ENN	• 
_	CIS IN A		ШŖ	2	NEX NEX		MATERIAL CLASSIFICATION	USCS OR BROKEN	REMARKS*
Ē		N N	S S	5	ENS SIST			US(	
ОЕРТН (FT.)	BLOWS PER SIX INCHES OR COBE RECOVERVIRI IN	SAMPLE NO., TYPE & RECOVERY OR	% ROCK RECOVERY	PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	- 55	5	USCS OR ROCK BROKENNESS	
Ш		MA -	8			COLOR		μ.	
1	. 2	3			6	7	8	9	10
						Red	Silty Clay		start 11:10 AM
				2.0					Moist
		(36)	+			Red	Decomposed Claystone		Drv, Augu to 5.0
				5.0					Air Rotary 11:30
						Red	Claystone / clayshale		Hanmerinclaystor
				15.0		trace grav			Less @ 12'
						BR	Fine grain Sandston-C		
	-			29,0	Hard	Grail	18 to 20'		
		L	_	0,16		BR	Sandy shale		
						Red	Claystone / clayshale		
·	ļ		$\perp$	35.0					
			$\perp$			Gray trace red	Siltstone w/sandstone		
	<u> </u>			4		red	seams / silf shale		
				440			Water Encountred 242		Water concurrentered y.
	· · · ·			-		Red	Claystone		
		<u> </u>		51.0					C 101
				42.5	Fard	Gray	Sondstone		End Duilling 12:404
		<u> </u>		-			Battom @ 62.5'		1.
		<u> </u>		-	· · · ·		081csw. @ 62.0		Let sit 15min blow
	1			-			Installation		out water = 30 Sec
	1			-			62.5 to 62.0' Sand		Then dry, 15 min on 15 sec of water
·····	1			-			20'Screen 62.0'to 42.0'		Add pottable water to
				-			Sand 6210'to 37.0'		clem hole 50 gl.to
•				-	1		Bondonile Pellets 37.0'-34.5'		Materia 1
				1			Volcary grout to 3.0;		5 Bags Sand
				1			Concrete 3.0 - 0.0 6 Diametr		20' Screen
							Pod , 2' stickup PVC		14 bucket fellets
				]			21/2' stick up 6: & steel		wateradded, 2 bigs
				7	•		Casing 2.5' Stickup	1	Volclay , 9 bags Concre

REMARKS - 25 ft , 4" & AIT rotary w/hammer to N345 W from Survey PL, 307 44 1D HSA to 5.0

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

\* POCKET PENETROMETER READINGS

BORING NO. 0530 MW

\*\* METHOD OF ADVANCING AND CLEANING BORING

				3						ai consultants transforming Jeeas into reality
N 54401 E 17541	9.11 83.58	G	irade	El.	9	09.43 T	op of PVC	Riser El. 911.43		
PROJECT	r Ann	2/3	J	Am	E	Amos	Power	station	BORING	ANO. 0331 (MW-10
	ON									CT NO. CO 40 384, 40.
				24	HRS	102		· ·		1 2
DATE	6-30	-05		•	CLAS	SIFIED BY	T.R.	Gower	PAGE	of
								DESCRIPTION		
DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERVIRUN	SAMPLE NO., TYPE &	% ROCK RECOVERY	RQD (%) OR TORVANE	PROFILE .	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2		3	4	5	6	7	8	9	10
					3.0		BR	Clayer Silt		Start 4:00.
							Red	Decomposed Claystone		Dry
					0.11			weathered claystone		Auger to 10.0'
							LT BR	Silty Shale / siltstone	<u> </u>	
					20.0		J. v.	↓ ·		
					•		BR	Sandstone	ļ	
					2.0				<u>(4)</u>	
96) (16)							Lt Gray	Siltstone - Red @ 29.0'	ļ	
	8	6			34.0			Gray @ 31.0		
	<i>5</i> 3			1	36.0	:	Red	Claystone		
						Hard	Gray	Fine grain Sandstone		
					40:5		¥	*		
							Red	claystone		
					46.0		Groy	41		
				з.,	58,0		Gray	Silfstone	<u> </u>	stup 5:00 @ 52'
	2				(0.0		Red	Claystone		
				_			Groy	Silfstone / V. Fine Grain		
	_			ļ	710				30	8
		1	÷		4	Hard	Gray	Sandstone		
					76.0					
L					4	Soft	Red	Siltstone / Claystone		
		_			810		<u> </u>	× ×		
L					82.0	Hard		Sandstone		
		_					Gray	Siltstone		
	_	_			84.0		<u> </u>	*		
		_			_	Hard	Gray	Sandstone/w/6" seams		Shadunt
					4			of softersiltstone		Stop @112' 11:05 AM
					125.0			4		
L		_		_	- 627		Red.	Claystone		
1	1.	1			138.0	0				

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

\* POCKET PENETROMETER READINGS

BORING NO. 0531 (mw-w)

\*\* METHOD OF ADVANCING AND CLEANING BORING



						s Po	wer Station		ANO. 0531 (MW -10 CTNO. 040384,40,
	N N		24	HRS	10 2_ SIFIED BY	T.R.	Gower	-	of
						1	DESCRIPTION		
ОЕРТН (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	<u>.</u>	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	. 10
				ľ	0	Gray_	Siltstone		Dry
	ļ	·		149,0					
						Gray	Sandstone		
				152,0	· · · ·	Red	A started and the started at the sta		
			-	153.0		DKGroy	Claystone Sondstone w/mica grains		
			$\vdash$	154.0		Gray	Sillistone		
		<u> </u>		-		Gray	2111310112		
			+	1					
				157.0					End 12:05 PM
· · · · ·	1		$\square$	1			Bottom @ 157.0'		
			<u> </u>	1		1			× .
				1			Installation		Material
	<b>3</b> 2			1			Hole measured @ 154.0		11 bags sand
							Sand to 153.0', 20'Screen		1/4 bucket pellets
							152 of to 133.0'. Sand		4/2 bags volclar.
		l		4		<u> </u>	153,0 to 85.0, bentonite		10 Bags Concrete MI
	ļ	ļ		4	ļ		pellets to 81.0", Volclay		6º d x5' steel
	1			-			153,0 to 85.0', bentonite pellets to 81.0', Volelay to 3.5', Concrete 3.5 to 0.0' 6"\$ x 5' steel Casing, 6'		Casing
				-			6 0 x 5 steel casing 6		
				-		-	I CLEVATHE FOC		
				-			2' Stick up PVC 2.5' Stick up Steel Casing		
				-			Lis stick up steel casing	8	
				-					
			+	-					
		1	+	1					
	-			-		-		1-	
		1	1	1		1			
	-		1	1				1	

REMARKS \*\* \_

\* POCKET PENETROMETER READINGS

\*\* METHOD OF ADVANCING AND CLEANING BORING

BORING NO. 0531 (MW-10)

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**Definition of Terms** 

# Used to Describe Subsurface Materials

			10	SOILS				
DENSITY OF	GRANULA	SOILS	BASED ON STA	NDARD PENE	TRATION	RESISTANC	Æ	
				STANDARD PE				
	DESK	GNATION		RESIST				
		LOOSE		(BLOW S/				
	LOOS			5 - 1				
	MEDI	UM DENSE		11 - 3				
	DENS			31 - 5				
	VERY	DENSE		OVER	50			
CONSISTEN			DILS IS BASED	ON FIELD AN	D/OR LAB	ORATORY T	ESTS	
CONSISTENCY		COMPRESS			0.000			
VERY SOFT		THAN 0.25	ARE FOOT	FIELD IDENTIF			-	
SOFT		Q 0.50				RAL INCHES BY RAL INCHES BY		
MEDIUM STIFF	0.50 T						Y THUMB WITH MODERAT	EFEORT
STIFF	1.0 TC						RATED ONLY WITH GREA	
VERY STIFF	2.0 TC			READILY INDE	NTED BY THU	MBNAIL		
HARD	MORE	E THAN 4.0		INDENTED WIT	H DIFFICULT	BY THUMBNAIL		
	TERMS US		HE DESCRIPTIC					
AND							AND GRAVEL MIXTURE.	IE
	THEN	ATERIALS	OCCUR IN THIN SE	PARATE SEAMS.	IT IS NOTED I	IN THE DETAIL	D WORD CLASSIFICATION	N N
			IS GIVEN WHERE P					
SOME	INDIC	ATES A SIG	SNIFICANT AMOUNT	OF THE ACCESS	ORY MATERI	AL.		
			AEDIUM DENSE SILT					
TRACE			NOR AMOUNT OF T					
INTERBEDDED	LISED	XAMPLE: I	LOOSE SILTY SAND	- TRACE OF GRA	VEL			
INTERBEDDED	03E0	XAMPLE: 1	RIBE THIN ALTERNA HARD INTERBEDDE	D SI TAND CLAV	APPROVINA		OSSIBLE	
	-			ROCK	(AFF RUNIMA	VIELT I/10 THIC	ung.	
TERM			DI	FINITION				
SEAM	THIN	(12 INCHES	S OR LESS) PROBAE		AVER			
SOME			IFICANT (15 TO 40 F			CCESSORYMA	TERIAL	
	EX	AMPLE: RO	OCK COMPOSED OF	SANDSTONE (70	%) AND SEA	MS OF SHALE (	30%) WOULD BE: SANDS	TONE -
	SC	ME SHALE	SEAMS					
FEW	INDIG	ATES: MIN	IOR (0-15 PERCENT	AMOUNTS OF TH	E ACCESSO	RY MATERIAL		
	SI	NDSTONE	OCK COMPOSED C	ANDSIONE (S	10%) AND SEA	MS OF SHALE	(10%) WOULD BE:	
INTERBEDDED					G SEAMS OF	MATERIAL OCO	CURRING IN APPROXIMAT	TELY
	EQU/	L AMOUNT	rs -					
				SANDSTONE (50	%) AND SHAI	LE (50%) SEAMS	S WOULD BE INTERBEDDI	ED
			AND SHALE.					
	10		TIVE TERMS	ABBREVL			Following terms:	•
			ROKEN	(V. BF		LESS THAN 2		
			KEN	(BR.		2 INCHES - 1 F		
		BLO		(BL		1 FOOT - 3 FE		
	202		SIVE	(M.)		3 FEET - 10 FE		
	IN LEI	NGTH DIVIE	DED BY THE TOTAL	IS COMULATIVE I	ENGTH OF P	ECES OF COR	E EQUAL TO OR GREATER	THAN FOUR INCHES
			ARE APPLIED				NGENTAGE.	
ROCK TYP			TERISTICS	I O GEDIMEN	IANT RUG	-nu		
SANDSTONE						DETWICK IN	AND 2MM IN DIAMETER	
SILTSTONE	MADE	UP OF GR	ANULAR MATERIAL	S LESS THAN 1/1	5 MM IN DIAM	ETER. FRACTL	RES RREGULARI Y MED	NUM THICK TO THICK BEDDED
CLAYSTONE	VERY	FINE GRAI	INED ROCK MADE L	IP OF CLAY MATE	RIALS. FRAC	TURES IRREGL	LARLY, VERY SMOOTH T	O TOUCH. GENERALLY HAS
	IRRE	GULARLY S	PACED PITTING ON	I SURFACE OF DF	ILLED CORE	S.		
SHALE LIMESTONE	A FIS	SILE VERY	FINE GRAINED ROO	CK. FRACTURES	ALONG BEDD	ING PLANES		
COAL	ROCK	CONSISTI	ING MAINLY OF ORC	SANIC REMAINS	GOS) EFFER	VESCES UPON	THE APPLICATION OF HY	JROCHLORIC ACID
•	•			LEGEND	8			
				0.000.00				
RESIDUA	AL SOIL		CLAYSTONE	0 2- 0.0. Sł	LITBARREL	SAMPLE		
		لللاها		-				
GRAVEL		╔┲╤╗┕	IMESTONE	CASING S	AMPLE			
SAND OR		Sesus s	SILTSTONE	∆ 5T-1 SA	MPLE NUMB	ER 3" DIA. UNDI	STURBED SAMPLE	
		14						
7 10 17.77		10000		Y	LENGTH OF C	ORE RECOVER	RED	
SILT		1996190	SANDSTONE		LENGTH OF D			
		1 COLLON						
CLAY		EE	SHALE	3-10-68	OUND WATE	R LEVEL AND D	DATE OF OBSERVATION	
		Canada -		IN			ED FOR SPLIT BARREL	
	C MATERIAL		CONCRETE		PENETRATE		as , on or at prince	
SLAG			COAL	7737773	APPROXIM	ATE TOP OF RO	оск	
x^x			a all li					
FILL		<b></b> ,	/OID					
XXX ~~~		- F						

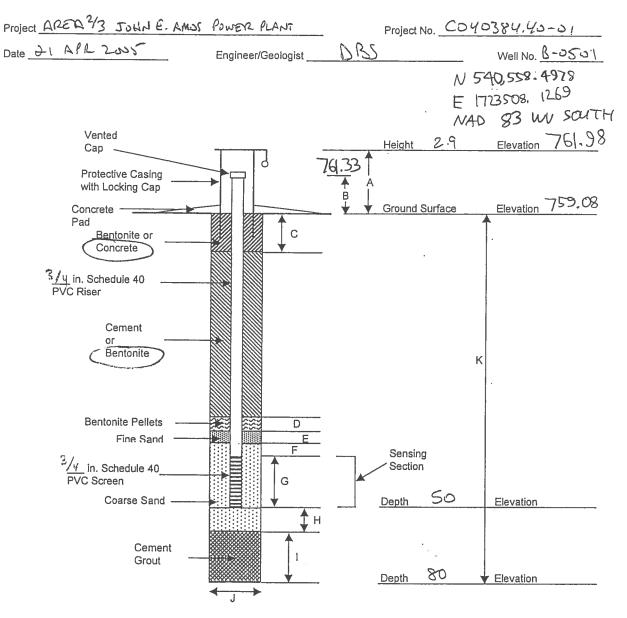


GAI Consultants, Inc. 2006

Well Construction Diagrams

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

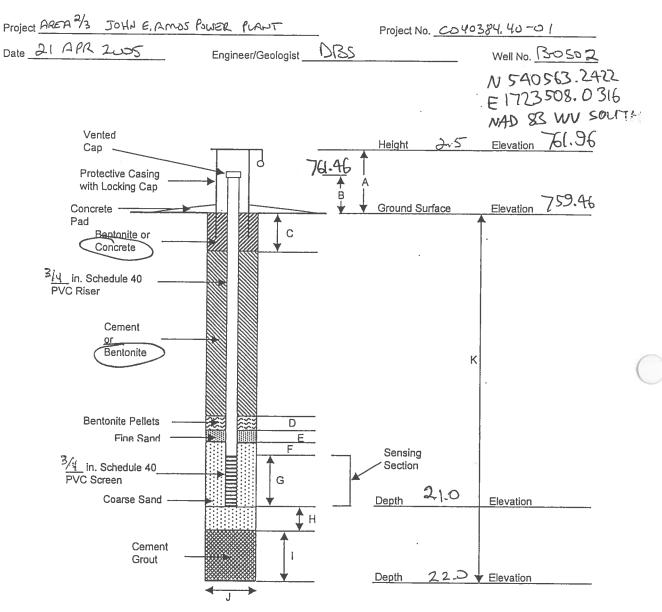
gai consultants



# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMEN	ISIONS (Feet	)	
A	В	С	D	E	F
2.9	2.25	35	0	· 0	5.
G	Н		J	К	
10	3	30	0.25	80.0	

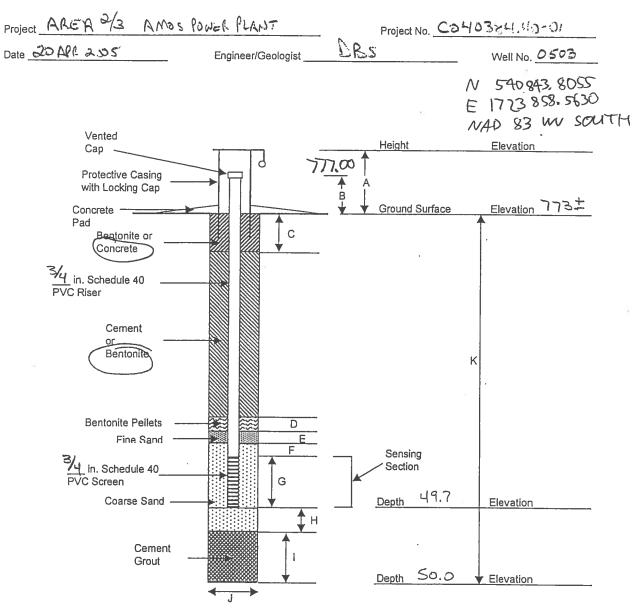
gal consultants



## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	)	
A	В	С	D	E	F
2.5	2.0	7.0	0	0	4
G	Н	1	J	К	
10	1	0	0.25	22.0	

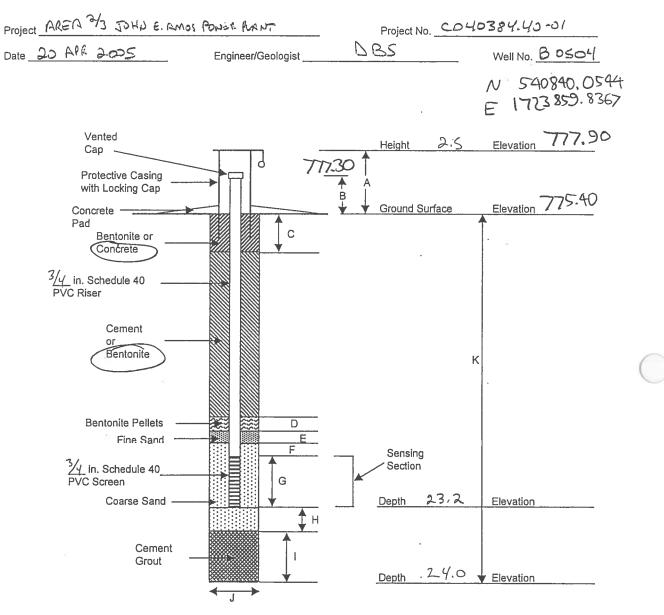
gal consultants



#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	C	D	E	F
2.6	2.0	34.7	0	Ο	5
G	Н		J	К	
10	0.3	0	0.25	50,0	

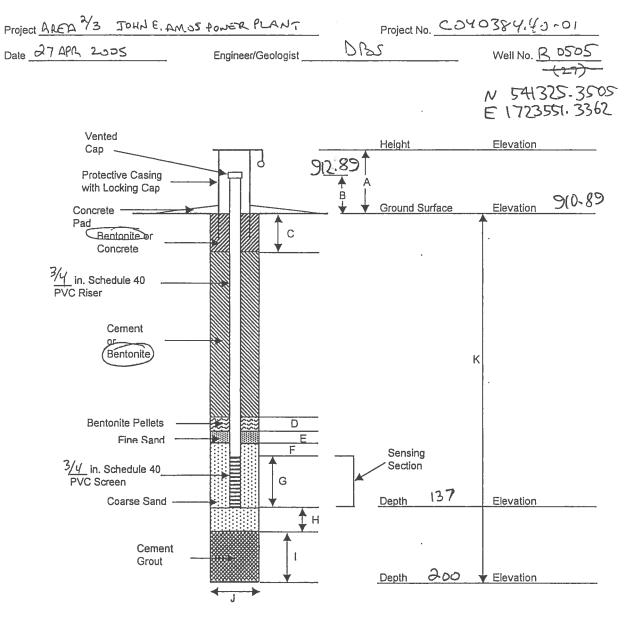




## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	ONS (Feet)				
A	A B C D E						
2.5	1.9	8.2	ð	ð	5.		
G	Н	1	J	К			
10	0.8	0	0.25	240			

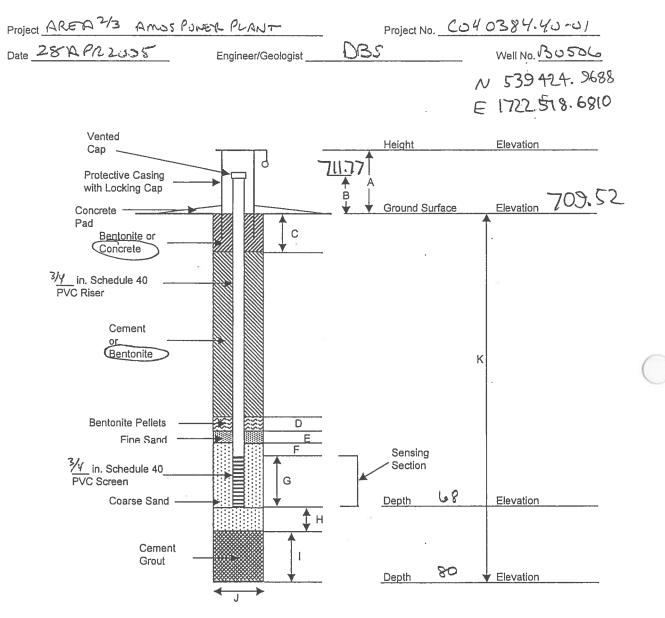
gal consultants



## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	С	D	E	F
2.5	2.0	0	0	0	107
G	H		J	K	
20	3	60	0.25	200	

gal consultants

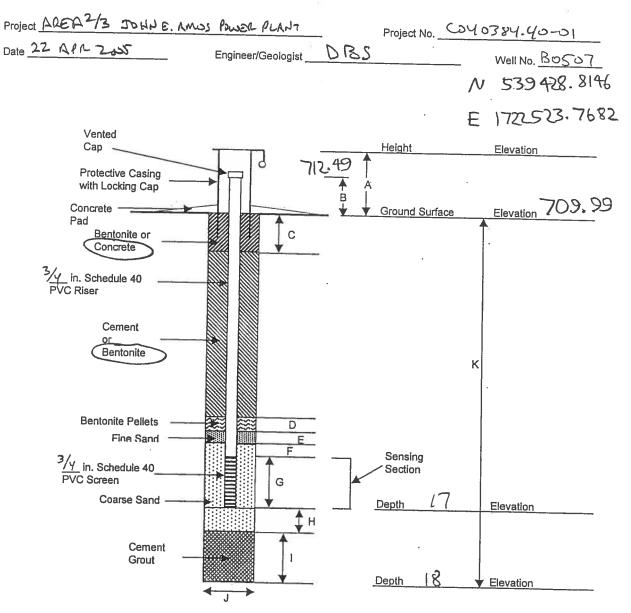


#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	С	D	E	F
2.55	2.25	20	0	0	38
G	Н	1	J	K	
10	2	10	0.25	80	

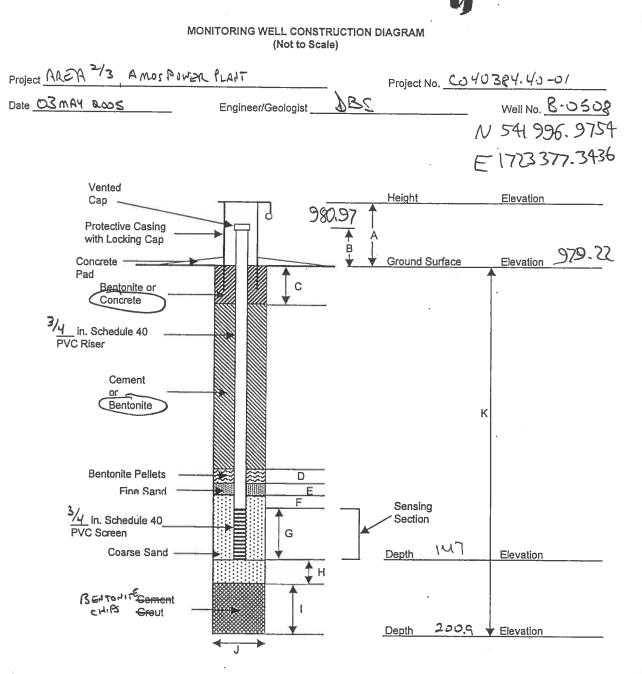
Remarks \_\_\_\_

gal consultants



# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMEN	SIONS (Feet)		
A	B	С	D	E	F
2.70	2.50	4	0	0	3
G	<u> </u>	<u> </u>	J	K	
10	1	0	0.25	18	



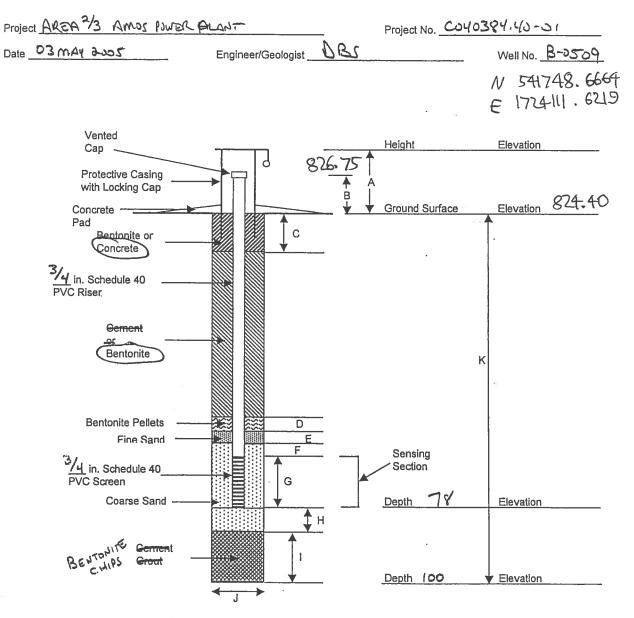
gal consultants

# STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)									
<u>A</u> .	В	С	D	E	۴·				
2.5	1.75	77			50.				
G	н	1	J	К					
20	3	50,9	0.15	200,9					

Remarks \_

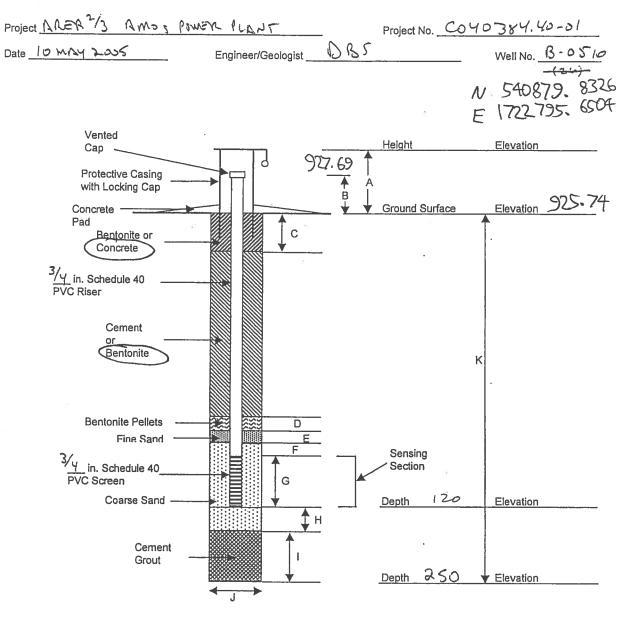
gal consultants



# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMEN	SIONS (Feet	).	
A	В	C	D	E	F
2-6	2.35	20		-	48.
· G·	Н	l	J ·	К	
10	2.0	20	0.25	130	

