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11687 Lebanon Road, Cincinnati OH 45241

October 16, 2017
File: 175534017
Revision 0

Ohio Valley Electric Corporation
3932 U.S. Route 23
P.O. Box 468
Piketon, Ohio 45661

RE: Groundwater Monitoring System
CCR Landfill, South Fly Ash Pond, and Boiler Slag Pond
EPA Final Coal Combustion Residuals (CCR) Rule
Kyger Creek Station
Cheshire, Gallia County, Ohio

1.0 PURPOSE

This letter documents Stantec's certification of the groundwater monitoring system designed and constructed by Applied Geology and Environmental Science, Inc. (AGES) for the Ohio Valley Electric Corporation (OVEC) Kyger Creek Station's CCR Landfill, South Fly Ash Pond (SFAP), and Boiler Slag Pond (BSP). The EPA Final CCR Rule requires owners or operators of CCR landfills and surface impoundments to install a groundwater monitoring system as per 40 CFR 257.91.

2.0 GROUNDWATER MONITORING SYSTEM - REQUIREMENTS

The performance standard listed in 40 CFR 257.91(a) requires that the groundwater monitoring system consist of sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that:

(1) Accurately represents the quality of background groundwater that has not been affected by leakage from a CCR unit, and

(2) Accurately represents the quality of groundwater passing the waste boundary of the CCR unit, by installing the downgradient monitoring system at the waste boundary ensuring detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.

In accordance with 40 CFR 257.91(b), the number, spacing, and depths of the monitoring system shall be determined based on site-specific technical information such as:

(1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow, and

(2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the

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uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.

40 CFR 257.91(c) states that the groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards of 40 CFR 257.91(a), based on the site-specific information in 40 CFR 257.91(b). The groundwater monitoring system must consist of a minimum of one upgradient and three downgradient monitoring wells with additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.

40 CFR 257.91(e) states that the monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. The casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of samples and the groundwater.

3.0 SUMMARY OF FINDINGS

Stantec personnel reviewed the *Coal Combustion Residuals Regulation, Monitoring Well Installation Report (MWIR), Ohio Valley Electric Corporation, Kyger Creek Station, Cheshire, Gallia County, Ohio* (AGES, August 2016). Each of the four sections of 40 CFR 257.91, as shown above in Section 2.0 of this certification letter, is detailed below to demonstrate compliance. The sections, tables, figures, and appendices detailed in the following paragraphs refer to the MWIR.

<u>40 CFR 257.91(a)</u>

Performance standard. *The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that:*

(1) Accurately represents the quality of background groundwater that has not been affected by leakage from a CCR unit, and

(2) Accurately *represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.*

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This standard is met if §§257.91(b) through (e) are met. §§257.91(a), (b), (c), and (e) are discussed below. §257.91(d) applies to a single groundwater monitoring system installed to monitor multiple CCR units (multiunit). It is not applicable for the Kyger Creek Station groundwater monitoring system.

40 CFR 257.91(b)

> *The number, spacing, and depths of the monitoring systems shall be determined based on site-specific technical information such as:*
>
> *(1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow, and*
>
> *(2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.*

The geology and hydrogeology for each CCR unit is discussed based on historical data in Section 3.0. The uppermost aquifer for each is identified using subsurface stratigraphy, well yields from historic sampling events, and existing monitoring well networks. Generalized geologic cross-sections are included as Figures 3, 4, 6, and 8 (AGES, 2016). Tables 5 and 6 are summaries of the slug tests performed for the BSP and SFAP. The hydrogeologic and subsurface investigation report aquifer testing results supporting the CCR Landfill permit-to-install application are included in Appendix A (Hull, 2007).

Section 4.2 outlines the evaluation of the existing well and piezometer data to estimate groundwater depth in the uppermost aquifer and likely groundwater flow direction. Two additional geotechnical borings were performed in both the BSP and the SFAP per Section 4.3. The borings were intended to obtain more detailed subsurface geology for the upgradient and downgradient sides of the two surface impoundments and to identify location, thickness, and composition, of the uppermost aquifer. Soil samples from these borings were the basis of the grain-size analyses used to design the monitoring well screens and filter packs for the BSP and the SFAP (Section 4.4 and Appendix B).

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40 CFR 257.91(c)

> *the groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards of 40 CFR 257.91(a), based on the site-specific information in 40 CFR 257.91(b). The groundwater monitoring system must consist of a minimum of one upgradient and three downgradient monitoring wells with additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.*

Section 4.6 outlines the monitoring well networks for each CCR unit to meet this requirement.

For the CCR Landfill, the existing groundwater system includes 13 monitoring wells. It was designed for the ultimate waste boundary of a multiple-phased landfill construction. Only the initial phase of landfill construction has been completed. Per Section 3.1, eleven monitoring wells were installed to monitor the Buffalo sandstone as part of the permit-to-install for the CCR Landfill. These are permanent monitoring wells located outside of the ultimate landfill waste boundary. Two temporary downgradient monitoring wells were installed in 2015 at the active phase's limit of waste. It is anticipated that these wells will be abandoned as part of the construction of the next phase of the landfill.

Five downgradient monitoring wells are considered supplemental since they are at least 1,000 feet away from the active landfill phase. Section 4.6.1 and Table 2 lists the remaining eight monitoring wells in the CCR network as four downgradient and four upgradient. Figure 2 shows the groundwater monitoring well locations for the CCR Landfill.

The BSP's groundwater monitoring network is described in Section 4.6.2 and Table 3. Eight monitoring wells were installed around the BSP perimeter in 2015. Three monitoring wells are noted as upgradient, while five are listed as downgradient. Figure 5 shows the groundwater monitoring well locations of the BSP.

Fourteen monitoring wells were installed around the SFAP perimeter in 2015 to serve as the groundwater monitoring network. The wells are described in Section 4.6.3 and Table 4. Four monitoring wells are noted as downgradient, eight as upgradient with two noted as side gradient. Figure 7 shows the groundwater monitoring well locations of the SFAP.

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As discussed in Section 5.0, slug testing was performed in two monitoring wells at the BSP and at the SFAP. The testing was performed to estimate saturated hydraulic conductivity of the uppermost aquifer beneath the surface impoundments and to evaluate groundwater flow velocity. The test results are in Tables 5 and 6 with supporting data in Appendix G.

40 CFR 257.91(e)

> *The monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. The casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of samples and the groundwater.*

The monitoring well installation and development for the three CCR units is discussed in Section 4.5. The second and third paragraphs of Sections 4.5.1 and 4.5.2 discuss the two-inch diameter slotted Schedule 40 PVC screen, 0.40-millimeter quartz sand filter pack, steel casing during well placement, and the four-foot-thick annular bentonite seal above the filter pack in each well. Section 4.4 discusses the design of pre-packed well screens used for the construction of the SFAP and BSP monitoring wells. Monitoring well logs are detailed in Appendix C. Well construction for the monitoring networks of each CCR unit is detailed in terms of well ID, locations, elevations, and date of installation in Tables 2, 3, and 4.

The attached MWIR demonstrates that the groundwater monitoring system was designed and constructed to meet the requirements set forth in 40 CFR 257.91(a), (b), (c), and (e).

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4.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Stan A. Harris, being a Professional Engineer in good standing in the State of Ohio, do hereby certify, to the best of my knowledge, information, and belief:

1. that the information contained in this certification is prepared in accordance with the accepted practice of engineering;

2. that the information contained herein is accurate as of the date of my signature below; and

3. that the groundwater monitoring system for the OVEC Kyger Creek Station's CCR Landfill, South Fly Ash Pond, and Boiler Slag Pond has been designed and constructed to meet the requirements specified in 40 CFR 257.91(a), (b), (c), and (e).

SIGNATURE _____ DATE 10/16/17
Stan A. Harris, PE

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TELEPHONE: (513) 842-8200

ATTACHMENTS: Applied Geology and Environmental Science, Inc. (AGES) (2016). Coal Combustion Residuals Regulation, Monitoring Well Installation Report, Ohio Valley Electric Corporation, Kyger Creek Station, Cheshire, Gallia County, Ohio. August.

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STAN A. HARRIS
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COAL COMBUSTION RESIDUALS REGULATION
MONITORING WELL INSTALLATION REPORT

OHIO VALLEY ELECTRIC CORPORATION
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO

AUGUST 2016

Prepared for:

OHIO VALLEY ELECTRIC CORPORATION (OVEC)

By:

APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC.

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AUGUST 2016

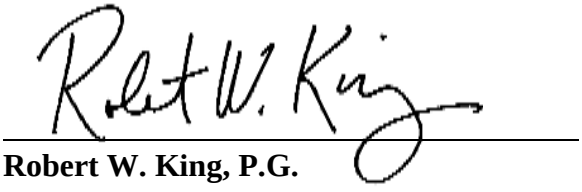
Prepared for:

OHIO VALLEY ELECTRIC CORPORATION (OVEC)

Prepared By:

Applied Geology and Environmental Science, Inc.

Diane E. Miller, P.G.
Senior Geologist



Robert W. King, P.G.
President/Chief Hydrogeologist

COAL COMBUSTION RESIDUALS REGULATION
MONITORING WELL INSTALLATION REPORT
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1.0 INTRODUCTION

On December 19, 2014, the United States Environmental Protection Agency (U.S. EPA) issued their final Coal Combustion Residuals (CCR) regulation which regulates CCR as a non-hazardous waste under Subtitle D of Resource Conservation and Recovery Act (RCRA) and became effective six (6) months from the date of its publication (April 17, 2015) in the Federal Register. The rule applies to new and existing landfills, and surface impoundments used to dispose of or otherwise manage CCR generated by electric utilities and independent power producers. Because the rule was promulgated under Subtitle D of RCRA, it does not require regulated facilities to obtain permits, does not require state adoption, and cannot be enforced by U.S. EPA. The only compliance mechanism is for a state or citizen group to bring a RCRA suit in federal district court against any facility that is alleged to be in non-compliance with the new requirements.

All CCR landfills and CCR surface impoundments (including inactive impoundments unless they close within three (3) years from the promulgation date of the rule) are subject to new, and typically more stringent than current, state requirements for groundwater monitoring and, if necessary, corrective action. Within 30 months after the date of publication (April 17, 2015) in the Federal Register, all existing CCR landfills and existing CCR surface impoundments must have installed groundwater monitoring systems, initiated a groundwater detection monitoring program, and begun assessing groundwater monitoring data to evaluate groundwater quality at each CCR unit.

In March 2015, the Ohio Valley Electric Company (OVEC) contracted with Applied Geology and Environmental Science (AGES), Inc. to identify upgrades in the groundwater monitoring program for the Kyger Creek Station located in Cheshire, Ohio that would be necessary for compliance with the CCR regulation. Based on a review of available data and the CCR regulation, AGES, OVEC and staff from Stantec worked together to develop a detailed scope of work and schedule for the groundwater monitoring system upgrades. Field work on the project (monitoring well installation and development) was conducted from August through November 2015.

Presented below are a discussion of the CCR units identified at the station, site geology and hydrogeology, and the well installation and development program.

2.0 BACKGROUND

The Kyger Creek Station, located in Cheshire, Ohio, is a 1.1-gigawatt (GW) coal-fired power station operated by OVEC. The Kyger Creek Station has five (5) 217-megawatt (MW) generating units and has been in operation since 1955. Beginning in 1955, ash products were sluiced to disposal ponds located in the plant site. During the course of plant operations, CCRs have been managed and disposed of in various units at the station. There are three (3) CCR units at the Kyger Creek Station (Figure 1):

- Type III Residual Waste Landfill (Landfill);
- Boiler Slag Pond (BSP); and,
- South Fly Ash Pond (SFAP).

Information regarding the history and hydrogeology of each unit was obtained by reviewing several historic documents listed in Section 7.0 of this report.

2.1 Type III Residual Waste Landfill

The Landfill is a residual solid waste Landfill located approximately one-half mile south of the intersection of Little Kyger Creek Road and Shaver Road in Addison Township, Gallia County, Ohio (Figure 1). The Landfill is bordered on the east by Shaver Road and on the west, north and south by vacant, forested land owned by OVEC. The proposed permitted footprint of the Landfill occupies approximately 98 acres and is capable of managing approximately 20.4 million cubic yards (approximately 4,000 tons per day) of Class III residual waste generated by the coal-powered Kyger Creek Plant located approximately two (2) miles southeast of the Landfill.

2.2 Boiler Slag Pond

The BSP is located at the south end of the Kyger Creek Station and is approximately 32 acres in size (Figure 1). The BSP was built in 1955 to serve, and still currently serves, as a process and disposal area for the coal combustion waste products generated at the station. Overflow from the BSP is carried into a reinforced concrete intake structure at the south end of the Boiler Slag Complex. Water entering the intake structure is discharged into the Clearwater Pond. The Clearwater Pond was built in 1980, is approximately nine (9) acres in size and is located to the southwest end of the BSP. The Clearwater Pond is not a CCR Unit and monitoring is not required.

2.3 South Fly Ash Pond

The SFAP is located at the northwest end of the station (Figure 1). The SFAP was built in 1955 to serve, and still currently serves, as a process and disposal area for the coal combustion waste

products generated at the station. This collection pond is approximately 67 acres in size and banked on all sides.

3.0 GEOLOGY & HYDROGEOLOGY

Gallia County is located on the western edge of the Appalachian Basin within the Appalachian Plateau Physiographic Province, Allegheny Section, locally known as the Marietta Plateau. Sedimentary bedrock formations in this area are as much as 7,400 feet thick and range in geologic age from Pennsylvanian to Cambrian. The primary stratigraphic units underlying Gallia County include from youngest to oldest: recent (Holocene) colluvium and alluvium deposits, Pleistocene lacustrine and glacial sand and gravel deposits, and Pennsylvanian age bedrock composed predominantly of shale and sandstone, with occasional thin limestone and coal seams.

The Appalachian Plateau in Gallia County is bordered on its northern margin by the Glaciated Appalachian Plateau some 40-50 miles to the northwest. The geomorphology of the Appalachian Plateau in Gallia County consists of steeply sloping ridges and steep, narrow stream valleys. Upland areas are primarily underlain by sandstone bedrock while valleys are underlain by shale bedrock and colluvial and alluvial sediments. Ground elevation ranges from as much as 1,000 feet along ridge tops to 500 feet near the Ohio River Valley. Generally, surface water drainage is to the south and southeast into the Ohio River.

3.1 Type III Residual Landfill

A Hydrogeologic and Subsurface Investigation Report (HSIR) (Hull, 2007) was completed as part of the Permit to Install (PTI) issued to OVEC by the Ohio Environmental Protection Agency (EPA) in April 2009. Based on information in the HSIR, bedrock is primarily overlain by approximately 20 feet of silty clay. Bedrock in the area is part of the Glenshaw Formation, a Pennsylvanian-age sequence of alternating shale and sandstone units. The HSIR identified six (6) sandstone units that include (from youngest to oldest), the Pomeroy Sandstone, the Bellaire Sandstone, the Connellsville Sandstone, the Morgantown Sandstone, the Cow Run Sandstone, and the Buffalo Sandstone. The Pomeroy Sandstone is not present within the footprint of the Landfill. The Bellaire, Connellsville and Morgantown units have been historically eroded and are not present across the entire site. The Cow Run Sandstone is present across most of the site but is not present across the northern portion of the site, where it decreases in thickness until it pinches out. The Buffalo Sandstone is the only sandstone unit present across the entire site. The layout of the Landfill is shown in Figure 2. Generalized cross-sections (A – A' and B – B') are presented in Figures 3 and 4, respectively.

The HSIR identified both the Cow Run sandstone and Buffalo sandstone as the uppermost aquifers at the site. However, as indicated on tables from the HSIR that summarize the results of aquifer testing (Appendix A), hydraulic conductivity values for the Cow Run range from 10E-8 centimeters per second (cm/sec) (from a packer test) to 10E-3 cm/sec in single well pumping

tests. These very low hydraulic conductivity values are not indicative of a unit that meets the U.S. EPA definition of an aquifer:

> *"An aquifer is a geological formation or group of formations or part of a formation that is capable of yielding a significant amount of water to a drinking water well or spring."*

During historic sampling events at the site, several monitoring wells screened in the Cow Run sandstone were regularly purged to dryness and would not recover sufficiently to collect a sample. These very low well yields are the result of the low hydraulic conductivity values and the fact that the Cow Run thins to the north and is not present at all beneath the northern portion of the Landfill (Figures 3 and 4).

Based on the hydrogeological conditions, the estimated maximum sustainable yields and local groundwater usage, the Buffalo Sandstone is designated as the uppermost aquifer beneath the Landfill. The Bellaire, Connellsville, Morgantown and Cow Run Sandstones are designated as significant zones of saturation. Based on information in the HSIR, the base of the Type III Residual Waste Landfill is separated from the Buffalo Sandstone aquifer by more than 100 feet of low permeability silty clay and bedrock. This meets the requirement of the CCR rule that the base of the CCR unit be at least five (5) feet above the top of the uppermost aquifer.

Based on historic data, groundwater flow in the Buffalo Sandstone tends to be variable with the main component of flow being to the northwest toward BUSW-4 located just to the northwest of the limit of the Landfill. Groundwater also tends to flow in a radial direction away from IMW-1BU located just east of the current limit of the Landfill.

Eleven monitoring wells (BUSW-1 through BUSW-5, BUSW-8, BUSW-10, MW-3D, MW-4D, IMW-1BU and IMW-2BU) were installed prior to 2007 to monitor groundwater in the Buffalo sandstone as part of the permit for the Landfill. The Landfill is being constructed in three (3) phases and the existing monitoring network was designed to monitor groundwater quality around the proposed final limits of the Landfill with a temporary monitoring well (IMW-1BU) installed close to the limit of Phase 1 which began operation in early 2011.

3.2 Boiler Slag Pond

Based on available existing data, deposits of silts and clays beneath the base of the BSP range from 15 to over 50 feet thick. The silts and clays transition to a layer of dense sand and gravel where groundwater is present. The layout of the BSP is shown in Figure 5. A generalized cross section (C – C') of the geology beneath the BSP is presented in Figure 6. Based on previously reported physical properties and yield, the sand and gravel unit was determined to be the uppermost aquifer beneath the BSP and is located more than five (5) feet beneath the bottom of

the BSP as required by the CCR rule. Based on water level data from the existing wells and piezometers, groundwater was determined to flow primarily toward the south and southwest.

3.3 South Fly Ash Pond

The layout of the SFAP is presented in Figure 7. A generalized cross section (D – D') showing the geology beneath the SFAP is presented in Figure 8. In 1995, as part of the closure of the North Fly Ash Pond (NFAP), a Hydrogeologic Site Investigation Report was prepared to evaluate the hydrogeologic conditions beneath the NFAP and SFAP. The report indicated that the SFAP is directly underlain by 10 to 20 feet of low permeability clayey silty soil above a sand and gravel unconsolidated aquifer, which is designated as the uppermost aquifer at the site. The sand and gravel aquifer is directly underlain by bedrock at depths of approximately 70 to 95 feet below ground surface (bgs). The 1995 report indicated that groundwater beneath the SFAP flowed primarily toward the southeast and the Ohio River.

4.0 GROUNDWATER MONITORING SYSTEM DESIGN & INSTALLATION

4.1 Groundwater Monitoring System Design

Section §257.91 of the CCR Rule states that the groundwater monitoring system for each CCR unit must contain a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit and, accurately represent the quality of groundwater passing the waste boundary of the CCR unit.

Section §257.91(c) requires that the groundwater monitoring system for each CCR unit includes a minimum of one (1) upgradient/background monitoring well to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit, and a minimum of three (3) downgradient monitoring wells located as close as practicable to the waste boundary to accurately represent the quality of groundwater passing the waste boundary of the CCR unit.

4.2 Data Review and Evaluation of Existing Wells and Piezometers

To begin the process, AGES reviewed available data for any existing monitoring wells and piezometers that had been installed around each CCR unit. The purpose of this data review was to identify the approximate depth to the uppermost aquifer beneath each CCR unit and to evaluate likely groundwater flow direction to ensure that the new CCR groundwater monitoring network contained the required number of upgradient/background and downgradient monitoring wells.