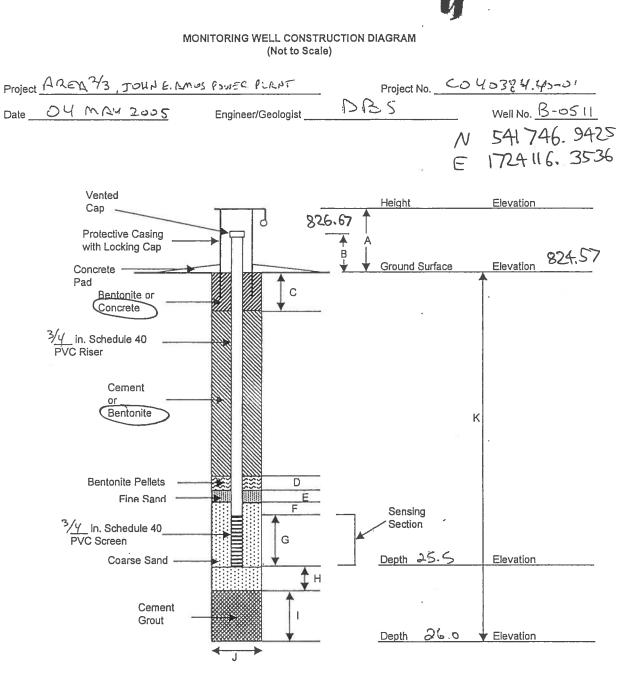
gal consultants



## STANDPIPE PIEZOMETER INSTALLATION SKETCH

	DIMENSIONS (Feet)									
A	B	С	D	E 👌	F					
2.6	195	30	-		70 .					
G	Н	1	J	K						
20	2	1287	0.25	250,7						

Remarks \_

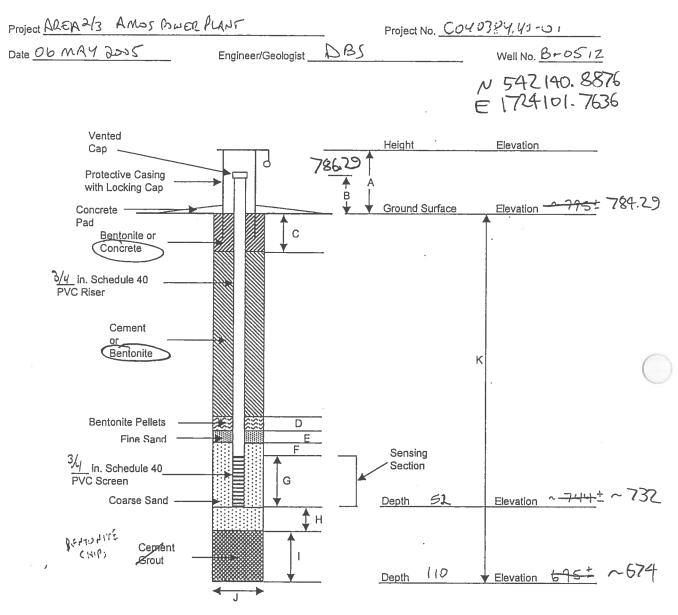


gai consultants

#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

DIMENSIONS (Feet)									
A	В	С	D	E	F				
2.45	2.1	3,5	-		12.0				
G	Н		J	K					
10	D.5	_	0.25	26.0					

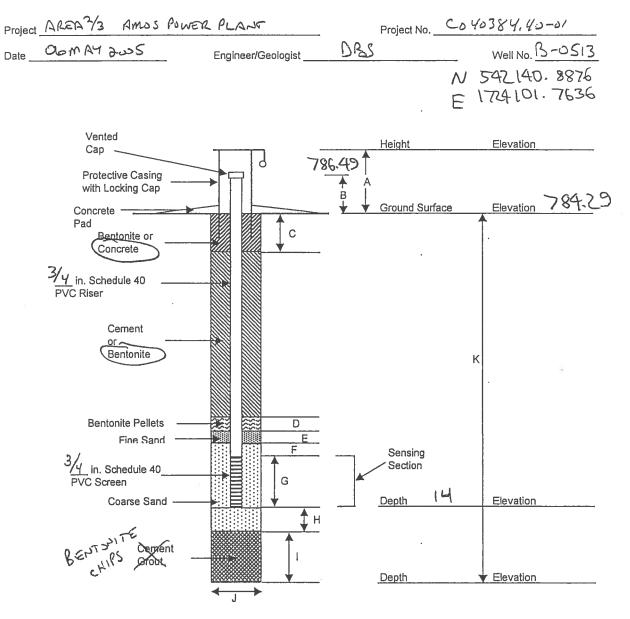
gal consultants 0



# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	)	
A	В	С	D	E	F
2.6	2.0	20.0	•		22.0
G	Н	<u> </u>	J	К	
10	2	56	0.25	110	
Remarks	PIEZO	METE	r B-c	513 1	NITALLEI
in SA	IME B.	SRE 14	NE (TI	PAT IL	(FT)

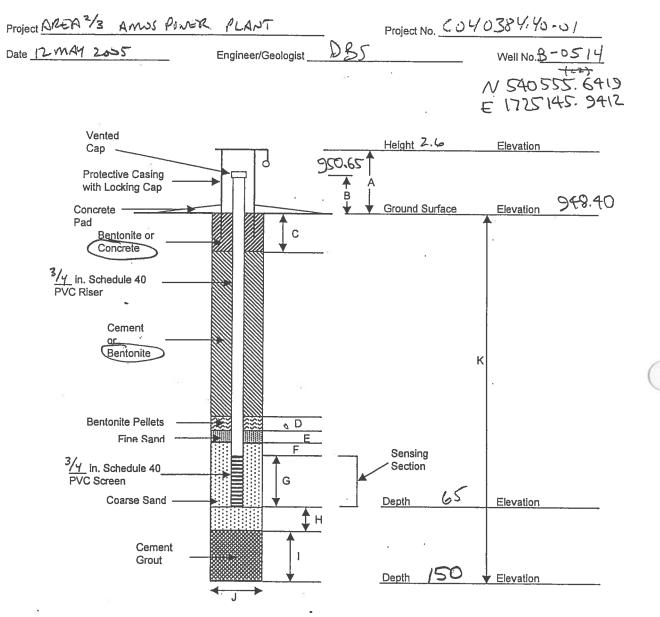




#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)			
A	B	С	D	E	F	
2.6	2.2	3		_	1.5.	
G	Н	1	J	K		
10	2	3**	0.25			
Remarks _	NOTE :	Pizzo	METER	r gNS	MLED	
IN SA	ime Bo	RE HOL	EAS	B-05	2	
** 2F	T SEAL	- BETWEE	N SANO	IACK FOR	B-0512	1
SAND P	PACK A	sa Bo	513			

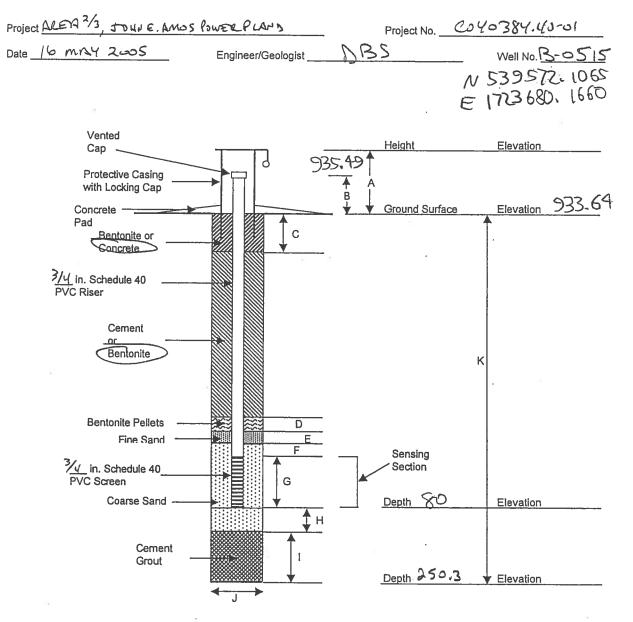
gal consultants



# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	)	
A	B	С	D	E	F
2.0	2.25	17	-	-	38
G	Н	<u> </u>	J	K	
10	2	83	0.25	150	

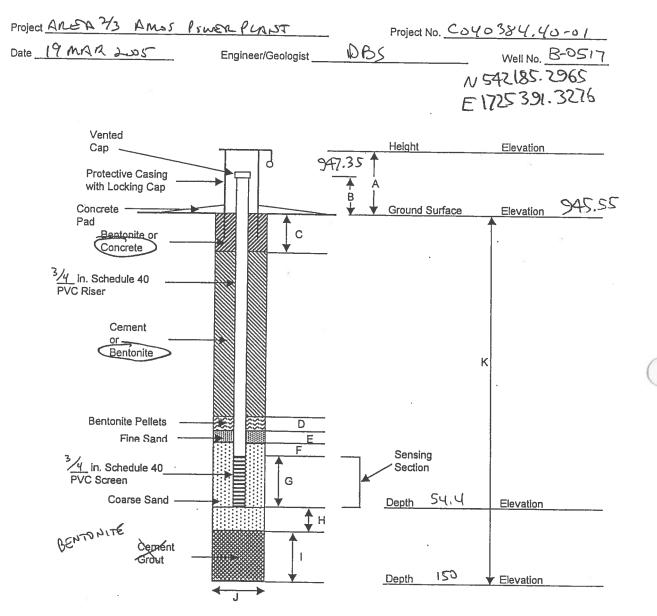
gal consultants



STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	)	
A	В	С	D	E	F
2.1	1.85	20.0	-		50
G	Н	I	J	К	
ro	2	168.3	0.25	250,3	

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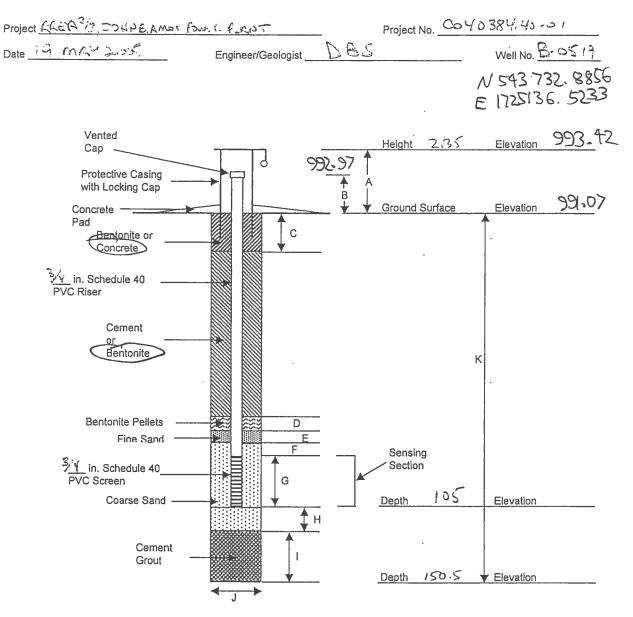
# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMEN	ISIONS (Feet)	)	
A	В	· C	D	É	F
2.3	1.8	14	$\square$		30.4
G	Н		J	K	
10	:2	93.6	0.25	150	

Remarks PACKER ASSEMBLY STUCK IN HOLE. SALVAGED

MOR PACKER AND ALMP. PLATED REMAINDER DOWN HOLE.

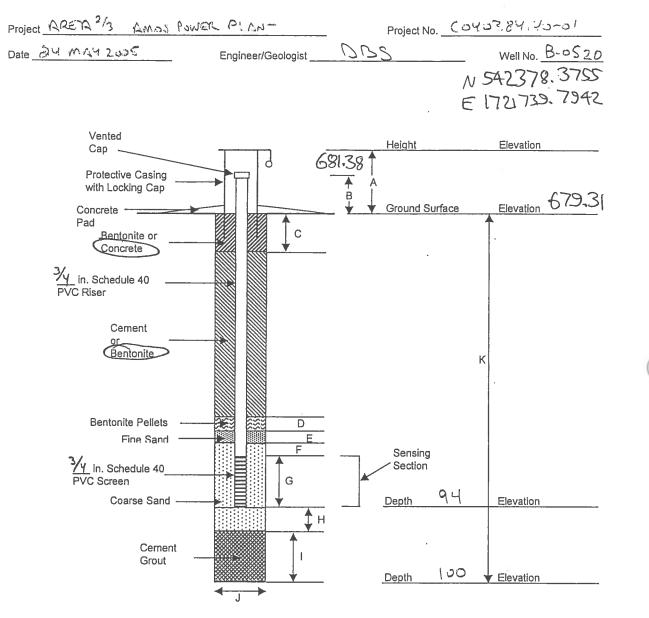
gal consultants



#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	C	D	E	٦
2.35	14	15		وبالألبط	80
G	H		J	К	
10.	3	42,5	0.25	150,5	

gai consultants



#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	B	С	D	E	F
2.4	2.07	34		pression.	50.
G	Н	1	J	К	
10	2	4	0:25	00	

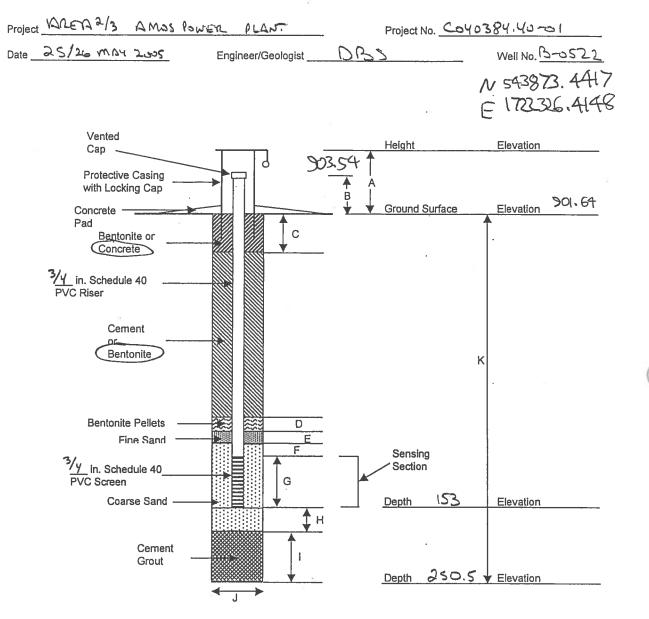
MONITORING WELL CONSTRUCTION DIAGRAM (Not to Scale) Project AREA = /3 AMOS POWER PLANT Project No. 040384.40-01 OBS Well No. B-0521 Date 23 MAY 2005 Engineer/Geologist N 544-199.5521 E 1724054.5791 Vented Height Elevation Cap 1006.48 9 **Protective Casing** ¥ with Locking Cap Elevation 1004,35 B Ground Surface Concrete Pad С Bentonite or Concrete 3/1\_ in. Schedule 40 PVC Riser Cement Bentonite K **Bentonite Pellets** D Fine Sand E F Sensing 3/4 in. Schedule 40 Section PVC Screen G 70.4 Coarse Sand Depth Elevation Îн Cement Grout 70.4 Elevation Depth J

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## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	С	D	E	F
2.28	2.13	12.4			48.
G	Н	1	J	К	
10			0:25	70,4	12

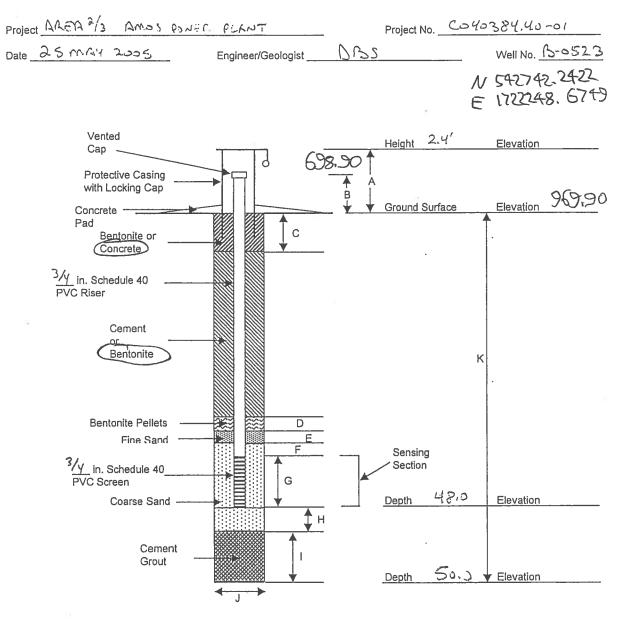
gai consultants



#### STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	(i	
A	B	С	D	E	F
2.18	1.9	35		-	98
G	н	1	J	К	
20	2	95,5	0,25	250,5	

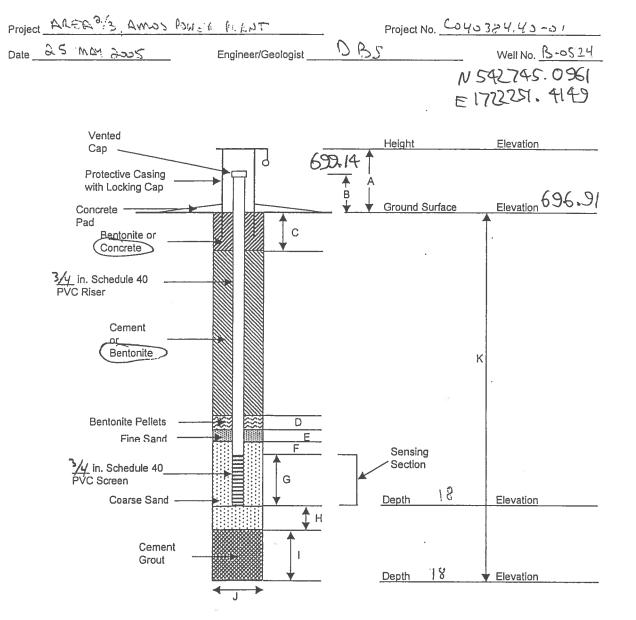
gal consultants



## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)		
A	В	С	D	E	F
2.4	2.0	24	-		
G	Н		J	К	
10	2	-	0:25	50.0	

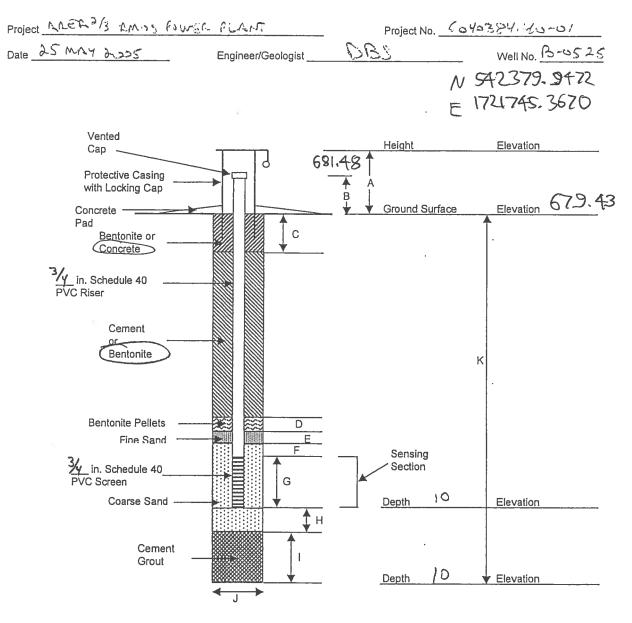
gal consultants transforming kiess into reality



## STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMEN	SIONS (Feet)		
A	В	С	D	E	F
2.55	2.23	3	_	-	5
G	H		J	К	
10	-	-	0.25	18	

gal consultants



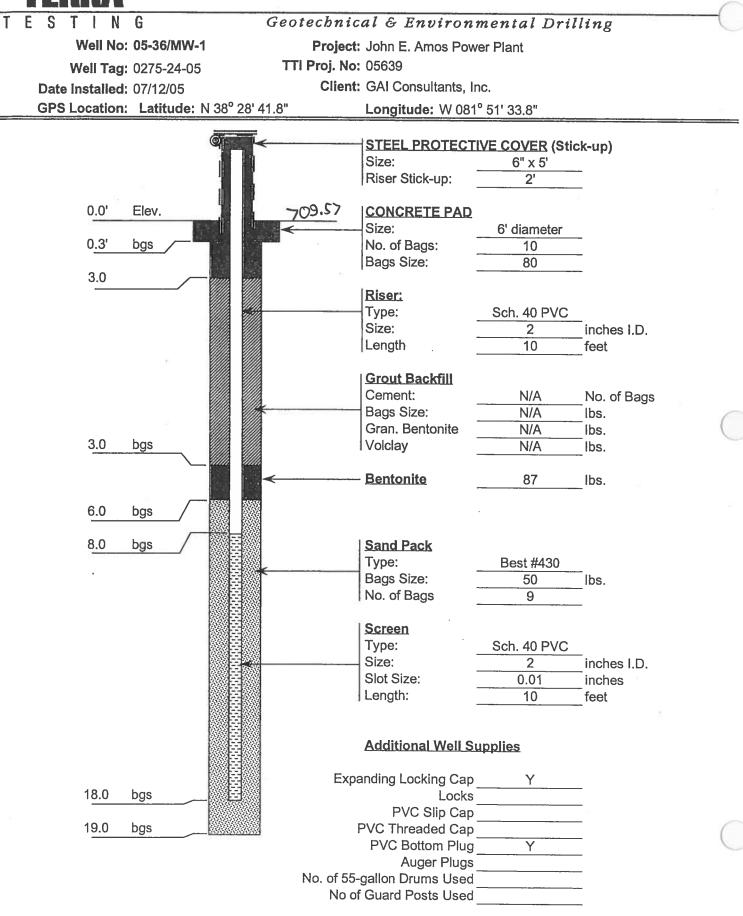
# STANDPIPE PIEZOMETER INSTALLATION SKETCH

		DIMENS	SIONS (Feet)	••••••	
Α	В	C	D	E	F
2.3	2.05	2	_	-	R.
G	Н	<u> </u>	J	K	
5	0	-	0.25	10	

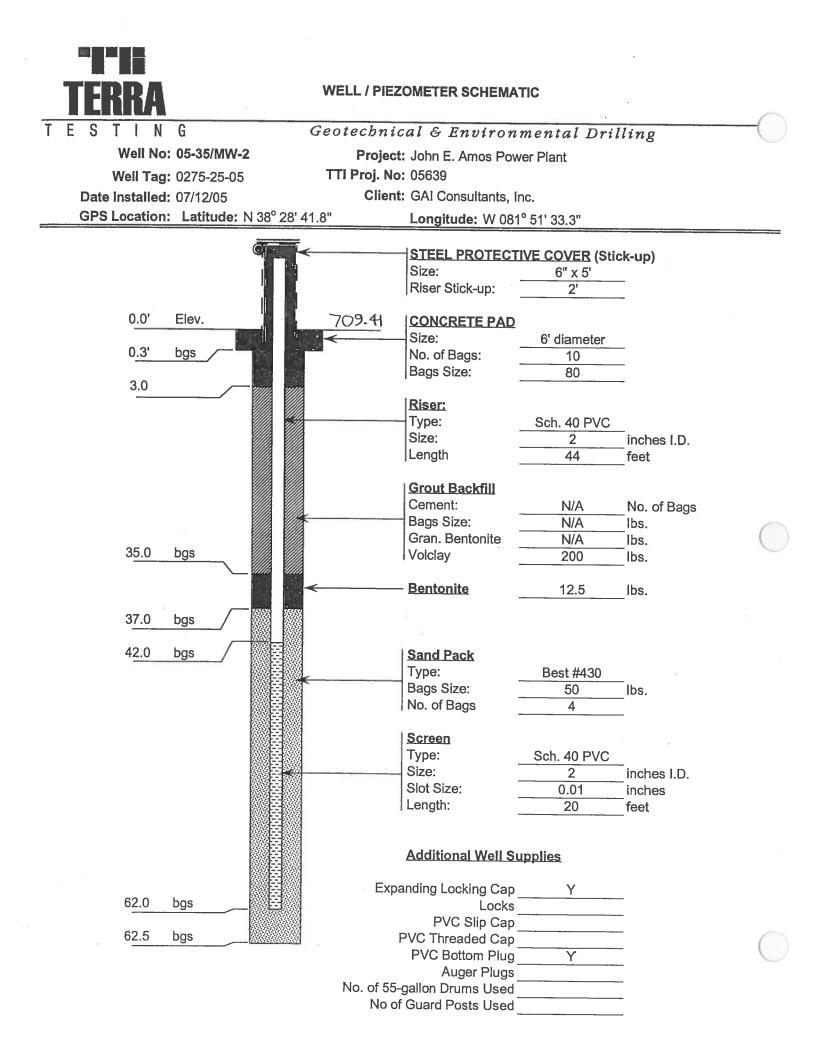
Remarks \_



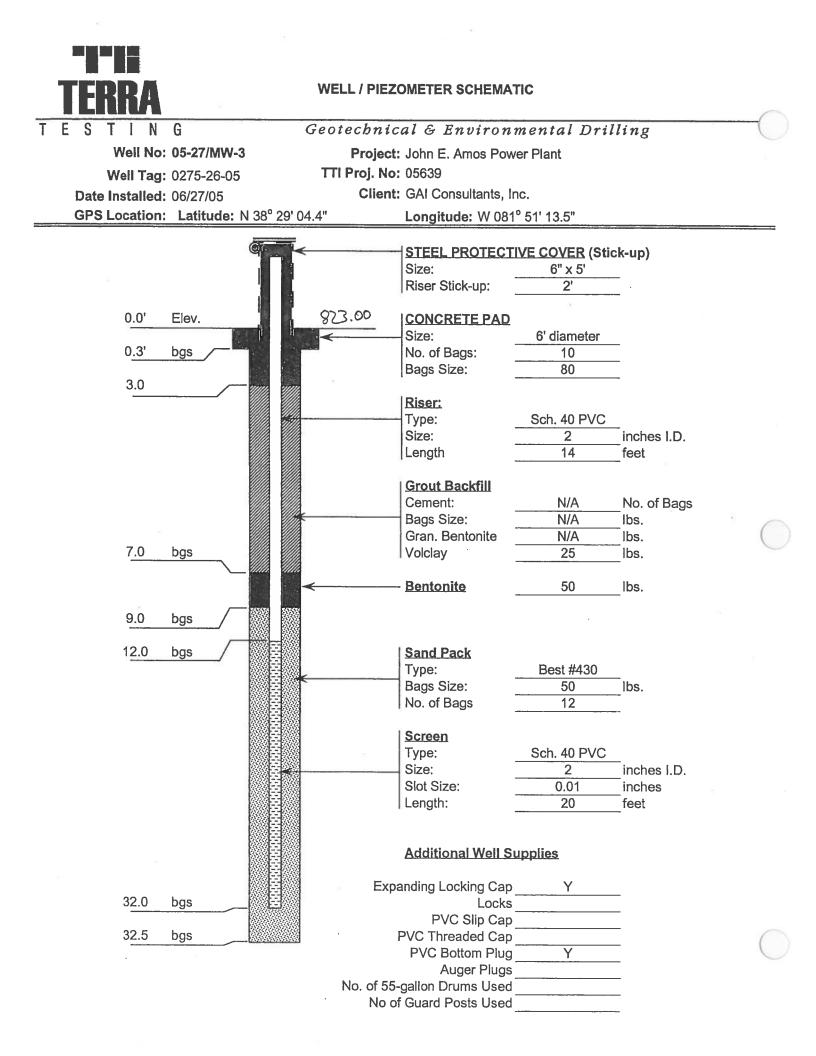
# WELL / PIEZOMETER SCHEMATIC



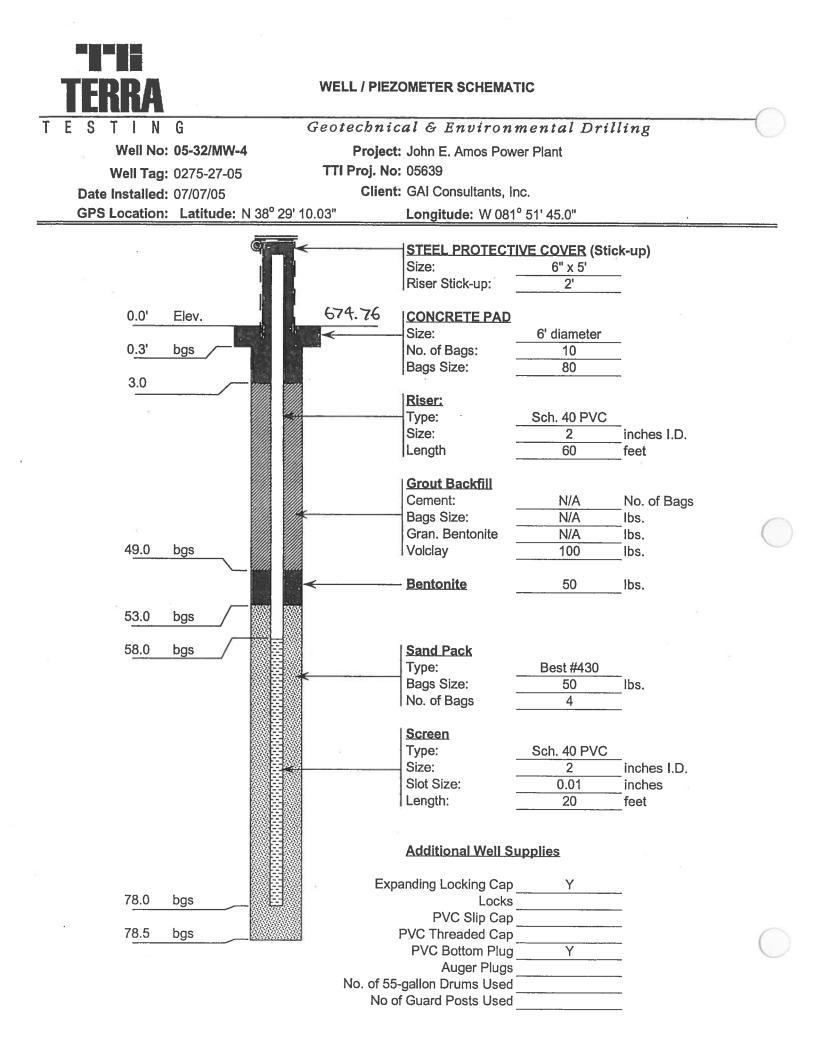
State of West Virginia		Monitoring Well Construction Well Number: WV00275-0024-05	
<b>Department of Environm</b>	ental Protection	vveii Number: vvv00275-0024-05	
Bite Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield	Well Registration No. WV00275-0024-05         Grid Location:         a. Latitude:       38       28       41      8         b. Longitude:       81       51       33      8         c. Method Used:       GPS	Purpose of Monitoring Well: Monitor Groundwater	
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.: 05639/05-36-MW-1 Installed By (Name, Firm, Address): Installer: Vern Curtis / Dougias 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 for	mat).		
1.Cap and Lock: 2.Protective Cover:	Protective	YES e Cover Pipe	
3. Monitoring Well Reference Point:		0 ft.	
4.Borehole Diameter:		4 inches.	
5.Ground Surface Seal: a.Material: concrete		חווועריבע אפרוויוער אין אין אין אין אין אין אין אין אין אין	liannaa
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 V c.Material: PVC	Vell Riser: 2 inches.		
d.Installation Procedure: Thru Augers & Open Bee	Irock Hole		
8.Annuiar 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		and the second	
c.Volume Added: 87 pounds			
		2 A	
14.Bottom of Bentonite Seal/Filter Pack Top: 15.Depth to Top of Screen:		6 ft.	
16.Screen:			
a.Material: PVC			
b.Installation Procedure: Thru Augers & Open Bed	Irock 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 Va	riance Number: MW-07-05		
24.WV Contractor License No. WV002350			

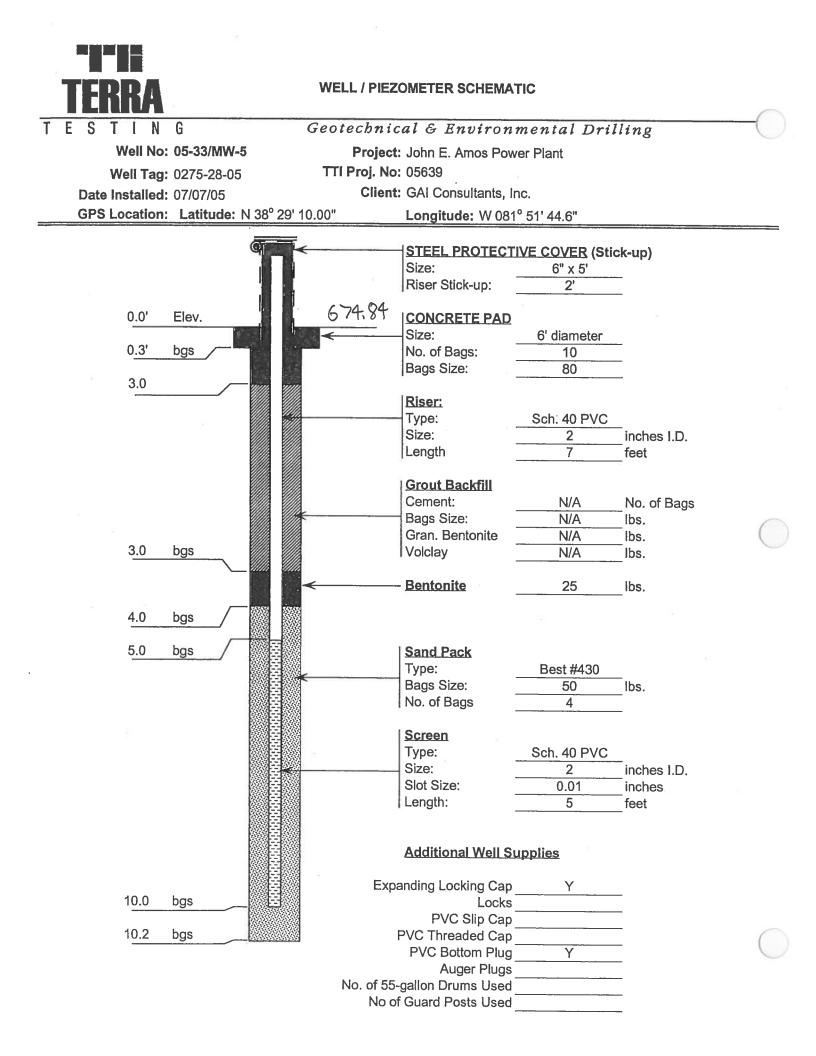


State of West Virginia		Monitorin	g Well Construction	
÷	ntal Protoction		ber: WV00275-0025-05	
Department of Environme Site Name/Physical Address:	ental Protection	05	Dumono of Mentioder Melly	<b></b>
Site: Proposed Landfill G Line 1: Area 2/3 a Line 2: Blue Lick Road J	a. Latitude: 38 28 418 b. Longitude: 81 51 333 c. Method Used: GPS	05	Purpose of Monitoring Well: Monitor Groundwater	
Zip:     25213-     C       County:     Putham     G       Well Owner (Name, Firm, Address):     In       Owner:     Tom Carroll     Ir       Line 1:     John E. Amos Power Plant     L       Line 2:     1530 Winfield Road     L       City:     Windfield     C       State:     WV     S       Zip:     25213-     Z	Company/Project Well No.: 05639/05-35-MW-2 stalled By (Name, Firm, Address): Istaller: Vern Curtis / Douglas Novotny ine 1: Terra Testing, Inc. ine 2: 260 Meadowlands Boulevard ity: Washington tate: PA ip: 15301- hone: 724-746-9100		Date Well Installed: 07/12/2005 Driller's WV Cert No. WV00275	
Section B: (all number fields must be in decimal form	at)			
1.Cap and Lock: 2.Protective Cover:	Protec	YES tive Cover Pipe		
3.Monitoring Well Reference Point:		0 ft.		
4.Borehole Diameter:		4 inches.		
5.Ground Surface Seal: a.Material: concrete		1		dillamaman
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 We c.Material: PVC	ell Riser: 2 inches.			
d.Installation Procedure: Thru Augers & Open Bedre	ock 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			2. 24 日前報	
13.Filter Pack Seal:				
a.Material: bentonite pellet				
b.Installation Procedure: Gravity Fed c.Volume Added: 12.5 pounds			and the second	
•			भूतराष्ट्रा हो ते व	
14.Bottom of Bentonite Seal/Filter Pack Top: 15.Depth to Top of Screen:		37 ft.	and the second	
16.Screen:		42 ft.		
a.Material: PVC			Antipation and an antipation	
b.Installation Procedure: Thru Augers & Open Bedro	ock Hole			
c.Slot Size: .01 inches. d.Screen Length: 20 ft.				
17.Filter Pack: a.Material: medium sand				
b.Installation Procedure: Gravty 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		02.0 16	$P_{\rm even} = \frac{1}{2} \left[ \frac{1}{2} \frac{1}$	
22.Decontamination Procedures: None				
23.Special Circumstances and Exceptions: Yes Varia 24.WV Contractor License No. WV002350	ance Number: MW-07-05			



State of West Virginia				ng Well Construction nber: WV00275-0026-05
Department of Environm	nental Prote	ction	weit nun	ilber: 44400275-0026-05
ite Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WW	Well Registration No. Grid Location: a. Latitude: b. Longitude: c. Method Used:	WV00275-0026-05 38 29 44 81 51 135 GPS	· · · · · · · · · · · · · · · · · · ·	Purpose of Monitoring Well: Monitor Groundwater
Zip: 25213- County: Putham Vell Owner (Name, Firm, Address): Dwner: 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 Wel 05639/05-27-MW-3 Installed By (Name, Fi Installer: Vern Curtis / fi Line 1: Terra Testing, Line 2: 260 Meadowi City: Washington State: PA Zip: 15301- Phone: 724-746-9100	rm, Address): Douglas Novotny Inc. ands Boulevard		Date Well Installed: 06/27/2005 Driller's WV Cert No. WV00275
Section B: (all number fields must be in decimal fo	rmat)			
1.Cap and Lock: 2.Protective Cover:		Protective	YES Cover Pipe	
3.Monitoring Well Reference Point:			0 ft.	
4.Borehole Diameter:		<i>N</i> .	4 inches.	
5.Ground Surface Seal:				אומארוןאנואנאניינייניין
a.Material: concrete				
b.Installation Procedure: Hand Mixed				
6.Surface Seal Bottom/Annular Space Top: 7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID \ c.Material: PVC	Vell Riser: 2 inches.		3 ft.	
d.Installation Procedure: Thru Augers & Open Be	drock 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.	1000 C 555
15.Depth to Top of Screen:			12 ft.	神道の
16.Screen:				
a.Material: PVC				
b.Installation Procedure: Thru Augers & Open Be	drock Hole			And the second se
c.Slot Size: .01 inches. d.Screen Length: 20 ft.				
17.Filter Pack:				
a.Material: medium sand b.Installation Procedure: Gravity fed				
8				
18.Well Depth: 19.Bottom of Filter Pack:			32 ft.	
20.Bottom of Borehole:			32.5 ft. 32.5 ft.	
20.Bolton of Borenole. 21.Backfill Material (below filter pack): sand			J2.5 A.	
22.Decontamination Procedures: None				
23.Special Circumstances and Exceptions: Yes Va 24.WV Contractor License No. WV002350	riance Number: MW-07	-05		

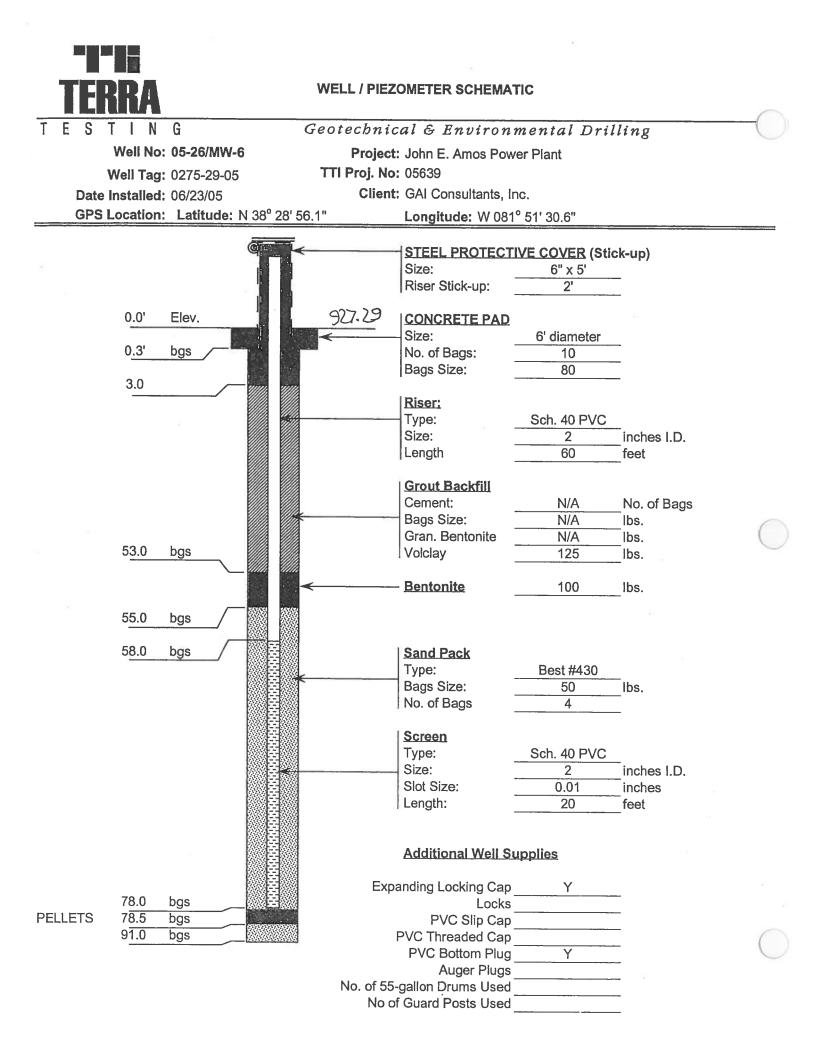


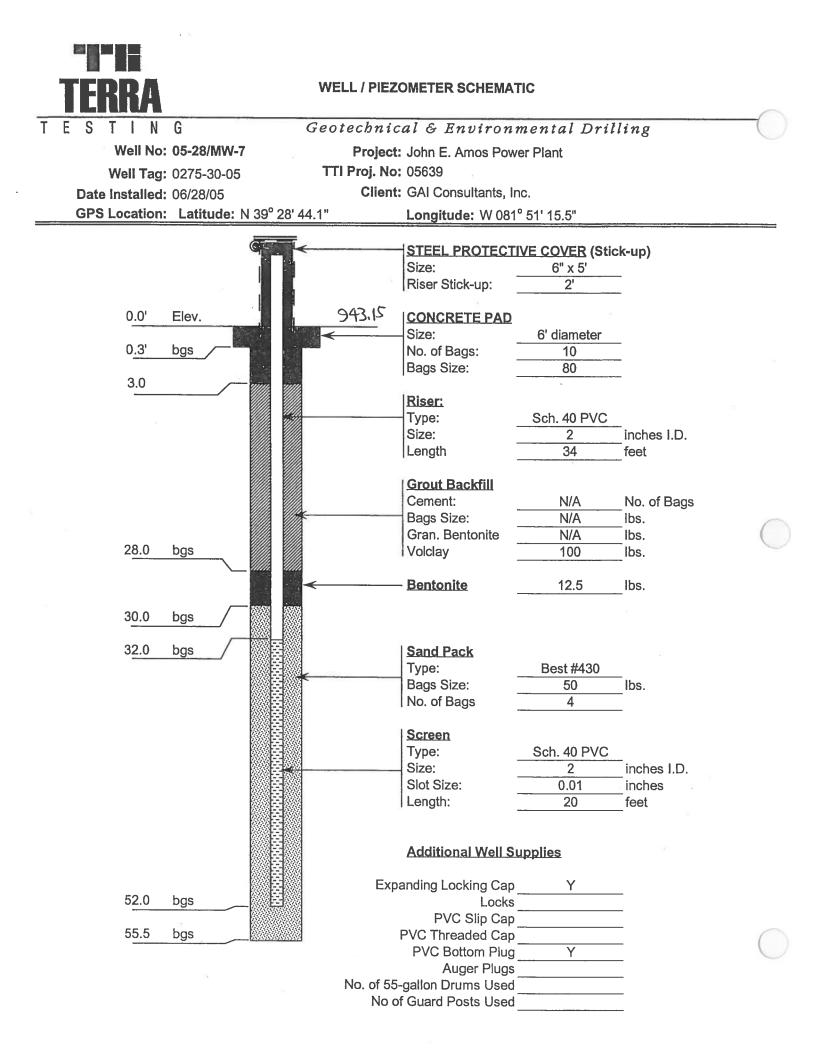


State of West Virginia				ng Well Construction	
Department of Environn	nental Protec	tion	vvell Nun	nber: WV00275-0028-05	
ite Name/Physical Address:	Well Registration No. V			Purpose of Monitoring Well:	
Site: Proposed Landfill ine 1: Area 2/3 ine 2: Blue Lick Road City: Windfield	b. Longitude:	38 29 10 . 31 51 446 GPS		Monitor Groundwater	
State: VVV Lip: 25213- County: Putnam Fell Owner (Name, Firm, Address):	Company/Project Well 05639/05-33-MW-5 installed By (Name, Firr			Date Well Installed:	
Owner: Tom Carroll ine 1: John E. Amos Power Plant ine 2: 1530 Winfield Road State: WV ip: 25213- hone: 304-759-3156	Installer: Vern Curtis / Do Line 1: Terra Testing, I Line 2: 260 Meadowlar City: Washington State: PA Zip: 15301- Phone: 724-746-9100	ouglas Novotny nc.		07/07/2005 Driller's WV Cert No. WW00275	
Section B: (all number fields must be in decimal for					
1.Cap and Lock: 2.Protective Cover:		Protective	YES Cover Pipe		
3. Monitoring Well Reference Point:			0 ft.		
4.Borehole Diameter:			4 inches.		
5.Ground Surface Seal: a.Material: concrete				THRINGIN WARE EVICE	
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 c.Material: PVC	Well Riser: 2 inches.	£			
d.Installation Procedure: Thru Augers & Open Be	edrock 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 Be	edrock 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 V 24.WV Contractor License No. WV002350	ariance Number: MW-07-	05			

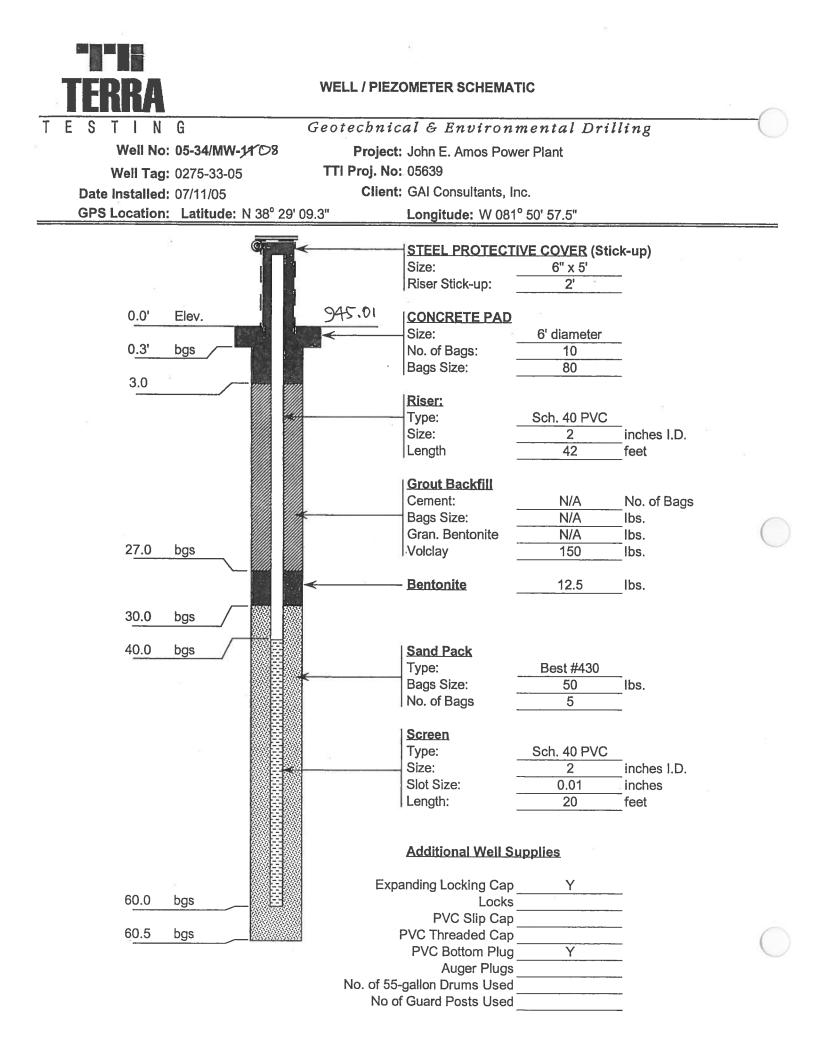
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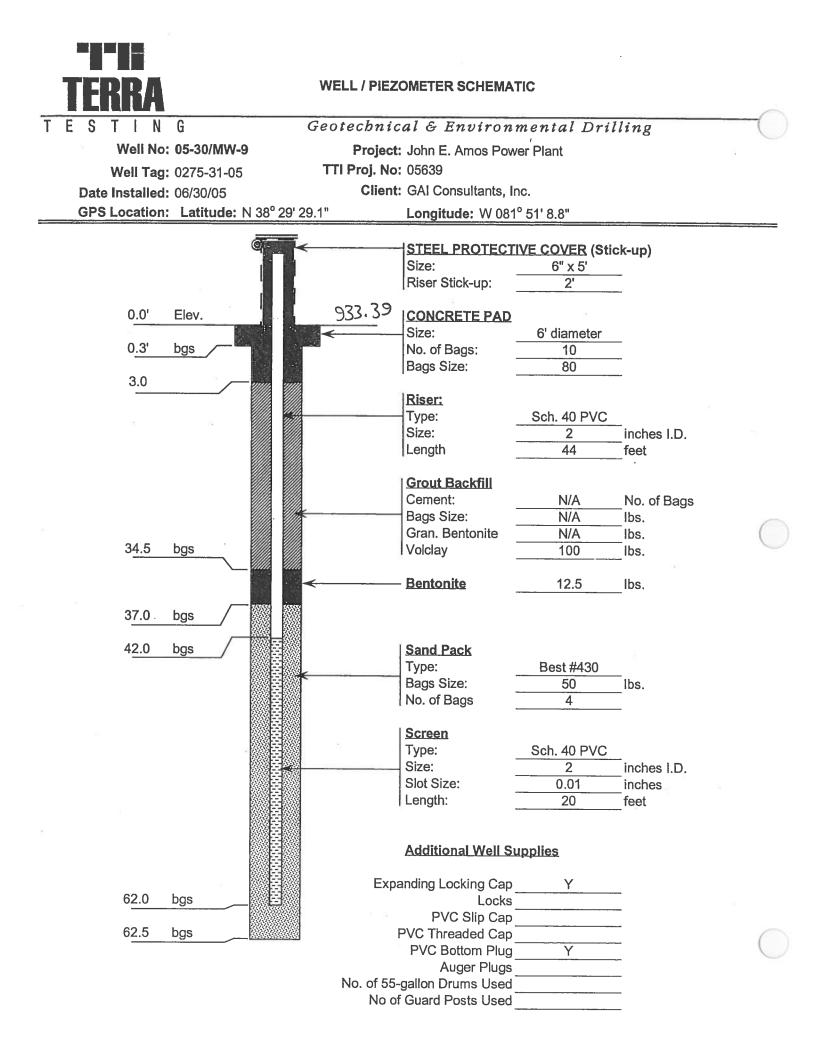




State of West Virginia Department of Environme	ntal Protection	Monitoring Well Construction Well Number: 00015-0018-08 Approved
Site Name/Physical Address: Site: John E. Amos FGD Landfill Line 1: 1530 Winfield Road Line 2: City: Winfield State: WV	Well Registration No. 00015-0-18-0- Grid Location: a. Latitude: 38 28 46 .0 b. Longitude: 81 51 22 .0 c. Method Used: GPS	Purpose of Monitoring Well: Assessment
Owner: American Electric Power Line 1: 1 Riverside Plaza Line 2: City: Columbus State: OH Zip: 43215-	Company/Project Well No.: MW-7R         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 Dríller's WV Cert No. RoushM31
Section B: (all number fields must be in decimal forma	t)	
1.Cap and Lock:	Destastiva	YES
2.Protective Cover:	Protective	Cover Pipe
3.Monitoring Well Reference Point:		0 ft. 6 inches.
4.Borehole Diameter: 5.Ground Surface Seal:		
a.Material: concrete		mentions of the participation
b.Installation Procedure: Formed 7' x 7' Pad Arrow Co	oncrete	
6.Surface Seal Bottom/Annular Space Top:		1 ft. 23
7.Well Riser: a.OD Well Riser: 2.25 inches. b.ID Well c.Material: PVC	Riser: 2 inches.	
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.Voiume 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 P	ressure Water Pump	
23.Special Circumstances and Exceptions: No Variance 24.WV Contractor License No. 00015	e Number:	

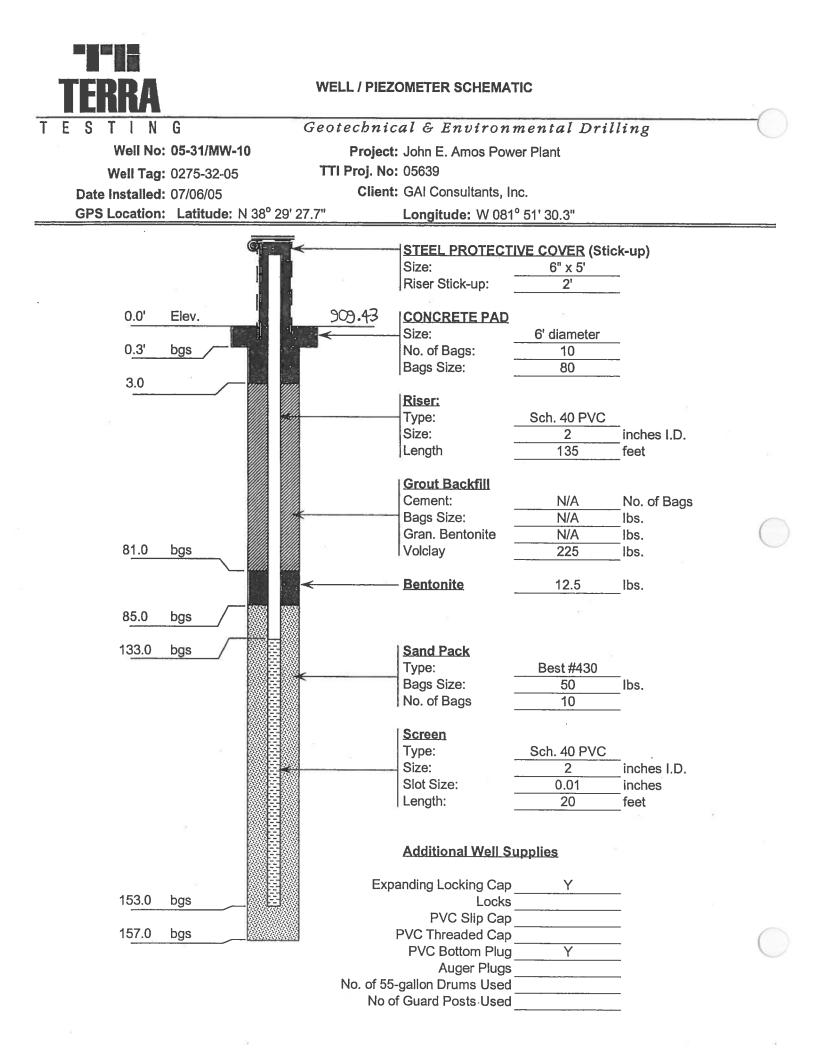


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State of West Virginia		Monitorin	g Well Construction	
Department of Environm	ental Protect	ion	aber: WV00275-0033-05	
ite Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield State: WV Zip: 25213-	Weil Registration No. W Grid Location: a. Latitude: 38 b. Longitude: 81	/00275-0033-05 3 29 93 50 573 PS	Purpose of Monitoring Well: Monitor Groundwater	
County: Putnam Vell 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 Section B: (all number fields must be in decimal for	05639/05-34-MW-11 Installed By (Name, Firm, Installer: Vern Curtis / Doc Line 1: Terra Testing, In Line 2: 260 Meadowland City: Washington State: PA Zip: 15301- Phone: 724-746-9100	, <b>Address):</b> Iglas Novotny C.	Date Well Installed: 07/11/2005 Driller's WV Cert No. WV00275	
1.Cap and Lock:	inia)	YES		
2.Protective Cover:		Protective Cover Pipe		
3.Monitoring Well Reference Point:		0 ft.		5
4.Borehole Diameter:		4 inches.		
5.Ground Surface Seal: a.Material: concrete			WIRNELY STATE HEYON CO	
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 c.Material: PVC				
d.Installation Procedure: Thru Augers & Open B	drock Hole			
8.Annular Space Seal: a.Material: high solids grout -		2		
b.Installation Procedure: pour				
9.Well Development Procedure: other - By Client				
10.Drilling Method Used: percussion -		27 ft.		
11.Annular Space Seal Bottom/Filter Seal Top:	S	27 14		
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.	2 4:	
15.Depth to Top of Screen:		40 ft.		
16.Screen: a.Material: PVC				
b.Installation Procedure: Thru Augers & Open B				
c.Slot Size: .01 inches. d.Screen Length: 20 ft.			4.	
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.	H CANADA STR	
20.Bottom of Borehole:		60.5 ft.		
21.Backfill Material (below filter pack): sand				
22.Decontamination Procedures: None				
23.Special Circumstances and Exceptions: Yes 24.WV Contractor License No. WV002350	/ariance Number: MW-07-	05		



State of West Virginia		Molt N	oring Well Construction
Department of Environr	nental Protectio	on vveil N	umber: VVV0275-0031-05
Ite Name/Physical Address: Site: Proposed Landfill Ine 1: Area 2/3 Ine 2: Blue Lick Road City: Windfield State: WV	Well Registration No. WV00 Grid Location: a. Latitude: 38 2	0275-0031-05 29 291 51 88	Purpose of Monitoring Well: Monitor Groundwater
Ip: 25213- County: Putnam Fell Owner (Name, Firm, Address): Owner: Tom Carroll Line 1: John E. Amos Power Plant Line 2: 1530 Winfield Road City: Windfield State: WW Zip: 25213- Phone: 304-759-3156	Company/Project Well No.: 05639/05-30-MW-9 Installed By (Name, Firm, A Installer: Vern Curtis / Dougk Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands I City: Washington State: PA Zip: 15301- Phone: 724-746-9100	ddress): as Novotny	Date Well Installed: 06/30/2005 Driller's WV Cert No. WV00275
Section B: (all number fields must be in decimal			
1.Cap and Lock: 2.Protective Cover: 3.Monitoring Well Reference Point:		YE Protective Cover Pip 0	Statement Statement Statement Statement
4.Borehole Diameter: 5.Ground Surface Seal: a.Material: concrete		4 inche	
b.Installation Procedure: Hand Mixed			
6.Surface Seal Bottom/Annular Space Top: 7.Well Riser: a.OD Well Riser: 2.38 inches. b.IE c.Material: PVC	Well Riser: 2 inches.	3	)ft.
d.Installation Procedure: Thru Augers & Open I	Bedrock Hole		
8.Annular Space Seal: a.Material: high solids grout -			
b.Installation Procedure: pour			
9.Well Development Procedure: other - By Clier	ht		
10.Drilling Method Used: percussion -		34.5	5. <del>0</del>
11.Annular Space Seal Bottom/Filter Seal Top: 12.Drilling Fluid Used: Yes Source: Air		54.5	
13.Filter Pack Seal: a.Material: bentonite pellet b.Installation Procedure: Gravity Fed	8		
c.Volume Added: 12.5 pounds			
14.Bottom of Bentonite Seal/Filter Pack Top:	· •		7 ft.
15.Depth to Top of Screen: 16.Screen; a.Material: PVC		42	2 ft.
b.Installation Procedure: Thru Augers & Open c.Siot Size: .01 inches. d.Screen Length: 20 f			
17.Filter Pack: a.Material: medium sand b.Installation Procedure: Gravity Fed			
18.Well Depth:		62	2 ft.
19.Bottom of Filter Pack:		62.5	5 ft.
20.Bottom of Borehole:		62.5	5 ft.
21.Backfill Material (below filter pack): sand			
22.Decontamination Procedures: None 23.Special Circumstances and Exceptions: Yes 24.WV Contractor License No. WV002350	Variance Number: MW-07-05		