4.2.1 Type III Residual Waste Landfill

An evaluation of historic groundwater elevations and flow data indicated that the existing monitoring wells screened in the Buffalo Sandstone were determined to be usable for the CCR monitoring program. However, two (2) additional Buffalo Sandstone monitoring wells were required to satisfy the requirements of the CCR Rule. The additional wells (CCR-1BU and CCR-2BU) needed to be installed along the Phase 1 limit of the Landfill to fulfill the requirement of a minimum of three (3) downgradient wells installed as close as practicable to the boundary of the CCR unit. These monitoring wells were to be installed using the same well construction methods as the other wells screened in the Buffalo sandstone.

4.2.2 Boiler Slag Pond

In 2010, a subsurface investigation was conducted as part of a project to evaluate the embankments around the ponds located at Kyger Creek Station. During this investigation, several soil borings were conducted around the BSP. The results of the subsurface investigation

indicated that the soil beneath the BSP consisted of lean clay with varying amounts of silt and fine sand. The lean clay was encountered to an elevation of approximately 530 feet above mean sea level (msl). The sand and gravel of the uppermost aquifer were encountered at depths ranging from approximately 25 to 50 feet below ground surface (bgs). During the investigation, three (3) piezometers were installed to monitor water levels at the BSP. Groundwater was generally encountered at depths of between 5 and 22 feet bgs.

In June 2015, water levels were collected from existing wells and piezometers. Based on these water levels, groundwater beneath the BSP was encountered between 4.60 feet bgs in KC-1016 and 39.40 feet bgs in KC-1021. Based on these measurements, groundwater appeared to flow from the south/southwest toward Kyger Creek and the Ohio River. Historic water levels from the BSP are included in Appendix E. Historic groundwater flow maps are included in Appendix F.

4.2.3 South Fly Ash Pond

During the 2010 subsurface investigation of embankments around the ponds located at Kyger Creek Station, several soil borings were also conducted around the SFAP. The results of the subsurface investigation indicated that the soil beneath the SFAP were similar to those beneath the BSP consisting of lean clay with varying amounts of silt and fine sand. The lean clay was encountered to an elevation of approximately 530' msl. The sand and gravel of the uppermost aquifer were encountered at depths ranging from approximately 25 to 50 feet below ground surface. During the investigation, several piezometers were installed to monitor water levels at the SFAP. Groundwater was generally encountered at depths of between 5 and 22 feet bgs.

In June 2015, water levels were collected from existing wells and piezometers around the SFAP and the NFAP. Based on the available information from the existing wells and piezometers, the groundwater flow appeared to be radial away from the SFAP, which had a measured elevation in June 2015 of 583.5 feet above msl.

4.3 Soil Boring Installation

At the BSP and SFAP, most of the existing wells and piezometers were not screened in the uppermost aquifer beneath each CCR Unit. Therefore, OVEC conducted two (2) soil borings each at the BSP and SFAP. One (1) soil boring was installed in the upgradient/background side of each CCR Unit and one (1) soil boring was installed in the downgradient side. The purpose of these borings was to obtain a more detailed description of the subsurface geology and to identify the location, size and composition of the uppermost aquifer beneath the BSP and the SFAP.

To obtain additional geologic information specific to designing the CCR groundwater monitoring networks, two (2) exploratory soil borings (BSP-B-1 and BSP-B-2) were completed at the BSP (Figure 5) and two (2) soil borings (SFAP-B-1 and SFAP-B-2) were conducted around the SFAP (Figure 7). These soil borings were completed to evaluate the subsurface geology beneath each unit and to collect samples from the uppermost aquifer. These soil samples

were sent to a geotechnical soil laboratory for grain-size analysis to provide data to be used to design the groundwater monitoring system.

4.4 Grain Size Analysis and Monitoring Well Design

The CCR rule requires that unfiltered groundwater samples be submitted for laboratory analysis of Appendix III and IV constituents. According to the preamble to the rule, the unfiltered sample requirement assumes that groundwater samples with a turbidity of less than 5 NTUs can be obtained from a properly designed monitoring well. The proper design of the sand pack and well screen in each unconsolidated CCR well is therefore critical to obtaining representative samples.

To support CCR well design, representative samples were collected of material from the uppermost aquifer beneath the BSP and the SFAP. These soil samples were submitted to a geotechnical laboratory for grain-size analysis per American Society for Testing and Materials (ASTM) Methods D421 and D422. The results of the grain size analyses were used to design the well screens and filter packs for the monitoring wells. The results of the grain size analyses are included in Appendix B.

In accordance with U.S. EPA monitoring well design guidelines (U.S. EPA, 1991), the grain size of the filter pack was chosen by multiplying the 70% retention (or 30% passing) size of the formation, as determined by the grain size analysis, by a factor of 3 (for fine uniform formations) to 6 (for coarse, non-uniform formations). Table 1 summarizes the results of the grain-size analysis and the 70% retention size for each of the samples collected from each boring.

To reduce turbidity as much as possible, pre-packed well screens were selected for use in the wells around the BSP and the SFAP. The 2-inch diameter 0.01" slotted Schedule 40 PVC pre-packed screens are designed specifically for sampling metals in groundwater. The pre-packed well screens were constructed using an inner filter pack consisting of 0.40 mm clean quartz filter sand between two layers of food-grade plastic mesh to reduce sample turbidity by filtering out smaller particles than is possible with standard filter packed wells and prepack screens. No metal components were used in the constructions of the pre-packed well screens, thus eliminating potential interference with metals analysis.

4.5 Monitoring Well Installation and Development

Well installation and development at the Kyger Station were conducted from August to November 2015 by Bowser-Morner, Inc., under the supervision of AGES. During the field work, AGES oversaw all drilling activities, prepared lithologic descriptions of all soil and bedrock material, and took detailed field notes for all of the work.

To comply with the new CCR rule requiring the groundwater monitoring system for each CCR unit to contain a minimum of one (1) background/upgradient and three (3) downgradient

monitoring wells, two (2) new wells were installed at the Landfill, eight (8) new wells were installed at the BSP and 12 new wells were installed around the SFAP. The details regarding the installation of the monitoring wells at each CCR unit are presented below.

4.5.1 Monitoring Well Installation – Type III Residual Waste Landfill

At this CCR unit, two (2) new Landfill monitoring wells (CCR-1BU and CCR-2BU) were installed using the same materials and construction as the existing Landfill wells. Rotary vibratory drilling was used to advance each boring until refusal, at which point the borehole was advanced to completion using rock coring methods. A steel casing was installed as each boring was advanced to keep the borehole open during well installation.

The two (2) new Landfill monitoring wells were constructed using 20 feet of 2-inch diameter, 0.10-inch slot Schedule 40 PVC screen with 2-inch diameter riser pipe from the top of the screen to the ground surface. A filter pack consisting of 0.40 mm clean quartz sand was installed directly around the well screen. The sand was placed as the metal casing was pulled back in one (1)- to two (2)- foot increments to reduce caving effects and ensure proper placement of the filter pack. The filter pack extended four (4)-feet above the top of the well screen.

A four (4)-foot thick annular bentonite seal was installed directly above the filter pack in each well. Once in place, the bentonite seal was allowed to hydrate before the remainder of the annular space around each riser pipe was backfilled from the top of the bentonite seal to ground surface using a grout consisting of portland cement and bentonite. Each monitoring well was completed with an above-ground protective steel casing and a locking well cap. Following installation, each monitoring well was surveyed for elevation and location by OVEC personnel.

Well construction details for all of the Landfill wells, including survey data, are included in Table 2.

4.5.2 Monitoring Well Installation – BSP and SFAP

The monitoring wells around the BSP and the SFAP were installed using a rotary vibratory drilling method. The vibrating drill bit was simultaneously pushed down and rotated, while the drill head was advanced in 10-foot runs through an 8-inch metal casing to keep the borehole open. Continuous soil samples were obtained from the entire length of each 10-foot run and were logged by the AGES geologist (Appendix C).

Once each borehole was advanced to the desired depth, a 10-foot, pre-packed well screen was set into the borehole. An outer filter pack consisting of 0.40 mm clean quartz sand was installed directly around the pre-packed well screen. The sand was placed as the metal casing was pulled back in one (1)- to two (2)- foot increments to reduce caving effects and ensure proper placement of the filter pack. The filter pack extended two (2)-feet above the top of the screen.

A four (4)-foot thick annular bentonite seal was installed above the filter pack in each well. Once in place, the bentonite seal was allowed to hydrate before the remainder of the annular space around each monitoring well was backfilled using a grout consisting of portland cement and bentonite. Each monitoring well was completed with a flush-mount steel well cover with a locking well-cap. Following installation, each monitoring well was surveyed for elevation and location by OVEC personnel.

Well construction details for all of the wells installed at the BSP and SFAP are presented in Tables 3 & 4, respectively. All boring and well logs are included in Appendix C.

4.5.3 Monitoring Well Development

Well development was initiated at least 48 hours after installation of each of the monitoring wells. Development consisted of alternating surging and pumping with a submersible pump. During development of the monitoring wells, field parameters including temperature, specific conductance, pH and turbidity were recorded at regular intervals. Development continued until each parameter stabilized and turbidity was less than 5 NTUs. Well development data for each well is included in Appendix D.

4.6 Groundwater Monitoring Networks

To comply with the CCR Rule, each monitored CCR Unit must have a groundwater monitoring network consisting of a minimum of one (1) upgradient/background monitoring well and a minimum of three (3) downgradient monitoring wells installed as close as practicable to the waste boundary. A discussion of the CCR monitoring well network for each unit is presented below.

4.6.1 Type III Residual Waste Landfill

Based on groundwater level data collected since 2007, groundwater elevations in the Buffalo Sandstone (the uppermost aquifer at the unit) beneath the Landfill have varied over time. Some Buffalo Sandstone wells at the site can be upgradient during one event and then downgradient during a later event. Groundwater levels measured in January 2016, March 2016 and May 2016 are included in Appendix E. Groundwater flow maps for January, March and May 2016 are included in Appendix F. Based on this data, it was determined that a radial network of wells would be most appropriate for the Landfill.

Of the 11 monitoring wells installed in 2007 for the OEPA groundwater monitoring program, six (6) of those wells are located around the Phase 1 boundary of the waste and are included in the CCR monitoring network:

- BUSW-1 (downgradient)
- BUSW-2 (upgradient)
- BUSW-3 (variable: usually side or downgradient)
- BUSW-4 (downgradient)
- BUSW-5 (upgradient)
- IMW-1BU (upgradient)

The remaining five (5) wells (BUSW-8, BUSW-10, MW-3D, IMW-2BU and MW-4D) are supplemental wells located at least 1,000 feet away from the Phase 1 waste limit and do not satisfy the CCR requirement that downgradient wells be "as close as practicable" to the limit of waste.

In 2015, two (2) additional downgradient monitoring wells (CCR-1BU and CCR-2BU) were installed at the Phase 1 limit of waste. These monitoring wells were designed to be constructed in a manner consistent with the construction of the monitoring wells installed in 2007. The installation of these monitoring wells completed the CCR groundwater monitoring network for Phase 1 of the Landfill. As shown on Table 2, the CCR groundwater monitoring network for the Landfill includes four (4) upgradient monitoring wells (BUSW-2, BUSW-3, BUSW-5 and IMW-1BU) and four (4) downgradient monitoring wells (BUSW-1, BUSW-4, CCR-1BU and CCR-2BU), which satisfies the requirements of the CCR rule. As additional phases of the Landfill are constructed in the future, additional groundwater monitoring wells will need to be installed.

Groundwater levels measured from the wells in January 2016, March 2016 and May 2016 are included in Appendix E. Groundwater flow maps for January, March and May 2016 are included in Appendix F. Based on the first three (3) rounds of groundwater level measurements, groundwater flows in a radial pattern away from the highest water levels, which are typically observed in wells BUSW-2, BUSW-5 and IMW-1BU, toward the lowest water levels typically observed in BUSW-3 and BUSW-4 located along the western boundary of the Landfill, and in the supplemental wells located to the east of the Landfill.

4.6.2 Boiler Slag Pond

In August 2015, eight (8) groundwater monitoring wells were installed around the perimeter of the BSP (Table 3 and Figure 5). Groundwater levels measured from the wells in January 2016, March 2016 and May 2016 are included in Appendix E. Based on the first three (3) rounds of groundwater level measurements, groundwater in the BSP flows from the northwest to the south and southeast towards the Ohio River. Groundwater flow maps for January, March and May 2016

are included in Appendix F. Based on water level data, three (3) monitoring wells (KC-15-01 through KC-15-03) were installed along the northern border of the BSP to serve as the upgradient groundwater monitoring wells. Five (5) wells (KC-15-04 through KC-15-08) were installed along the western, southern and eastern borders of the BSP to serve as the downgradient monitoring locations. These eight (8) wells will serve as the CCR monitoring network for the BSP.

4.6.3 South Fly Ash Pond

A review of available data indicated that groundwater flowed in a radial pattern away from the pond. Therefore, a phased approach was developed to install the proposed CCR monitoring wells. During Phase 1, four (4) wells (KC-15-11, KC-15-14, KC-15-18 and KC-15-21) were installed, one (1) along each side of the pond. After installation, these four (4) wells were surveyed and the water levels were measured to calculate initial groundwater elevations to guide the placement of the remaining proposed monitoring wells.

Based on these initial groundwater elevations, a definitive groundwater flow direction was not apparent. Therefore, it was decided to use a conservative approach and install an additional 10 monitoring wells, evenly spaced, around the entire perimeter of the SFAP.

Based on the first three (3) rounds of groundwater level measurements, groundwater beneath the SFAP flows from the northeast towards the southwest. Groundwater levels measured in January 2016, March 2016 and May 2016 are included in Appendix E. Groundwater flow maps for January, March and May 2016 are included in Appendix F.

The CCR groundwater monitoring network consists of eight (8) upgradient monitoring wells (KC-15-10 through KC-15-17), four (4) downgradient monitoring wells (KC-15-09, KC-15-20, KC-15-21 and KC-15-22) and two (2) side-gradient monitoring wells (KC-15-18 and KC-15-19). As the CCR monitoring program continues, groundwater flow will continue to be monitored and any observed seasonal variations will be noted in the first annual groundwater monitoring report to be published in January 2018. If groundwater flow in the uppermost aquifer remains consistent, it may be possible to reduce the number of monitoring wells sampled during each CCR monitoring event. Construction details for the SFAP groundwater monitoring network wells are summarized on Table 4. Groundwater monitoring well locations are shown on Figure 7.

5.0 AQUIFER TESTING

In May 2016, slug tests were conducted on two (2) wells (KC-15-02 and KC-15-05) at the BSP and two (2) wells (KC-15-14 and KC-15-21) at the SFAP. The slug testing was performed to obtain the saturated hydraulic conductivity (K) for the uppermost aquifer beneath each unit. Both rising and falling head slug tests were performed on each well. The falling head tests were performed by lowering a solid slug with a known volume, into the water column of the well and recording the drop in head over time. The rising head tests were performed by removing the solid slug and recording the rise in head over time. The change of head over time was recorded using a data logger and pressure transducer. Dedicated rope was used for each well and the slug was decontaminated using the procedures specified in the Groundwater Monitoring Program Plan (GMPP) for the Kyger station. Slug testing was performed after well development and three (3) rounds of groundwater sampling.

The slug test data were evaluated using AQTESOLV, a commercially available software package. Data from each monitoring well were analyzed using both the Bouwer-Rice and Hvorslev slug test solutions which are straight-line analytical techniques commonly used to analyze rising and falling head slug test data. The AQTESOLV results for each well are presented in Appendix G.

Slug test results for the BSP and SFAP are summarized on Tables 5 and 6, respectively. The mean K for the uppermost aquifer beneath the BSP is 1.26×10^{-2} cm/sec and the mean K for the uppermost aquifer beneath the SFAP is 2.13×10^{-3} cm/sec. Data from these tests will be used to evaluate groundwater flow velocity at the BSP and SFAP.

6.0 CONCLUSIONS

To meet the requirements of the CCR regulation, two (2) additional groundwater monitoring wells were installed at the Landfill, and new groundwater monitoring networks were installed at the BSP and the SFAP. Based on available historic data and exploratory soil borings conducted around the BSP and the SFAP, the following units were identified as the uppermost aquifer at each CCR unit:

- **Landfill:** The Buffalo Sandstone was identified as the uppermost aquifer beneath the Landfill.

- **Boiler Slag Pond:** A layer of silty sand located approximately 50 feet bgs was identified as the uppermost aquifer beneath the BSP.

- **South Fly Ash Pond:** A layer of silty sand located approximately 60 feet bgs was identified as the uppermost aquifer beneath the SFAP.

To meet the monitoring network requirements of the CCR Rule, two (2) monitoring wells were installed at the Landfill; eight (8) monitoring wells were installed around the BSP; and 14 monitoring wells were installed around the SFAP.

Following installation, development and three (3) rounds of groundwater sampling, slug testing was conducted on two (2) monitoring wells at the BSP and two (2) monitoring wells at the SFAP. Data from the slug testing was used to calculate the mean K of the uppermost aquifer beneath the BSP and the SFAP. The mean K for the uppermost aquifer beneath the BSP is 1.26×10^{-2} cm/sec and the mean K for the uppermost aquifer beneath the SFAP is 2.13×10^{-3} cm/sec.

To meet the requirements of the CCR, the groundwater monitoring networks at each of the three (3) CCR units at the Kyger Creek station will be sampled in accordance with the GMPP.

7.0 REFERENCES

American Electric Power Service Corporation (AEP), 1995. Hydrogeologic Site Investigation Report for the Proposed North Fly Ash Pond Closure. June 1995.

Applied Geology and Environmental Science, Inc. (AGES), 2016. Coal Combustion Residuals Regulation Groundwater Monitoring Program Plan, Ohio Valley Electric Corporation, Kyger Creek Station, Cheshire, Gallia County, Ohio. May 2016.

DLZ Ohio, Inc. (DLZ), 2011. Kyger Creek Power Plant – Subsurface Investigation and Analysis of Ash Pond Embankments. January 12, 2011.

Hull & Associates, Inc. (Hull), 2007. Hydrogeologic and Subsurface Investigation Report, Ohio Valley Electric Corporation, Kyger Creek Plant, Residual Waste Landfill, Gallia County, Cheshire, Ohio. March 2007 (Revised December 2008).

United States Environmental Protection Agency (U.S. EPA), 1991. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells. March 1991.

TABLES

TABLE 1
GRAIN SIZE ANALYSIS RESULTS
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO

CCR Unit	Boring No.	Sample Depth (feet)	70% Retention (30% Passing) Size (mm)	Filter Pack Size (mm)	Screen Mesh (inches)	Unified Soil Classification Symbol & Description	
Boiler Slag Pond	BAP-B-1	62.0 - 70.0	0.80	0.40	0.01	SP-SM	Poorly graded Sand with silt & gravel.
Boiler Slag Pond	BAP-B-2	50.0 - 60.0	0.095	0.40	0.01	SM	Silty Sand.
Boiler Slag Pond	BAP-B-2	60.0 - 70.0	0.17	0.40	0.01	SP-SM	Poorly Graded Sand with silt.
South Fly Ash Pond	B-1	62.0 - 68.0	1.0	0.40	0.01	SW-SM	Well graded Sand with silt and gravel.
South Fly Ash Pond	B-1	70.0 - 78.0	0.5	0.40	0.01	SW-SM	Well graded Sand with silt and gravel.
South Fly Ash Pond	B-2	60.0 - 70.0	0.9	0.40	0.01	SW-SM	Well graded Sand with silt and gravel.