Well Programs

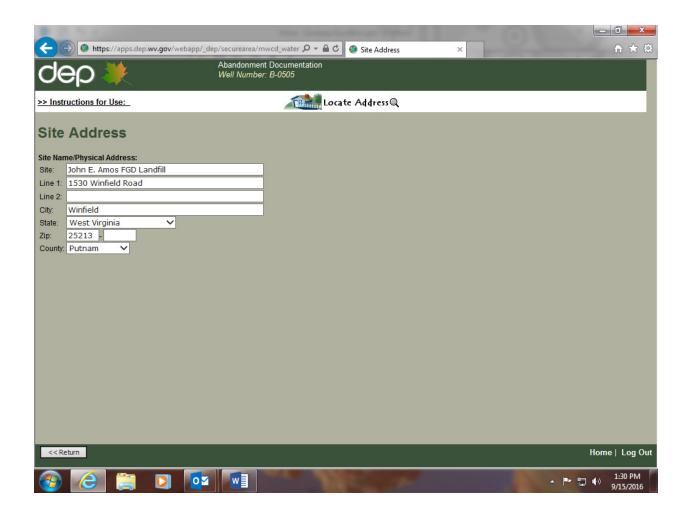


State of West Virginia		Monitoring Well	
Department of Environ	mental Protection	vveii Number: W	N00275-0032-05
Site Name/Physical Address: Site: Proposed Landfill Line 1: Area 2/3 Line 2: Blue Lick Road City: Windfield	Well Registration No. WV00275-0032-05 Grid Location: a. Latitude: 38 29 277 b. Longitude: 81 51 303 c. Method Used: GPS		se of Monitoring Well: or Groundwater
State: WV Zip: 25213- County: Putnam 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.: 05839/05-31-MW-10 Installed By (Name, Firm, Address): Installer: Vérn Curtis / Douglas Novotny Line 1: Terra Testing, Inc. Line 2: 260 Meadowlands Boulevard City: Washington State: PA Zip: 15301- Phone: 724-746-9100	07/08 Driller	Vell Installed: 5/2005 's WV Cert No. 0275
Section B: (all number fields must be in decima	al format)		
1.Cap and Lock: 2.Protective Cover:	Protectiv	YES ve Cover Pipe	
3.Monitoring Well Reference Point:		0 ft.	
4.Borehole Diameter:		4 inches.	
5.Ground Surface Seal: a.Material: concrete		THEFTER	
b.Installation Procedure: Hand Mixed			
6.Surface Seal Bottom/Annular Space Top: 7.Well Riser: a.OD Well Riser: 2.38 inches. b.	ID Well Riser: 2 inches.	3 ft.	
c.Material: PVC d.Installation Procedure: Thru Augers & Oper	1 Bedrock Hole		
8.Annular Space Seal: a.Material: high solids grout -			
b.Installation Procedure: pour			
9.Well Development Procedure: other - By Cli	ent		
10.Drilling Method Used: percussion -		81 ft.	
11.Annular Space Seal Bottom/Filter Seal Top: 12.Drilling Fluid Used: Yes Source: Air		01 1(.	
13.Filter Pack Seal:	a.		
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.	E
15.Depth to Top of Screen:		133 ft.	
16.Screen: a.Material: PVC			
b.Installation Procedure: Thru Augers & Oper			
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			Same and an and a second second second second second second second second second second second second second s
23. Special Circumstances and Exceptions: Ye			

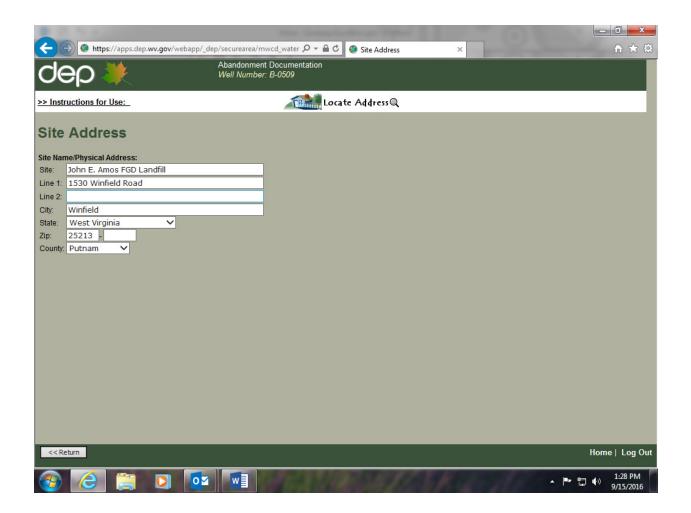
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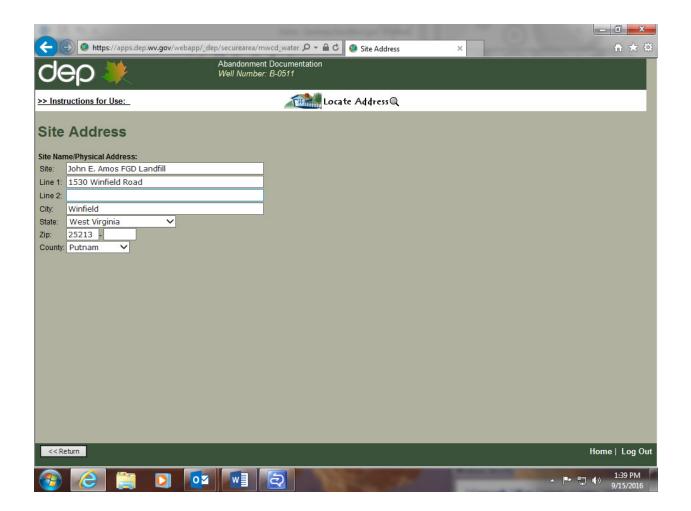
WVDEP Monitoring Well & Piezometer Closure Information



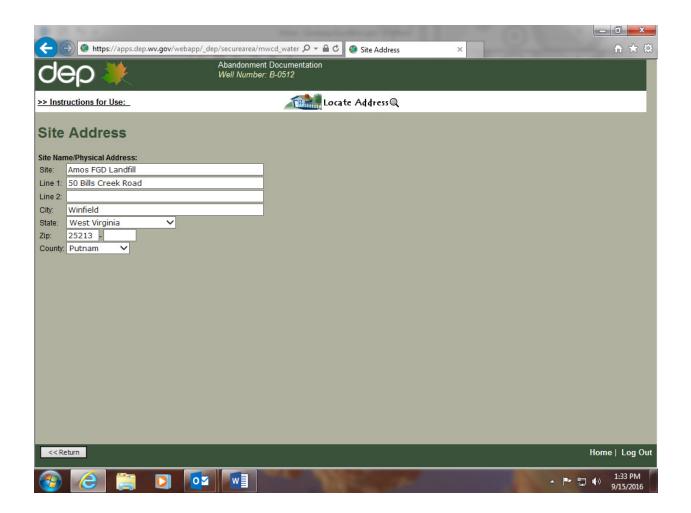
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>> Instructions for Use:			
Abandonment Abandonment Type:	Information		
Borehole:			
Monitoring Well: ●	B-0505		
Condition of Well: Reason for Abandonment Abandonment Date:	Good V Landfill Expansion		
Abandonment Procedure:			
Material Used:	Coated .25" Bentonite Pellets		
Procedure Used:	Gravity - Hydrated pellets above SWL - Used ~25#		
Total Well Depth:	137 ft. Height of Standing Water in Well: 89	ft. (if dry put 0)	
Annular Space Type:			
Decontamination Procedure:			
Special Circumstances:	No V Number:		
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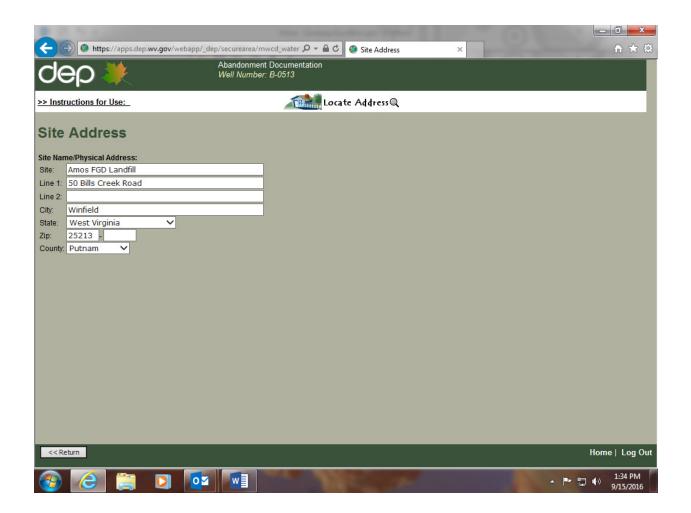
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Abandonment Type:				
Borehole: 🔾				
Monitoring Well: 🔍	B-0509			
Condition of Well:	Good V			
Reason for Abandonment:				
Abandonment Date:				
Abandonment Procedure:				
	Coated .25" Bentonite Pellets			
	Gravity - Hydrated above SWL - Used ~15# - Cut c			
Total Well Depth:		ft. (if dry put 0)		
Annular Space Type:				
Decontamination Procedure:				
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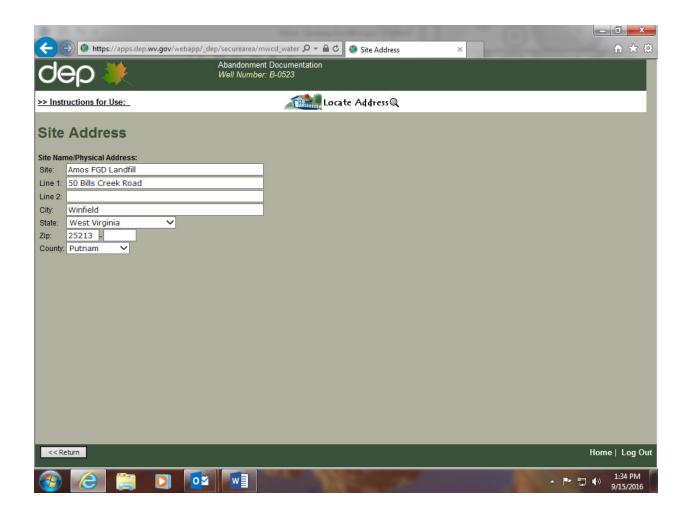
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Abandonment	Information		
Abandonment Type:			
Borehole: 🔾			
Monitoring Well: •	B-0511		
Condition of Well:	Good V		
Reason for Abandonment:	Landfill Expansion		
Abandonment Date:	4/8/2008 ii (mm/dd/yyyy)		
	Coated .25" Bentonite Pellets		
	Gravity - Hydrated above SWL - Used ~8# - Cut of		
Total Well Depth: Annular Space Type:		ft. (if dry put 0)	
Decontamination Procedure:			
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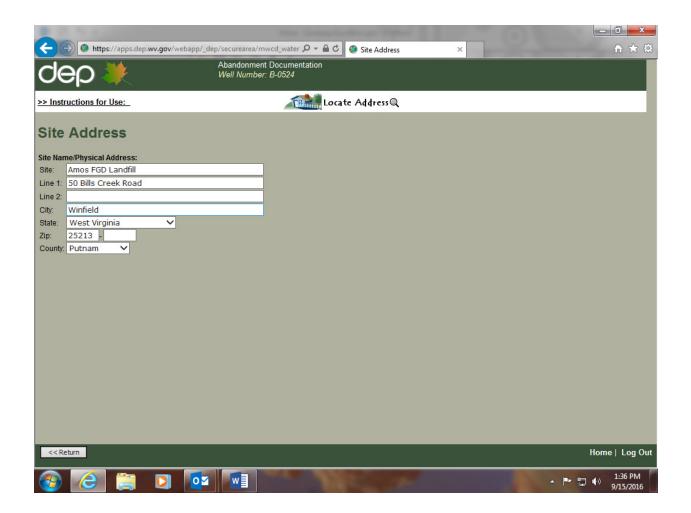
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>> Instructions for Use:			
Abandonment	Information		
Abandonment Type: Borehole: O Monitoring Well: ●	B-0512		
Condition of Well: Reason for Abandonment: Abandonment Date:	Good V No longer in use.		
	Impermeable V Liquid Nox	ft. (if dry put 0)	
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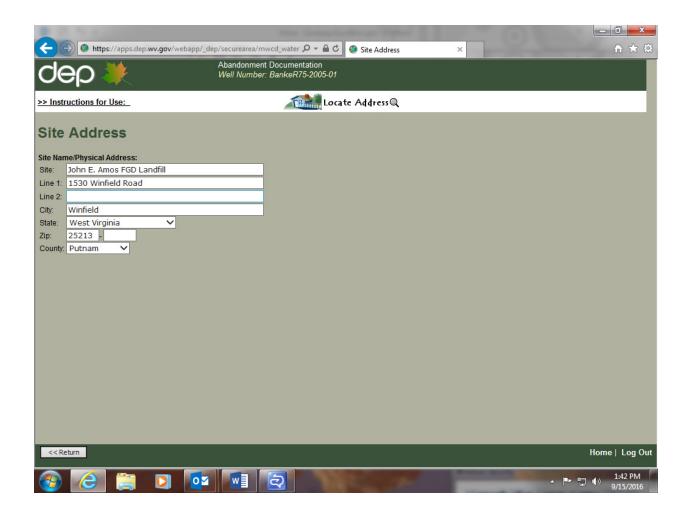
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Abandonment	Information		
Abandonment Type:			
Borehole: 🔘			
Monitoring Well: 🔍	B-0513		
Condition of Well:	Good V		
Reason for Abandonment:	1" piezometer is no longer in use.		
Abandonment Date:	4/16/2013 (mm/dd/yyyy)		
Abandonment Procedure:			
	3/8" Coated Pellets / 10 lbs.		
	Gravity / Pulled protector / Dug 3" / Placed clay cap		
Total Well Depth:		ft. (if dry put 0)	
Annular Space Type:		c (ii diy put o)	
Decontamination Procedure:			
Special Circumstances:	No V Number:		
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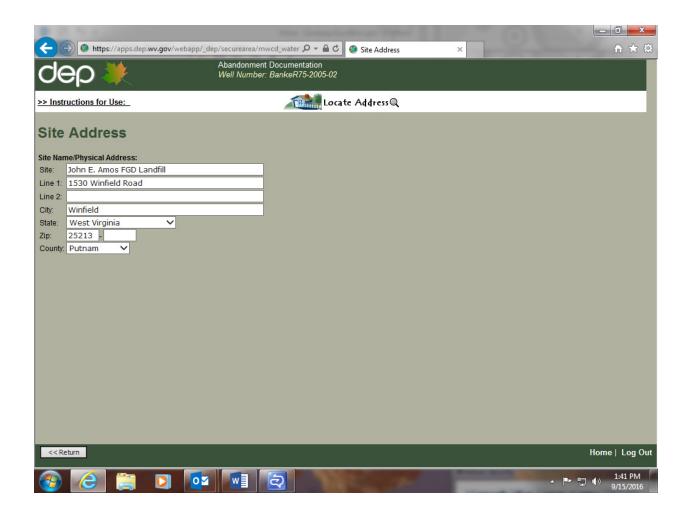
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Abandonment	Information		
Abandonment Type:			
Borehole: O			
Monitoring Well: ●	B-0523		
Condition of Well:	Good V		
	1" piezometer is no longer in use.		
Abandonment Date:			
	3/8" Coated Pellets / 15 lbs.         Gravity / Pulled protector / Dug 3' / Placed clay cap         50       ft. Height of Standing Water in Well: 22		
Annular Space Type:		ft. (if dry put 0)	
Decontamination Procedure:			
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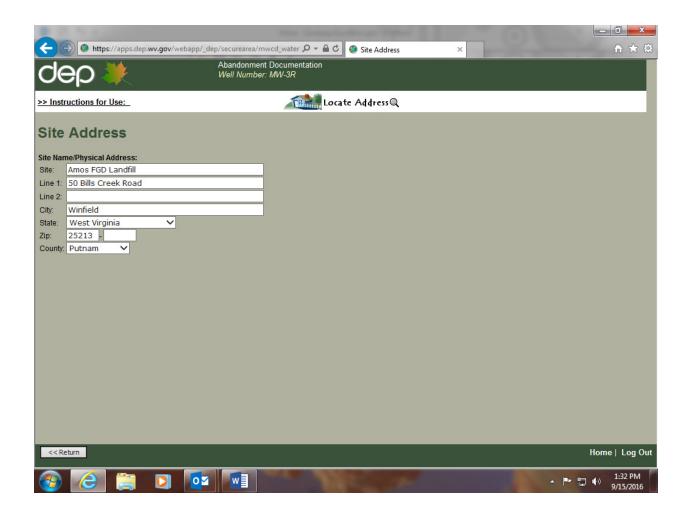
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>> Instructions for Use:			
Abandonment	Information		
Abandonment Type:			
Borehole: O Monitoring Well: ●	B-0524		
Condition of Well:			
Reason for Abandonment:			
Abandonment Date:	4/16/2013 (mm/dd/yyyy)		
Abandonment Procedure:			
	3/8" Coated Pellets / 15 lbs.		
	Gravity / Pulled protector / Dug 3' / Placed clay cap		
Total Well Depth:		ft. (if dry put 0)	
Annular Space Type: Decontamination Procedure:			
Special Circumstances:			
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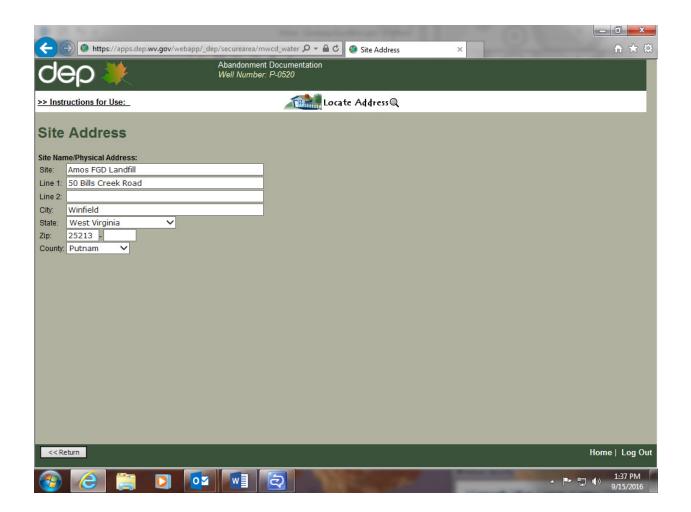
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>> Instructions for Use:				
Abandonment	Information			
Abandonment Type:				
Borehole: O				
Monitoring Well: 🖲	BankeR75-2005-01			
Condition of Well:	Good V			
Reason for Abandonment:				
Abandonment Date:	4/25/2007 (mm/dd/yyyy)			
Abandonment Procedure:				
	14.8 lbs of 3/8 Bentonite Coated Pellets			
	Casing cut 30" below surface and dropped 3/8 Ber			
Total Well Depth:		ft. (if dry put 0)		
Annular Space Type:				
Decontamination Procedure:	None			
Special Circumstances:	No V Number: 05-01			
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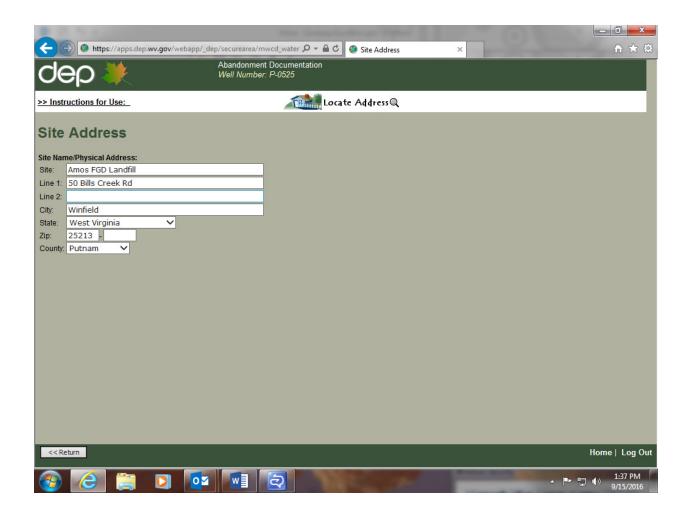
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Abandonment	Information			
Abandonment Type:				
Borehole: O				
Monitoring Well: 💿	BankeR75-2005-02			
Condition of Well:	Good V			
Reason for Abandonment:				
Abandonment Date:				
Abandonment Procedure:				
	6.1 lbs of 3/8 Bentonite Coated Pellets			
Procedure Used:				
Total Well Depth:		ft. (if dry put 0)		
Annular Space Type:		in (ii di) paro)		
Decontamination Procedure:	None			
Special Circumstances:	No 💙 Number:			
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Abandonment	Information			
Abandonment Type:				
Borehole: 🔾				
Monitoring Well: •	MW-3R			
Condition of Well:	Good V			
Reason for Abandonment:	No longer in use.			
Abandonment Date:	4/16/2013 iii (mm/dd/yyyy)			
Abandonment Procedure:				
	3/8" Coated Pellets - 8 lbs.			
Procedure Used:	Pulled pump / Gravity pellets / Pulled protector / Di			
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 V Number:			
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>> Instructions for Use:				
Abandonment	Information			
Borehole: O				
Monitoring Well: •	P-0520			
Condition of Well: Reason for Abandonment: Abandonment Date:	Good V No longer in use			
Abandonment Procedure:				
Material Used:	1/4" Coated Bentonite Pellets 35 lbs			
Procedure Used:	Gravity - Dug down 3', cut off, installed clay cap			
Total Well Depth:	96 ft. Height of Standing Water in Well: 23	ft. (if dry put 0)		
Annular Space Type:				
Decontamination Procedure:				
Special Circumstances:	No 💙 Number:			
<< Return				Home   Log Out
		-	Statement Statement	1:37 PM
				▲ I I I I I I I I I I I I I I I I I I I



B. 15 No. 4				
(-) (-) ( https://apps.de	ep.wv.gov/webapp/_dep/securearea/mwcd_water 🔎 🗕 🖒	Abandonment	Information ×	ĥ★ ‡
dep 💥	Abandonment Documentation Well Number: P-0525	4		
>> Instructions for Use:				
Abandonment	Information			
Abandonment Type: Borehole:				
Monitoring Well: •	P-0525			
Condition of Well: Reason for Abandonment: Abandonment Date:	Good V No longer in use			
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:		ft. (if dry put 0)		
Annular Space Type:				
Decontamination Procedure:				
Special Circumstances:	No V Number:			
<< Return				Home   Log Out
			And in case of the local division of the loc	▲ ■ ■ 1:37 PM
				9/15/2016



WVDEP Monitoring Well & Piezometer Pending Closure Information



Facility	Reg #	Туре	City	County	Well #	Latit	ude	Lon	gitude	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 5	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 5	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

G:\Public\AEP\CCRCOM~1\AMOSCC~1\ReportLANDFI~2\DRAFTT~3\APPEND~1\ITEMST~1\MONITO~1\WVDEP MW & Piezometer Pending Closure Information



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

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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.

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.

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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

JOB NUMBER	WV015976.0	005		LUG OF BORING	
COMPANY An	nerican Electi	ric Power		BORING NO. MW-1	18
PROJECT Am	os - FGD Lan	dfill		BORING START	
COORDINATES	N 38.5 E 81	1.6		PIEZOMETER TYPE	Ξ.
GROUND ELEVA	TION 735.6	SYSTE	m <b>NAVD88</b>	HGT. RISER ABOVE	Ξ
Water Level, ft	<b>⊻ 21.0</b>	Ţ	Ţ	DEPTH TO TOP OF	W
TIME				WELL DEVELOPME	ΞN
DATE	8/15/2018			FIELD PARTY Za	ac

BORING NO. <u>MW-1801</u>	DATE	/ <b>19</b> SHE	ET <b>1</b> OF	5
BORING START	<b>В</b> ВС	ORING FINISH	8/8/18	
PIEZOMETER TYPE PV	C	WELL TYPE	WO	
HGT. RISER ABOVE GROU	JND <b>2.8</b>	DIA	2"	
DEPTH TO TOP OF WELL	SCREEN 50	<b>).4</b> BOTTOM	114.4	
WELL DEVELOPMENT	Surge/Purg	e BACKFILL	Bentonite Gro	out
FIELD PARTY Zachar	y Racer (AE	<b>P)</b> RIG	Direct Circula	tion -
			Wireline Core	

			CAM									-	
Щ	Ϋ́ι ι	Щ	SAM		STANDARD		RQD	DEPTH	Ę	S	SOIL / ROCK		DRILLER'S
PP I		MP	DEF		PENETRATION	TOTAL		IN	LOG	sc		WELL	
SAMPLE		SAMPLE	IN F	EET	RESISTANCE		%		GRAPHIC LOG	D 0	IDENTIFICATION	≥	NOTES
	2		FROM	ТО	BLOWS / 6"			FEET	0				
								-		CL ML	0-5': SILTY CLAY; 2.5YR 5/6 (red); moist; backfill material.		0-49': Riser
Г								F					
9			5.0	6.5	50/4	3.6		5			5-6': SANDSTONE.		
Ë									::::				
ITAI								-		0	$_{\neg}$ 6-6.3': SHALE; GLEY1 5/N (gray); dry; thin		
5			6.5	8.0	48-23-15	3.6				CL ML	bedded; hard.		
Z								-	1	ML	6.3-6.5': SILTY CLAY; red; moist; hard		
RAE											6.5-8': SILT; 10YR 6/2 (tan); with sandstone and		
ШЩ ШЩ			8.0	9.5	11-3-5	7.2				ΜH	\shale fragments; compacted fill material.		
TAIL								_			8-9.5': CLAYEY SILT; 5YR 4/2 (brown); firm;		
											moist; fill material.		
ž			9.5	11.0	4-4-7	10.8		10 -		CL	9.5-11': SILTY CLAY; 10YR 6/3 (brown) to brown		
IAE								10		ML	clayey silt; dry; crumbly; fill material.		
								-					
IUO			11.0	12.5	4-8-50/3	10.8				CL ML	11-12.5': SILTY CLAY; 5YR 4/2 (brown); moist;		
OGS								-		IVIL	firm.		
			40.5								¬Note: Sandstone at 12-12.3'. /		
GIN			12.5	14.0	50/3			-		ML	12.5-14': SILT, compacted; 10YR 7/4 (tan); very		
LES											hard; dry; fill material.		
Ē—	_		14.0	15.5	50/4			-	ШЦ		· •		
Ē			14.0	15.5	50/4						14-14.5': SILTY SHALE material, weathered; \mottled tan and dark brown; dry; very hard.		
LOG			14.9	19.9		51		15			14.5-14.9': SANDSTONE; strong field strength;		
ц—	_										2.5Y 6/2; fine-grained texture; massive structure;		
LE /								-			slightly to moderately decomposed; moderately		
											disintegrated with Fe staining; fracture at		
DR N								-			14.3-14.5'.		
NFC											14.9-19.9': SHALE; moderate field strength;		
빏								-			GLEY1 5/GY; fine-grained texture; thinly bedded;		
											moderately decomposed along bedding planes;		
Ň											moderately disintegrated along bedding planes and fracture; vertical fracture with Fe staining at		
S:/KNOXVILLE-TN/FOR NICOLE AEP LOG EDIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER.GPJ											15.5-16.5'.		
	-					1ł							1
11:49 -			IYPE	OF C	ASING USED						Continued Next Page		
5/3/19 -			NQ-2 RC		RE			PIEZOM	ETER	TYPE	E: PT = OPEN TUBE POROUS TIP, SS	= OF	PEN TUBE
			<u>6" x 3.25</u>								CREEN, G = GEONOR, P = PNEUMATIC		
N			9" x 6.25		VANCER	4"	+						
AEP - AEP.GDT -			NW CAS			4 3"	-+	WELL TY	PE:	0	V = OPEN TUBE SLOTTED SCREEN, G	/I = (	JEOMON
		S	SW CAS	SING		6"					RECORDER A. Gillespie		
₩ N				<b>IMER</b>		8"							