TABLE 2
GROUNDWATER MONITORING NETWORK
TYPE III RESIDUAL WASTE LANDFILL
KYGER CREEK PLANT

Monitoring Well ID	Designation	Date of Installation	Coordinates		Ground Elevation (ft)[2]	Top of Casing Elevation (ft)[2]	Top of Screen Elevation (ft)	Base of Screen Elevation (ft)	Total Depth From Top of Casing (ft)
			Northing	Easting					
CCR Unit Boundary Wells									
BUSW-1	**Downgradient**	6/20/2006	335756.52	2063859.43	781.46	784.21	521.21	508.10	276.11
BUSW-2	**Upgradient**	-	336285.22	2062985.02	792.19	794.98	526.69	506.69	288.56
BUSW-3	**Upgradient**	9/13/2007	336746.19	2062430.81	787.57	790.01	529.57	504.57	283.56
BUSW-4	**Downgradient**	5/17/2006	337738.57	2062566.35	780.99	783.46	535.76	525.76	257.70
BUSW-5	**Upgradient**	8/2/2007	338123.59	2063553.15	781.06	783.27	542.06	502.06	281.12
IMW-1BU	**Upgradient**	9/6/2007	337177.94	2064160.50	699.89	702.29	519.39	499.39	202.97
CCR-1BU	**Downgradient**	10/13/2015	337641.36	2063220.23	783.41	785.80	524.41	504.41	281.39
CCR-2BU	**Downgradient**	10/21/2015	336302.19	2064286.87	742.28	744.69	514.78	494.78	249.91
Supplemental CCR Wells									
BUSW-8	**Downgradient**	4/17/2006	337692.04	2065706.88	630.59	633.48	498.12	498.12	145.36
BUSW-10	**Downgradient**	6/29/2007	336364.75	2065495.79	617.26	619.76	513.85	498.85	120.91
IMW-2BU	**Downgradient**	9/10/2007	337417.23	2065170.91	609.77	612.44	508.96	493.96	118.48
MW-3D	**Downgradient**	5/1/2006	338184.68	2065077.38	741.11	743.53	515.58	505.58	237.95
MW-4D	**Downgradient**	5/10/2006	336365.51	2066044.36	576.87	579.51	504.94	494.94	84.57

Notes:
1. The Well locations are referenced to the Ohio State Plane South, North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988

TABLE 3
GROUNDWATER MONITORING NETWORK
BOILER SLAG POND
KYGER CREEK PLANT

Monitoring Well ID	Designation	Date of Installation	Coordinates		Ground Elevation (ft)[2]	Top of Casing Elevation (ft)[2]	Top of Screen Elevation (ft)	Base of Screen Elevation (ft)	Total Depth From Top of Casing (ft)
			Northing	Easting					
KC-15-01	Upgradient	8/5/2015	332114.55	2072393.84	579.77	579.20	519.77	509.77	69.43
KC-15-02	Upgradient	8/7/2012	332500.654	2072569.222	580.79	580.25	520.79	510.79	69.46
KC-15-03	Upgradient	8/12/2015	332546.402	2073001.342	582.03	581.55	520.03	510.03	71.52
KC-15-04	Downgradient	8/12/2015	331782.439	2073755.607	579.89	579.37	519.89	509.89	69.48
KC-15-05	Downgradient	8/19/2015	331569.994	2073574.832	580.52	580.07	520.52	510.52	69.55
KC-15-06	Downgradient	8/18/2015	331218.52	2073210.42	579.98	579.48	519.98	509.98	69.50
KC-15-07	Downgradient	8/11/2015	331291.75	2072957.79	578.54	578.04	508.54	498.54	79.50
KC-15-08	Downgradient	8/10/2015	331460.59	2072675.87	579.41	578.75	509.41	499.41	79.34

Notes:
1. The Well locations are referenced to the Ohio State Plane South, North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988

TABLE 4
GROUNDWATER MONITORING NETWORK
SOUTH FLY ASH POND
KYGER CREEK PLANT

Monitoring Well ID	Designation	Date of Installation	Coordinates		Ground Elevation (ft)[2]	Top of Casing Elevation (ft)[2]	Top of Screen Elevation (ft)	Base of Screen Elevation (ft)	Total Depth From Top of Casing (ft)
			Northing	Easting					
KC-15-09	Downgradient	9/15/2015	334631.959	2072494.446	587.85	587.47	516.85	506.85	80.62
KC-15-10	Upgradient	9/16/2015	335018.949	2072695.744	587.75	587.45	523.75	513.75	73.70
KC-15-11	Upgradient	8/20/2015	335426.144	2072970.304	588.07	587.71	524.07	514.07	73.64
KC-15-12	Upgradient	9/17/2015	335867.034	2073268.666	588.40	587.94	524.40	514.40	73.54
KC-15-13	Upgradient	9/1/2015	336047.047	2073665.155	588.23	587.86	521.23	511.23	76.73
KC-15-14	Upgradient	8/20/2015	335808.537	2074057.138	588.85	587.80	524.85	513.85	72.95
KC-15-15	Upgradient	9/2/2015	335558.54	2074472.666	587.95	587.63	523.95	513.95	73.68
KC-15-16	Upgradient	9/3/2015	335223.916	2074799.53	588.82	588.38	524.82	514.82	73.50
KC-15-17	Upgradient	9/3/2015	334881.253	2074480.308	588.68	588.13	524.68	514.68	73.45
KC-15-18	Sidegradient	8/25/2015	334507.455	2074126.888	588.27	587.72	524.27	514.27	73.45
KC-15-19	Sidegradient	9/9/2015	334132.454	2073771.27	588.47	588.18	524.47	514.47	73.71
KC-15-20	Downgradient	8/27/2015	333841.393	2073452.842	589.45	588.72	525.45	515.45	73.26
KC-15-21	Downgradient	8/27/2015	334089.953	2073009.526	588.28	587.84	518.28	508.28	79.56
KC-15-22	Downgradient	9/10/2015	334307.567	2072647.434	587.51	587.27	518.51	508.51	78.76

Notes:
1. The Well locations are referenced to the Ohio State Plane South, North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988

Table 5
SUMMARY OF SLUG TEST RESULTS
Boiler Slag Pond
Kyger Creek Station
Cheshire, Ohio
May 2016

Piezometer	Test	Analytical Method	K (cm/sec)	Mean K (cm/sec)
KC-15-02	Rising Head #1	Bouwer-Rice	1.46 E-2	2.18 E-2
		Hvorslev	1.61 E-2	
	Falling Head #1	Bouwer-Rice	3.58 E-2	
		Hvorslev	2.23 E-2	
	Rising Head #2	Bouwer-Rice	2.00 E-2	
		Hvorslev	2.15 E-2	
	Falling Head #2	Bouwer-Rice	1.72 E-2	
		Hvorslev	1.77 E-2	
KC-15-05	Rising Head #1	Bouwer-Rice	5.83 E-3	3.47 E-3
		Hvorslev	6.48 E-3	
	Falling Head #1	Bouwer-Rice	1.59 E-3	
		Hvorslev	1.79 E-3	
	Rising Head #2	Bouwer-Rice	4.74 E-3	
		Hvorslev	4.91 E-3	
	Falling Head #2	Bouwer-Rice	1.15 E-3	
		Hvorslev	1.27 E-3	
			Mean K (cm/sec)	1.26 E-2

Table 6
SUMMARY OF SLUG TEST RESULTS
South Fly Ash Pond
Kyger Creek Station
Cheshire, Ohio
May 2016

Piezometer	Test	Analytical Method	K (cm/sec)	Mean K (cm/sec)
KC-15-14	Rising Head #1	Bouwer-Rice	3.33 E-3	4.08 E-3
		Hvorslev	3.95 E-3	
	Falling Head #1	Bouwer-Rice	5.41 E-3	
		Hvorslev	4.57 E-3	
	Rising Head #2	Bouwer-Rice	2.88 E-3	
		Hvorslev	3.16 E-3	
	Falling Head #2	Bouwer-Rice	3.96 E-3	
		Hvorslev	4.38 E-3	
KC-15-21	Rising Head #1	Bouwer-Rice	1.57 E-4	1.88 E-4
		Hvorslev	1.71 E-4	
	Falling Head #1	Bouwer-Rice	3.08 E-4	
		Hvorslev	3.35 E-4	
	Rising Head #2	Bouwer-Rice	1.33 E-4	
		Hvorslev	1.45 E-4	
	Falling Head #2	Bouwer-Rice	1.13 E-4	
		Hvorslev	1.43 E-4	
			Mean K (cm/sec)	**2.13 E-3**

FIGURES

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CHECKED BY	
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DWG FILE	KYGER MW INSTALL_Aerial Site b08.dwg
DRAWING SCALE	NOT TO SCALE

AGES
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Clinton, PA 15026
412.264.6453

OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SITE LOCATION MAP

DRAWING NAME	REV.
FIGURE 1	0

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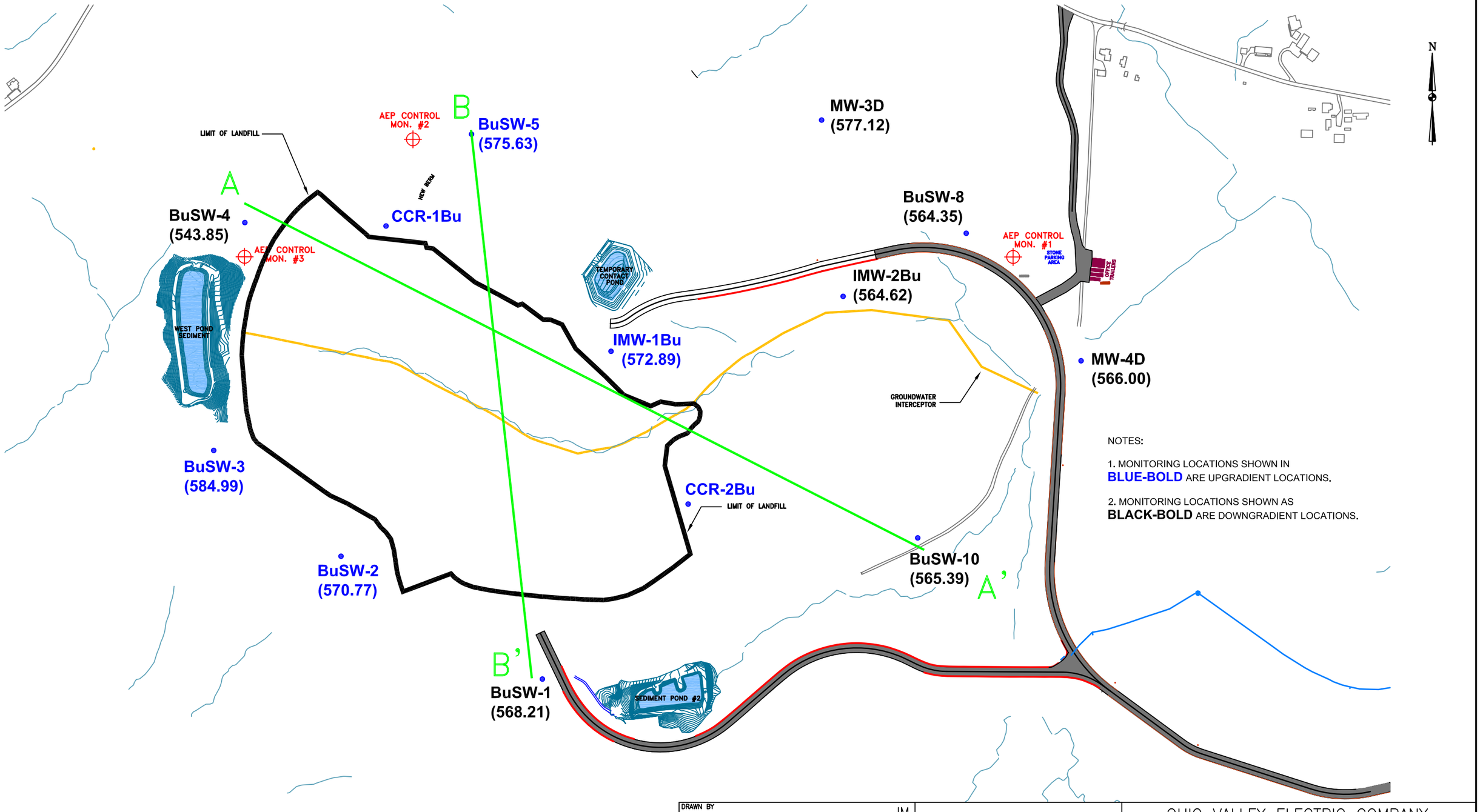

NOTES:

1. MONITORING LOCATIONS SHOWN IN **BLUE-BOLD** ARE UPGRADIENT LOCATIONS.

2. MONITORING LOCATIONS SHOWN AS **BLACK-BOLD** ARE DOWNGRADIENT LOCATIONS.

LEGEND:

BuSW-1	BUFFALO SANDSTONE WELL
(567.96)	GROUNDWATER ELEVATION

400' 0' 400' 800'

SCALE: 1"= 400'

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CHECKED BY	
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DWG. FILE	KYGER MW INSTALL_MWs BUFFALO b09.dwg
DRAWING SCALE	AS SHOWN

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GROUNDWATER MONITORING WELL LOCATIONS

DRAWING NAME	REV.
FIGURE 2	0

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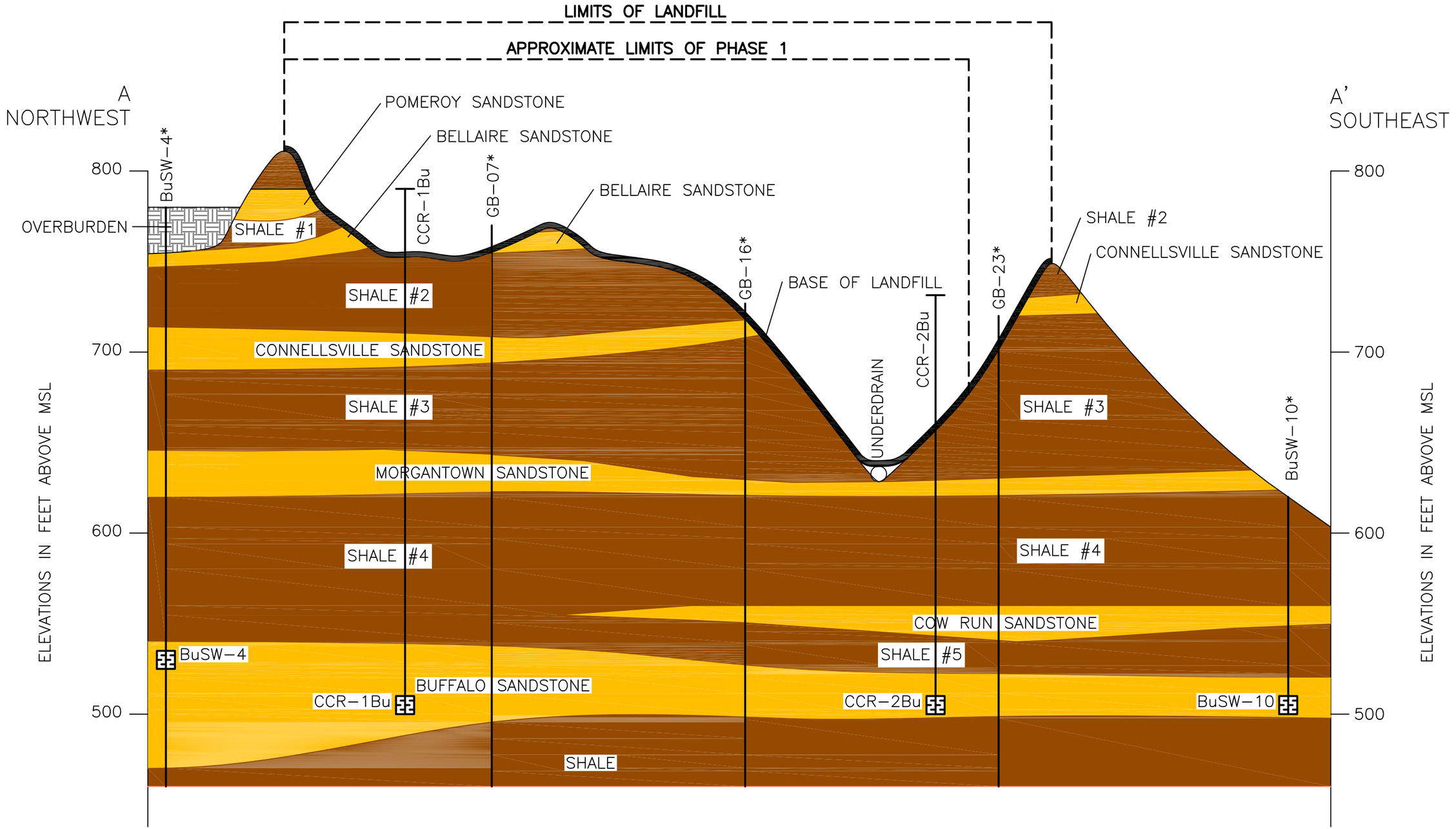

*GEOLOGIC DATA FROM 2007 HSIR.

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CHECKED BY	
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DRAWING SCALE	NOT TO SCALE

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OHIO VALLEY ELECTRIC COMPANY
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GENERALIZED GEOLOGIC CROSS-SECTION
A-A' (NORTHWEST - SOUTHEAST)

DRAWING NAME	REV.
FIGURE 3	0

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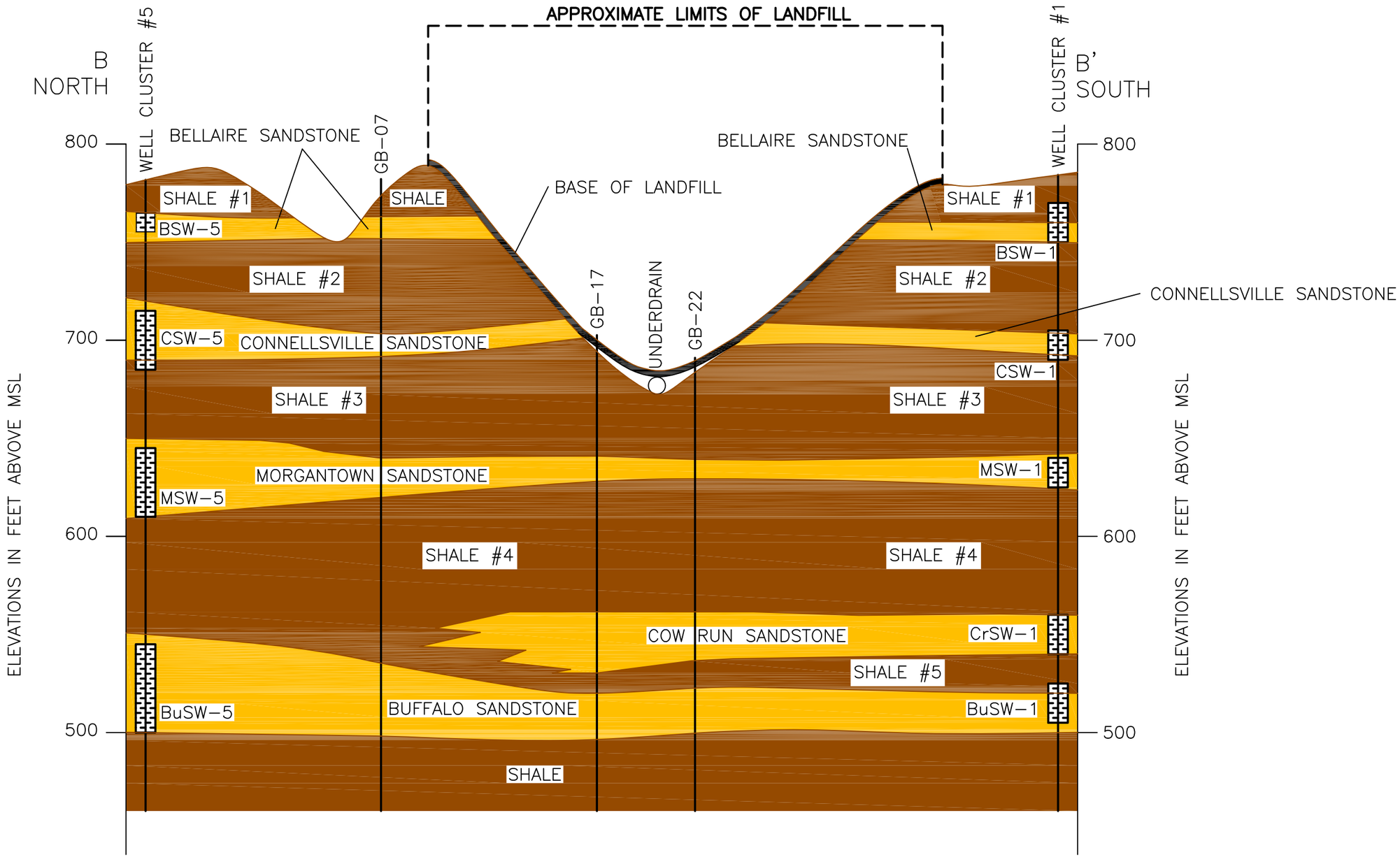