JOB NUMBER WV015976.0005

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

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

19.9       24.9       8-7.6       55         19.9       24.9       8-7.6       55         19.9       24.9       8-7.6       55         19.9       24.9       8-7.6       55         19.9       24.9       34.9       4-4-13       72         24.9       34.9       4-4-13       72       24.925.2: SHALE: moderately disintegrated; slightly accomposed; slightly decomposed; slightly decompo	SAMPLE	SAMPLE	IN F	PTH EET	STANDARD PENETRATION RESISTANCE		RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION		WELL	DRILLER'S NOTES
1       24.0       04.0       12       12       14											<ul> <li>GLEY1 5/GY; fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated; moderately to intensely fractured.</li> <li>Transition to strong field strength, 2.5YR 4/4; fine-grained texture; massive structure to thinly bedded; slightly decomposed; slightly</li> </ul>	-	<u> </u>	
34.9     38.3     4-5-8     36       38.3     44.9     5-7-13-9-6-6     70       40     41     44.9     50.0     4-4-7-8	OUNTAINEER.GPJ		24.9	34.9	4-4-13	72					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;	-		
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.         40       -       40       -         40       -       40       -         40       -       40       -         40       -       40       -         40       -       40       -         40       -       40       -         40       -       -       40         40       -       -       40         40       -       -       40         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -       -       -         -       -	IS OUTPUTAEP MOUNTAINEERAEP M										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	-		
38.3       44.9       5-7-13-9-6-6       70         40       -       40       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         40       -       -       -         41       -       -       -         42       -       -       -       -         44.9       50.0       4-4-7-8       50       -         44.9-50': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with       -	DG EDIT FILES/GINT LOC		34.9	38.3	4-5-8	36		00	-		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			
Image: Constraint of the constr	3/19 11:49 - S:\KNOXVILLE-TNFOR NICOLE AEP LC		38.3	44.9	5-7-13-9-6-6	70		40 -	-		to weak field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; highly decomposed; intensely			
	EP.GDT - 5/		44.9	50.0	4-4-7-8	50		45 -						

Continued Next Page

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

BORING START \_\_\_\_\_\_\_\_ BORING FINISH \_\_\_\_\_\_\_\_\_

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

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

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

SAMPLE	NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
			64.8 74.8	74.8 85.0	4-5-4-6	76		- 75 –			disintigrated; moderately fractured. 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 disintigrated, becomes more limestone fragments last 1 ft, 3-5 cm; moderately to intensely fractured. 74.8-85': SHALE, highly weathered; weak field		75-105': Bentonite
KAEP MOUNTAINEER.GPJ								- - - 80 - -			strength; 2.5YR 4/4 (red) with tan and gray mottling; fine-grained texture; massive structure; highly decomposed; highly disintigrated, mottled; intensely fractured.		
AEP - AEP.GDT - 5/3/19 11:49 - S.;KNOXVILLE-TNIFOR NICOLE AEP LOG EDIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER.GPJ			85.0	95.0	5-4-4	120		 85 - -			85-92.7": SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintigrated, calcite in light colored beds/thin; slightly fractured.		
LE-TN/FOR NICOLE AEP LOG EDIT FIL								- 90 — - -			92.7-94.6': SHALE; moderate field strength; fine-grained texture; massive structure; slightly		
.GDT - 5/3/19 11:49 - S:\KNOXVILI			95.0	105.0	7-4-4	120		- 95 — -			decomposed; slightly disintigrated, some mottling; moderately fractured. 94.6-95': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintigrated, 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 disintigrated; slightly fractured at 95-95.2'.		
EP - AEP									::::		Continued Next Page		

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

BORING NO. <u>MW-1801</u> DATE <u>5/3/19</u> SHEET <u>5</u> OF <u>5</u> 
 PROJECT
 Amos - FGD Landfill
 BORING START
 8/7/18
 BORING FINISH
 8/8/18

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		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 disintigrated; \slightly fractured at 100.2-100.5'.		
LEER.GPJ							- - 105 -			strength; fine-grained texture; massive structure; highly decomposed; moderately to highly disintigrated mottling with silt filled fractures; highly fractured.		
DIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER.GPJ							- - - 110 -	-				
LE AEP LOG EDIT FILES/GINT LOGS OUT							- - 115 -	-				
AEP - AEP.GDT - 5/3/19 11:49 - S./KNOXVILLE-TNFOR NICOLE AEP LOG EI							- - 120 – -	-				
AEP - AEP.GDT												

JOB NUMBER	WV015976.0	005	L	OG OF BU
	nerican Electi	ric Power		BORING
PROJECT Am	os - FGD Lan	dfill		BORING
COORDINATES	N 38.5 E 81	1.9		_ PIEZON
GROUND ELEVA	TION 709.8	SYSTEM N	AVD88	_ HGT. RI
Water Level, ft	⊻ 35.0	<b>⊻</b>	Ţ	DEPTH
TIME				WELL D
DATE	8/21/2019			FIELD F

BORING NO. <u>MW-1802</u>	DATE 5/3/19	SHEET	OF <u>5</u>
BORING START 8/20/	BORING	FINISH 8/21/18	
PIEZOMETER TYPE NA	WEL	L TYPE <b>OW</b>	
HGT. RISER ABOVE GROU	ND <b>2.91</b>	DIA <b>2"</b>	
DEPTH TO TOP OF WELLS	SCREEN <u>50</u> B	оттом 114.4	
WELL DEVELOPMENT	Burge/Purge BA	CKFILL Benton	ite Grout
FIELD PARTY Zachary	/ Racer (AEP)	RIG Direct C	Circulation -
		Wirelin	e Core

											-	vireline Core
ще	щ	SAM		STANDARD	고싶	RQD	DEPTH	<u>ں</u>	S		Ι.	
SAMPLE NUMBER	SAMPLE	DEF		PENETRATION	₹₽₽		IN	Ηg	U	SOIL / ROCK	WELL	DRILLER'S
N N	4 V	IN F	EET	RESISTANCE	<u>b</u> ä8	%		RA	S	IDENTIFICATION	N N	NOTES
o z	0	FROM	то	BLOWS / 6"	TOTA LENG1 RECOVE		DEPTH IN FEET	G				
		-	_						GW	0-3.5': GRAVEL backfill; large rip-rap and smaller	88	0-41': Bentonite Grout
									0	compacted gravels.		
								-10. 6		oonipacted grateion	KK	
								•••				
								7.0.			ЙК	
								7 D.				
									CL	3.5-4.5': SILTY CLAY; brown; moist; soft; backfill	121 12	2
								¥////		material.		
2		4.5	6.0	6-4-5	0					4.5-6': NO RECOVERY, due to gravel blocking		
G.G.		4.0	0.0	0 4 0	Ŭ		5 -	-		cutting shoe.	8 B	
問												
AIN		<u> </u>	75	4.2.4	2.0			1111			88	
IN		6.0	7.5	4-3-4	3.6			<i>\////</i>	CL	6-17': SILTY CLAY; 7.5YR 4/3 (brown); moist;		
MOL								_////		firm; compacted backfill material; becomes wet at 12.5'.		
										12.5.		
RA		7.5	9.0	3-4-5	7.2			_////				
ÿ								\///				
TAIL												
NN		9.0	10.5	4-4-6	18		-	V////				
MO							4.0					
AEP							10 -	-\////				
5		10.5	12.0	5-4-5	13.2							
£							-	-\////				
0 S O												
8		12.0	13.5	3-4-6	15.6			-\////				
Ĩ Į								\///				
S/GI								-\///				
Щ <u></u>		13.5	15.0	3-5-8	14.4							
Ë		10.0	10.0	000				-\////				
ő	$\left  \right $	15.0	16.5	4-7-9	15.6		15 -	-\////				
Ш		15.0	10.5	4-7-9	0.61							
Ч								_////				
<u>5</u>		·	10-					<i>\////</i>				
N N		16.5	18.0	6-25-8	16.8			<u> </u>				
FOF										17-17.5': SANDSTONE, weathered; GLEY1 7/N	88	4
S:KNOXVILLE-TNFOR NICOLE AEP LOG EDIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER, GPJ								////	CL	\(gray); dry.		
μ̈́		18.0	19.5	7-23-15	14.4			V///		17.5-19.5': SILTY CLAY; GLEY1 6/N (gray)	8	4
Ž								¥///		mottled with brown, red, tan; moist; soft; crumbles		
N0										easily.	88	4
l.s		19.5	21.0	20->50/4	10.8			<u> ////</u>	CL			
5/3/19 11:49 -		TYPE	OF C	ASING USED						Continued Next Page		
X 19		NQ-2 RO		RF					TVD	E PT = OPEN TUBE POROUS TIP, SS	- 0	
		6" x 3.25		· · · ·			PIEZOM			CREEN, G = GEONOR, P = PNEUMATIC		
		9" x 6.25	HSA				SL		-03	UNLEN, G - GLONOR, F - FINEUMATIC	,	
				VANCER	4"		WELL T	YPE:	٥V	V = OPEN TUBE SLOTTED SCREEN, G	VI = C	GEOMON
		NW CAS	SING		<u>3"</u> 6"	-+					-	
HE NA		SW CAS AIR HAN			<u>6"</u> 8"					RECORDER A. Gillespie		
					0							

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE STANDARD RQD SAMPLE NUMBER DEPTH SAMPLE GRAPHIC ഗ DEPTH TOTAL LENGTH RECOVEF SOIL / ROCK DRILLER'S PENETRATION LOG WELL လူ IN IN FEET RESISTANCE % **IDENTIFICATION** NOTES  $\supset$ FEET FROM BLOWS / 6" то 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 96 22.5 24.4 23 22.5-24': SILTSTONE: moderate to weak field 4 ×××× 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. XVIXVIXX 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. 29.4-32.8': SHALE, weathered; moderate field 29.4 33.7 5-11-6 40 30 strength; 10YR 4/4 (red) mottled; fine-grained texture; massive structure; moderately decomposed; moderately to intensely disintegrated; moderately fractured. 32.8-33.7': SHALE; moderate field strength; 5YR 5/4 (tan) mottled; fine-grained texture; massive 33.7 39.4 structure; moderately to highly decomposed; 5-4-4-7-5 59 moderately to intensely disintegrated; moderately to intensely fractured. 35 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': SHALE; moderate field strength; 10YR 39.4 44.4 4-6-4-4 57 40 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; moderately to highly decomposed; moderately to 41-44': Bentonite intensely disintegrated; intensely fractured. Pellets 44-45': Secondary 44.4-47.8': SHALE, highly weathered; weak field 44.4 54.4 7-8-7-5-5-24-5 120 Filter Pack 45 strength; 10YR 4/4 (red) with gray, tan, and black 45-71': Primary Filter mottling; fine-grained texture; massive structure; Pack

Continued Next Page

AEP.GDT - 5/3/19 11:49 - S\KNOXVILLE-TNFOR NICOLE AEP LOG EDIT FILES\GINT LOGS OUTPUTAEP MOUNTAINEERAEP MOUNTAINEER.GPJ AEP.

8/20/18 BORING START

BORING FINISH 8/21/18

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE NUMBER SAMPLE	DEF IN F		RESISTANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	FROM 44.4	TO 54.4	BLOWS / 6" 7-8-7-5-5-24-5	120					highly decomposed; intensely disintegrated; intensely fractured.		
									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.		
						50 -			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.		50-70': Screen
									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;		
	54.4	64.4	8-12-5-6-7-4-4-4	114		55 -			strong field strength; GLEY1 4/5GY; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; unfractured. 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);		
						60 -			fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; slightly to moderately fractured. 55.4-57.1': SHALE, interbedded with sandstone; moderate field strangth; CLEX1.4/2.10B.4/2;		
									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		

JOB NUMBER **WV015976.0005** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE NUMBER	SAMPLE	SAM DEF IN FI FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		64.4	74.4	4-6-8-6-4-5-4-4-5	_					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.		
P MOUNTAINEER.GPJ							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.		
3S OUTPUTAEP MOUNTAINEERAEI		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.		
- AEP.GDT - 5/3/19 11:49 - S./KNOXVILLE-TNFOR NICOLE AEP LOG EDIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER.GPJ							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'.		
P.GDT - 5/3/19 11:49 - S:\KNOXVILLE		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.		
AEP - AEP							<u> </u>	<u> </u>		Continued Next Page		

JOB NUMBER WV015976.0005

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET		USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		94.4	104.4	7-4-5-4-9-9-8-5- 11-5-6-10-19	120		- 100 -					
VTAINEER.GPJ		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.		
GDT - 5/3/19 11:49 - S.:KNOXVILLE-TNFOR NICOLE AEP LOG EDIT FILES/GINT LOGS OUTPUTAEP MOUNTAINEER/AEP MOUNTAINEER.GPJ							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.		
VICOLE AEP LOG EDIT FILES/GINT LO							- 115 - -					
T - 5/3/19 11:49 - S:\KNOXVILLE-TNFOR I							120 -	-				

AEP.GD AEP -



Arcadis, Inc. 2021

Boring and Piezometer Construction Logs

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

JOB NUMBER	30080156		LOC	3 OF BORING	1				
COMPANY An	nerican Electi	ric Power		BORING NO. 2	101 SS	DATE _9	/2/21 SHE	ET <u>1</u> (	OF <u>2</u>
PROJECT Am	os - FGD Lan	dfill		BORING START	r <u>6/15</u>	5/21	BORING FINISH	6/16/21	
COORDINATES	N 541,737.3	17 E 1,724,95	59.605	PIEZOMETER T	YPE	Α	WELL TYPE	WO	
GROUND ELEVA	TION 932.04	<u>ft</u> system <u>N</u>	AD83/NAVD88	HGT. RISER AB	OVE GRO	UND <b>2.8'</b>	DIA	2"	
Water Level, ft	<b>∑</b> 20.61	∑	Ţ	DEPTH TO TOP	OF WELL	SCREEN 19	BOTTOM	29'	
TIME				WELL DEVELO	PMENT _	Purge/Jet	BACKFILL	Bentoni	te Grout
DATE	8/9/2021			FIELD PARTY	Zack R	Racer (AEP	<b>')</b> RIG	Wireline	Coring

	ш К	щ	SAM		STANDARD	Ч. Ч. Ч.	RQD	DEPTH	<u>0</u>	S			
	SAMPLE NUMBER	SAMPLE	DEF		PENETRATION	TOTAL		IN	GRAPHIC LOG	s S	SOIL / ROCK	WELL	DRILLER'S
	SAIUN	SA	IN F			C L L L	%	FEET	GR	⊃	IDENTIFICATION	3	NOTES
	1	RC	4.1	<u>9.5</u>	BLOWS / 6"	5.3	96	- - - - - - - - - - - - - - - - - - -			(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray (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.	X 1 X V X V X V X V X V X V X V X V X V	0-11': Grout seal *Lithology from 2101 I/D borehole. 2101 SS installed in offset 6" borehole.
10:40 - C:USERSISOLUNDIARCADISAEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONIBORING LOGS-GINTAEP BORING LOGS (1) GPJ	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. (12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		11-14': Bentonite seal 14-15': Secondary Sand Pack (choker sand) 15-30': Primary Sand Pack
10:40 - C:\USERS\SC	3	RC	19.5 <b>TYPE</b>	24.5 <b>OF C</b>	ASING USED	3.9	67	-			Continued Next Page		19'-29': Slotted PVC (20-slot) Screen
AEP.GDT - 9/2/21	NA NA NA		<u>NQ-2 RC</u> 6" x 3.25 9" x 6.25	HSA	RE			PIEZOM SLC			E: PT = OPEN TUBE POROUS TIP, SS CREEN, G = GEONOR, P = PNEUMATIC		EN TUBE
EP.GI	NA		HW CAS	SING AD	VANCER	4" 3"		WELL T	YPE:	O١	V = OPEN TUBE SLOTTED SCREEN, GI	<b>1</b> = G	EOMON
AEP - AF	NA NA		<u>NW CAS</u> SW CAS	ING		6"					RECORDER Mike Lutz		
AE	NA		<u>AIR HAN</u>	IMER		8"							

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	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.		<u>Z</u>
AEP - AEP.GDT - 9/2/21 10:40 - C:\USERSISOLUNDARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATIONIBORING LOGS-GINTAEP BORING LOGS (1).GPJ	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. (28.2-28.5 ft) NOTE: Vertical fracture		
EP - AEP.GDT - 9/2/21								45	-				

JOB NUMBER 30080156		
COMPANY American Electric Power	BORING NO. 2101 S DATE 9/2/21 SHE	ET <u>1</u> OF <u>3</u>
PROJECT Amos - FGD Landfill	BORING START 6/15/21 BORING FINISH	6/16/21
COORDINATES N 541,735.055 E 1,724,955.37	PIEZOMETER TYPE <b>NA</b> WELL TYPE	OW
GROUND ELEVATION SYSTEM NAD83/NAVE	188 HGT. RISER ABOVE GROUND 2.86' DIA	2"
Water Level, ft $\boxed{2}$ 38.59 $\boxed{2}$ $\boxed{2}$	DEPTH TO TOP OF WELL SCREEN 42' BOTTOM	57'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring

	SAMPLE NUMBER	SAMPLE	SAM DEF		STANDARD PENETRATION	AL STH /ERY	RQD	DEPTH	GRAPHIC LOG	cs	SOIL / ROCK	L	DRILLER'S	
	SAM NUM	SAM	IN FEET RESISTANCE	TOTAL LENGTH RECOVEI	%	IN FEET	SRAF LO	N S	IDENTIFICATION	MELL	NOTES			
	1	RC	4.1	<u>TO</u> 9.5	BLOWS / 6"	5.3	96	FEET			(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray (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.	11.KU.KU.KU.KU.KU.KU.KU.KU.KU.KU.KU.KU.KU.	0-34': Grout seal *Lithology from 2101 I/D borehole. 2101 S installed in offset 6" borehole.	
10:40 - C:USERSISOLUNDIARCADISIAEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONIBORING LOGS-GINTIAEP BORING LOGS (1).GPJ	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. (12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.	11 X 11 X 11 X 11 X 11 X 11 X 11 X 11		
- AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLU	3 NA NA NA NA		RC       19.5       24.5       3.9       67         TYPE OF CASING USED         NQ-2 ROCK CORE         6" x 3.25 HSA       9" x 6.25 HSA         9" x 6.25 HSA       4"         HW CASING ADVANCER       4"         NW CASING       3"						Image       Image         Continued Next Page         PIEZOMETER TYPE:       PT = OPEN TUBE POROUS TIP, SS = OPEN TU SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC         WELL TYPE:       OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMOR					
AEP - A	NA		SW CAS	ING		6" 8"					RECORDER Mike Lutz			

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	SAM DEF IN F	PTH EET	STANDARD PENETRATION RESISTANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
3	RC	FROM 19.5	TO 24.5	BLOWS / 6"	<u>∝</u> 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 rdc logs (1).GPJ	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		
- AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINTAEP BORING LOGS (1).GPJ 0							30 -			(20.2-20.5 II) NOTE. Venical fracture	11 X (1 X (1 X (1 X (1 X (1 X (1 X (1 X	
EP TEAM SITE - FGD LANDFILL\2021 INV	RC	34.5	44.5		9.8	69	35 -					34-37': Bentonite seal 37-38': Secondary Sand Pack (choker şand) 38-58': Primary Sand Pack
0:40 - C:\USERS\SOLUND\ARCADIS\AF							40 - - -			(39.2-42.5 ft) NOTE: Medium grained (42.5-50.4 ft) SHALE, medium grained; gray with red mottling; highly weathered; moderately fractured; medium-bedded. NOTE: Interbedded		42-57': Slotted PVC (20-slot) Screen
AEP - AEP.GDT - 9/2/21 10	RC	44.5	49.5		4.1	0	45			with medium-grained sandstone.		

\_\_\_\_

JOB NUMBER 30080156

AEP

 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

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

SAMPLE	SAMPLE	SAM DEF IN F		STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	N S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
6	RC		49.5		4.1	0						
-GINTAEP BORING LOGS (1).GPJ	RC	49.5	56.5		6.9	94	50 - 55 -			(50.4-58.0 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous; moderate to strong field strength.		
AEP.GDT - 9/2/21 10:40 - C:USERSISOLUND'ARCADISIAEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONIBORING LOGS-GINTAEP BORING LOGS (1).GPJ	RC	56.5	58.0		1.5	98	60 -					

						/er				BORING NO. 2101 I & D DATE 9/2/21 SHEET 1 OF 6		
PRO	JECT	_ Am	los - FC	GD Lan	dfill					BORING START <u>6/15/21</u> BORING FINISH <u>6/16/21</u>		
coo	RDIN	ATES	N 541	1,732.9	<b>09 E</b> 1	, <b>724</b> ,	951.	574	_ P	PIEZOMETER TYPE NA WELL TYPE OW		
GRO	UND	ELEVA		932.04	<u>ft</u> SY	STEM	NA	D83/NAVD8	<u>3</u> 8 н	IGT. RISER ABOVE GROUN <u>D 2.73' (I) 2.71' (D)</u> DIA <u>2''</u>		
Wate	er Lev	/el, ft	∑ 56	.95	<b>∑104</b>	.06 (C	)) 🛛	-	D	DEPTH TO TOP OF WELL SCREEN 60'/92' BOTTOM 75'/102'		
TIME	Ξ						<u>′</u>		N	NELL DEVELOPMENT <b>Purge/Jet</b> BACKFILL Bentonite Grou		
DAT	DATE 8/9/2021 8/9/2021									FIELD PARTY Zack Racer (AEP) RIG Wireline Coring		
	1	1		I				1				
SAMPLE NUMBER	SAMPLE	DE	MPLE PTH FEET TO		IDARD RATION TANCE VS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH OHAT	LOG			
1	GB	0.0	4.1							(0-4.1 ft) SANDSTONE; moderately fractured; brownish gray NOTE: 8" Borehole Diameter		
2	RC	4.1	1 9.5	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. (12.1-19.8 ft) SANDSTONE, medium grained; yellowish brown; slightly weathered; slightly fractured; thick-bedded; moderate field strength.		
A	DC	10 5	24 5			20	67		::			
4	RC	19.5	24.5			3.9	67		<u> </u>			
					USED					Continued Next Page		
X NA			OCK CO	RE				PIEZOMETE				
NA         6" x 3.25 HSA         SLOTTE           NA         9" x 6.25 HSA         SLOTTE								SLOT	IED	SCREEN, G = GEONOR, P = PNEUMATIC		
NA HW CASING ADVANCER 4" WELL TYPE						4" 3"	]	WELL TYPE	: C	OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON		
NA NA												
NA NA					NA SW CASING 6"					RECORDER Mike Lutz		

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
4	RC	19.5	24.5	BLOWSTO	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.	11XX11XX11XX11XX11 11XX11XX11XX11XX11	
							30 -			(28.2-28.5 ft) NOTE: Vertical fracture	<u> </u>	
6	RC	34.5	44.5		9.8	69	35 -				111X111X111X111X111X111X111X111	
							40 -			(39.2-42.5 ft) NOTE: Medium grained (42.5-50.4 ft) SHALE, medium grained; gray with	11 XX 11 XX	
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.		
										Continued Next Page		

JOB NUMBER 30080156

COMPANY American Electric Power PROJECT Amos - FGD Landfill

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

SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
7	RC	44.5	49.5 56.5		<ul><li>4.1</li><li>6.9</li></ul>	94	50 -				111XX111XX111XX111XX111XX111X	
6-GINTAEP BORING LOGS (1).GPJ							55 -			(50.4-59.2 ft) SANDSTONE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; micaceous; moderate to strong field strength.	1 KXI   1 KXI   1 KXI   1 KXI   1 KXI   1 KX  1 KXI   1 KXI   1 KXI   1 KXI   1 KXI	54-57': Bentonite seal
- FGD LANDFILL2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ	RC	56.5	64.5		8	98	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).		Z Sand Pack (choker sand) 58-77': Primary Sand Pack 60-75': Slotted PVC (20-slot) Screen
AEP.GDT - 9/2/21 10:40 - C:/USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGDL	RC	64.5	74.5		10	68	65 - 70 -			(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.		
EP.GDT - 9/										(71-72.5 ft) NOTE: Very soft and fissile; highly decomposed.		

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 BORING START
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 BORING FINISH
 6/16/21

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

SAMPLE NUMBER SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
10 RC		74.5		10	68				(72.3-73.2 ft) NOTE: Shale layer.		
11 RC	2 74.5	84.5		10	67	75 -	-				
- FGD LANDFILLEV21 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1),GPJ						80 -			(76.8-77 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured; thin-bedded.		77-87': Bentonite seal
12 RC	84.5	94.5		10	86	85 -	-		<ul> <li>(82.8-83.5 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured; thin-bedded.</li> <li>(84.5-85.8 ft) NOTE: Interbedded shale layers; moderately weathered; moderately fractured;</li> </ul>		
						-			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
	94.5	104.5		10	44	95 -			(96.5-100.8 ft) NOTE: Highly fractured.		

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 COMPANY
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 BORING NO. 2101 I & D
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 BORING START
 6/15/21
 BORING FINISH
 6/16/21

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

SAMPLE	SAMPLE	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
13	RC	94.5	104.5		10	44	100 -			(97.3-97.6 ft) NOTE: Very weathered, highly decomposed, intensely disintegrated, reddish brown		
EP BORING LOGS (1).GPJ	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.		7 104'-144.5': Bentonite backfill
E - FGD LANDFILL 2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ 51							110 -					
CADIS/AEP TEAM SITE - FGD LANDFILL/20 51	RC	114.5	124.5		10	100	115 -					
AEP.GDT - 9/2/21 10:40 - C:USERSISOLUNDARCADISIAEP TEAM SIT							120 -					

Continued Next Page

AEP -

COMPANY American Electric Power PROJECT Amos - FGD Landfill

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

SAMPLE NUMBER	SAMPLE	SAM DEF IN F	IPLE PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL ENGTH ECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
16	RC	FROM 124.5	TO 134.5	BLOWS / 6"	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'.		
17	RC	134.5	144.5		10	67	135 -			(132.3-136.3 ft) SANDSTONE, fine grained to medium grained; gray; fresh to slightly weathered; unfractured; moderate to strong field strength.		
										(136.3-138.4 ft) SANDSTONE, fine grained to medium grained; gray; fresh to slightly weathered; unfractured; thin-bedded; moderate to strong field strength. (138.4-142.8 ft) SHALE, fine grained; reddish		
							140 -			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.		
								_				

JOB NUMBER	30080156		LUG OF BURING
	nerican Elect	ric Power	BORING NO. 2102 S DATE 9/2/21 SHEET 1 OF 3
PROJECT Am	los - FGD Lan	dfill	BORING START 6/16/21 BORING FINISH 6/16/21
COORDINATES	N 541,946.4	01 E 1,725,330.822	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVA	TION 932.97	ft SYSTEM NAD83/N	AVD88         Hgt. Riser above ground 2.97'         Dia         2"
Water Level, ft	⊈ 41.27	$\overline{\Lambda}$	DEPTH TO TOP OF WELL SCREEN 43' BOTTOM 58'
TIME			WELL DEVELOPMENT <b>Purge/Jet</b> BACKFILL Bentonite Grout
DATE	8/9/2021		FIELD PARTY Zack Racer (AEP) RIG Wireline Coring
SAL SAL			

ц	רא ר	ш	SAM	PLE	STANDARD	н RY	RQD	DEPTH	<u>U</u>	S			
đ	NUMBER	SAMPLE	DEF		PENETRATION	TOTAL LENGTH RECOVEF		IN	GRAPHIC LOG	C	SOIL / ROCK	WELL	DRILLER'S
N A A		SAN	IN FI	EET	RESISTANCE		%		LC	N S	IDENTIFICATION	M	NOTES
	, 2	0,	FROM	то	BLOWS / 6"	, _m		FEET	0				
	1	GB	0.0	4.0				-		GC	(0.0-1.5 ft) GRAVEL; some clay, silt, and sand; moist		0-35': Grout seal
								-	0/		(1.5-2.5 ft) SANDSTONE, fine grained to medium grained; yellowish brown; highly weathered;		*Lithology from 2102
											\medium-bedded; very weak to weak field strength.		I/D borehole. 2102 S
(1).GPJ								-			(2.5-7.2 ft) SHALE, fine grained; reddish brown;		was installed in offset
(1).											moderately weathered; intensely fractured;		6" borehole.
SDC	2	RC	4.0	14.6		7.7	17	-			thin-bedded; weak field strength.		
0 C								5 -				ĸ	
RIN								5-					
BO								_				$\boxtimes \mathbb{K}$	
AEI												$\bowtie$	
INT								_				88	
10:40 - C:USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINTAEP BORING LOGS								-			(7.2-18.6 ft) SANDSTONE, fine grained; grayish brown; slightly weathered; intensely fractured; thin-bedded; weak to strong field strength (strengthens downward).		
1/BO								-					
TION											(8.5-8.8 ft) NOTE: Vertical fractures with iron staining.	ĸ	
IGA <sup>-</sup>								10 -	1::::		Stairing.		
EST												$\boxtimes \mathbb{K}$	
≥								-	::::			$\bowtie$	
021													
ILL V2								-					
E D L									::::			$\boxtimes$	
LAP								-					
ВD												$\boxtimes$	
μ								-	1:::				
	3	RC	14.6	24.6		9.3	35					$\mathbb{X}$	
EAN	3	КC	14.0	24.0		9.5	35	15 -			(15-17.9 ft) NOTE: Vertical fractures with iron		
Γ											staining.		
SVAE								-			C C	12 R	
ADI													
ARC								-				ĸ	
SOLL								-				88	
RS/S									Ë		(18.6-24.2 ft) SHALE, fine grained; gray;		
ISEI								-			moderately weathered; intensely fractured;	88	
- 											thin-bedded to medium-bedded; very weak to	$\bowtie$	
1 10:40			TYPE	OF C	ASING USED						Continued Next Page		
	NA		NQ-2 RC		RE			PIEZOM			,		EN TUBE
<u>, 1</u>	<u>na</u> Na		<u>6" x 3.25</u> 9" x 6.25					SLC	DTTE	DS	CREEN, $G = GEONOR$ , $P = PNEUMATIC$		
P.G	NA		HW CAS	ING AD	VANCER	4"		WELL T	YPE:	٥١	W = OPEN TUBE SLOTTED SCREEN, GM	<b>Л = G</b>	EOMON
- AE	NA NA		<u>NW CAS</u> SW CAS			<u>3"</u> 6"							-
	<u>na</u> Na		<u>SW CAS</u> AIR HAN			<u>6"</u> 8"					RECORDER Mike Lutz		
													,

JOB NUMBER 30080156

PROJECT Amos - FGD Landfill

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

	SER 3ER	PLE	SAM DEF		STANDARD PENETRATION	AL TH ERY	RQD	DEPTH	ніс G	c s	SOIL / ROCK	Ŀ	DRILLER'S
	SAMPLE NUMBER	SAMPLE	IN F	EET	RESISTANCE	TOTAL LENGTH RECOVEF	%	IN FEET	GRAPHIC LOG	U S (	IDENTIFICATION	WELL	NOTES
	3	RC	FROM 14.6	TO 24.6	BLOWS / 6"	9.3	35				moderate field strength. NOTE: Occasional sandstone seams.	TRURUNU RUTA	
	4	RC	24.6	34.6		8.5	48	25 -			(24.2-28.7 ft) SHALE, fine grained; reddish brown; highly weathered; intensely fractured.	<u> </u>	
								30 -			<ul> <li>(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.</li> <li>(30.1-30.3 ft) NOTE: Vertical fracture.</li> </ul>	<u> 1991   199</u>	
מאבר ובאואו טווב - רסט באואטרוברגטס	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.		35-38': Bentonite seal 38-39': Secondary Sand Pack (choker sand)
								40 -			<ul> <li>(39.4-43 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength.</li> <li>(43-46.3 ft) SHALE, fine grained; gray; fresh; moderately fractured; thin-bedded; moderate to strong field strength.</li> </ul>		· 39-59': Primary Sand Pack ✓ ✓ · 43'-58': Slotted PVC · (20-slot) Screen
	6	RC	44.6	54.6		8.6	58	45 -					

Continued Next Page

COMPANY American Electric Power

JOB NUMBER 30080156

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

SAMPLE		SAM DEF IN F FROM	РТН EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY		DEPTH IN FEET	GRAPHIC LOG	NSCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
6 [6 [0 [0 [0 [0 [0 [0 [0 [0 [0 [0 [0 [0 [0	RC	44.6	54.6		8.6	58	50 -			<ul> <li>(46.3-53.4 ft) SHALE, fine grained; gray to reddish brown; moderately weathered.</li> <li>(49.3-53.4 ft) NOTE: Moderate to highly decomposed, soil-like consistency, reddish brown.</li> <li>(49.9-50.8 ft) NOTE: Sandstone layer.</li> <li>(51.6-52.3 ft) NOTE: Sandstone layer.</li> <li>(53.4-59.0 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured;</li> </ul>		
AEP - AEP.GDT - 9/2/21 10:40 - C:USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ	RC	54.6	58.0		3.4	73	55 60 65 70			medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength. NOTE: Occasional layers of strong shale (<0.5').		