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DRAWING SCALE	NOT TO SCALE

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GENERALIZED GEOLOGIC CROSS-SECTION
B-B' (NORTH - SOUTH)

DRAWING NAME	REV.
FIGURE 4	0

Plot: 05/17/2016 14:55 _PROGRAM-KYGER OVEC\Kyger Creek-CCR Program\CAD\WELL INSTALLATION\KYGER MW INSTALL_Cross Sec B-B' b10.dwg

N

OHIO ROUTE 7

C

KC-15-02

KC-15-03

BAP-B-1 / KC-15-01

BOILER SLAG POND

BAP-B-2 / KC-15-04

KC-15-05

KYGER CREEK

KC-15-08

KC-15-07

KC-15-06

CLEARWATER POND

C'

OHIO RIVER

200' 0' 200' 400'

SCALE: 1"= 200'

LEGEND:

SOIL BORING /MONITORING WELL LOCATION

MONITORING WELL LOCATION

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_PONDS+MWs b11.dwg
DRAWING SCALE	1"=200'

AGES
Applied Geology And Environmental Science, Inc.
2402 Hookstown Grade Road, Suite 200
Clinton, PA 15026
412.264.6453

OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
BOILER SLAG POND
SOIL BORING AND
GROUNDWATER MONITORING WELL LOCATIONS

DRAWING NAME: FIGURE 5

REV.: 0

Plot: 08/15/2016 15:03 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\PONDS_2015 b11\KYGER MW INSTALL_PONDS+MWs b11.dwg\BOILER SLAG POND

C
(NORTHWEST)

C'
(SOUTHEAST)

ELEVATIONS IN FEET ABVOVE MSL

600
590
580
570
560
550
540
530
520
510
500

KC-15-02

KC-15-06

BOILER SLAG POND

CLAY

SAND

OHIO RIVER

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_Cross Sec C-C' b12.dwg
DRAWING SCALE	NOT TO SCALE

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
BOILER SLAG POND
GENERALIZED GEOLOGIC CROSS-SECTION
C-C' (NORTHWEST - SOUTHEAST)

DRAWING NAME	REV.
FIGURE 6	0

Plot: 08/15/2016 15:16 _PROGRAM-KYGER OVEC\Kyger Creek-CCR Program\CAD\WELL INSTALLATION\KYGER MW INSTALL_Cross Sec C-C' b12.dwg

N

KYGER CREEK

RAILROAD TRACKS

DRAINAGE DITCH

NORTH FLY ASH POND

KC-15-13

KC-15-12

KC-15-14

D

SFAP-B-1 / KC-15-11

KC-15-15

KC-15-16

SOUTH FLY ASH POND

KC-15-10

KC-15-17

KC-15-09

SFAP-B-2 / KC-15-18

OHIO ROUTE 7

D'

KC-15-22

KC-15-21

KC-15-19

KC-15-20

POWER PLANT

OHIO RIVER

300' 0' 300' 600'

SCALE: 1"= 300'

LEGEND:

SOIL BORING /MONITORING WELL LOCATION

MONITORING WELL LOCATION

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_PONDS+MWs b11.dwg
DRAWING SCALE	1"=300'

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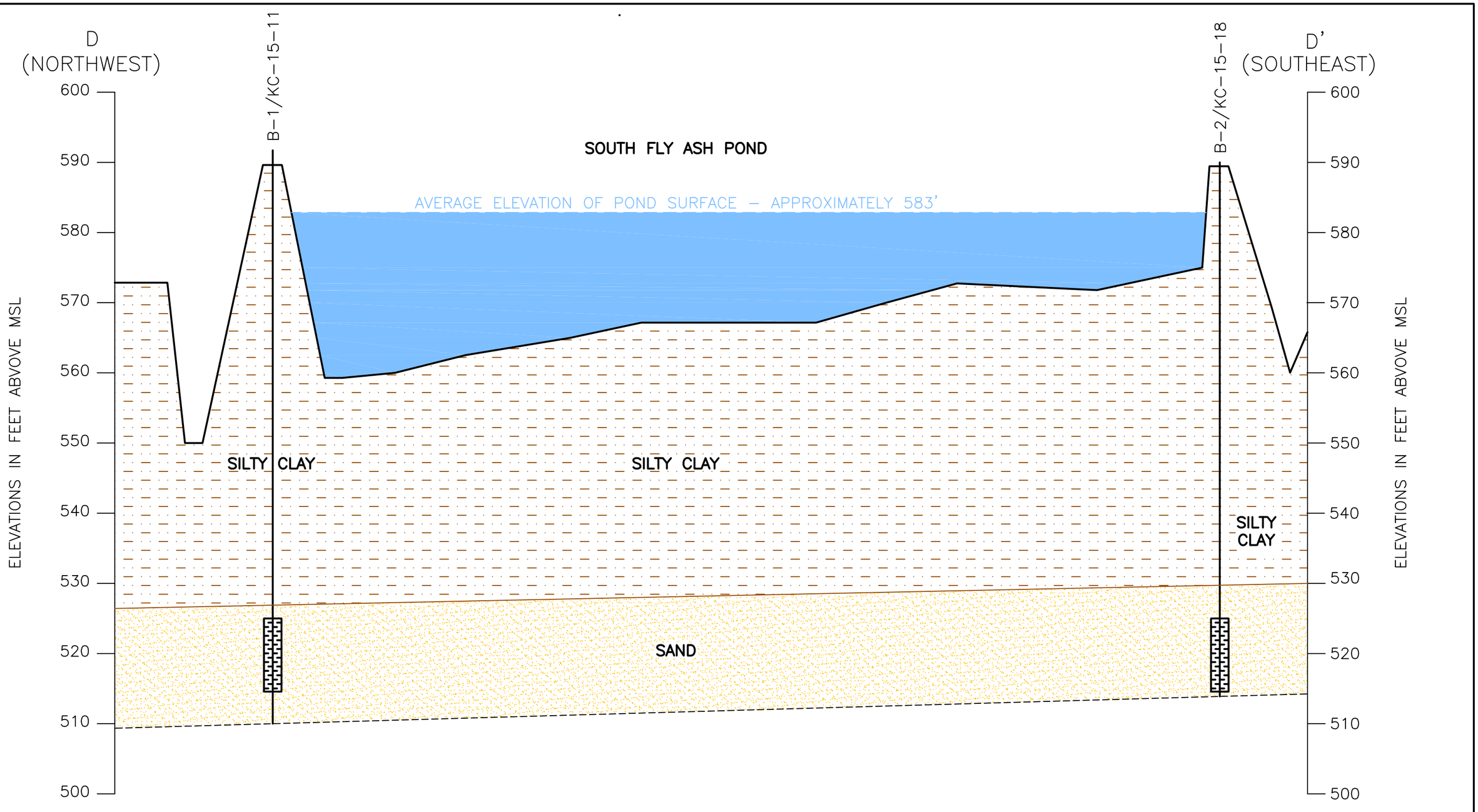
OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SOUTH FLY ASH POND
SOIL BORING AND
GROUNDWATER MONITORING WELL LOCATIONS

DRAWING NAME: FIGURE 7

REV.: 0

Plot: 08/15/2016 15:10 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\PONDS_2015 b11\KYGER MW INSTALL_PONDS+MWs b11.dwg\FLY ASH POND



DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_Cross Sec D-D' b13.dwg
DRAWING SCALE	NOT TO SCALE

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OHIO VALLEY ELECTRIC COMPANY
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SOUTH FLY ASH POND
GENERALIZED GEOLOGIC CROSS-SECTION
D-D' (NORTHWEST – SOUTHEAST)

DRAWING NAME	REV.
FIGURE 8	0

APPENDIX A

2007 HSIR AQUIFER TESTING RESULTS

HYDROGEOLOGIC INVESTIGATION
PROPOSED RESIDUAL WASTE LANDFILL
KYGER CREEK PLANT

TABLE B-5

SUMMARY OF PACKER TEST DATA [1]

Boring ID	Test Interval (ft. bgs)	Approximate Base of Packer Elevevation (ft) [2]	Test Pressure (PSI)	Head change (ft)	Volume water (gal)	Test Duration (min)	r (ft)	Q (ft^3/min)	H (ft)	K (ft/min)	K (cm/sec)	Shale Unit #
GB-05	100-110	673.6	90	0.62	0.01	120	0.135	0.00134	317.63	3.28E-07	1.67E-07	4
	205-215	568.6	90	0.62	0.05	120	0.135	0.00668	422.63	1.23E-06	6.27E-07	2
GB-10	50-60	564.8	60	1.51	2.22	30	0.135	0.00989	213.42	3.61E-06	1.84E-06	4
	65-75	525.1	60	0.53	0.78	60	0.135	0.00174	213.42	6.34E-07	3.22E-07	4
GB-11	40-50	550.1	90	0.58	0.85	60	0.135	0.00190	257.63	5.75E-07	2.92E-07	4
GB-15[3]	110-120	506.1	90	5.08	7.47	23	0.135	0.04340	327.63	1.03E-05	5.25E-06	Cow Run
GB-16	90-100	605.3	60	0.3	0.44	30	0.135	0.00197	238.42	6.43E-07	3.27E-07	4
	90-100	605.3	90	0.6	0.88	30	0.135	0.00393	307.63	9.96E-07	5.06E-07	Duplicate
GB-18	70-80	659.8	60	0.27	0.40	60	0.135	0.00088	218.42	3.16E-07	1.60E-07	3
	130-140	599.8	60	0.16	0.24	50	0.135	0.00063	278.42	1.76E-07	8.95E-08	4
	180-190	549.8	60	0.54	0.79	60	0.135	0.00177	328.42	4.20E-07	2.13E-07	5
GB-21	110-120	657.3	80	0.41	0.60	60	0.135	0.00134	297.64	3.52E-07	1.79E-07	3
	160-170	607.3	80	0.64	0.94	60	0.135	0.00210	354.56	4.61E-07	2.34E-07	4
	239-249	528.3	90	2.97	4.37	60	0.135	0.00973	456.63	1.66E-06	8.44E-07	5
GB-23	80-90	661.7	90	0.62	0.91	60	0.135	0.00203	297.63	5.32E-07	2.70E-07	3
	130-140	611.7	60	0.1	0.15	60	0.135	0.00033	278.42	9.17E-08	4.66E-08	4
	209-219	532.7	90	0.52	0.76	60	0.135	0.00170	426.63	3.11E-07	1.58E-07	5
GB-26	100-110	663.7	90	3.4	5.00	60	0.135	0.01114	317.63	2.73E-06	1.39E-06	3
	170-180	593.7	90	0.1	0.15	60	0.135	0.00033	387.63	6.59E-08	3.35E-08	4
	236-246	537.7	90	1.35	1.98	20	0.135	0.01326	443.63	2.33E-06	1.19E-06	5
CRW-1	60-70	610.9	60	0.01[4]	0.01	10	0.250	0.00019	208.42	5.59E-07	2.83E-08	2
	105-115	665.9	60	0.01[4]	0.01	10	0.250	0.00019	253.42	4.57E-08	2.32E-08	3
CSW-2	45-55	737.2	30	0.48	0.68	10	0.250	0.00903	124.21	4.48E-06	2.27E-06	2
	55-65	727.2	90	0.125	0.18	10	0.250	0.00235	272.63	5.31E-07	2.70E-07	2
CSW-3	40-50	737.7	40	0.05	0.07	10	0.250	0.00094	142.28	4.07E-76	2.07E-07	2
	60-70	717.6	60	0.08	0.11	10	0.250	0.00150	208.42	4.44E-07	2.26E-07	2
CSW-5	110-120	661.1	60	0.04	0.06	10	0.250	0.00752	258.42	1.79E-06	9.11E-07	3
	170-180	601.1	60	0.02	0.03	10	0.250	0.00038	318.42	7.27E-08	3.69E-08	4
IMW-1BU[3]	158-168	531.9	60	0.18	0.25	10	0.165	0.00339	306.42	7.05E-07	3.58E-07	Cow Run
	168-178	521.9	60	0.24	0.34	10	0.165	0.00451	316.42	9.10E-07	4.62E-07	5
[3]	190-200	531.9	40	NA[5]	3.90	10	0.165	0.05214	292.28	1.14E-05	5.78E-06	Buffalo
IMW-2BU	80-90	519.8	60	0.03	0.04	10	0.165	0.00564	228.42	1.58E-07	8.01E-08	5

Notes:
1. Calculations based on Permeability Tests in Individual Drill Holes and Wells, Groundwater Manual, U.S. Department of Interior, 2nd Edition, 1995
2. All elevations for this project are referenced to NAVD88.
3. Denotes packer tests in sandstone units.
4. Estimated flow, no flow measured during test.
5. Not avaliable, flow meter used in place of manometer.

HYDROGEOLOGIC INVESTIGATION
PROPOSED RESIDUAL WASTE LANDFILL
KYGER CREEK PLANT

TABLE B-6

SUMMARY OF SLUG TEST DATA

Well ID	Sandstone Unit	Slug In K (cm/sec)	Slug Out K (cm/sec)
IMW-1Bu	Buffalo	ND [1.]	5.81E-06 [2.]
CRW-2	Cow Run	1.88E-07	2.69E-07
CRW-3	Cow Run	2.71E-07	NM
PZ-2	Cow Run	ND	1.68E-08 [2.]

Notes:
1. Not determined due to poor water level data.
2. Not measured, insufficient water for slug.
3. Data used for analysis is measured water level recovery after well bailed down.

HYDROGEOLOGIC INVESTIGATION
PROPOSED RESIDUAL WASTE LANDFILL
KYGER CREEK PLANT

TABLE B-7

SINGLE-WELL PUMPING TEST SUMMARY TABLE[a]

Well ID	Former Well ID	Sandstone Unit	Depth to water (ft, bgs)	Water Column (ft)	Date Tested	Constant Discharge Rate[a] (gpm)	Constant Discharge Rate (ft^3/day)	Stabilized Drawdown (ft)[b]	Transmissivity (ft^2/day)	Saturated Thickness (ft)	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
BSW-1	–	Bellaire	16.59	11.60	4/2/2008	0.060	11.55	11.10	44.83	11.60	3.86	1.36E-03
BSW-2	–	Bellaire	30.41	10.93	4/2/2008	0.008	1.54	10.43	6.36	10.93	0.58	2.05E-04
BSW-3	–	Bellaire	30.86	8.31	4/2/2008	0.040	7.70	7.81	42.47	8.31	5.11	1.80E-03
BSW-5	–	Bellaire	17.85	9.27	4/1/2008	0.045	8.66	8.77	42.55	9.27	4.59	1.62E-03
CSW-3	–	Connellsville	95.55	5.22	4/2/2008	0.025	4.81	4.72	43.92	5.22	8.41	2.97E-03
CSW-3 [c]	–	Connellsville	95.55	5.22	4/1/2008	0.069	13.28	4.72	121.23	5.22	23.22	8.19E-03
CSW-5	–	Connellsville	66.77	27.53	4/1/2008	0.017	3.27	27.03	5.22	27.53	0.19	6.68E-05
MW-3S	NA	Connellsville	50.80	6.61	4/1/2008	0.082	15.79	6.11	111.30	6.61	16.84	5.94E-03
MW-3S [d]	NA	Connellsville	50.80	6.61	4/1/2008	0.073	14.05	6.11	99.08	6.61	14.99	5.29E-03
MSW-2	–	Morgantown	172.20	1.18	4/2/2008	0.001	0.19	0.68	12.20	1.18	10.34	3.65E-03
MSW-3	–	Morgantown	172.67	0.68	4/2/2008	0.036	6.93	0.18	1658.58	0.68	2439.09	8.61E-01
MSW-5	–	Morgantown	165.44	6.96	4/1/2008	0.045	8.66	6.46	57.77	6.96	8.30	2.93E-03
CRW-8	MW-02	Cow Run	49.14	41.21	8/9/2006	0.13	25.03	2.90	371.75	13.5	27.54	9.72E-03
CRW-10	MW-07	Cow Run	41.45	26.10	8/8/2006	0.13	25.03	10.36	104.06	6	17.34	6.12E-03
BuSW-1	MW-06D	Buffalo	214.75	61.36	8/9/2006	0.06	11.55	7.8	63.79	15.5	4.12	1.45E-03
BuSW-8	MW-02D	Buffalo	66.69	78.67	8/9/2006	0.13	25.03	5.42	198.91	22	9.04	3.19E-03
BuSW-10	MW-07D	Buffalo	55.20	65.71	8/9/2006	0.38	73.15	3.75	840.35	23.5	35.76	1.26E-02
MW-01D	MW-01D	Buffalo	31.60	68.20	8/9/2006	0.38	73.15	4.66	676.25	25	27.05	9.54E-03
MW-03D		Buffalo	179.92	58.19	8/9/2006	0.13	25.03	12.59	85.63	15	5.71	2.01E-03
MW-04D		Buffalo	14.09	70.51	8/8/2006	0.50	96.25	6.21	667.71	25	26.71	9.42E-03

Notes:

a. Well yield was calculated by dividing the total volume of groundwater removed from the well once evacuated by the time of the yield test.
b. Stabilized drawdown was calculated by subtracting 0.5 feet from the water column length (ft) from sustainable yield test performed on April 1 and 2, 2008.
c. A conservative maximum sustainable yield using the total data set (2.9 gallons of water removed in 42 minutes) was used to calculate yield.
d. Calculated yield for the fourth hour of the yield test. The maximum rate of pumping was 4.35 gallons per hour during this period.
e. Calculations based on Single Well Pump Tests as described in the Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring, Division of Drinking and Ground Waters, Ohio EPA, February 1995.

APPENDIX B

GRAIN SIZE ANALYSIS RESULTS

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-1-62-70, 62.0'-70.0'	Lab ID	4
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
1 1/2"	37.5	100.0
1"	25	97.4
3/4"	19	89.6
3/8"	9.5	71.3
No. 4	4.75	58.4
No. 10	2	44.9
No. 40	0.425	21.1
No. 200	0.075	5.3
	0.02	1.4
	0.005	0.6
	0.002	0.0
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	41.6	55.1
Coarse Sand	13.5	23.8
Medium Sand	23.8	---
Fine Sand	15.8	15.8
Silt	4.7	5.3
Clay	0.6	0.0

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol: SP-SM
Group Name: Poorly graded sand with silt and gravel

AASHTO Classification: A-1-a (0)

Comments:

Reviewed By RJ

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-1-62-70, 62.0'-70.0'	Lab ID	4

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	Angular
Particle Hardness:	Hard and Durable
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: 1 1/2" Sieve

Sieve Size	% Passing
1 1/2"	100.0
1"	97.4
3/4"	89.6
3/8"	71.3
No. 4	58.4
No. 10	44.9

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

Specific Gravity 2.65

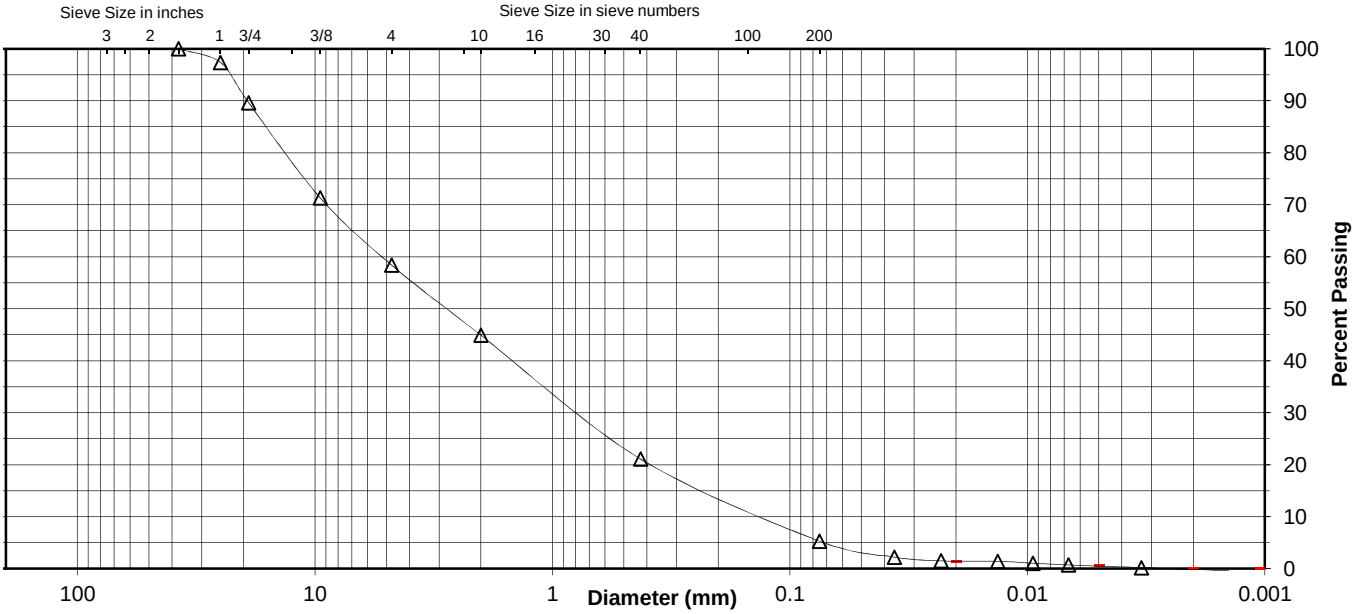
Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	21.1
No. 200	5.3
0.02 mm	1.4
0.005 mm	0.6
0.002 mm	0.0
0.001 mm	0.0

Particle Size Distribution

	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
ASTM	10.4	31.2	13.5	23.8	15.8	4.7	0.6

	Gravel	Coarse Sand	Fine Sand	Silt	Clay
AASHTO	55.1	23.8	15.8	5.3	0.0



Comments

Reviewed By RJ

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-2-50-60, 50.0'-60.0'	Lab ID	5
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
	N/A	
	N/A	
	N/A	
	N/A	
No. 10	2	100.0
No. 40	0.425	99.2
No. 200	0.075	19.9
	0.02	6.8
	0.005	3.9
	0.002	1.4
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	0.0	0.0
Coarse Sand	0.0	0.8
Medium Sand	0.8	---
Fine Sand	79.3	79.3
Silt	16.0	18.5
Clay	3.9	1.4

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol:	SM
Group Name:	Silty sand
AASHTO Classification:	A-2-4 (0)

Comments:

Reviewed By RJ

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-2-50-60, 50.0'-60.0'	Lab ID	5

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	N/A
Particle Hardness:	N/A
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: No. 10 Sieve

Sieve Size	% Passing
No. 10	100.0

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

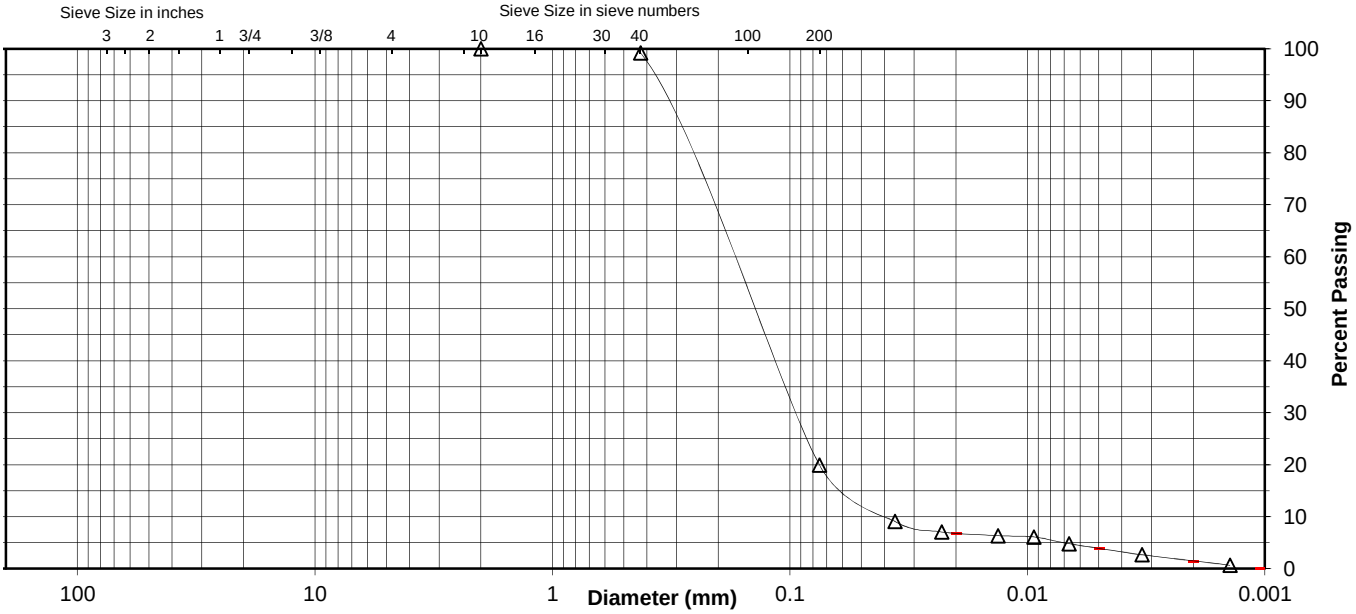
Specific Gravity 2.65

Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	99.2
No. 200	19.9
0.02 mm	6.8
0.005 mm	3.9
0.002 mm	1.4
0.001 mm	0.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.0	0.0	0.0	0.8	79.3	16.0	3.9
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	0.0			0.8	79.3	18.5	1.4



Comments

Reviewed By RJ

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-2-60-70, 60.0'-70.0'	Lab ID	6
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
	N/A	
3/4"	19	100.0
3/8"	9.5	97.9
No. 4	4.75	94.0
No. 10	2	83.8
No. 40	0.425	53.3
No. 200	0.075	10.0
	0.02	2.9
	0.005	0.6
	0.002	0.0
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	6.0	16.2
Coarse Sand	10.2	30.5
Medium Sand	30.5	---
Fine Sand	43.3	43.3
Silt	9.4	10.0
Clay	0.6	0.0

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol: SP-SM

Group Name: Poorly graded sand with silt

AASHTO Classification: A-3 (0)

Comments:

Reviewed By RJ

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	BAP-B-2-60-70, 60.0'-70.0'	Lab ID	6

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	Angular
Particle Hardness:	Hard and Durable
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: 3/4" Sieve

Sieve Size	% Passing
3/4"	100.0
3/8"	97.9
No. 4	94.0
No. 10	83.8

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

Specific Gravity 2.65

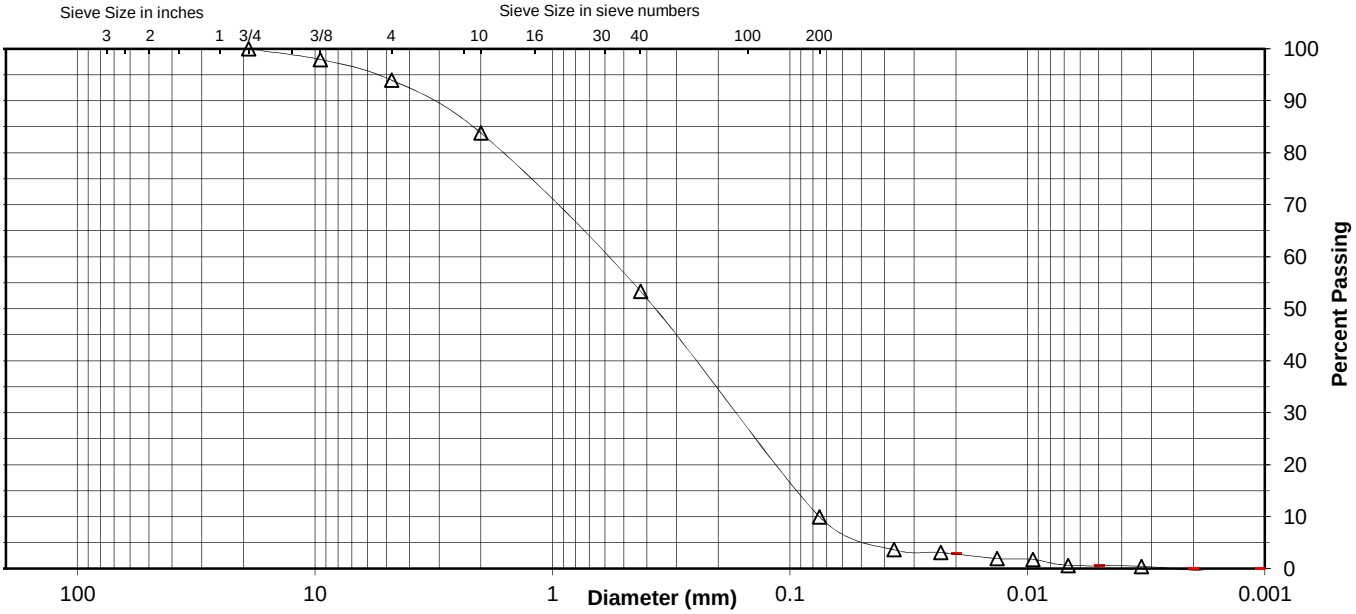
Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	53.3
No. 200	10.0
0.02 mm	2.9
0.005 mm	0.6
0.002 mm	0.0
0.001 mm	0.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.0	6.0	10.2	30.5	43.3	9.4	0.6

AASHTO	Gravel	Coarse Sand	Fine Sand	Silt	Clay
	16.2	30.5	43.3	10.0	0.0



Comments

Reviewed By RJ

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-1-62-68, 62.0'-68.0'	Lab ID	1
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
1"	25	100.0
3/4"	19	94.8
3/8"	9.5	70.6
No. 4	4.75	55.0
No. 10	2	41.4
No. 40	0.425	18.9
No. 200	0.075	7.5
	0.02	2.0
	0.005	1.4
	0.002	0.6
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	45.0	58.6
Coarse Sand	13.6	22.5
Medium Sand	22.5	---
Fine Sand	11.4	11.4
Silt	6.1	6.9
Clay	1.4	0.6

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol: SW-SM

Group Name: Well-graded sand with silt and gravel

AASHTO Classification: A-1-a (0)

Comments:

Reviewed By 

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-1-62-68, 62.0'-68.0'	Lab ID	1

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	Angular
Particle Hardness:	Hard and Durable
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: 1" Sieve

Sieve Size	% Passing
1"	100.0
3/4"	94.8
3/8"	70.6
No. 4	55.0
No. 10	41.4

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

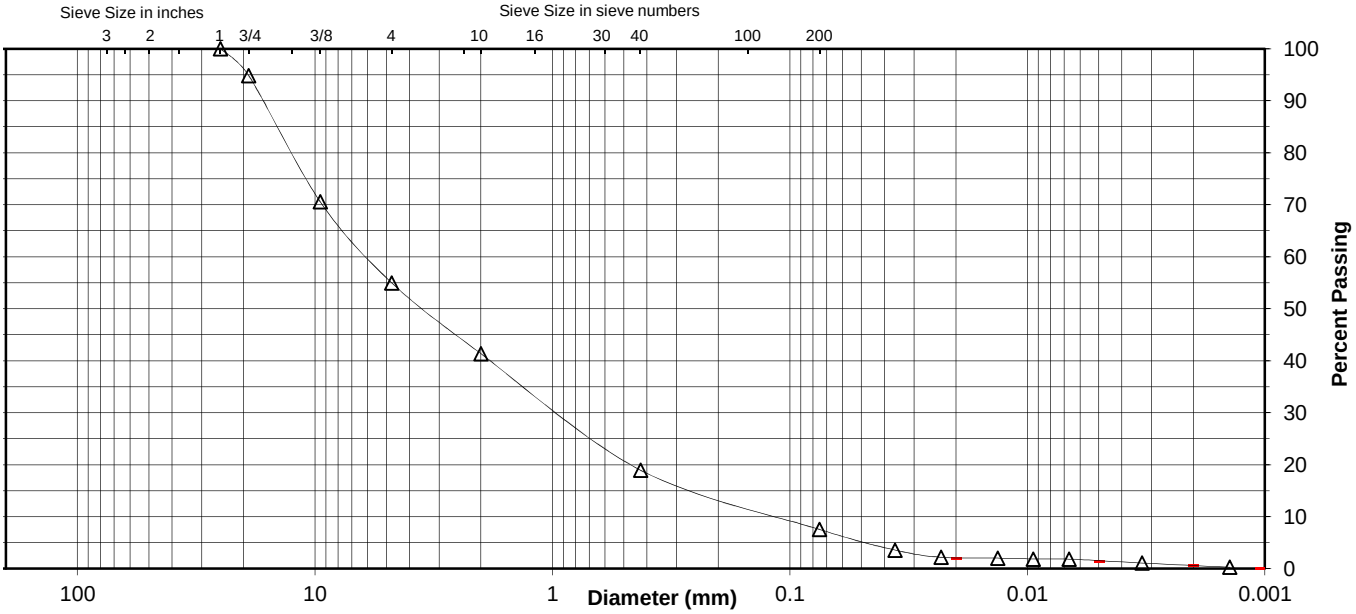
Specific Gravity 2.65

Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	18.9
No. 200	7.5
0.02 mm	2.0
0.005 mm	1.4
0.002 mm	0.6
0.001 mm	0.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	5.2	39.8	13.6	22.5	11.4	6.1	1.4
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	58.6			22.5	11.4	6.9	0.6



Comments

Reviewed By RJ

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-1-70-78, 70.0'-78.0'	Lab ID	2
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
1"	25	100.0
3/4"	19	96.3
3/8"	9.5	85.5
No. 4	4.75	73.2
No. 10	2	60.1
No. 40	0.425	23.0
No. 200	0.075	6.9
	0.02	1.1
	0.005	0.0
	0.002	0.0
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	26.8	39.9
Coarse Sand	13.1	37.1
Medium Sand	37.1	---
Fine Sand	16.1	16.1
Silt	6.9	6.9
Clay	0.0	0.0

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol: SW-SM

Group Name: Well-graded sand with silt and gravel

AASHTO Classification: A-1-b (0)

Comments:

Reviewed By RJ

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-1-70-78, 70.0'-78.0'	Lab ID	2

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	Rounded
Particle Hardness:	Hard and Durable
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: 1" Sieve

Sieve Size	% Passing
1"	100.0
3/4"	96.3
3/8"	85.5
No. 4	73.2
No. 10	60.1

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

Specific Gravity 2.65

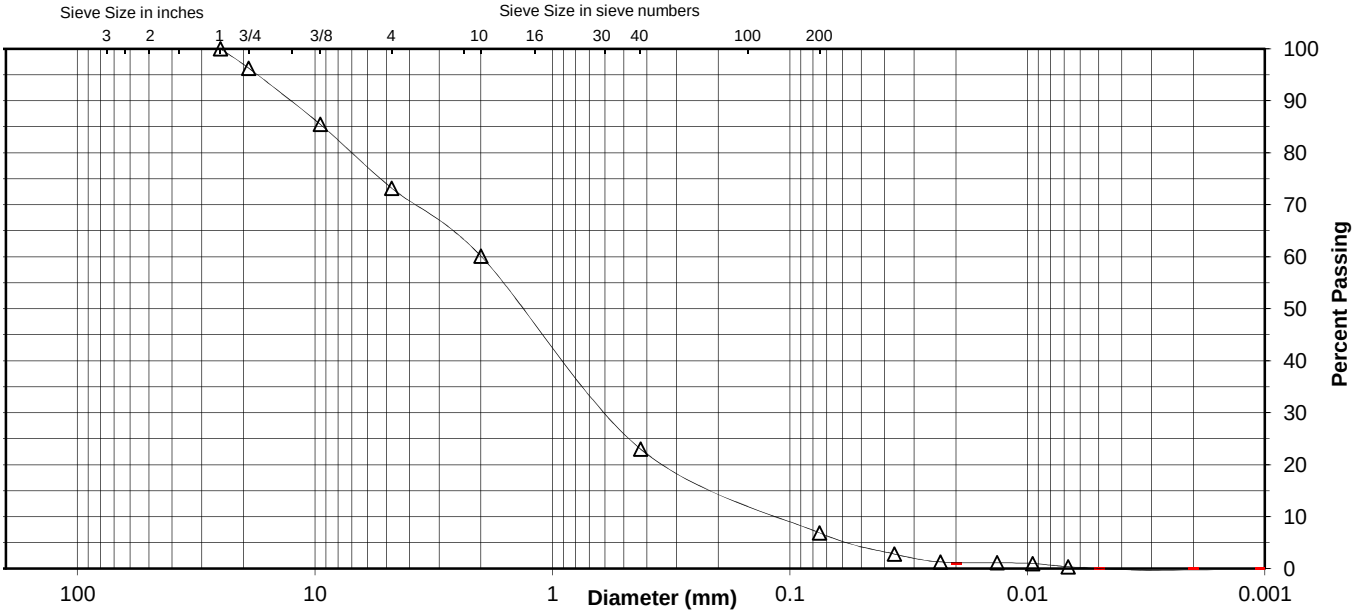
Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	23.0
No. 200	6.9
0.02 mm	1.1
0.005 mm	0.0
0.002 mm	0.0
0.001 mm	0.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	3.7	23.1	13.1	37.1	16.1	6.9	0.0

AASHTO	Gravel	Coarse Sand	Fine Sand	Silt	Clay
	39.9	37.1	16.1	6.9	0.0



Comments

Reviewed By RJ

Stantec

Summary of Soil Tests

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-2-60-70, 60.0'-70.0'	Lab ID	3
Sample Type	SPT	Date Received	7-21-15
		Date Reported	7-27-15

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
1 1/2"	37.5	100.0
1"	25	96.5
3/4"	19	91.9
3/8"	9.5	77.5
No. 4	4.75	63.8
No. 10	2	44.6
No. 40	0.425	18.1
No. 200	0.075	7.4
	0.02	3.0
	0.005	1.4
	0.002	0.8
estimated	0.001	0.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	36.2	55.4
Coarse Sand	19.2	26.5
Medium Sand	26.5	---
Fine Sand	10.7	10.7
Silt	6.0	6.6
Clay	1.4	0.8

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Activity Index:	N/A

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Estimated

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.65

Classification

Unified Group Symbol: SW-SM

Group Name: Well-graded sand with silt and gravel

AASHTO Classification: A-1-a (0)

Comments:

Reviewed By RJ

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Kyger Creek OVEC CCR Rule Eng	Project Number	175534017
Source	SFAP-B-2-60-70, 60.0'-70.0'	Lab ID	3

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method	ASTM D 422
Prepared using	ASTM D 421
Particle Shape	Angular
Particle Hardness:	Hard and Durable
Tested By	TA
Test Date	07-22-2015
Date Received	07-21-2015

Maximum Particle size: 1 1/2" Sieve

Sieve Size	% Passing
1 1/2"	100.0
1"	96.5
3/4"	91.9
3/8"	77.5
No. 4	63.8
No. 10	44.6