			30080				_		LO		FBORING
					ric Pow	/er					RING NO. 2102 I & D DATE 9/2/21 SHEET 1 OF 6
			los - FC								RING START 6/16/21 BORING FINISH 6/16/21
					46 E 1						ZOMETER TYPE NA WELL TYPE OW
GRO	UND								<u>/D8</u> 8		T. RISER ABOVE GROUN <u>D 2.90' (I), 2.89' (D)</u> DIA <u>2''</u>
Nate	er Lev	el, ft	☑ 78.	94 (I)	<b>∑105</b> .	68 (D	) 🗹				PTH TO TOP OF WELL SCREEN 62'/96' BOTTOM 77'/106'
TIME											ELL DEVELOPMENT <u>Purge/Jet</u> BACKFILL <u>Bentonite Grou</u>
DATI	Ξ		8/9/2	2021	8/9/2	021				FIE	ILD PARTY Zack Racer (AEP) RIG Wireline Coring
SAMPLE NUMBER	SAMPLE		MPLE PTH	STAN PENET	IDARD RATION	-AL GTH VERY	RQD	DEPTH IN	GRAPHIC LOG	C S	SOIL / ROCK IDENTIFICATION SOIL / ROCK IDENTIFICATION SOIL / ROCK
SAN NUN	SAN	IN I FROM	FEET TO	RESIS	TATION TANCE VS / 6"		%	FEET	GRA	N S	IDENTIFICATION S NOTES
1	GB	0.0	4.0	BLOV	V370			-		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.
								-			Medium-bedded; very weak to weak field strength. (2.5-7.2 ft) SHALE, fine grained; reddish brown; moderately weathered; intensely fractured;
2	RC	4.0	14.6			7.7	17	-			thin-bedded; weak field strength.
								5 -			
								-			
								_			
											(7.2-18.6 ft) SANDSTONE, fine grained; grayish brown; slightly weathered; intensely fractured; thin-bedded; weak to strong field strength
								10 -			(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
		TYP	E OF C	ASING	USED						Continued Next Page
X NA		<u>NQ-2 R</u> 6" x 3.2	OCK CO 5 HSA	RE				PIEZOM			
NA		<u>9" x 6.2</u>		VANCE	२	4"					CREEN, G = GEONOR, P = PNEUMATIC W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NA		NW CA	SING			3" 6"	=	WELL T	TPE:		
NA NA		<u>SW CA</u> AIR HA				<u>6"</u> 8"					RECORDER Mike Lutz

JOB NUMBER **30080156** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

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

PLE BER	SAMPLE	SAM DEF		STANDARD PENETRATION	AL STH ZERY	RQD	DEPTH	GRAPHIC LOG	s c s	SOIL / ROCK	ILL	DRILLER'S
SAMPLE NUMBER	SAM	IN F FROM	EET TO	RESISTANCE BLOWS / 6"	TOTAL LENGTI RECOVE	%	IN FEET	GRAI	U S	IDENTIFICATION	WELL	NOTES
3	RC	14.6	24.6		9.3	35				moderate field strength. NOTE: Occasional sandstone seams. (24.2-28.7 ft) SHALE, fine grained; reddish	1) [XU] [XU] [XU] [XU] [XU] [X [] [XU] [XU] [XU] [XU] [XU] [X [] [XU] [XU] [XU] [XU] [XU] [XU] [XU] [X	
4	RC	24.6	34.6		8.5	48	25 -			brown; highly weathered; intensely fractured.	X [] X [] X [] X [] X [] X [] X [] X []	
							30 -			<ul> <li>(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.</li> <li>(30.1-30.3 ft) NOTE: Vertical fracture.</li> </ul>	1 K 1 1 K 1 1 K 1 1 K 1 1 K 1 1 K 1 1 K 1 1 K 1 1 K 1 1 K	
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. (39.4-43 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; strong field strength. (43-46.3 ft) SHALE, fine grained; gray; fresh;	1   X   1   X	
6	RC	44.6	54.6		8.6	58	45 -			moderately fractured; thin-bedded; moderate to strong field strength.	KUTIKUTIKU KUTIKUTIKU KUTIKUTIKU	

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

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2102 I & D DATE 9/2/21 SHEET 3 OF 6 BORING START \_\_\_\_\_\_\_ BORING FINISH \_\_\_\_\_\_\_

SAMPLE STANDARD DEPTH PENETRATION HE IN FEET RESISTANCE	SOIL / ROCK IDENTIFICATION SOIL / ROCK IDENTIFICATION SOIL / ROCK SOIL / ROCK IDENTIFICATION SOIL / ROCK SOIL /
SAMPLE STANDARD PENETRATION PENETRATION PENETRATION RESISTANCE FROM TO BLOWS / 6"	IDENTIFICATION NOTES
C 44.6 54.6 8.6 58 (46.3-53.4 ft	) SHALE, fine grained; gray to m; moderately weathered.
50 decomposed	) NOTE: Moderate to highly , soil-like consistency, reddish brown. ) NOTE: Sandstone layer.
	) NOTE: Sandstone layer.
- · · · · · · · · · · · · · · · · · · ·	ned; gray; fresh; slightly fractured; ded; strong field strength. NOTE: ayers of strong shale (<0.5').
	) NOTE: Moderate fracture .
	Sand Pack (choker sand) 60-81': Primary Sand Pack 62-77': Slotted PVC (20-slot) Screen
C         64.6         74.6         10         85         65         NOTE: Poss	) SHALE, fine grained; reddish brown thered; moderately fractured; ded; weak to strong field strength. ible slickensides, smooth, shiny,
weathered; s Moderate to Occasional la at 68.9', 69.3 (66.5 ft) NO	) SHALE, fine grained; gray; slightly slightly fractured; medium-bedded; strong field strength. NOTE: ayers of soft, weathered shale (<0.1') 3', and 69.6'.
70 -	Becomes strong to very strong,
	hered to fresh. [日]

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

JOB NUMBER 30080156

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. 2102 I & D DATE 9/2/21 SHEET 4 OF 6 

	SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	8	RC	64.6	74.6		10	85	-					
DRING LOGS (1).GPJ	9	RC	74.6	84.6		10	94	75 - - - - 80 -			(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.		
EP.GDT - 92/21 10:40 - C: USERSISOLUNDARCADISMEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ	10	RC	84.6	94.6		10	88	- - 85 -			(80.9-91 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; moderate field strength.	<u>.</u>	81-91': Bentonite seal
SERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD L								- 90 - - -			(89-90.7 ft) NOTE: Reddish brown, moderately to intensely fractured. (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
EP.GDT - 9/2/21 10:40 - C:\U	11	RC	94.6	104.6		9.7	76	95 - - -					96-106': Slotted PVC (20-slot) Screen

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
 BORING NO. 2102 I & D DATE 9/2/21 SHEET 5 OF 6

SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
11	RC	94.6	104.6		9.7	76	- 100			(98.2-102 ft) SHALE, fine grained; moderately fractured to intensely fractured.		
GPJ										(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).		
ITAEP BORING LOGS (1).	RC	104.6	114.6		10	100	105 -			(104.6-106.8 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		
21 INVESTIGATION/BORING LOGS-GIN							- 110 – -			(108.4-109.3 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		108'-134.6': Bentonite backfill
AEP TEAM SITE - FGD LANDFILL\20 51	RC	114.6	124.6		10	100	115 -			(113.1-114.6 ft) NOTE: Gray sandstone, fresh, competent, unfractured, very strong field strength.		
AEP.GDT - 9/2/21 10:40 - C:USERSISOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINTAEP BORING LOGS (1) GPJ							120 -			(117.4-129 ft) SANDSTONE, fine grained to medium grained; fresh; unfractured; medium-bedded; micaceous; very strong field strength.		

AEP.

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	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
13	RC RC	114.6 124.6	124.6 134.6		10 10	100	125 -					
KING LOGS (1) GPJ							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.	_	
E - FGD LANDFILL\2021 INVESTIGATIONBORING LOGS-GINTVAEP BORING LOGS (1).GPJ							135 -					
TE - FGD LANDFILL\2021 INVESTIGA							140 -	-				
SISOLUND'ARCADISIAEP TEAM SI							145 -	-				
AEP - AEP.GDT - 9/2/21 10:40 - C:USERSISOLUND'ARCADIS'AEP TEAM SIT								-				

JOB NUMBER 30080156	G OF BORING	
COMPANY American Electric Power	BORING NO. 2103 S & I DATE 9/2/21 SHE	et <u>1</u> of <u>6</u>
PROJECT Amos - FGD Landfill	BORING START 6/17/21 BORING FINISH	6/17/21
COORDINATES N 542,191.177 E 1,725,406.308	PIEZOMETER TYPE <b>NA</b> WELL TYPE	OW
GROUND ELEVATION 935.46 ft SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D <b>2.47' (S), 2.45' (I)</b></u> DIA	2"
Water Level, ft	DEPTH TO TOP OF WELL SCREEN 45'/67' BOTTOM	58'/82'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring

0° Z °     FROM TO     BLOWS / 6"     FEET     0       Image: Comparison of the second s		DRILLER'S
1       RC       4.6       14.6       10       77       5	eld	0-40': Grout seal NOTE: 8" Borehole Diameter
01         10           10         10           2         RC         14.6         24.6         9.9         80         15	11 X 11 X 11 X 11 X 11 X 11 X 11 X 11	
2 RC 14.6 24.6 9.9 80 15 (15.2-18.6 ft) SHALE, fine grained; reddish brown; moderately weathered; intensely fracture thin-bedded; weak to moderate field strength.	11×11/×11/×11/×	
Open State     Open State       TYPE OF CASING USED     Continued Next Page		
X     NQ-2 ROCK CORE       NA     6" x 3.25 HSA       NA     6" x 0.55 H0A   PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP SLOTTED SCREEN, G = GEONOR, P = PNEUM		OPEN TUBE
NA       9" x 6.25 HSA       SLOTTED SCREEN, G = GEONOR, P = PNEUM         NA       9" x 6.25 HSA       Well type:       OW = OPEN TUBE SLOTTED SCREEN		
WA     NW CASING     3"     WELL TIPE.     OW - OF ENTIDE SECTIED SECTED SE	, 0141 -	

JOB NUMBER 30080156

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. 2103 S & I DATE 9/2/21 SHEET 2 OF 6 

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
2	RC	14.6	24.6		9.9	80		-		strength.	11,5×11,5×11,5×11,5×11,5×11,5×11,5×11,5	
E - FGD LANDFILLI2021 INVESTIGATIONBORING LOGS-GINTVAEP BORING LOGS (1).GPJ 6	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. (31-37.2 ft) SHALE, fine grained; gray; slightly weathered; slightly fractured; medium-bedded; banded; some observable sand; strong field strength.	11 KU 11 KU 11 KU 11 KU 11 KU 11 KU 11 KU 11 KU 11 KU 12 KU	
AEP.GDT - 9/2/21 10:40 - C:USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 IN/	RC	34.6	44.6		10	100	35 -			<ul> <li>(37.2-40 ft) SANDSTONE, fine grained to medium grained; gray; fresh; slightly fractured; medium-bedded; micaceous; banded; strong field strength.</li> <li>(40-42.6 ft) SHALE, fine grained to medium grained; gray; slightly weathered; moderately fractured; medium-bedded; sandy; weak to strong field strength.</li> <li>(42.6-56.2 ft) SHALE, fine grained; reddish brown to gray; moderately weathered; intensely fractured; thin-bedded. NOTE: weak to moderate field strength.</li> </ul>	×111×111×111×111×111×111×111×111×111×1	40-43': Bentonite seal 43-44': Secondary Sand Pack (choker sand)
EP.GDT - 9/2/	RC	44.6	54.6		9.5	82	45 -			-		44-59': Primary Sand Pack

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JOB NUMBER 30080156

 COMPANY
 American Electric Power
 BORING NO. 2103 S & I
 DATE 9/2/21
 SHEET 3
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 PROJECT
 Amos - FGD Landfill
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 6/17/21
 BORING FINISH
 6/17/21

 BORING NO. 2103 S & I DATE 9/2/21 SHEET 3 OF 6

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
5	RC	44.6	54.6		9.5	82	50 -					48-58': Slotted PVC (20-slot) Screen
- FGD LANDFILL/2021 INVESTIGATIONBORING LOGS-GINITAEP BORING LOGS (1).GPJ	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
AEP.GD1 - 9/2/21 10:40 - C:USERS/SOLUNU/ARCAU/SWEP LEAM SITE - FC	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'. (69.6-80.2 ft) SHALE, fine grained to medium grained; gray; slightly weathered; slightly fractured; medium-bedded; sandy; micaceous;		64-65': Secondary Sand Pack (choker sand) 65-84': Primary Sand Pack 67-82': Slotted PVC (20-slot) Screen

Continued Next Page

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2103 S & I DATE 9/2/21 SHEET 4 OF 6 

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	8	RC	64.6 74.6	74.6 84.6		10	67 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		
5-GINT/AEP BORING LOGS (1).GPJ								- - - 80 — - -			shale, moderately weathered, thin bedded. (78.9-80.2 ft) NOTE: Reddish brown zone of weak shale, moderately weathered, thin bedded. (80.2-103.2 ft) SHALE, fine grained; gray; fresh; slightly fractured; medium-bedded; nodules (lime or chert); strong field strength.		
FILL\2021 INVESTIGATION\BORING LOGS	9	RC	84.6	94.6		9.8	76	- - 85 -			<ul> <li>(83.2-86.6 ft) NOTE: Gray micaceous sandstone, fine to medium grained, fresh, strong field strength.</li> <li>(86.6-87.2 ft) NOTE: Gray to reddish brown shale, intensely fractured, moderately weathered.</li> </ul>		84'-134.6': Bentonite backfill
AEP - AEP. GDT - 9/2/21 10:40 - C.'USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINTAEP BORING LOGS (1).GPJ								- - 90 - - -			(88.5-90.4 ft) NOTE: Gray to reddish brown shale, intensely fractured, moderately weathered.		
AEP.GDT - 9/2/21 10:40 - C:\USERS\SOI	10	RC	94.6	104.6		9.8	72	- 95 — -					
VEP - /											Continued Next Page		

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	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	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.		
SITE - FGD LANDFILLI2021 INVESTIGATION/BORING LOGS-GINTVAEP BORING LOGS (1).GPJ	11	RC	104.6	114.6		10	97	105			<ul><li>(103.2-120.4 ft) SANDSTONE, fine grained to medium grained; gray; fresh; unfractured; medium-bedded; strong to very strong field strength.</li><li>(105.6-106.7 ft) NOTE: Gray shale.</li></ul>		
AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD	12	RC	114.6	124.6		10	100	115 - - - - - - - - - - - - - - - - - - -			(115-118 ft) NOTE: Angled sandstone. (120.4-134.6 ft) SHALE, fine grained; gray; fresh; unfractured; medium-bedded; strong to very strong field strength.		
ЧЕР											Continued Next Page		

JOB NUMBER 30080156

 COMPANY
 American Electric Power

 PROJECT
 Amos - FGD Landfill

 BORING NO.
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 BORING START
 6/17/21
 BORING FINISH
 6/17/21

SAMPLE	SAMPLE	SAN DEF IN F FROM	EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
		DEF IN F	PTH EET	STANDARD PENETRATION RESISTANCE BLOWS / 6"	0 0 LENGTH RECOVERY	RQD 9% 100 100	DEPTH IN FEET 125 - - - - - - - - - - - - - - - - - -		USCS		MELL	
P - AEP.GDT - 9/2/21 10:40 - C:\USERS\							- - -	-				

JOB NUMBER 30080156	
COMPANY American Electric Power	BORING NO. <u>2104</u> DATE <u>9/2/21</u> SHEET <u>1</u> OF <u>6</u>
PROJECT Amos - FGD Landfill	BORING START <b>6/22/21</b> BORING FINISH <b>6/22/21</b>
COORDINATES N 542,356.375 E 1,725,041.563	PIEZOMETER TYPE NA WELL TYPE NA
GROUND ELEVATION SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D NA</u> DIA NA
Water Level, ft $\square$ $\square$ $\square$	DEPTH TO TOP OF WELL SCREEN NA BOTTOM NA
	WELL DEVELOPMENT NA BACKFILL Bentonite Grout
DATE	FIELD PARTY Zack Racer (AEP) RIG Wireline Coring
Water Level, ft     ☑     ☑       TIME     Image: Second seco	WELL DEVELOPMENT NA BACKFILL Bentonite Grout

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
-								-	-				No well installed
10:39 - C:USERSISOLUNDIARCADISIAEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONIBORING LOGS-GINTIAEP BORING LOGS (1).GPJ	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.		
BITE - FGD LANDFILL/2021 INVESTIGATIO	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. (12.6-18.1 ft) MUDSTONE, fine grained; tan to gray; slightly weathered; slightly fractured; thick-bedded; moderate field strength.	-	
:\USERS\SOLUND\ARCADIS\AEP TEAM S	3	RC	14.6	24.6		9.1	49	15			(18.1-19.2 ft) SHALE, fine grained; Gray-green; moderately weathered; unfractured; laminated; weak field strength.	-	
:39 - C:			ТҮРЕ	OF C	ASING USED						Continued Next Page		
- 9/2/21 1(	X		NQ-2 RC 6" x 3.25	ОСК СО				PIEZOM					EN TUBE
AEP.GDT - 9/2/21	NA NA		<u>9" x 6.25</u> HW CAS	HSA SING AD	VANCER	4"		WELL T			W = OPEN TUBE SLOTTED SCREEN, GI		EOMON
AEP - AE	NA NA NA		<u>NW CAS</u> SW CAS AIR HAN	SING		3" 6" 8"					RECORDER Alan Gillespie		

 COMPANY
 American Electric Power

 PROJECT
 Amos - FGD Landfill

 BORING NO.
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 9/2/21
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 BORING START
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 BORING FINISH
 6/22/21

ш	ц	ш	SAM	PLE	STANDARD	-×	RQD	DEPTH	U	S			
SAMPLE	ABE	SAMPLE	DEF		PENETRATION	TOTAL LENGTH RECOVERY		IN	GRAPHIC LOG	O	SOIL / ROCK	WELL	DRILLER'S
SAN	NN	SAN	IN FI		RESISTANCE		%	FEET	GR/	N S	IDENTIFICATION	≥	NOTES
		RC	FROM 14.6	TO 24.6	BLOWS / 6"	≌ 9.1	49				(19.2-27.4 ft) MUDSTONE, fine grained; red to		
			14.0	24.0							gray; fresh; moderately fractured; massive; weak		
								-			field strength.		
								-					
								-					
								-					
4	1	RC	24.6	34.6		8.1	79	25 –					
<u>r</u>								-					
5. []								-					
250											(27.4-28.5 ft) MUDSTONE, fine grained; gray;		
I DR								-			moderately weathered; moderately fractured;		
RCK NDR								_	····		laminated; weak field strength.		
AEP								_	::::		(28.5-39.7 ft) SANDSTONE, fine grained; gray to green; slightly weathered; slightly fractured;		
UNI UNI UNI								30 -			massive; strong field strength.		
200													
								-					
								-					
- FGD LANDFILL2021 INVESTIGATIONIBORING LOGS-GINTMEP BORING LOGS (1).GP													
EAL								-					
	5	RC	34.6	44.6		9.2	56	35 -					
크													
LAN								-			(35.8-36.4 ft) NOTE: Sandstone becomes medium grained.		
								-			medium graineu.		
ш													
AM :								-					
<u>-</u>									::::				
SAE								-					
CAD								40 -			(39.7-44.2 ft) SANDSTONE, medium grained;		
HAN I									::::		gray; slightly weathered; massive; strong field		
								-			strength.		
12/2								-					
: ا								-	$\left  \begin{array}{c} \vdots \\ \vdots \\ \vdots \\ \end{array} \right $				
10:39													
- 9/2/21 10:39 - C:\USERS\SOLUNDARCADISAEP IEAM SII								-			(44.2-45.6 ft) MUDSTONE, fine grained; gray;		
	3	RC	44.6	54.6		8.4	72	45 -			moderately weathered; moderately fractured;		
L											thin-bedded; moderate field strength.		
- AF					<u> </u>				<u> </u>		Continued Next Page		

AEP - AEP.GDT - 9/2/21 10:39 - C:USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINTVAEP BORING LOGS (1),GPJ

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. <u>2104</u> DATE <u>9/2/21</u> SHEET <u>3</u> OF <u>6</u> 

SAMPLE	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
6		FROM 44.6	TO 54.6	BLOWS / 6"	8.4	72				(45.6-49.1 ft) MUDSTONE, fine grained; red; moderately weathered; moderately fractured; thick-bedded; shaley; moderate field strength.		
							50 -			(49.1-50.8 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; massive.	_	
L.							-	-		(50.8-52.3 ft) SANDSTONE, fine grained; gray; moderately weathered; moderately fractured; thin-bedded; shaley.	_	
JKING LUGS (1).6										(52.3-59.2 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; massive; strong field strength.		
E - FGU LANDFILLEZOZI INVESTIGATIONBORING EQGS-GINTAEP BURING EQGS (1).GFU	RC	54.6	64.6		9.6	74	55					
FGD LANDFILLYZUZ I INVESTIG							- 60 - - -			<ul> <li>(59.2-61.1 ft) MUDSTONE, fine grained; red; moderately weathered; moderately fractured); thin-bedded; shaley.</li> <li>(61.1-65.7 ft) SANDSTONE, fine grained; gray to red, mottled; slightly weathered; slightly fractured; thin-bedded; shaley.</li> </ul>		
	RC	64.6	74.6		9.9	65	65 -					
										(65.7-67.2 ft) SANDSTONE, fine grained; gray to red, banded; moderately weathered; moderately fractured; medium-bedded . NOTE: Interbedded with shale. (67.2-73.2 ft) SANDSTONE, fine grained; gray; slightly weathered; moderately fractured; strong field strength. NOTE: Interbedded with shale.		
- - - - - - - - - - -										Continued Next Page		

AEP - AEP.GDT - 9/2/21 10:39 - C:USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONBORING LOGS-GINT/AEP BORING LOGS (1)/GPJ

JOB NUMBER 30080156

LOG OF BORING

COMPANY American Electric Power BORING NO. <u>2104</u> DATE <u>9/2/21</u> SHEET <u>4</u> OF <u>6</u> PROJECT Amos - FGD Landfill 

SAMPLE NUMBER	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK - 그 DRILLE IDENTIFICATION 위 NOTE	
8	RC	64.6	84.6		9.9 9.8	65 80				(73.2-80.1 ft) SANDSTONE, fine grained; gray; fresh; slightly fractured; thin-bedded; strong field strength.	
							- 08			(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 attempth	
	RC	84.6	94.6		9.5	72	85 -			strength. (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;	
	PC	04 6	104 6		0.5	75	90 -			strong field strength. (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	95 -			Continued Next Page	

COMPANY American Electric Power

BORING NO. <u>2104</u> DATE <u>9/2/21</u> SHEET <u>5</u> OF <u>6</u> 

 PROJECT
 Amos - FGD Landfill

 Boring start
 6/22/21

 Boring finish
 6/22/21

ЦШШ		MPLE PTH	STANDARD	⊐.E.¦: Y	RQD	DEPTH	HC	S	SOIL / ROCK	Ĺ	DRILLER'S
SAMPLE NUMBER SAMPLF		EET	PENETRATION	ENG <sup>-</sup>	%	IN	GRAPHIC LOG	USCS	IDENTIFICATION	WELL	NOTES
	FROM		BLOWS / 6"	L BR		FEET	0				
11 R(	C 94.6	104.6		9.5	75	- 100 — -			(98.5-124.6 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
AEP BORING LOGS (1) GPJ	C 104.6	114.6		10	85	- - 105 -					
2021 INVESTIGATION/BORING LOGS-GINT						- - 110 — - -					
AEP - AEP.GDT - 9/2/21 10:39 - C:/USERS/SOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINT/AEP BORING LOGS (1).GFJ       C         E1       E1       E1         E2       E3       E3         E3       E3       E3	C 114.6	124.6		10	90	- 115  - -			(114.3 ft) NOTE: Sandstone becomes medium-grained and medium-bedded.		
P.GDT - 9/2/21 10:39 - C.\USERS\SOLUND\						- 120 — - -					
AEP - AE			ı	I					Continued Next Page		

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. <u>2104</u> DATE <u>9/2/21</u> SHEET <u>6</u> OF <u>6</u> 

SAMPLE	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
AEP - AEP.GDT - 9/2/21 10:39 - C.USERSISOLUNDARCADISIAEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ	RC	FROM 114.6 124.6	TO 124.6 134.6	BLOWS / 6"		90 77	125 - 125 - 130 - 130 - 140 -			(123.6 ft) NOTE: Sandstone is shaley, fine-grained, gray/light gray (mottled), no fractures. (124.6-126.1 ft) SANDSTONE, medium grained; sightly weathered; unfractured; thin-bedded; weathered; moderately fractured; thin-bedded; weak field strength. (133.7-134.6 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength.		

JOB NUMBER	30080156		LOC	3 OF BORING	1				
	nerican Electr	ic Power		BORING NO. 2	<u>105 SS &amp; S</u>	DATE 9/	2/21 SHE	ET <u>1</u> 0	F <u>5</u>
PROJECT Am	os - FGD Lan	dfill		BORING START	6/ <b>23/2</b>	<b>21</b> E	BORING FINISH	6/23/21	
COORDINATES	N 543,830.17	71 E 1,725,19	93.696	PIEZOMETER T	YPE NA		WELL TYPE	WO	
GROUND ELEVA	TION 991.72 1	<u>t</u> system <u>N</u>	IAD83/NAVD88	HGT. RISER AB	OVE GROUP	ND 2.78' (S	<u>s), 2.69' (s)</u> dia	2"	
Water Level, ft	<b>⊻75.08 (SS)</b>	∑107.68 (S)	Ţ	DEPTH TO TOP	OF WELL S	CREEN 61'	<b>'98'</b> BOTTOM	76'/108'	
TIME				WELL DEVELO	PMENT <u>P</u>	urge/Jet	BACKFILL	Bentonite	Grout
DATE	8/9/2021	8/9/2021		FIELD PARTY	Zack Ra	<u>cer (AEP)</u>	. RIG	Wireline	Coring

	SAMPLE NUMBER	SAMPLE	SAM DEF IN FI	ΡΤΗ ΕΕΤ		TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
10:40 - C:USERSISOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINT\AEP BORING LOGS (1).GPJ	1	RC	6.4	TO 14.5 24.5	BLOWS / 6"	4.1 6.8	59	10 - - - - - - - - - - - - - - - - - -			(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.	11 KV11 KV11 KV11 KV11 KV11 KV11 KV11 K	
AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\AR	NA NA NA NA		NQ-2 RC 6" x 3.25 9" x 6.25	OCK CO HSA HSA ING AD	ASING USED	<u>4"</u> 3"		PIEZOM SL( WELL T	OTTE	ED S	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. <i>Continued Next Page</i> E: PT = OPEN TUBE POROUS TIP, SS CREEN, G = GEONOR, P = PNEUMATIC V = OPEN TUBE SLOTTED SCREEN, GM	= OP	EN TUBE
Ľ.	NA NA		SW CAS	ING		6" 8"					RECORDER Alan Gillespie		

JOB NUMBER **30080156** 

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 2 OF 5 

SAMPLE	SAMPLE	SAN DE IN I FROM	MPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
2	R	C 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.	1×111×111×111×111×111×111×111×111×111×	
TE - FGD LANDFILL'2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ 6	R	C 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). (29.9 ft) NOTE: Rust in fracture.	801180118011801180118011801180118011801	
AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE - FGD LANDFILL\2021	R	C 34.5	44.5		9.9	56	35 - - - 40 -			(34.5-37.8 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Reddish coloring along bedding planes. (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. (41.8-49.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded;	111 K 11	
:P - AEP.GDT - 9/2/21 10:40 - C:\\	R	C 44.5	54.5		10	65	45			strong field strength.	X777X777X77X777X7 X777X777X777X777X7	

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JOB NUMBER 30080156

AEP -

 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

 BORING NO. 2105 SS & S DATE 9/2/21 SHEET 3 OF 5

SAMPLE NUMBER	SAMPLE	SAM DEF	IPLE PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TAL GTH WERY	RQD	DEPTH IN	GRAPHIC LOG	s c s	SOIL / ROCK	WELL	DRILLER'S
SAN	SAN	IN F FROM	EET TO	RESISTANCE BLOWS / 6"	RECO	%	FEET	GRA L(	S	IDENTIFICATION	×	NOTES
5 (1) Cb7	RC	44.5	54.5	BLOWSTU	10	65	50 -			(49.3-64 ft) MUDSTONE, fine grained; red with gray/tan mottling; moderately weathered; moderately fractured; medium-bedded; moderate field strength.	V KYTT KYTT KYTT KYTT KYTT KYTT KYTT KYT	53-56': Bentonite seal
- FGD LANDFILL2021 INVESTIGATIONBORING LOGS-GINTAEP BORING LOGS (1).GPJ	RC	54.5	64.5		7.1	56	55 - - - - - - - - - - - - - - - - - - -			(58.6 ft) NOTE: Becomes more weathered and fractured: moderate to weak field strength, moderate to highly weathered, moderately fractured, medium-bedded.		56-57': Secondary Sand Pack (choker sand) 57-80': Primary Sand Pack 61-76': Slotted PVC (20-slot) Screen
AEP.GDT - 9/2/21 10:40 - C:/USERS/SOLUND/ARCADIS/AEP TEAM SITE - FG	RC	64.5	74.5		7.4	58	65 - - - 70 -			(64-73.4 ft) MUDSTONE, fine grained; dark red; highly weathered; moderately fractured; thick-bedded; moderate field strength.		

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 4 OF 5 

B       BC       0.8       0.9       0       SUL ROCK       DENTIFICATION       DENTIFICATION         7       RC       64.5       74.5       7.4       58       7.5       7.7       58       7.5       7.7       58       7.5       7.7       58       7.5       7.7       58       7.7       57       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5       7.7       7.5	щК	щ		IPLE	STANDARD		RQD	DEPTH	<u>ں</u>	S			
PHOM         TO         BLOWS / 6*         zz         Participation           7         RC         64.5         74.5         58           8         RC         74.5         84.5         9.4         87           9         RC         74.5         84.5         9.4         87           9         RC         84.5         94.5         9.9         67           9         RC         84.5         94.5         9.9         67           90         -         (82-83.2.1) SANDSTONE, fine grained; gray, moderately weathered, slightly fractured; thin-bedded, strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, tot strong field strength, thin bedded, strong field strength, tot strong field strength, tot strong	MPL	MPL			PENETRATION			IN	APH 0G	C			
Provide         TO         BLOWS / 10         IZ         Set           7         RC         64.5         74.5         8         74         58           8         RC         74.5         84.5         9.4         87         75           7         RC         64.5         74.5         84.5         9.4         87         76           8         RC         74.5         84.5         9.4         87         76         (73.4-74.5 ft) SANDSTONE, fine grained; gray, moderately weathered; intensely finactured; fini-bedded; moderately weathered; intensely finactured; fini-bedded; strong field strength, NOTE: Challes deposition and iron staining at fracture.         80-93: Bentonile :           9         RC         84.5         94.5         9.9         67         86 -         (63.2-83.1 ft) SANDSTONE, fine grained; gray, moderately weathered; slightly fractured; thin-bedded; strong field strength, NOTE: Challe deposition and iron staining at fracture.         80-93: Bentonile :           9         RC         84.5         94.5         9.9         67         86 -         (63.2-83.1 ft) SANDSTONE, fine grained; gray, moderately weathered; slightly fractured; thin-bedded; strong field strength.         80-93: Bentonile :           90         -         (68.3-82.7 ft) SANDSTONE, fine grained; gray, slightly weathered; slightly fractured; thin-bedded; strong field strength.         (68.3-82.	NUI	SAI			RESISTANCE	오핀낈	%	FFFT	GR		IDENTIFICATION	3	NOTES
9       RC       84.5       94.5       9.9       67         9       RC       84.5       94.5       9.3       67         9       RC       84.5       94.5       9.3       67         9       RC       84.5       94.5       9.3       67         90       RC       84.5       94.5       9.9       67         90       RC       84.5       94.5       9.3       67         90       RC       84.5       94.5       9.3       67         90       RC       84.5       94.5       9.3       67         90       RC       84.5       94.5       9.9       67         90       RC       84.	7	RC			BLOWS76		58						· · · ·
8       RC       84.5       94.5       9.9       67         9       RC       84.5       94.5       9.9       67         10       RC       94.5       104.5       9.3       44         9       RC       94.5       104.5       9.3       44	8	RC	74.5	84.5		9.4	87	75 -			with red mottling; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with mudstone.		: : : :
10       RC       94.5       104.5       9.3       44       90											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		
9       RC       84.5       94.5       9.9       67         9       RC       84.5       94.5       9.9       67         8       -       -       -       -       -         (83.2-86.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.       -       -         9       RC       84.5       94.5       9.9       67         85       -       -       -       -       -         (83.2-86.3 ft) SANDSTONE, fine grained; gray; slightly 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       -       -       -       -       -         91       RC       94.5       104.5       9.3       44       95         10       RC       94.5       104.5       9.3       44       95       -         10       RC       94.5       104.5       9.3       44       95       -       -         10       RC       94.5       104.5       9.3       44       95       - <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>80 -</td><td></td><td></td><td></td><td></td><td>80-93': Bentonite sea</td></td<>								80 -					80-93': Bentonite sea
10       RC       94.5       104.5       9.3       44       90       -       Slightly fractured. (90.1 ft) NOTE: Shale becomes more sandy and transitions to sandstone.         10       RC       94.5       104.5       9.3       44       95       -       (94.7-100 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.       93-94': Secondary Sand Pack (choke sand)	9	RC	84.5	94.5		9.9	67				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;		
10       RC       94.5       104.5       9.3       44       95 <ul> <li>(92.7-94.7 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.</li> <li>93-94': Secondary Sand Pack (choke sand)</li> <li>94-110': Primary Sand Pack</li> <li>(94.7-100 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded with shale.</li> </ul> 93-94': Secondary Sand Pack (choke sand)								-			<ul> <li>(86.3-92.7 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with gray-green shale.</li> <li>(87.5 ft) NOTE: Becomes red shale interbedded with gray sandstone; moderate to weak field strength, thinly bedded, moderate weathering, slightly fractured.</li> <li>(90.1 ft) NOTE: Shale becomes more sandy and</li> </ul>		
moderately weathered; slightly fractured;       thin-bedded. NOTE: Interbedded with shale.	10	RC	94.5	104.5		9.3	44	05			(92.7-94.7 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		94-110': Primary
								95 -			moderately weathered; slightly fractured; thin-bedded. NOTE: Interbedded with shale.		Sand Pack

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2105 SS & S DATE 9/2/21 SHEET 5 OF 5 

SAMPLE NUMBER	SAMPLE		IPLE PTH EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
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').		98-108': Slotted PVC (20-slot) Screen
11	RC	104.5	110.0		5.5	87	105 -			(106.4-107.2 ft) NOTE: Becomes		
							- 110			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'. (107.2-120.4 ft) SANDSTONE, fine grained to medium grained; gray to light gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
							115 -					
							120 -					
							-	-				

JOB NUMBER 30080156	OF BORING
COMPANY American Electric Power B	BORING NO. 2105 I & D DATE 9/2/21 SHEET 1 OF 8
PROJECT Amos - FGD Landfill B	BORING START 6/23/21 BORING FINISH 6/23/21
COORDINATES N 543,825.103 E 1,725,192.735 P	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION 991.72 ft SYSTEM NAD83/NAVD88 H	IGT. RISER ABOVE GROUN <u>D <b>2.69' (I), 2.89' (D)</b></u> DIA <b><u>2''</u></b>
Water Level, ft 🖳 135.96 (I) 🖓 180.33 (D) 🖳 🛛	DEPTH TO TOP OF WELL SCREEN 120'/167' BOTTOM 140'/182'
TIME	VELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout
DATE 8/9/2021 8/9/2021 F	TIELD PARTY Zack Racer (AEP) RIG Wireline Coring

SAMPLE	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
10:40 - C:USERS\SOLUND\ARCADISAEP TEAM SITE - FGD LANDFILL\2021 INVESTIGATIONBORING LOGS-GINT\AEP BORING LOGS (1).GPJ  C	RC	6.4	14.5		4.1	59	5 5 10 15			(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.	1 K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K 1 K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K 1 K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K.V.F.K	
40 - C:\USERS\SOLUND\ARCA							-			<ul> <li>(16.6-18.1 ft) SANDSTONE, fine grained; gray; slightly weathered; moderately fractured; thin-bedded; strong field strength.</li> <li>(18.1-20 ft) MUDSTONE, fine grained; tan/red/black mottled; highly weathered; moderately fractured; medium-bedded; weak field strength.</li> </ul>	<u>VIIIXUIIXUIXXIIXX</u> VIIIXUIXXIIXXIIXXI	.[
- 9/2/21 10:4		NQ-2 RO	ОСК СО	ASING USED			PIEZOM	ETFR	TYPF	Continued Next Page E: PT = OPEN TUBE POROUS TIP, SS	= 0P	EN TUBE
./e - 10		6" x 3.25 9" x 6.25	HSA HSA							CREEN, $G = GEONOR$ , $P = PNEUMATIC$		
	\	NW CAS	SING	VANCER	4" 3"		WELL T	YPE:	OV	V = OPEN TUBE SLOTTED SCREEN, GI	VI = 0	BEOMON
ANA SE		SW CAS			6" 8"					RECORDER Alan Gillespie		

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

BORING NO. 2105 I & D DATE 9/2/21 SHEET 2 OF 8 

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	ΡTΗ	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	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.	1 × 1 1 × 1	
INVESTIGATION/BORING LOGS-GINTAEP BORING LOGS (1).GPJ	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). (29.9 ft) NOTE: Rust in fracture.	XX 11 XX 11 XX 11 XX 11 XX 11 XX 11 XX 11 XX 11 XX 17	
- 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	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. (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. (41.8-49.3 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.	U   K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     U   K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     U   K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K     K	
AEP.GDT - 9	5	RC	44.5	54.5		10	65	45					
AEP -											Continued Next Page		

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. 2105 I & D DATE 9/2/21 SHEET 3 OF 8 

SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINTVAEP BORING LOGS (1).GPJ 9	RC	44.5	64.5		7.1	65	50 -			(49.3-64 ft) MUDSTONE, fine grained; red with gray/tan mottling; moderately weathered; moderately fractured; medium-bedded; moderate field strength. (58.6 ft) NOTE: Becomes more weathered and fractured: moderate to weak field strength, moderate to highly weathered, moderately fractured, medium-bedded.	111 KA 11 r>111 KA 11	
- AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE	RC	64.5	74.5		7.4	58	65 - 70 -			(64-73.4 ft) MUDSTONE, fine grained; dark red; highly weathered; moderately fractured; thick-bedded; moderate field strength.	\K\11\K\11\K\11\K\11\K\11\K\11\K\11\K\	

GINT/AFP RORING LOGS (1) GP.I 000 ç Ē Ē 1000 EGD | 1011.0 10.40 101010 - AEP GUT AEP -

COMPANY American Electric Power

PROJECT Amos - FGD Landfill

SAMPLE	NUMBER	SAM DEI IN F	PTH EET	STANDARD PENETRATION RESISTANCE	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION			DRILLER'S NOTES
7		FROM C 64.5	TO 74.5	BLOWS / 6"	7.4	58				(73.4-74.5 ft) SANDSTONE, fine grained; gray			
8	3 R0	C 74.5	84.5		9.4	87	- 75			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:	<u>XVI1XV11XV11XV11XX V11V11V11V1V1V1V1V1V</u>	×~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
I AEP BURING LUGS (1).GPJ							80 -			<ul> <li>(78.8-80.8 ft) NOTE: Calcite deposition and iron staining at fracture.</li> <li>(80.8-81 ft) NOTE: Weathered shale.</li> </ul>			
STIGATION/BORING LOGS-GINTAEP	) R	C 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.	1XV11XV11XV11XV1		
M SITE - FGD LANDFILLV021 INVES							- - - 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.			
ERS/SOLUND/ARCADIS/AEP TEAM							-			(90.1 ft) NOTE: Shale becomes more sandy and transitions to sandstone. (92.7-94.7 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.	7/////////////////////////////////////	×11×11×11×11×11×11×11×11×11×11×11×11×11	
	0 R0	C 94.5	104.5		9.3	44	95 - - -			(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.	<u> </u>	X11XX11XX11XX1	

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

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AEP -

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 American Electric Power
 BORING NO. 2105 I & D
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 Amos - FGD Landfill
 BORING START
 6/23/21
 BORING FINISH
 6/23/21

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	PLE BER	PLE	SAM DEF		STANDARD PENETRATION	AL STH /ERY	RQD	DEPTH	о НС	C S	SOIL / ROCK	L	DRILLER'S
	SAMPLE	SAMPLE	IN F FROM		RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVEF	%	IN FEET	GRAPHIC LOG	N S O	IDENTIFICATION	WELL	NOTES
-	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/X/11/X/1/X/1/X/1/X/1/X/1/X/1/X/1/X/1	
EP BORING LOGS (1).GPJ	11	RC	104.5	114.5		10	87	105 -			(106.4-107.2 ft) NOTE: Becomes	7///X///X///X///X///X///X///X///X/	
FGD_LANDFILL\2021_INVESTIGATION\BORING_LOGS-GINTAEP BORING LOGS (1).GPJ								110 -			gray with red mottling, thinly bedded, moderately weathered, moderately fractured. NOTE: fractures and calcite deposits at 106.7' to 107.2'. (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.	X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1 1 X 1	112-115': Bentonite seal
1	12	RC	114.5	124.5		10	57	115 -					Sear 115-116': Secondary Sand Pack (choker sand) 116-142': Primary Sand Pack
AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE								120 -			(119.2 ft) NOTE: Calcite nodule (5 cm) and fractures. (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
AEP.GDT													

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SAMPLE NUMBER	SAMPLE	SAN DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
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').		
14	RC	134.5	144.5		9.5	85	135 -			(132-132.3 ft) NOTE: Thin shale layer, red, highly weathered, moderately fractured. (136.3-144.8 ft) SANDSTONE, fine grained; gray; moderately weathered; slightly fractured;		
							140 -			thin-bedded; strong field strength. NOTE: Calcite veins and nodules throughout.		142-162': Bentonite
15	RC	144.5	154.5		10	91	145 -			(143.8-144.8 ft) NOTE: Interbedded with shale. (144.8-149.9 ft) SANDSTONE, fine grained; gray		seal
15							- - - -			to light gray; moderately weathered; thin-bedded; strong to very strong field strength. (147.2-147.5 ft) NOTE: Calcite veins.		

AEP.

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PROJECT Amos - FGD Landfill

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SAMPLE NUMBER SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15 RC		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. (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.		
	C 154.5	164.5		10		155 -	-		<ul> <li>(153.9-154.5 ft) NOTE: Interbedded with shale.</li> <li>(154.5-163.2 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength.</li> <li>(156.1-163.2 ft) NOTE: Interbedded with red shale.</li> </ul>		
17 RC						- 160 - -			(163.2-166.2 ft) SANDSTONE, fine grained; gray		162-163': Secondary Sand Pack (choker sand) 163-184': Primary
17 RC	C 164.5	174.5		10	79	- 165 - -			to light gray; slightly weathered; slightly fractured; thin-bedded; strong field strength. NOTE: Fractures and calcite veins at base contact. (166.2-170 ft) NOTE: Interbedded with shale, moderately weathered and fractured.		Sand Pack 167-182': Slotted
- 1- 17/1 10-10 0-00 EVANDAME LIEVIN ATT						- 170 – -			(170-180 ft) SHALE, fine grained; red to dark red; moderately weathered; moderately fractured; thin-bedded; moderate field strength.		
18 RC	C 174.5	184.5		9.8	91	175			Continued Next Page		

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	SAMPLE NUMBER	SAMPLE	SAM DEF IN F FROM	РТН EET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVER		DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	MELL	DRILLER'S NOTES
NG LOGS (1).GPJ	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. (180-184.5 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		<u>7</u> 184'-194.5': Bentonite
EAM SITE - FGD LANDFILL\2021 INVESTIGATION\BORING LOGS-GINTAEP BORING LOGS (1).GPJ	19	RC	184.5	194.5		10	97	185 -			(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.		backfill
AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM S								195 - 200 -	-				

JOB NUMBER 30080156	G OF BORING	
COMPANY American Electric Power	BORING NO. <u>2106</u> DATE <u>9/2/21</u> SHE	et <u>1</u> of <u>5</u>
PROJECT Amos - FGD Landfill	BORING START 6/22/21 BORING FINISH	6/23/21
COORDINATES N 542,837.390 E 1,722,861.693	PIEZOMETER TYPE <b>NA</b> WELL TYPE	OW
GROUND ELEVATION 722.64 ft SYSTEM NAD83/NAVD8	B HGT. RISER ABOVE GROUN <u>D 2.94'</u> DIA	2"
Water Level, ft $48.35$ $\overline{2}$	DEPTH TO TOP OF WELL SCREEN 37' BOTTOM	57'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F	тн	STANDARD PENETRATION RESISTANCE	TOTAL ENGTH COVERY	RQD	DEPTH IN	GRAPHIC LOG	I S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	ωΞ	Ś	FROM	то	BLOWS / 6"	L I U	/0	FEET	5				
EP BORING LOGS (1).GPJ	0	RC	3.0	9.6		4.3	37				(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;	TKU KU  0-29': Grout seal NOTE: 6" Borehole Diameter	
ATION/BORING LOGS-GINT/AE	1	RC	9.6	14.6		4.3	42	-			<ul> <li>(A-1 0.017) Of the Period XL, mile grained, moderately weathered; intensely fractured; medium-bedded; moderate field strength. NOTE: Interbedded with mudstone.</li> <li>(6.3-10.1 ft) SANDSTONE, fine grained; slightly weathered; slightly fractured; thin-bedded; strong field strength.</li> </ul>		
SITE - FGD LANDFILL\2021 INVESTIG								10			(10.1-16.8 ft) MUDSTONE, fine grained; red to reddish gray (mottled); highly weathered; moderately fractured; moderate to weak field strength.		
10:40 - C.USERSISOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINT/AEP BORING LOGS (1).GFJ	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.		
;40 - (			TYPF	OFC	ASING USED	1		I	1		Continued Next Page		1
/21 10	X		NQ-2 RC							T\/D'	Ŭ	- 00	
r - 9/2/21	NA		6" x 3.25	HSA							E: PT = OPEN TUBE POROUS TIP, SS SCREEN, G = GEONOR, P = PNEUMATIC		
- AEP.GDT	NA NA	NA         9" x 6.25 HSA           NA         HW CASING ADVANCER         4"				WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON							
- AEF	NA	NA NW CASING 3"											
AEP.	NA NA		<u>SW CAS</u> AIR HAN			6" 8"					RECORDER Alan Gillespie		

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. <u>2106</u> DATE <u>9/2/21</u> SHEET <u>2</u> OF <u>5</u> 

SAMPLE NUMBER	SAMPLE	Sample Depth In Feet Om to	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
2 R		4.6 24.6		10	63				(20.3-20.6 ft) NOTE: Shale lens. (21.5-21.6 ft) NOTE: Shale lens.	K C K C K C K C K C K C K C K C K C K C	
	RC 24	4.6 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.		
- FGD LANDFILL2021 INVESTIGATION/BORING LOGS-GINT/AEP BORING LOGS (1).GPJ P						30 -			NOTE: Interbedded with mudstone.		29-32': Bentonite seal 32-33': Secondary Sand Pack (choker sand)
AM SITE - FGD LANDFILL/2021 INVESTIG	RC 34	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.		33-59': Primary Sand Pack 37'-57': Slotted PVC (20-slot) Screen
AEP - AEP.GDT - 9/2/21 10:40 - C:\USERS\SOLUND\ARCADIS\AEP TEAM SITE						40 -					
- AEP.GDT - 9/2/21 10:40	RC 44	4.6 54.6		4.4	36	45 -			(44.6 ft) NOTE: Becomes less weathered, moderate field strength. Continued Next Page		

COMPANY American Electric Power PROJECT Amos - FGD Landfill

BORING NO. <u>2106</u> DATE <u>9/2/21</u> SHEET <u>3</u> OF <u>5</u> 

SAMPLE NUMBER	SAMPLI	SAMPLE DEPTH IN FEET ROM TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
IEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINTAEP BORING LOGS (1),GPJ       9       5         B       3       3	FR       RC     4	IN FEET <u>ROM TC</u> <u>14.6</u> 54. 54.6 64. <u>54.6</u> 74.	6	9.6 9	% 36 76 39				(52.4 ft) NOTE: Becomes less weathered, less fractured, tan coloring dominates. (56.5-67.9 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded. NOTE: Interbedded with red sandy shale. (67.9-89.6 ft) SHALE, fine grained; red with gray mottling; highly weathered; moderately fractured; weak field strength.		NOTES
.EP.GDT - 9/2/21 10:40 -						70 -					
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COMPANY	American Electric Power	BORING NO. 2106	DATE_	<b>9/2/21</b> s	SHEET	4	OF _	5
PROJECT	Amos - FGD Landfill	BORING START	6/22/21	BORING FINIS	БН <u>6</u>	/23/21		

	NUMBER	SAMPLE	SAM DEF IN F FROM	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	7	RC	64.6	84.6		9	39 51	-					
AEP - AEP.GDT - 9/2/2110:40 - C:USERSISOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINT/AEP BORING LOGS (1),GPJ								75			(79.1 ft) NOTE: Becomes less weathered, moderate field strength.		
TE - FGD LANDFILL\2021 INVESTIGATION	9	RC	84.6	94.6		9.7	64	85 - - -					
JSERS/SOLUND/ARCADIS/AEP TEAM SI								90			<ul> <li>(89.6-94.3 ft) SANDSTONE, fine grained; gray; slightly weathered; unfractured; thin-bedded; strong field strength.</li> <li>(92.7-92.8 ft) NOTE: Highly weathered.</li> <li>(93.7-93.8 ft) NOTE: Highly weathered.</li> <li>(94.3-99.8 ft) SHALE fine grained; red;</li> </ul>		
- AEP.GDT - 9/2/21 10:40 - C:\U	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.											Continued Next Page		

JOB NUMBER 30080156

AEP

LOG OF BORING

 
 COMPANY
 American Electric Power
 BORING NO. 2106
 DATE 9/2/21
 SHEET 5
 OF 5

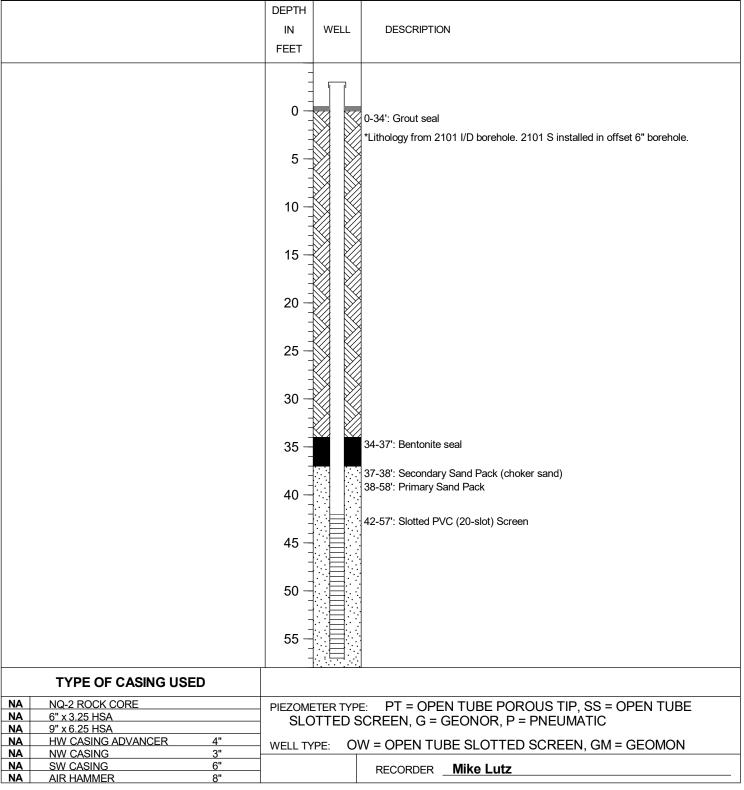
 PROJECT
 Amos - FGD Landfill
 BORING START
 6/22/21
 BORING FINISH
 6/23/21
 BORING NO. <u>2106</u> DATE <u>9/2/21</u> SHEET <u>5</u> OF <u>5</u>

	SAMPLE NUMBER	SAMPLE	SAM DEF IN F	PTH	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL ENGTH COVERY	RQD %	DEPTH IN	GRAPHIC LOG U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
	ທ z 10	ഗ RC	FROM 94.6	TO 104.6	BLOWS / 6"	9.7	69	FEET				
	10		04.0	104.0		0.7		- 100 – -		(99.8-104 ft) SANDSTONE, fine grained; gray; slightly weathered; slightly fractured; thin-bedded; strong field strength.		
P BORING LOGS (1).GPJ								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'.		
P - AEP.GDT - 9/2/21 10:40 - C:USERSISOLUND/ARCADIS/AEP TEAM SITE - FGD LANDFILL/2021 INVESTIGATION/BORING LOGS-GINT/AEP BORING LOGS (1).GPJ								- - - - -				
DISVAEP TEAM SITE - FGD LANDFILL\202								- 115 - -				
9/2/21 10:40 - C:\USERS\SOLUND\ARCA								- 120 – -				
- AEP.GDT -									-			

JOB NUMBER 30080156	JO OF BORING
COMPANY American Electric Power	BORING NO. 2101 I & D DATE 10/8/21 SHEET 1 OF 1
PROJECT Amos - FGD Landfill	BORING START 6/15/21 BORING FINISH 6/16/21
COORDINATES N 541,732.909 E 1,724,951.574	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION SYSTEM NAD83/NAVD8	8 HGT. RISER ABOVE GROUN <u>D 2.73' (I) 2.71' (D)</u> DIA <u>2''</u>
Water Level, ft $\overline{\mathbf{Y}}$ 56.95 $\overline{\mathbf{Y}}$	DEPTH TO TOP OF WELL SCREEN 60'/92' BOTTOM 75'/102'
TIME	WELL DEVELOPMENT <u>Purge/Jet</u> BACKFILL <u>Bentonite Grout</u>
DATE 8/9/2021	FIELD PARTY
	- -