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on -3 inch fraction only

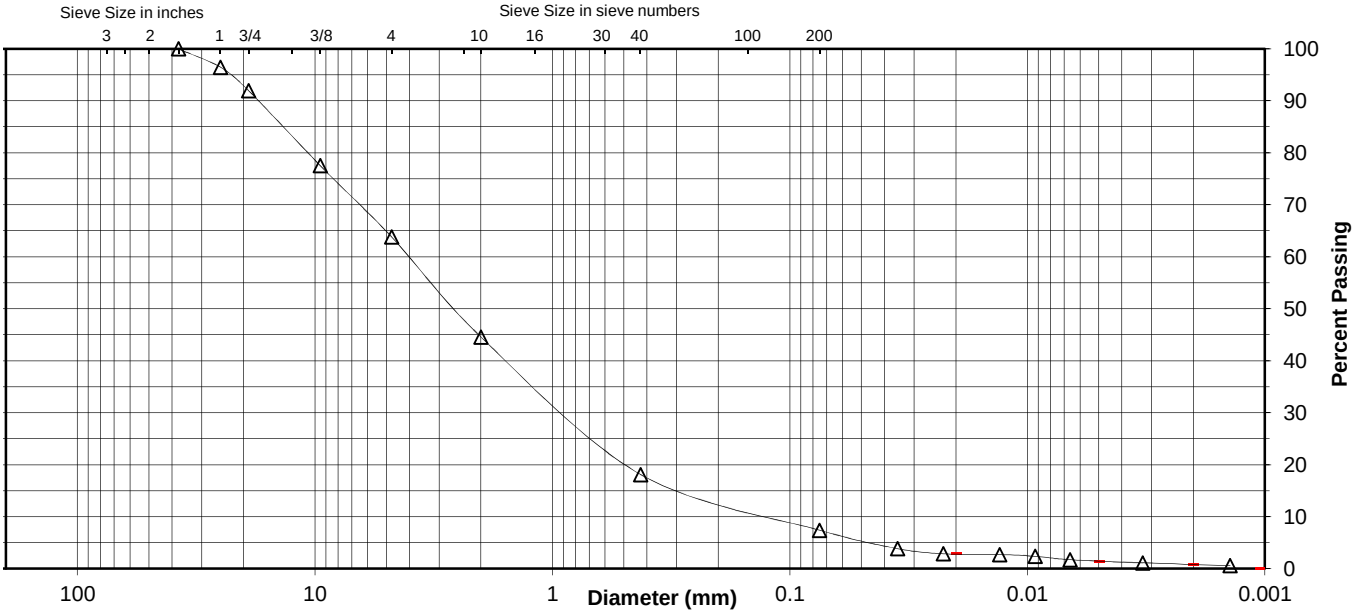
Specific Gravity 2.65

Dispersed using Apparatus A - Mechanical, for 1 minute

No. 40	18.1
No. 200	7.4
0.02 mm	3.0
0.005 mm	1.4
0.002 mm	0.8
0.001 mm	0.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	8.1	28.1	19.2	26.5	10.7	6.0	1.4
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	55.4			26.5	10.7	6.6	0.8



Comments

Reviewed By RJ

APPENDIX C

BORING & WELL LOGS

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

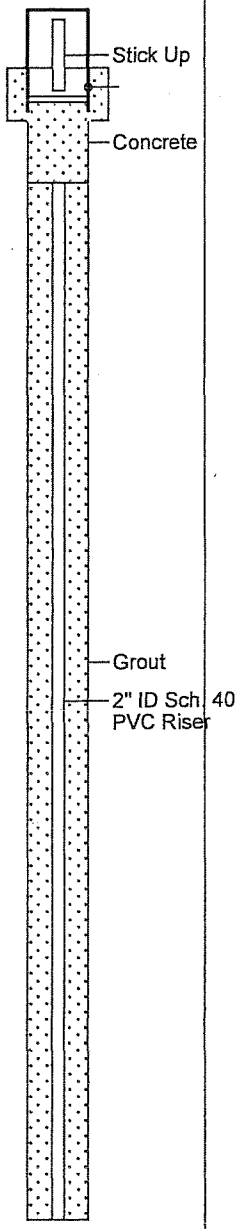
G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0	2.0/1.0	SP1/SS1	NA	6-7-8-8			0.0 to 1.0 - Medium dense brown to dark brown sandy SILT, dry, some organics (spoils).
2	2.0/0.7	SP2/SS2	NA	7-6-7-7			2.0 to 2.7 - Medium dense light brown silty SAND, dry (spoils), some weathered grey shale within.
4	2.0/1.3	SP3/SS3	NA	3-4-5-5			4.0 to 5.3 - Medium dense light brown to tan medium to coarse grained SAND, trace silt, slightly moist to very moist.
6	2.0/1.2	SP4/SS4	NA	1-3-4-39			6.0 to 7.2 - Medium dense brown to light brown silty SAND, moist, coal seam at base.
8	2.0/0.3	SP5/SS5	NA	50/4			8.0 to 8.1 - Medium dense brown silty SAND, slightly moist.
9							8.1 to 8.3 - Soft to medium hard dark grey SHALE, micaceous.
10	0.5/0.3	SP6/SS6	NA	50/3			10.0 to 10.3 - Same As Above (SAA).
11	5.0/5.0 RQD = NM	RC1/10MIN	NA	NA			10.5 to 15.5 - SAA: no mica.
16	10.0/10.0 RQD = NM	RC2/20MIN	NA	NA			15.5 to 21.3 -SAA: micaceous near base.
20							

Well: BuSW-1
Elev.:



REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20–25							21.3 to 25.5 - Hard grey fine grained SANDSTONE.
25–26	10.0/10.0 RQD = NM	RC3/15MIN	NA	NA			25.5 to 26.1 - SAA.
26–35							26.1 to 35.5 - Soft medium to dark grey SHALE, non-micaceous.
35–36	10.0/10.0 RQD = 72	RC4/16MIN	NA	NA			35.5 to 38.5 - SAA.
38–40							38.5 to 39.1 - SAA: dark grey fine grained SANDSTONE interbed, hard coal seam at 37.5.

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							
41							
42							
43							
44							
45							
46	10.0/9.8 RQD = 77.5	RC5/25MIN	NA	NA			39.1 to 45.5 - Soft medium to dark grey SHALE. 45.5 to 55.3 - Very soft to soft grey SHALE, highly weathered from 49.7 to 55.3 (purple and red staining).
47							
48							
49							
50							
51							
52							
53							
54							
55							
56	10.0/10.0 RQD = 92	RC6/22MIN	NA	NA			55.5 to 60.2 - SAA: highly weathered.
57							
58							
59							
60							

Grout
2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60							60.2 to 64.6 - Medium hard grey SHALE, micaceous at base, slight chemical weathering.
61							
62							
63							
64							
65							64.6 to 65.5 - Hard light grey SHALE, slightly fissile.
66	10.0/9.8 RQD = 71	RC7/29MIN	NA	NA			65.5 to 75.5 - Medium hard light grey to dark grey SHALE, some chemical weathering (purple/brown staining) from 69.3 to 75.3.
67							
68							
69							
70							
71							
72							
73							
74							
75							
76	10.0/8.7 RQD = 85	RC8/35MIN	NA	NA			75.5 to 83.5 - Medium hard light grey to grey SHALE, some weathering, fine grained SANDSTONE interbeds from 76.8 to 78.1' and 79.5 to 80.2'.
77							76.8 to 78.1 - Fine grained SANDSTONE.
78							78.1 to 83.5 - Medium hard light gray SHALE.
79							
80							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							
81							
82							
83							
84							83.5 to 84.2 - Soft red SHALE.
85							
86	10.0/10.0 RQD = 91	RC8/26MIN	NA	NA			85.5 to 87.1 - SAA.
87							87.1 to 92.1 - Hard grey SHALE.
88							87.7 to 88.9 - Fine grained SANDSTONE.
89							88.9 to 92.1 - SHALE.
90							
91							
92							92.1 to 95.5 - Medium hard red SHALE, chemical weathering (purple/grey staining).
93							
94							
95							
96	10.0/3.4 RQD = 0	RC9/90MIN	NA	NA			95.5 to 98.9 - Medium hard red and grey SHALE. Core hammered out of barrel.
97							
98							
99							
100							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-27 BuSW-1.bor

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/26/2006
Date Completed	: 06/01/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							
101							
102							
103							
104							
105							
106	10.0/10.0 RQD = 58	RC10/22MIN	NA	NA			105.5 to 113.5 - Soft grey SHALE, highly weathered, iron staining.
107							
108							
109							
110							
111							
112							
113							113.5 to 115.5 - Soft red SHALE, highly weathered.
114							
115							
116	5.1/4.0 RQD = 85	RC11/15MIN	NA	NA			115.5 to 119.6 - SAA.
117							
118							
119							
120							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-27 BuSW-1.bor

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Hydro Investigation/
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Cheshire, Ohio

Project Number: APO006

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S. Water Level Date	: Not Measured
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LOG OF BORING GB-27/BuSW-1

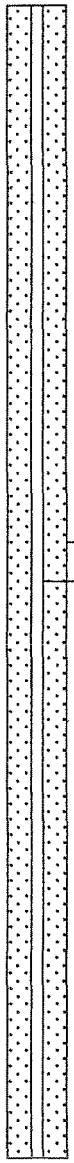
G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							
121	10.0/4.5 RQD = 36	RC12/150MIN	NA	NA			120.5 to 125.0 - SAA: soft to medium hard, slightly weathered.
122							
123							
124							
125							
126							
127							
128							
129							
130							
131	10.0/10.0 RQD = 87	RC13/15MIN	NA	NA			130.5 to 139.2 - SAA: medium hard to hard, slightly weathered.
132							
133							
134							
135							
136							
137							
138							
139							139.2 to 140.5 - Medium hard grey SHALE, slightly weathered.
140							



REMARKS:

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Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

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LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140							
141	10.0/10.0 RQD = 85	RC14/20MIN	NA	NA			140.5 to 145.7 - Very hard blue-grey SANDSTONE with blue-grey shale interbeds 141 and 142.5.
142							
143							
144							
145							
146							145.7 to 150.5 - Soft to medium hard red SHALE, slightly weathered.
147							
148							
149							
150							
151	10.0/10.0 RQD = 74	RC15/25MIN	NA	NA			150.5 to 156.5 - Hard blue-grey, fine grained SANDSTONE with soft, red shale interbed from 155.1 to 156.0.
152							
153							
154							
155							
156							
157							156.5 to 160.5 - Hard blue-grey SHALE.
158							
159							
160							

Well: BuSW-1
Elev.:

REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
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S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

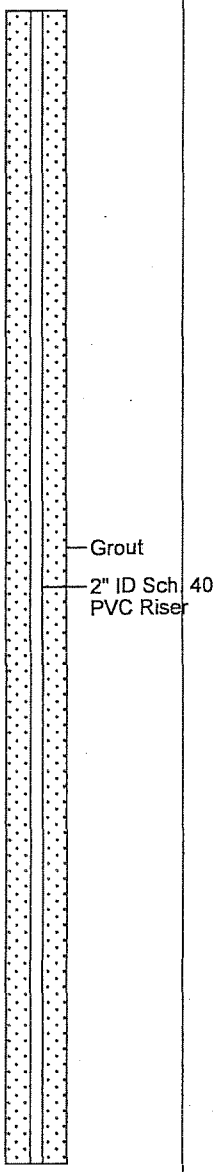
G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160							
161	10.0/10.0 RQD = 60	RC16/14MIN	NA	NA			160.5 to 170.5 - Soft to medium hard grey-blue SHALE, slightly micaceous.
162							
163							
164							
165							
166							
167							
168							
169							
170							
171	10.0/9.9 RQD = 92	RC17/22MIN	NA	NA			170.5 to 180.5 - Soft to medium hard grey SHALE, increasing iron staining and chemical weathering with depth.
172							
173							
174							
175							
176							
177							
178							
179							
180							



REMARKS:

Boring backfilled with cement-bentonite grout.

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Cheshire, Ohio

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S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
180							
181	10.0/9.9 RQD = 68	RC18/31MIN	NA	NA			180.5 to 190.5 - SAA: heavy iron staining and chemical weathering throughout.
182							
183							
184							
185							
186							
187							
188							
189							
190							
191	10.0/10.0 RQD = 41	RC19/25MIN	NA	NA			190.5 to 200.5 - SAA: heavy iron staining and chemical weathering.
192							
193							
194							
195							
196							
197							
198							
199							
200							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hydro Investigation/
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Cheshire, Ohio

Project Number: APO006

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Date Started	: 05/26/2006
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

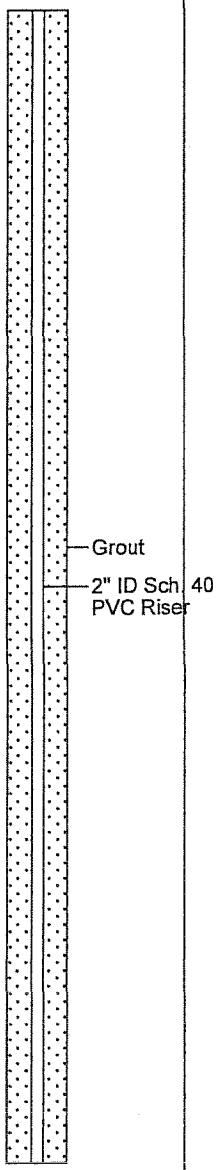
G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200							
201	10.0/10.0 RQD = 70	RC20/26MIN	NA	NA			200.5 to 210.5 - SAA: staining softer with depth.
202							
203							
204							
205							
206							
207							
208							
209							
210							
211	10.0/9.6 RQD = 58	RC21/22MIN	NA	NA			210.5 to 216.6 - SAA: heavy iron staining.
212							
213							
214							
215							
216							
217							216.6 to 220.1 - Hard to very hard grey SHALE.
218							
219							
220							



REMARKS:

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Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

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LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220							
221	10.0/10.0 RQD = 75	RC22/22MIN	NA	NA			220.5 to 230.5 - SAA: interbedded with fine grained grey SANDSTONE, calcite cement.
222							
223							
224							
225							
226							225.4 to 226.5 - Fine grained SANDSTONE.
227							226.5 to 230.5 - Hard to very hard grey SHALE with SANDSTONE interbeds.
228							
229							
230							
231	10.0/10.0 RQD = 80	RC23/27MIN	NA	NA			230.5 to 233.0 - Hard grey fine grained SANDSTONE.
232							
233							233.0 to 240.5 - Medium hard to hard grey SHALE with fine grained SANDTONE interbeds.
234							
235							
236							
237							
238							
239							
240							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

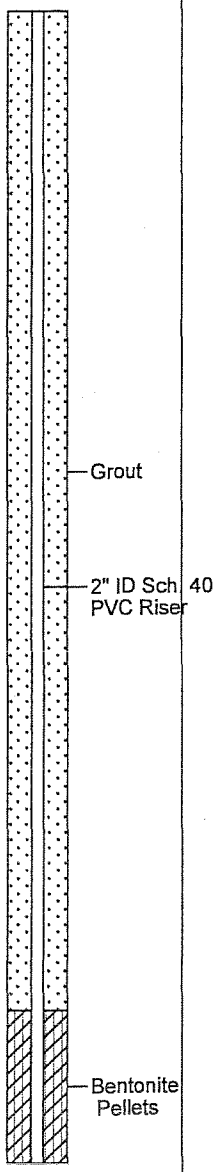
G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
240							
241	10.0/10.0 RQD = 81	RC24/30MIN	NA	NA			240.5 to 245.0 - Hard grey SHALE.
242							
243							
244							
245							245.0 to 250.5 - Soft to medium hard grey SHALE, highly weathered, iron staining.
246							
247							
248							
249							
250							
251	10.0/10.0 RQD = 67	RC25/19MIN	NA	NA			250.5 to 260.5 - SAA: heavy staining and weathering decreasing with depth.
252							
253							
254							
255							
256							
257							
258							
259							
260							



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Cheshire, Ohio

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S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

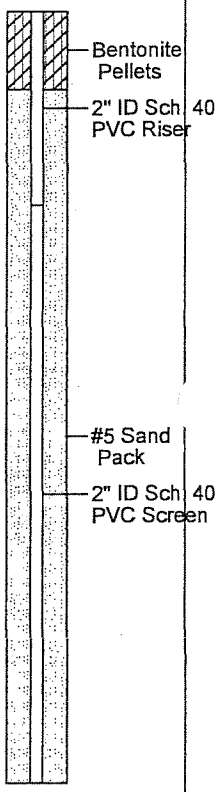
G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
260							
261	10.0/9.8 RQD = 75	RC26/12MIN	NA	NA			260.5 to 261.8 - Medium hard to hard grey SHALE, increasing mica wiht dpeth.
262							261.8 to 265.8 - Hard light grey fine grained SANDSTONE, heavy mica.
263							
264							
265							
266							265.8 to 270.3 - SAA: medium hard, medium to coarse grained heavy calcite cement.
267							
268							
269							
270							
271	10.0/8.8 RQD = 72	RC27/35MIN	NA	NA			270.5 to 277.3 - SAA.
272							
273							
274							
275							
276							
277							
278							277.3 to 279.3 - Soft to medium hard grey SHALE, heavy iron staining and chemical weathering.
279							
280							



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Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 300.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
280							
281	10.0/10.0 RQD = 76	RC28/35MIN	NA	NA			
282							
283							
284							
285							
286							
287							
288							
289							
290							
291	10.0/10.0 RQD = 53	RC29/32MIN	NA	NA			290.5 to 300.5 - Hard to soft grey SHALE, slight weathering, decreasing hardness with depth.
292							
293							
294							
295							
296							
297							
298							
299							
300							

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hydro Investigation/
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S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-27/BuSW-1

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-1
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
300					⊠		EOB @ 300.5' bgs.
301							
302							
303							
304							
305							
306							
307							
308							
309							
310							
311							
312							
313							
314							
315							
316							
317							
318							
319							
320							

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

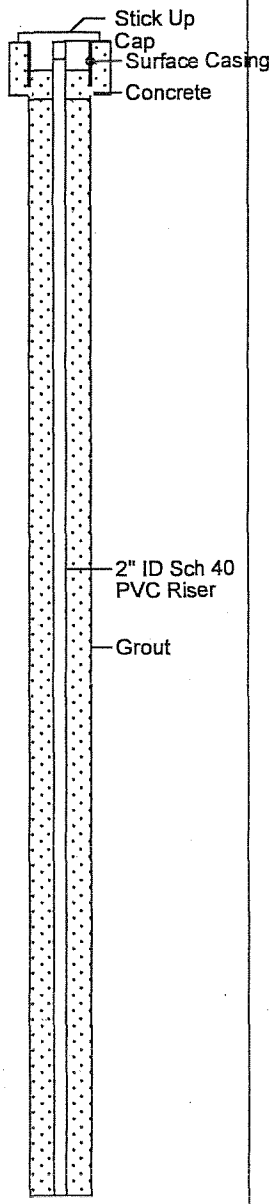
LOG OF BORING BuSW-2

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 - 21.0 - Casing set; no sampling.
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Well: BuSW-2



REMARKS:

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Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

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Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

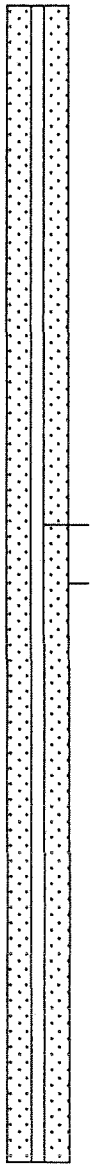
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21	4.0 / 4.0	R-1 21.0 - 25.0	96%				21.0 - 25.0 - Hard, gray SANDSTONE; medium grained, slightly weathered, thick bedding, fractures noted, micaceous; coal seam at 21.3 feet.
22							
23							
24							
25	10.0 / 10.0	R-2 25.0 - 35.0	99%				25.0 - 26.9 - Same As Above (SAA).
26							
27							26.9 - 30.6 - Soft, gray SHALE; very fine grained, highly weathered, argillaceous, medium bedding, fractures noted.
28							
29							
30							
31							30.6 - 35.0 - Hard, gray with little brown staining SANDSTONE; medium grained, micaceous, thick bedding, unfractured.
32							
33							
34							
35	10.0 / 10.0	R-3 35.0 - 45.0	98%				35.0 - 39.2 - SAA.
36							
37							
38							
39							
40							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
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Logged by	: Jay Read / Matt McCoy
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Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