		DEPTH		
		IN	WELL	DESCRIPTION
		FEET		
		$\begin{array}{c} 0\\ 5\\ 10\\ 15\\ 20\\ 25\\ 30\\ 35\\ 40\\ 45\\ 50\\ 55\\ 60\\ 65\\ 70\\ 75\\ 80\\ 90\\ 95\\ 100\\ 105\\ 110\\ 115\\ 120\\ 125\\ \end{array}$		0-54': Grout seal NOTE: 8" Borehole Diameter 54-57": Bentonite seal 57-58: Secondary Sand Pack (choker sand) 58-77": Primary Sand Pack (choker sand) 58-75: Slotted PVC (20-slot) Screen 77-87": Bentonite seal 87-88: Secondary Sand Pack (choker sand) 88-104': Primary Sand Pack (choker sand) 88-104': Primary Sand Pack (choker sand) 88-104': Primary Sand Pack (choker sand) 82-102': Slotted PVC (20-slot) Screen 104'-144.5': Bentonite backfill
		130 - 135 -		
		140		
	TYPE OF CASING USED			
X	NQ-2 ROCK CORE		TER TYP	
NA NA	6" x 3.25 HSA 9" x 6.25 HSA	SLC	TTED S	SCREEN, G = GEONOR, P = PNEUMATIC
NA	HW CASING ADVANCER 4"	WELL TY	PE: O	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NA	NW CASING 3"	//		· · · · · · · · · · · · · · · · · · ·
NA NA	SW CASING 6" AIR HAMMER 8"			RECORDER Mike Lutz

JOB NUMBER 30080156	G OF BORING	
COMPANY American Electric Power	BORING NO. 2101 S DATE 10/8/21 SHE	ET <b>1</b> OF <b>1</b>
PROJECT Amos - FGD Landfill	BORING START 6/15/21 BORING FINISH	6/16/21
COORDINATES N 541,735.055 E 1,724,955.37	PIEZOMETER TYPE <b>NA</b> WELL TYPE	OW
GROUND ELEVATION SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D <b>2.86'</b></u> DIA	2"
Water Level, ft $\forall$ 38.59 $\forall$	DEPTH TO TOP OF WELL SCREEN 42' BOTTOM	57'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring



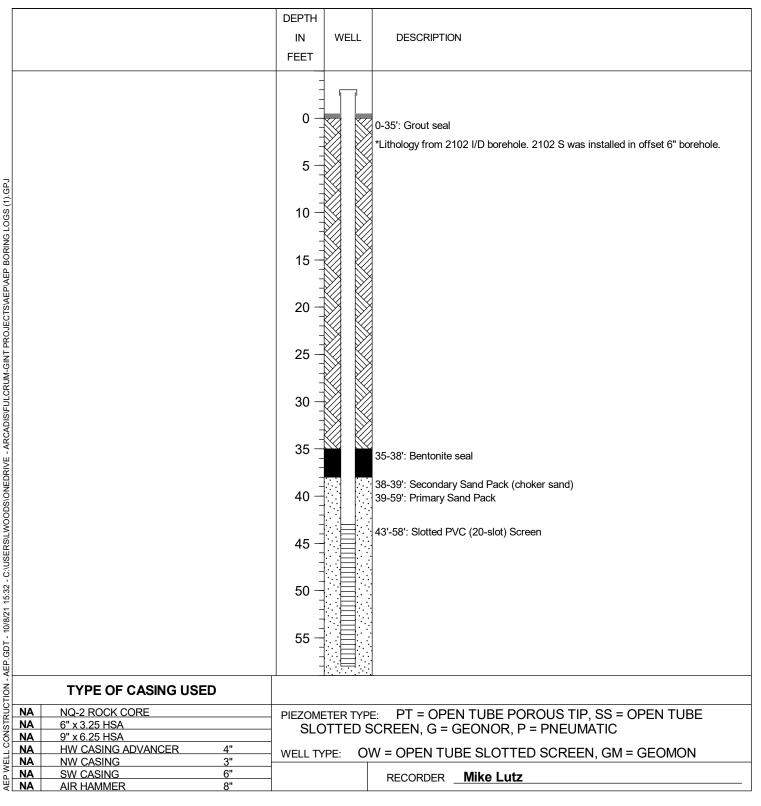
JOB NUMBER 30080156	G OF BORING
COMPANY American Electric Power	BORING NO. 2101 SS DATE 10/8/21 SHEET 1 OF 1
PROJECT Amos - FGD Landfill	BORING START 6/15/21 BORING FINISH 6/16/21
COORDINATES N 541,737.317 E 1,724,959.605	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION 932.04 ft SYSTEM NAD83/NAVD88	B HGT. RISER ABOVE GROUN <u>D 2.8'</u> DIA <u>2"</u>
Water Level, ft $\ \ \underline{\nabla}$ <b>20.61</b> $\ \underline{\nabla}$ $\ \underline{\Psi}$	DEPTH TO TOP OF WELL SCREEN 19' BOTTOM 29'
TIME	WELL DEVELOPMENT <u>Purge/Jet</u> BACKFILL <u>Bentonite Grout</u>
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

	DEPTH IN WELI FEET	DESCRIPTION
- AEP. GDT - 10/8/21 15:32 - C:\USERSILWOODS\ONEDRIVE - ARCADIS/FULCRUM-GINT PROJECTS\AEP.\AEP.AEP BORING LOGS (1).GPJ		0-11': Grout seal 1Lithology from 2101 I/D borehole. 2101 SS installed in offset 6" borehole. 11-14': Bentonite seal 14-15': Secondary Sand Pack (choker sand) 15-30': Primary Sand Pack 19'-29': Slotted PVC (20-slot) Screen
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 T	YPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE
NA         0         X 3.25 HSA           NA         9" x 6.25 HSA           NA         9" x 6.25 HSA           HW         CASING ADVANCER		SCREEN, G = GEONOR, P = PNEUMATIC OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NA     NW CASING     3"       NA     SW CASING     6"       NA     AIR HAMMER     8"		RECORDER Mike Lutz

JOB NUMBER 30080156	G OF BORING
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 SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D <b>2.90' (I), 2.89' (D)</b></u> DIA <b><u>2''</u></b>
Water Level, ft $\nabla$ 78.94 $\nabla$ $\nabla$	DEPTH TO TOP OF WELL SCREEN 62'/96' BOTTOM 77'/106'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

	DEPTH IN	WELL	DESCRIPTION
Type of casing used           Type of casing used           X         NQ-2 ROCK CORE           NA         9" x6.25 HSA           NA         NW CASING         3"           NA         SW CASING         3"           NA         AIR HAMMER         8"		WELL	0-56': Grout seal NOTE: 8" Borehole Diameter
DRIVE - ARCADIS/FULCRUM-GINT PRC	60 65 70 75 80 85 90	h 문 다 E	56-59': Bentonite seal 59-60': Secondary Sand Pack (choker sand) 60-81': Primary Sand Pack 62-77': Slotted PVC (20-slot) Screen 81-91': Bentonite seal
IUSERSILWOODSION	95 - 100 - 105 -		91-92': Secondary Sand Pack (choker sand) 92-108': Primary Sand Pack 96-106': Slotted PVC (20-slot) Screen 108'-134.6': Bentonite backfill
AEP.GDT - 10/8/21 15:32 - C:	110 115 120 125 130		
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"	SLC		SCREEN, G = GEONOR, P = PNEUMATIC
NA     NW CASING     3"       NA     NW CASING     3"       NA     SW CASING     6"       NA     AIR HAMMER     8"		rpe: U	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON RECORDER <u>Mike Lutz</u>

JOB NUMBER 30080156	G OF BORING	
COMPANY American Electric Power	BORING NO. 2102 S DATE 10/8/21 SHE	ET <u>1</u> OF <u>1</u>
PROJECT Amos - FGD Landfill	BORING START 6/16/21 BORING FINISH	6/16/21
COORDINATES N 541,946.401 E 1,725,330.822	PIEZOMETER TYPE <b>NA</b> WELL TYPE	OW
GROUND ELEVATION _ 932.97 ft SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D <b>2.97'</b></u> DIA	2"
Water Level, ft $\forall$ <b>41.27</b> $\forall$	DEPTH TO TOP OF WELL SCREEN 43' BOTTOM	58'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring



JOB NUMBER 30080156	GOFBORING	
COMPANY American Electric Power	BORING NO. 2103 S & I DATE 10/8/21 SHEE	T_ <b>1</b> _OF_ <b>1</b>
PROJECT Amos - FGD Landfill	BORING START 6/17/21 BORING FINISH	6/17/21
COORDINATES N 542,191.177 E 1,725,406.308	PIEZOMETER TYPE <b>NA</b> WELL TYPE	WO
GROUND ELEVATION _ 935.46 ft SYSTEM NAD83/NAVD88	HGT. RISER ABOVE GROUN <u>D <b>2.47' (S), 2.45' (I)</b></u> DIA	2"
Water Level, ft $\nabla$ 57.15 $\nabla$	DEPTH TO TOP OF WELL SCREEN 45'/67' BOTTOM	58'/82'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL	Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG	Wireline Coring

	DEPTH IN FEET	WELL	DESCRIPTION
	$\begin{array}{c} 0 \\ 5 \\ 10 \\ 15 \\ 20 \\ 25 \\ 30 \\ 45 \\ 50 \\ 55 \\ 60 \\ 65 \\ 70 \\ 75 \\ 80 \\ 95 \\ 100 \\ 105 \\ 110 \\ 115 \\ 120 \\ 130 \\ 130 \\ \end{array}$		0-40': Grout seal NOTE: 8" Borehole Diameter 40-43': Bentonite seal 43-44': Secondary Sand Pack (choker sand) 44-59': Primary Sand Pack 48-58': Slotted PVC (20-slot) Screen 59-64': Bentonite seal 64-65': Secondary Sand Pack (choker sand) 65-84': Primary Sand Pack 67-82': Slotted PVC (20-slot) Screen 84'-134.6': Bentonite backfill
X         NQ-2 ROCK CORE           NA         6" x 3.25 HSA           NA         9" x 6.25 HSA           NA         9" x 6.25 HSA	SLO		CREEN, G = GEONOR, P = PNEUMATIC
NA         HW CASING ADVANCER         4"           NA         NW CASING         3"         -	WELL TY	PE: OV	N = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NASW CASING6"NAAIR HAMMER8"			RECORDER Mike Lutz

30080156

JOB NUMBER 30080156	
COMPANY American Electric Power	BORING NO. 2105 I & D DATE 10/8/21 SHEET 1 OF 1
PROJECT Amos - FGD Landfill	BORING START <u>6/23/21</u> BORING FINISH <u>6/23/21</u>
COORDINATES N 543,825.103 E 1,725,192.735	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION _ 991.72 ft _ SYSTEM NAD83/NAVD8	<b>8</b> HGT. RISER ABOVE GROUN <u>D <b>2.69' (I), 2.89' (D)</b></u> DIA <b><u>2''</u></b>
Water Level, ft $\overline{\mathbf{Y}}$ <b>135.96</b> $\overline{\mathbf{Y}}$	DEPTH TO TOP OF WELL SCREEN 120'/167' BOTTOM 140'/182'
TIME	WELL DEVELOPMENT <u>Purge/Jet</u> BACKFILL <u>Bentonite Grout</u>
DATE 8/9/2021	FIELD PARTY

Γ		DEPTH		
		IN	WELL	DESCRIPTION
		FEET		
AEP.GDT - 10/8/21 15:32 - C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\AEP\AEP BORING LOGS (1).GPJ		$\begin{array}{c} 0 \\ 5 \\ 10 \\ 20 \\ 20 \\ 30 \\ 40 \\ 45 \\ 55 \\ 66 \\ 77 \\ 88 \\ 90 \\ 90 \\ 101 \\ 115 \\ 120 \\ 130 \\ 145 \\ 150 \\ 155 \\ 160 \\ 100 \\ 100 \\ 110 \\ 110 \\ 120 \\ 130 \\ 145 \\ 155 \\ 160 \\ 100$		0-112: Grout seal NOTE: 8" Borehole Diameter 112-115: Bentonite seal 115-116: Secondary Sand Pack (choker sand) 116-142: Primary Sand Pack 120-140: Slotted PVC (20-slot) Screen 142-162: Bentonite seal 162-163: Secondary Sand Pack (choker sand) 163-184: Primary Sand Pack (choker sand) 163-184: Primary Sand Pack (choker sand) 163-184: Stotted PVC (20-slot) Screen 184'-194.5: Bentonite backfill
	TYPE OF CASING USED			
AEP WELL CONSTRUCTION	X NQ-2 ROCK CORE			
STRU	NA 6" x 3.25 HSA	PIEZOME		E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
CON	NA 9" x 6.25 HSA			
ELL	NAHW CASING ADVANCER4"NANW CASING3"	WELL TY	PE: O	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
N N	NA SW CASING 6"			RECORDER Alan Gillespie
AE	NA AIR HAMMER 8"			

JOB NUMBER 30080156	JO OF BORING
COMPANY American Electric Power	BORING NO. 2105 SS & S DATE 10/8/21 SHEET 1 OF 1
PROJECT Amos - FGD Landfill	BORING START 6/23/21 BORING FINISH 6/23/21
COORDINATES N 543,830.171 E 1,725,193.696	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION _ 991.72 ft SYSTEM NAD83/NAVD8	8 HGT. RISER ABOVE GROUN <u>D 2.78' (SS), 2.69' (S)</u> DIA 2"
Water Level, ft $\nabla$ <b>75.08</b> $\nabla$ $\nabla$	DEPTH TO TOP OF WELL SCREEN 61'/98' BOTTOM 76'/108'
TIME	WELL DEVELOPMENT <u>Purge/Jet</u> BACKFILL <u>Bentonite Grout</u>
DATE 8/9/2021	FIELD PARTY _ Zack Racer (AEP) RIG _ Wireline Coring

		DEPTH IN	WELL	DESCRIPTION
		FEET		
AEP WELL CONSTRUCTION - AEP.GDT - 10/8/21 15:32 - C.:USERSILWOODS!ONEDRIVE - ARCADIS/FULCRUM-GINT PROJECTS/AEP/AEP BORING LOGS (1).GPJ		0 5 10 15 20 25 30 40 45 50		0-53': Grout seal *Lithology from 2105 I/D borehole. 2105 S & SS installed in 8" borehole. 53-56': Bentonite seal 56-57': Secondary Sand Pack (choker sand)
DS\ONEDRIVE - ARCADIS\FU		60 65 70 75		57-80': Primary Sand Pack 61-76': Slotted PVC (20-slot) Screen
- C:\USERS\LWOO		80   85   90		80-93': Bentonite seal
AEP.GDT - 10/8/21 15:32		95   100   105		93-94': Secondary Sand Pack (choker sand) 94-110': Primary Sand Pack 98-108': Slotted PVC (20-slot) Screen
TION -	TYPE OF CASING USED			
CONSTRUC	NA         NQ-2 ROCK CORE           NA         6" x 3.25 HSA           NA         9" x 6.25 HSA			SCREEN, G = GEONOR, P = PNEUMATIC
VELL (	NA         HW CASING ADVANCER         4"           NA         NW CASING         3"	WELL TY	PE: O	W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
AEP V	NASW CASING6"NAAIR HAMMER8"			RECORDER Alan Gillespie

JOB NUMBER 30080156	G OF BORING
COMPANY American Electric Power	BORING NO. 2106 DATE 10/8/21 SHEET 1 OF 1
PROJECT Amos - FGD Landfill	BORING START 6/22/21 BORING FINISH 6/23/21
COORDINATES N 542,837.390 E 1,722,861.693	PIEZOMETER TYPE NA WELL TYPE OW
GROUND ELEVATION 722.64 ft SYSTEM NAD83/NAVD88	B HGT. RISER ABOVE GROUN <u>D 2.94'</u> DIA <u>2"</u>
Water Level, ft $48.35$ $\overline{2}$	DEPTH TO TOP OF WELL SCREEN 37' BOTTOM 57'
TIME	WELL DEVELOPMENT Purge/Jet BACKFILL Bentonite Grout
DATE 8/9/2021	FIELD PARTY Zack Racer (AEP) RIG Wireline Coring

	DEPTH IN	WELL	DESCRIPTION
	FEET		
	0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90		0-29': Grout seal NOTE: 6" Borehole Diameter 29-32': Bentonite seal 32-33': Secondary Sand Pack (choker sand) 33-59': Primary Sand Pack 37'-57': Slotted PVC (20-slot) Screen 59'-104.6': Bentonite backfill
	95		
	100 -		
TYPE OF CASING USED			
X         NQ-2 ROCK CORE           NA         6" x 3.25 HSA	PIEZOME		E: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SCREEN, G = GEONOR, P = PNEUMATIC
NA9" x 6.25 HSANAHW CASING ADVANCER4"	WELL TY		W = OPEN TUBE SLOTTED SCREEN, GM = GEOMON
NA         NW CASING         3"           NA         SW CASING         6"			RECORDER Alan Gillespie
NA AIR HAMMER 8"			



Well Survey

#### Prepared for:

ARCADIS U.S., INC.-Columbus 630 Plaza Drive, Suite 600 Highlands Ranch, CO 80129



 Water Well
 FGD LANDFILL

 WV
 PO #: WV015976.0004

 ES-124909
 Thursday, July 20, 2017

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Location

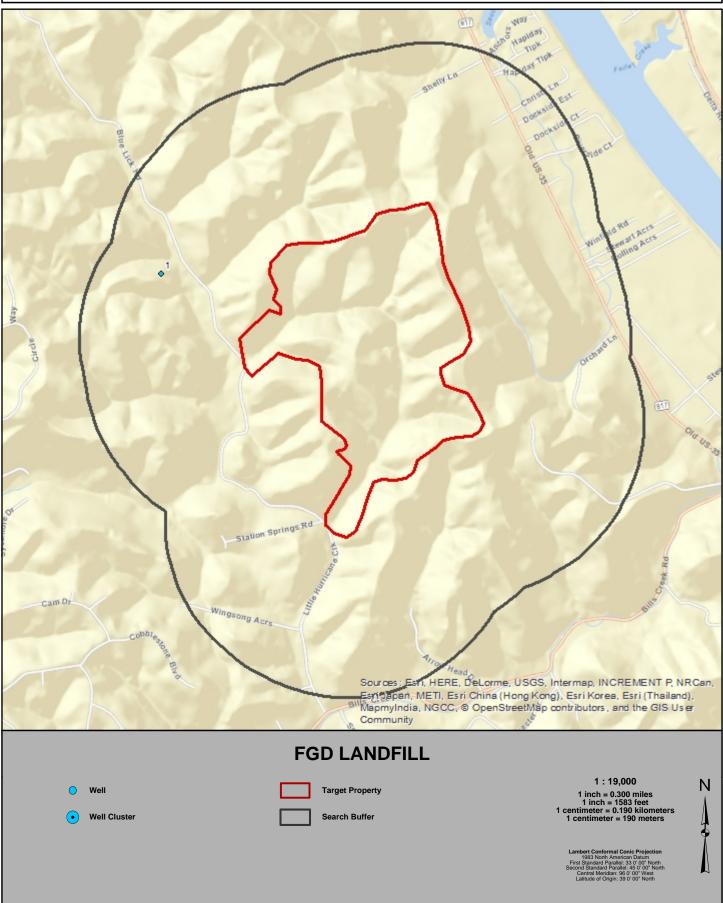
#### **Geographic Summary**



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						
Zip Codes Searched Search Distance	Zip Codes (historical zip codes included)					
	<b>Zip Codes (historical zip codes included)</b> 25213, 25070, 25109, 25124, 25560					
Search Distance						
Search Distance Target Property	25213, 25070, 25109, 25124, 25560					
Search Distance Target Property 0.5 miles	25213, 25070, 25109, 25124, 25560					
Search Distance Target Property 0.5 miles Topos Searched	25213, 25070, 25109, 25124, 25560 25213, 25070, 25109, 25124, 25560					

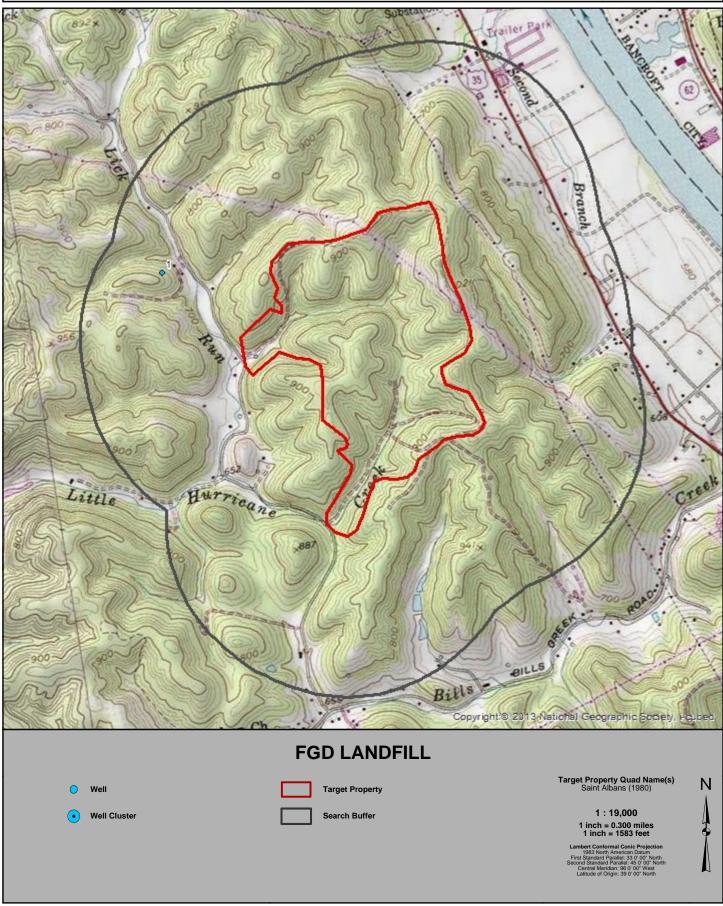
## Summary Map - 0.5 Mile Buffer





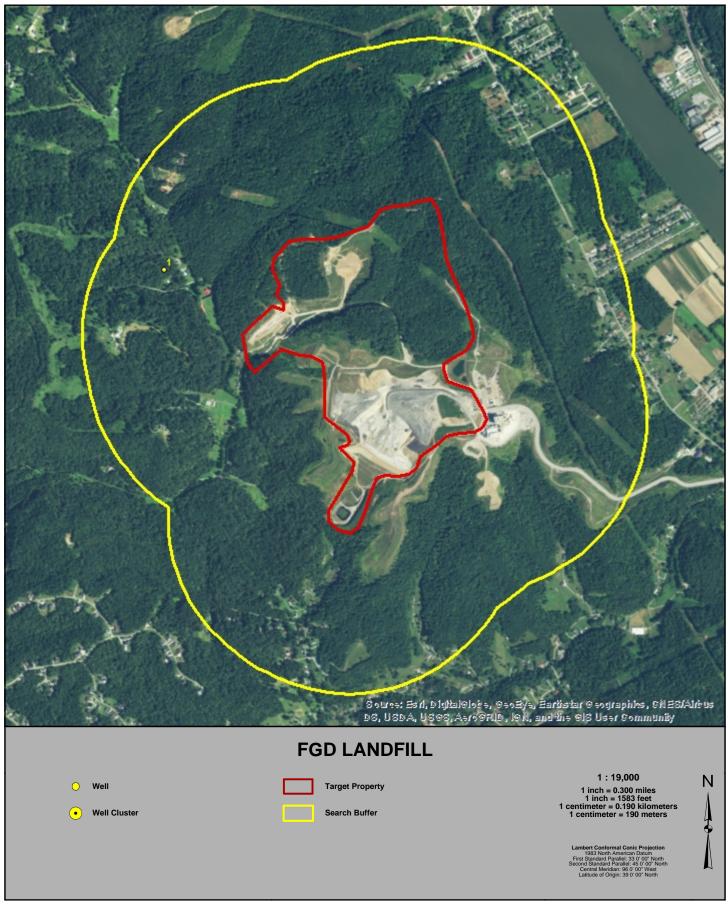
#### Topographic Overlay Map - 0.5 Mile Buffer





### Current Imagery Overlay Map - 0.5 Mile Buffer





#### 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- 382926081 520101	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	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

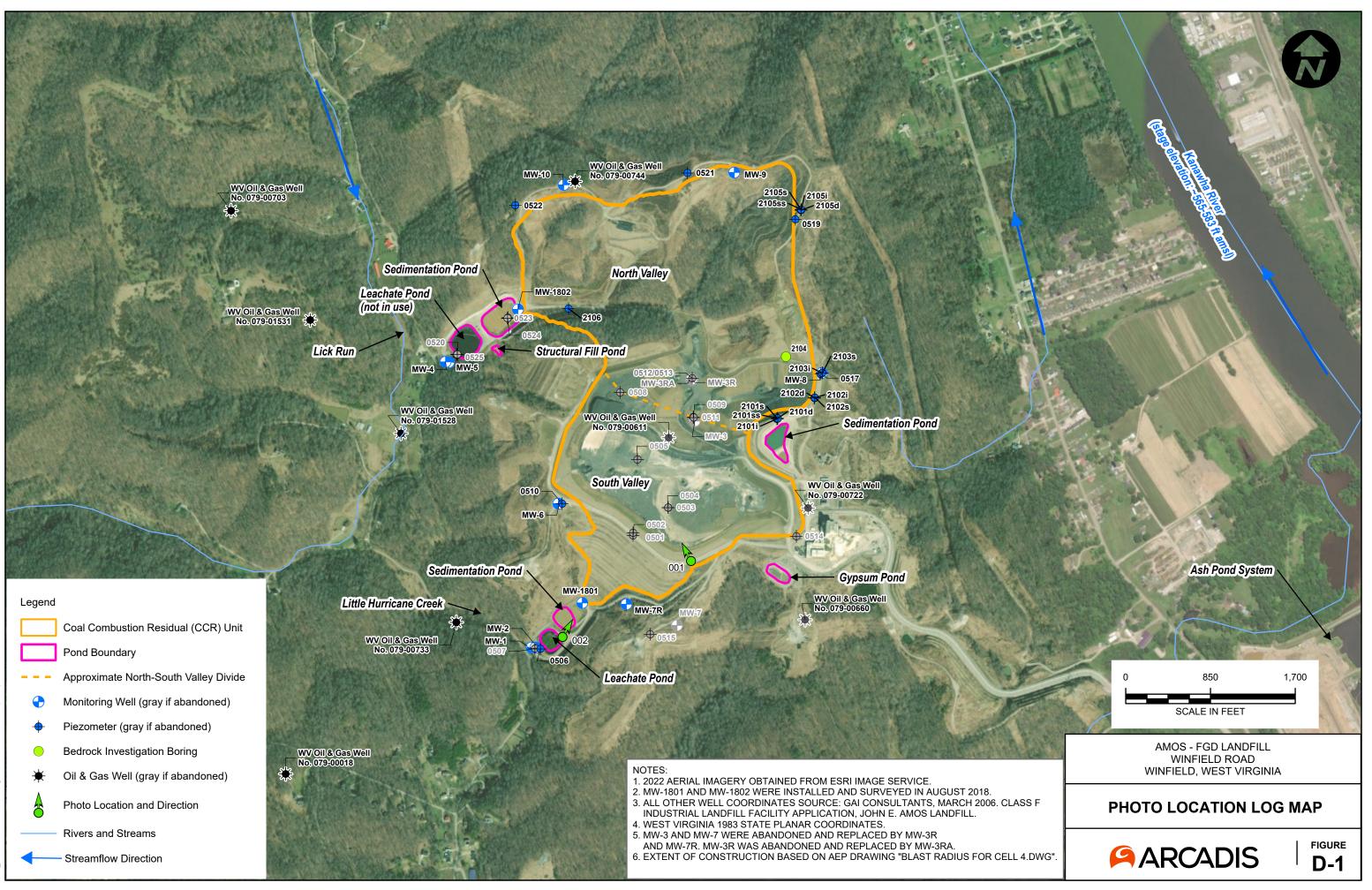
#### Disclaimer



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.



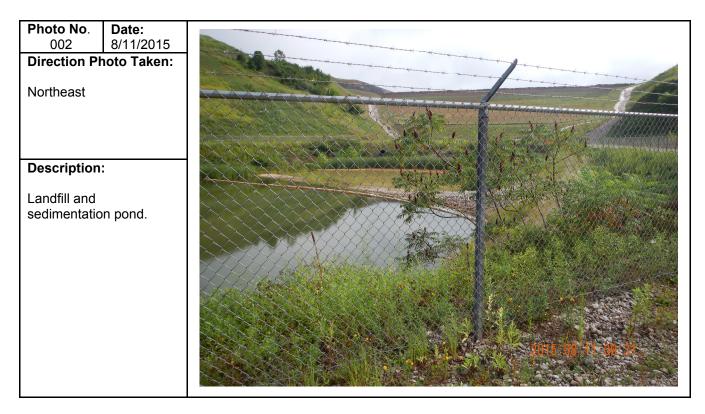
Photographic Log





# **PHOTOGRAPHIC LOG**





AEP Amos Generating Plant CCR Compliance 1530 Winfield Road, Winfield, WV OH015976.0007

Arcadis U.S., Inc. 7575 Huntington Park Drive, Suite 130 Columbus, OH 43235 United States Phone: 614 985 9100 Fax: 614 985 9170 www.arcadis.com