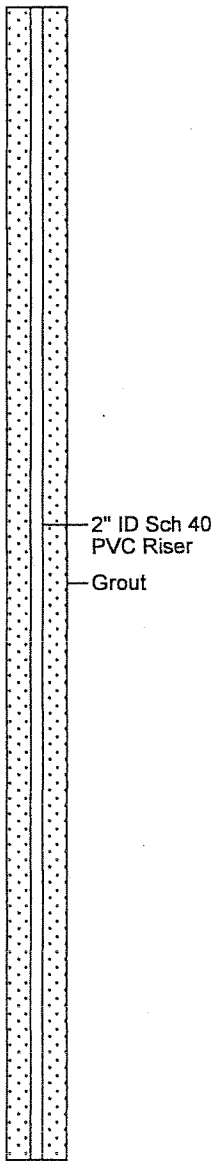
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							39.2 - 45.0 - Medium hard to hard, gray interbedded to moderately NE, and SILTSTONE; very fine to medium grained, slightly to moderately weathered, argillaceous, laminated to thin bedding, fractures noted.
45	10.0 / 10.0	R-4 45.0 - 55.0	86%				45.0 - 55.0 - Medium hard to hard, gray to red interbedded SHALE and SILTSTONE with few sandstone laminations; very fine grained, slightly to highly weathered, argillaceous, thin to medium bedding, fractures noted, becomes red and has higher shale content at 53.5 feet.
55	10.0 / 10.0	R-5 55.0 - 65.0	97%				55.0 - 55.6 - SAA: red. 55.6 - 65.0 - Soft to medium hard, gray to greenish-brown to red SHALE; very fine grained, moderate to highly weathered, argillaceous, medium bedding, fractures noted. Gray from 56.0 to 58.3 feet; greenish-brown from 58.3 to 60.6 feet; red from 60.6 to 65.0 feet.
60							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

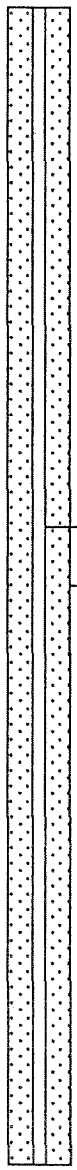
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
65	10.0 / 10.0	R-6 65.0 - 75.0	89%				65.0 - 74.5 - SAA: red with some greenish-brown mottling and gray.
75	10.0 / 10.0	R-7 75.0 - 85.0	98%				74.5 - 75.0 - Hard, gray SANDSTONE; fine to medium grained, slightly weathered, thin bedding, unfractured. 75.0 - 76.5 - SSA.
							76.5 - 85.0 - Medium hard, predominately gray with some red and greenish-brown mottling SHALE; very fine grained, highly weathered, argillaceous, medium bedding, fractures noted, contains trace siltstone.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
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Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							
81							
82							
83							
84							
85	10.0 / 10.0	R-8 85.0 - 95.0	100%				85.0 - 85.7 - SAA.
86							85.7 - 92.8 - hard, gray with some red mottling SANDSTONE with few argillaceous laminations; fine grained, slightly weathered, micaceous, medium bedding, unfractured.
87							
88							
89							
90							
91							
92							
93							92.8 - 95.0 - Medium hard to hard, gray and red interbedded SHALE and SANDSTONE; fine to very fine grained, slightly weathered, argillaceous, micaceous, thin bedding, unfractured.
94							
95	10.0 / 10.0	R-9 95.0 - 105.0	100%				95.0 - 97.5 - Medium hard, reddish-brown interbedded SILTSTONE and SHALE; very fine grained, slightly to moderately weathered, argillaceous, thin bedding, unfractured.
96							
97							
98							97.5 - 105.0 - Hard, gray SANDSTONE moderately interbedded with siltstone; fine to medium grained, slightly weathered, micaceous, medium bedding, fractures noted.
99							
100							

Well: BuSW-2

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

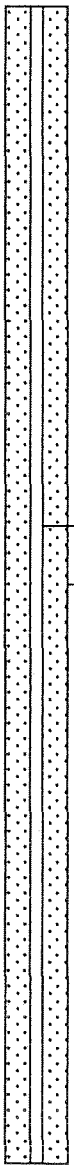
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
105	10.0 / 8.4	R-10 105.0 - 115.0	94%				105.0 - 115.0 - Medium hard to hard, red to greenish-gray interbedded SHALE and SANDSTONE; fine to medium grained, moderately weathered, argillaceous, thin bedding, fractures noted.
115	10.0 / 10.0	R-11 115.0 - 125.0	98%				115.0 - 116.8 - SAA.
							116.8 - 125.0 - Medium hard, gray to red with yellow staining SHALE; very fine grained, highly weathered, argillaceous, medium bedding, fractures noted.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
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Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

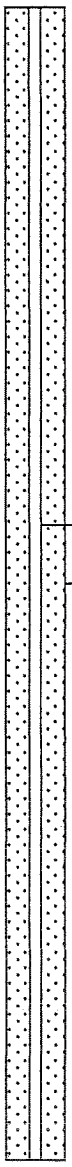
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120–140	10.0 / 10.0	R-12 125.0 - 135.0	99%				125.0 - 135.0 - Medium hard, red with little brown mottling SHALE with little interbedded siltstone; very fine grained, moderately to highly weathered, argillaceous, medium to think bedding, fractures noted.
135–140	10.0 / 10.0	R-13 135.0 - 145.0	88%				135.0 - 141.6 - SAA.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

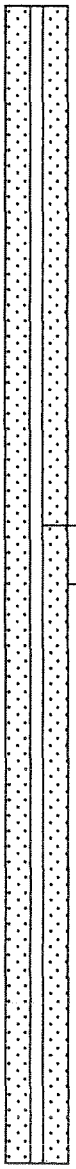
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140–144							
145	10.0 / 9.0	R-14 145.0 - 155.0	88%				141.6 - 145.0 - Medium hard to hard, red SILTSTONE; very fine grained, slightly weathered, argillaceous, thick bedding, unfractured.
145–154							145.0 - 155.0 - Hard, brown and gray interbedded SANDSTONE and SILTSTONE; very fine to medium grained, slightly weathered, thin to medium bedding, fractures noted.
155	10.0 / 9.3	R-15 155.0 - 165.0	77%				155.0 - 160.4 - Medium hard, red SHALE with few siltstone interbeds; very fine grained, moderately weathered, argillaceous, thin to medium bedding, fractures noted.
155–160							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

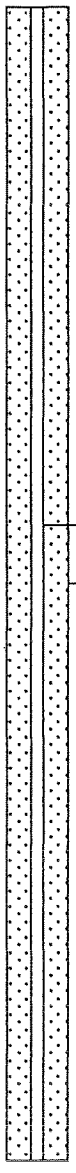
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160							
161							160.4 - 162.2 - Hard, gray SANDSTONE; medium grained, slightly weathered, slightly micaceous, medium bedding, unfractured.
162							162.2 - 165.0 - Hard, red SILTSTONE; very fine grained, slightly weathered, medium bedding, unfractured.
163							
164							
165	10.0 / 10.0	R-16 165.0 - 175.0	98%				165.0 - 169.4 - Hard, gray SANDSTONE moderately interbedding with shale and siltstone; fine to medium grained, thin to medium bedding, fractures noted.
166							
167							
168							
169							
170							169.4 - 171.6 - Medium hard, gray with red mottling SHALE with trace arenaceous lamination; very fine grained, moderately weathered, argillaceous, thin bedding, fractures noted.
171							
172							171.6 - 175.0 - Hard, gray SILTSTONE with trace shale and sandstone laminations; very fine grained, slightly weathered, medium bedding, unfractured.
173							
174							
175	10.0 / 10.0	R-17 175.0 - 185.0	95%				175.0 - 180.2 - SAA: little red coloration.
176							
177							
178							
179							
180							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio
Project Number: APO017
Project Manager: Steve Gross

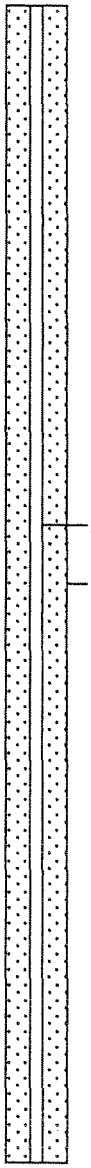
Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab
Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
180							180.2 - 185.0 - Medium hard, red SHALE; very fine grained, moderately to highly weathered, argillaceous, thick bedding, fractures noted, little yellow staining.
185	10.0 / 10.0	R-18 185.0 - 195.0	92%				185.0 - 195.0 - SAA: gray, red, and yellowish-brown zones; broken zone at 194.2 to 195.0 feet.
195	10.0 / 9.5	R-19 195.0 - 205.0	97%				195.0 - 204.5 - SAA: highly weathered.
200							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

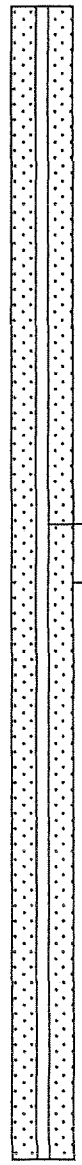
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
205	10.0 / 10.0	R-20 205.0 - 215.0	97%				205.0 - 215.0 - SAA: red with some yellow mottling, fractures noted.
215	10.0 / 10.0	R-21 215.0 - 225.0	71%				215.0 - 225.0 - Soft to medium hard, red SHALE; very fine grained, highly weathered, argillaceous, thick bedding, fractures noted.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220–240	10.0 / 10.0	R-22 225.0 - 235.0	88%				225.0 - 233.8 - SAA: gray and red.
235	10.0 / 10.0	R-23 235.0 - 245.0	79%				235.0 - 245.0 - Medium hard to hard, gray interbedded SILTSTONE and SHALE with trace sandstone; very fine grained, moderately weathered, argillaceous, thin bedding, fractures noted.
239–240							238.8 - 235.0 - Hard, red SILTSTONE; very fine grained, moderately weathered, few argillaceous laminations, thin bedding, fractures noted.

Well: BuSW-2

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

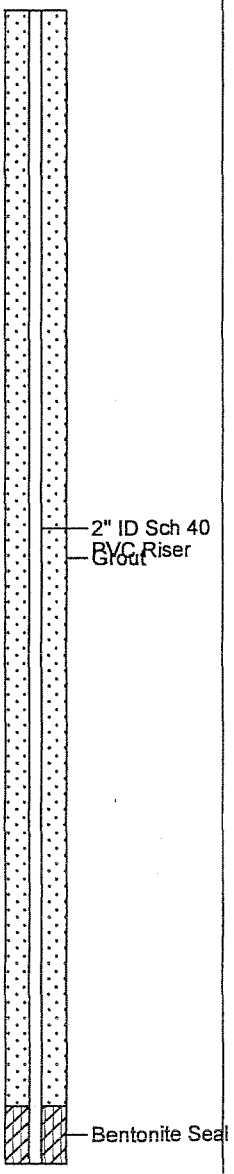
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
245	10.0 / 9.0	R-24 245.0 - 255.0	90%				245.0 - 248.0 - Hard, gray SILTSTONE with few sandstone interbeds; fine grained, slightly weathered, medium bedding, unfractured.
							248.0 - 253.8 - Hard, gray SANDSTONE; medium grained, slightly weathered, pyritic, thick bedding, fractures noted.
254							253.8 - 255.0 - Hard, brown and gray SILTSTONE.
255	10.0 / 10.0	R-25 255.0 - 265.0	78%				255.0 - 262.4 - Hard, red and gray SHALE; fractures noted.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

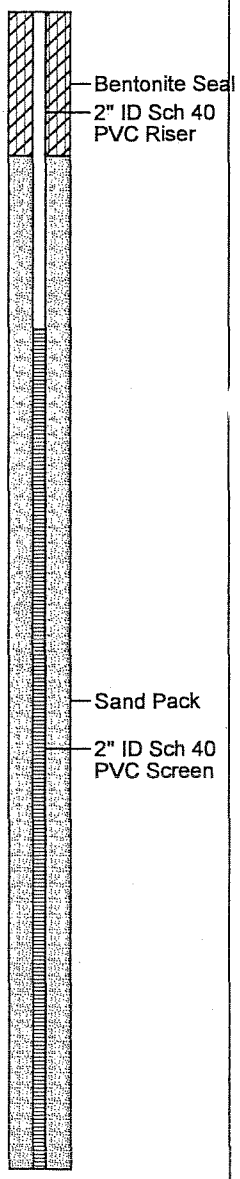
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
260–280							262.4 - 265.0 - Hard, gray SILTSTONE; argillaceous, becoming a fine grained sandstone.
265	10.0 / 10.0	R-26 265.0 - 275.0	100%				265.0 - 275.0 - Hard, gray, fine grained SANDSTONE; micaceous, thinly bedded.
275	10.0 / 10.0	R-27 275.0 - 285.0	100%				275.0 - 285.0 - Hard, gray, fine to coarse grained SANDSTONE; rounded grains of breccia at 52 inches.

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/30/2007
Date Completed	: 9/04/2007
Logged by	: Jay Read / Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 290'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

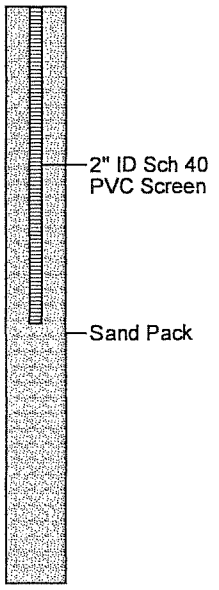
LOG OF BORING BuSW-2

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
280							
281							
282							
283							
284							
285	5.0 / 5.0	R-28 285.0 - 290.0	90%				285.0 - 285.7 - SAA.
286							285.7 - 290.0 - Hard, red and gray SHALE; orange staining.
287							
288							
289							
290							290.0 - Bottom of boring.
291							
292							
293							
294							
295							
296							
297							
298							
299							
300							

Well: BuSW-2



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 08/28/07
Date Completed	: 08/29/07
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 313.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

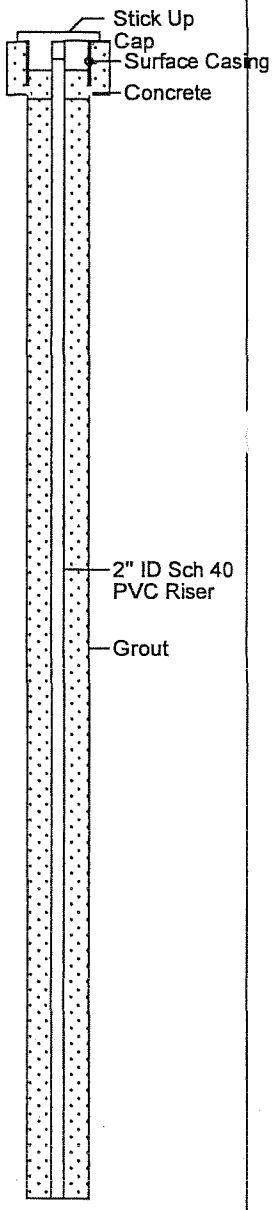
LOG OF BORING BuSW-3

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 - 21.0 - Casing set; no sampling.

Well: BuSW-3



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 08/28/07
Date Completed	: 08/29/07
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 313.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

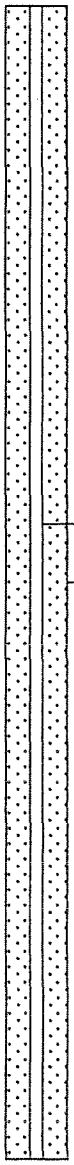
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21	2.0/1.5	R-1 21.0 - 23.0	9/10				21.0 - 22.5 - Hard gray with brown SANDSTONE, coarse to medium grained, moderately to highly weathered, thin bedding, fractures noted.
22							
23	10.0 / 9.8	R-2 23.0 - 33.0	53%				23.0 - 29.7 - Soft medium hard, brown and gray mottled (23-28.4) to gray (28.4-29.7) SHALE, very fine grained highly weathered, argillaceous, thin to medium bedding, fractures noted.
24							
25							
26							
27							
28							
29							
30							29.7 - 31.3 - Hard gray SANDSTONE, fine to medium grained, slghtly weathered, medium bedding, fractures noted.
31							31.3 - 32.8 - Soft gray SHALE.
32							
33	10.0 / 9.9	R-3 33.0 - 43.0	93%				33.0 - 35.2 - Soft olive SHALE, very fine grained highly weathered, argillaceous, medium bedding, fractures noted.
34							
35							
36							35.2 - 37.0 - Hard gray SANDSTONE, fine to medium grained slightly weathered, medium bedding, unfractured.
37							37.0 - 42.9 - Soft medium hard gray and brown SHALE, with few siltstone interbeds, very fine grained, argillaceous, thin to medium bedding, fractures noted.
38							
39							
40							

Well: BuSW-3



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 08/28/07
Date Completed	: 08/29/07
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 313.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

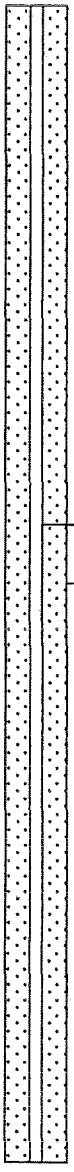
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40–60	10.0 / 9.0	R-4 43.0 - 53.0	86%				43.0 - 44.4 - Same As Above (SAA). 44.4 - 53.0 - Soft red to gray SHALE, very fine grained, moderately weathered, argillaceous, thick bedding, fractures noted.
53	10.0 / 10.0	R-5 53.0 - 63.0	97%				53.0 - 63.0 - Soft medium hard gray and brown mottled to red and brown mottled SHALE, very fine grained, highly weathered argillaceous, medium bedding, fractures noted.

Well: BuSW-3



REMARKS:

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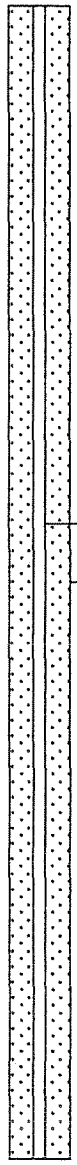
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60–80	10.0 / 10.0	R-6 63.0 - 73.0	91%				63.0 - 73.0 - SAA.
73	10.0 / 9.5	R-7 73.0 - 83.0	87%				73.0 - 76.0 - Soft gray SHALE, very fine grained, highly weathered, argillaceous, medium bedding, unfractured.
76							76.0 - 83.0 - Hard gray SANDSTONE, fine grained, slightly weathered, medium bedding, slightly fractured, containing some argillaceous interbeds.

Well: BuSW-3



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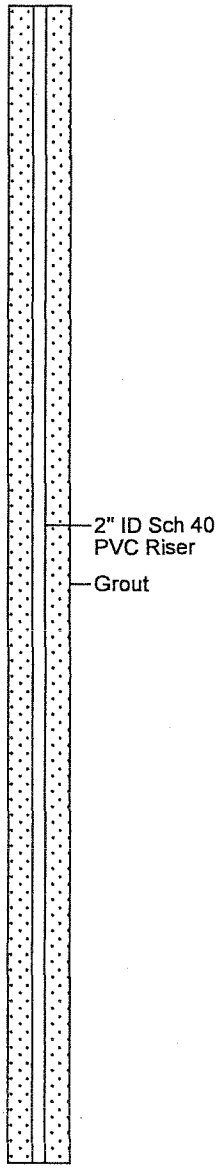
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							
81							
82							
83	10.0 / 10.0	R-8 83.0 - 93.0	88%				83.0 -84.5 - Medium hard red SHALE.
84							
85							84.5 - 85.6 - Hard gray SANDSTONE.
86							85.6 - 93.0 - Medium hard to soft red SHALE, very fine grained, highly weathered, argillaceous, thick bedding, fractures noted.
87							
88							
89							
90							
91							
92							
93	10.0 / 10.0	R-9 93.0 - 103.0	90%				93.0 - 98.5 - Hard gray SANDSTONE, fine grained, slightly weathered, thick bedding, unfractured.
94							
95							
96							
97							
98							
99							98.5 - 103.0 - Soft medium hard gray to red SHALE, with few argillaceous, laminations, very fine grained, slightly to moderately weathered, thick to medium bedding, fractures noted.
100							

Well: BuSW-3



REMARKS:

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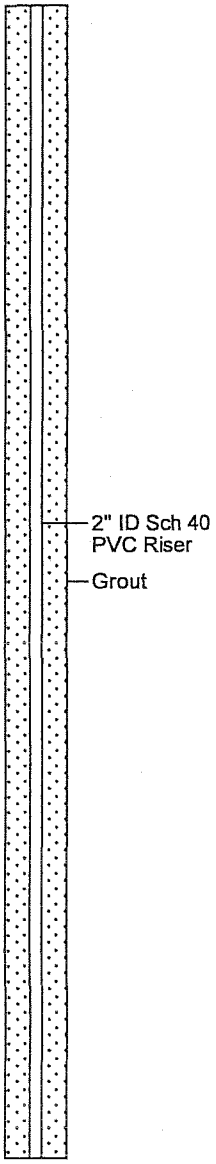
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab
Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
103	10.0 / 8.4	R-10 103.0 - 113.0	92%				103.0 - 104.5 - Medium hard gray SHALE, some sandstone interbeds. 104.5 - 113.0 - SAA: hard and olive to purple, olive mottled in color.
113	10.0 / 10.0	R-11 113.0 - 123.0	91%				113.0 - 123.0 - SAA: olive and purple to red.

Well: BuSW-3



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Ground Elevation (ft.)	: N/A

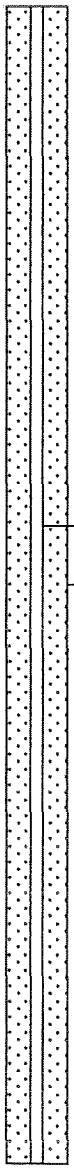
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							
121							
122							
123	10.0 / 9.6	R-12 123.0 - 133.0	86%				123.0 - 132.6 - Medium hard red SHALE, very fine grained, moderately to highly weathered argillaceous thick bedding, fractures noted.
124							
125							
126							
127							
128							
129							
130							
131							
132							
133	10.0 / 10.0	R-13 133.0 - 143.0	92%				133.0 - 139.9 - SAA: gray mottling and trace argillaceous laminations.
134							
135							
136							
137							
138							
139							
140							

Well: BuSW-3



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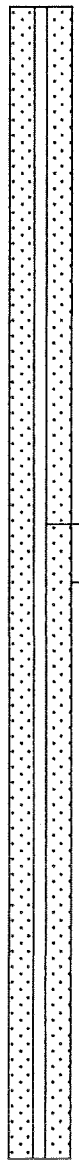
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140							139.9 - 143.0 - Hard gray SANDSTONE, medium grained, slightly weathered, micaceous thick bedding, unfractured.
141							
142							
143	10.0 / 9.3	R-14 143.0 - 153.0	83%				143.0 - 146.0 - SAA: trace brown argillaceous laminations.
144							
145							
146							146.0 - 152.3 - Medium hard red SHALE with few gray micaceous laminations, very fine grained, highly weathered, medium bedding, fractures noted.
147							
148							
149							
150							
151							
152							
153	10.0 / 9.3	R-15 153.0 - 163.0	95%				153.0 - 156.6 - SAA: little gray mottling.
154							
155							
156							
157							156.6 - 161.0 - Hard gray SANDSTONE, fine to medium grained, slightly weathered, thick bedding, unfractured.
158							
159							
160							

Well: BuSW-3



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Ground Elevation (ft.)	: N/A

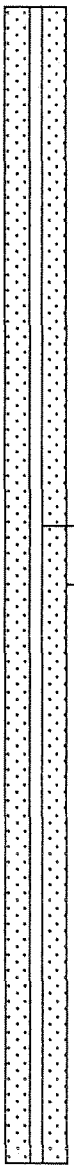
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160							
161							161.0 - 163.0 - Hard brown SILTSTONE, very fine grained, slightly weathered, medium bedding, fractures noted.
162							
163	10.0 / 10.0	R-16 163.0 - 173.0					163.0 - 164.3 - SAA.
164							
165							164.3 - 166.3 - Medium hard gray SHALE, very fine grained, moderately weathered, argillaceous, pyritic, medium bedding, unfractured.
166							
167							166.3 - 170.7 - Hard gray SANDSTONE, medium grained, slightly weathered, micaceous, pyritic, thick bedding, unfractured.
168							
169							
170							
171							170.7 - 173.0 - Medium hard gray SHALE, very fine grained, slightly weathered, argillaceous, medium bedding, unfractured.
172							
173	10.0 / 10.0	R-17 173.0 - 183.0	96%				173.0 - 183.0 - SAA: red at 178.0-180.0.
174							
175							
176							
177							
178							
179							
180							

Well: BuSW-3



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Hydro Investigation
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Cheshire, Ohio

Project Number: APO017

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Ground Elevation (ft.)	: N/A

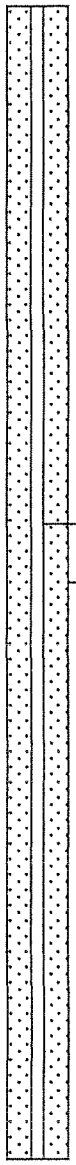
LOG OF BORING BuSW-3

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
183	10.0 / 10.0	R-18 183.0 - 193.0	95%				183.0 - 193.0 - SAA: mottled green gray purple and greenish brown from 183 -188, red from 188 - 193.
193	10.0 / 9.5	R-19 193.0 - 203.0	85%				193.0 - 203.0 - SAA: gray with a red zone at 194.1

Well: BuSW-3



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Cheshire, Ohio

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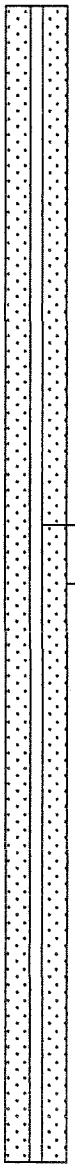
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200–220	10.0 / 10.0	R-20 203.0 - 213.0	91%				203.0 -213.0 - Medium hard gray with brown mottling to red SHALE, very fine grained moderately weathered argillaceous, medium bedding, fractures noted.
200–220	10.0 / 10.0	R-21 213.0 - 223.0	73%				213.0 - 221.7 - SAA: red to gray.

Well: BuSW-3



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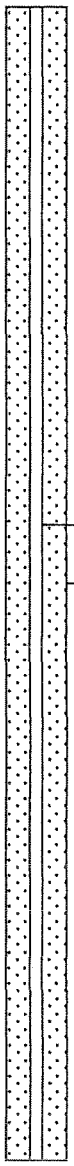
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220							
221							
222							221.7 - 223.0 - Hard gray SANDSTONE, medium grained, slightly weathered, medium bedding, unfractured.
223	10.0 / 10.0	R-22 223.0 - 233.0	100%				223.0 - 227.6 - Medium hard to hard gray interbedded SHALE and SILTSTONE, very fine grained, slightly weathered, argillaceous, thin bedding, unfractured.
224							
225							
226							
227							
228							227.6 - 233.0 -Hard gray SANDSTONE, with trace argillaceous laminations, fine to medium grained, slightly weathered, trace mica, medium to thick bedding, unfractured.
229							
230							
231							
232							
233	10.0 / 9.6	R-23 233.0 - 243.0	96%				233.0 - 242.6 - SAA: micaceous.
234							
235							
236							
237							
238							
239							
240							

Well: BuSW-3



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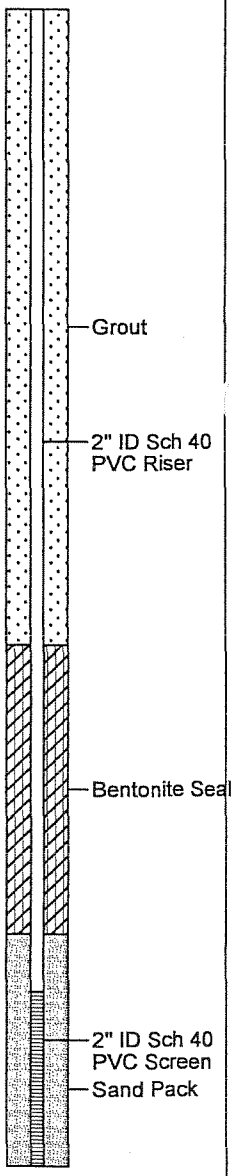
LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
240–260	10.0 / 10.0	R-24 243.0 - 253.0	96%				243.0 - 251.6 - Hard gray to brown SILTSTONE, some fine grained sandstone beds and few argillaceous laminations, fine grained, slightly weaterhed, thin bedding, fractures noted.
	10.0 / 9.8	R-25 253.0 - 263.0	96%				251.6 - 253.0 - Medium hard red SHALE, with few siltstone interbeds, very fine grained moderately to highly weathered, argillaceous, medium bedding, fractures noted. 253.0 - 256.3 - SAA. 256.3 - 262.8 - Hard gray SANDSTONE, few argillaceous laminations, fine grained, slightly to moderately weathered, thin to medium bedding, fractures noted.

Well: BuSW-3



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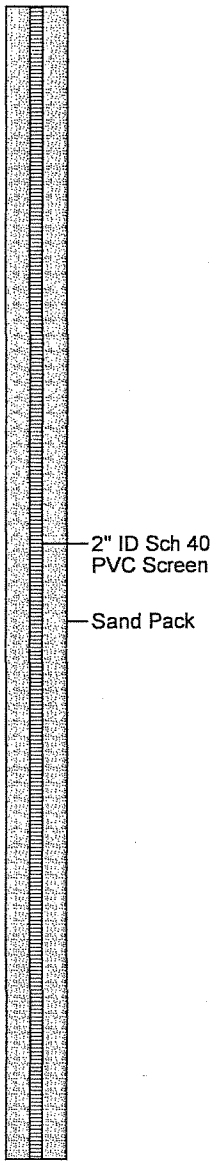
LOG OF BORING BuSW-3

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
260							
261							
262							
263	10.0 / 10.0	R-26 263.0 -273.0	100%				263.0 - 273.0 -SAA: argillaceous laminations, become rarer with depth, very micaceous @ 269-273.
264							
265							
266							
267							
268							
269							
270							
271							
272							
273	10.0 / 10.0	R-27 273.0 - 283.0	92%				273.0 - 282.2 - Hard gray SANDSTONE, medium grained, slightly weathered, micaceous, thick bedding, unfractured.
274							
275							
276							
277							
278							
279							
280							

Well: BuSW-3



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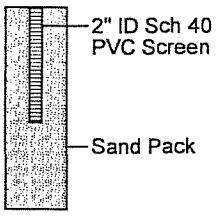
Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
280							
281							
282							
283	10.0 / 9.3	R-28 283.0 - 293.0	81%				282.2 - 283.0 - Soft to medium hard gray to brown SHALE, very fine grained, highly weathered, argillaceous, thin bedding, fractures noted. 283.0 - 288.6 - Medium hard red with some brown green and purple mottling SHALES, very fine grained, argillaceous, thick bedding, fractures noted.
284							
285							
286							
287							
288							
289							288.6 - 293.0 - Hard gray SANDSTONE, frine to medium grained, slightly weathered, micaceous, thick bedding, fractures noted.
290							
291							
292							
293	10.0 / 10.0	R-29 293.0 - 303.0	97%				293.0 - 303.0 - Hard gray SILTSTONE, micaceous laminations, fine grained, slightly weathered, medium bedding, unfractured, broken zone at bottom.
294							
295							
296							
297							
298							
299							
300							

Well: BuSW-3



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Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 313.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-3

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-3

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
300–303	10.0 / 10.0	R-30 303.0 - 113.0	92%				303.0 - 310.4 - SAA: some argillaceous laminations.
310–313							310.4 - 313 - Hard light gray LIMESTONE, very fine grained, moderately weathered, calcite medium bedding, fractures noted, oil within rock and seeping from pores.
313							End of boring.

REMARKS:

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

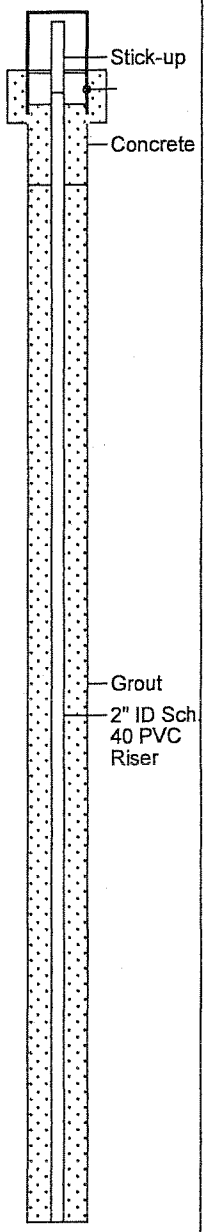
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0	2.0/1.3	SP1/SS1	NA	2-3-4-6			0.0 to 1.3 - Loose orange/brown/gray SAND, trace coal and shale, moist.
	2.0/1.2	SP2/SS2	NA	5-4-5-6			2.0 to 3.2 - Same As Above (SAA).
	2.0/1.0	SP3/SS3	NA	NA			4.0 to 5.0 - California Sampler.
	2.0/0.7	SP4/SS4	NA	3-5-6-8			6.0 to 6.7 - SAA: no coal.
	2.0/1.4	SP5/SS5	NA	2-4-6-7			8.0 to 9.4 - SAA: orange/beige, no shale, trace coal.
10	2.0/1.0	SP6/SS6	NA	2-4-5-8			10.0 to 11.0 - SAA.
	2.0/1.4	SP7/SS7	NA	8-11-8-10			12.0 to 13.4 - SAA.
	2.0/1.5	SP8/SS8	NA	4-3-5-6			14.0 to 15.5 - SAA: coal and shale at bottom.
	2.0/0.7	SP9/SS9	NA	1-1-2-2			16.0 to 16.7 - SAA.
	2.0/1.2	SP10/SS10	NA	W/H-1-1-1			18.0 to 19.2 - Soft green/grey clayey SAND, very moist to wet, coal and wood frags.
20							

Well: BuSW4
Elev.:



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20	2.0/1.1	SP11/SS11	NA	3-10-15-8			20.0 to 21.1 - Soft to medium dense clayey SAND, few coal and ss frags, moist, wood frags.
	2.0/1.5	SP12/SS12	NA	4-11-19-26			22.0 to 23.5 - Stiff to very stiff orange grey silty CLAY/weathered SHALE, moist, little sand.
	2.0/1.2	SP13/SS13	NA	7-7-10-14			24.0 to 25.2 - SAA: stiff, black mottling.
	2.0/1.4	SP14/SS14	NA	35-50-50/4			26.0 to 27.4 - Hard brown/light grey SHALE, weathered, iron stained, fissile.
	2.0/1.4	SP15/SS15	NA	18-38-50/4			28.0 to 29.4 - SAA.
30	2.0/0.4	SP16/SS16	NA	50/4			30.0 to 30.4 - Very hard grey SILTSTONE.
	2.0/0.8	SP17/SS17	NA	44-50/4			32.0 to 32.8 - SAA.
	2.0/0.7	SP18/SS18	NA	47-50/4			34.0 to 34.7 - SAA: wet between 34.3 -34.5.
	2.0/0.9	SP19/SS19	NA	23-50-50/4			36.0 to 36.9 - Very hard grey SHALE, slightly moist, fissile.
	2.0/0.8	SP20/SS20	NA	48-50/4			38.0 to 38.9 - SAA: wet.
40							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40	2.0/0.1	SP21/SS21	NA	50/2			40.0 to 40.1 - SAA. 40.5 to 48.5 - Soft dark red to grey moderately weathered SHALE.
	10.0/10.0 RQD = 90.0	RC1/	NA	NA			
							48.5 to 50.5 - SAA.
50	10.0/10.0 RQD = 93.5	RC2/12MIN	NA	NA			50.5 to 57.5 - SAA: red, some orange and grey mottling.
							57.5 to 60.5 - SAA: fracs at 56.7 and 59.5.
60							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60	10.0/10.0 RQD = 99.2	RC3/12MIN	NA	NA			60.5 to 63.5 - SAA: <0.1 silt seams.
							63.5 to 65.3 - Hard grey fine grained SANDSTONE.
							65.3 to 70.5 - Medium hard green/grey, moderately weathered SHALE.
70	10.0/10.0 RQD = 98.7	RC4/14MIN	NA	NA			70.5 to 80.5 - SAA: soft blue grey and burgundy, few 1.0 siltstone seams at 74.6, 77.0, 80.0. Fractures noted.
80							

Well: BuSW4
Elev.:

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

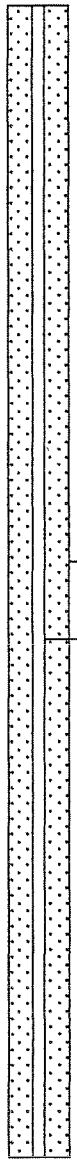
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80	10.0/10.0 RQD = 92.5	RC5/12MIN	NA	NA			80.5 to 85.5 - SAA: siltstones at 82.0, 90.0-90.5.
							85.5 to 89.0 - Hard fine grained SANDSTONE.
90	10.0/10.0 RQD = 94.7	RC6/12MIN	NA	NA			90.0 to 90.5 - Soft red SHALE. 90.5 to 91.3 - SAA: interbedded with red shale. 91.3 to 100.5 - SAA: soft burgundy/red and grey, moderately weathered. Fracs at 91.9, 93.0, 94.1, 97.0.
100							



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

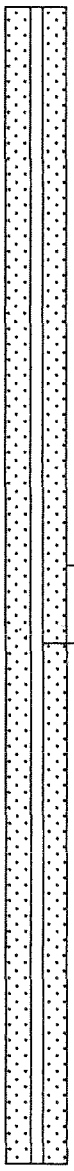
G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100	10.0/9.8 RQD = 97.0	RC7/17MIN	NA	NA			100.5 to 106.0 - SAA: soft medium hard burundy and blue grey, few <0.1 siltstone interbeds. Fracs @ 101.4, 102.3, 104.0.
110	10.0/10.0 RQD = 91.9	RC8/12MIN	NA	NA			110.5 to 120.5 - SAA: red, siltstone interbeds at bottom.
120							



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120	5.0/4.2 RQD = 64.0	RC9/9MIN	NA	NA			120.5 to 121.5 - Hard blue grey fine grained SANDSTONE, slightly weathered.
							121.5 to 122.6 - Soft red SHALE, moderately weathered.
	5.0/5.0 RQD = 40.8	RC10/10MIN	NA	NA			125.5 to 130.5 - SAA.
130	5.0/1.0 RQD = 100	RC11/12MIN	NA	NA			130.5 to 131.0 - SAA.
	5.0/5.0 RQD = 92.5	RC12/14MIN	NA	NA			135.5 to 138.0 - SAA: ~1.0 fine grained sandstone interbed at 136.0 -137.0, micaceous at bottom.
							138.0 to 140.5 - Fine grained SANDSTONE, micaceous.
140							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140	10./9.5 RQD = 96.9	RC13/14MIN	NA	NA			140.5 to 142.5 - SAA: micaceous
							142.5 to 150.0 - Hard grey and red interbedded SILTSTONE & SHALE, micaceous.
150	10.0/10.0 RQD = 87.3	RC14/10MIN	NA	NA			150.5 to 154.3 - Soft red SHALE, moderately weathered.
							154.3 to 157.5 - Hard blue/grey fine grained SANDSTONE, moderately weathered.
							157.5 to 160.5 - Soft blue grey SILTSTONE, moderately weathered, grain size increasing with depth.
160							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
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Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160	10.0/10.0 RQD = 92.9	RC15/10MIN	NA	NA			160.5 to 170.5 - Soft to medium hard blue grey SHALE, moderately weathered.
170	10.0/10.0 RQD = 85.6	RC16/9MIN	NA	NA			170.5 to 180.5 - SAA: soft blue grey to red, mod. weathered, occasional siltstone interbed 170.5-171.0 and 175.5-176.0
180							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
180	10.0/10.0 RQD = 91.2	RC17/8MIN	NA	NA			180.5 to 190.5 - SAA: siltstone absent, red with grey and orange mottling.
190	10.0/10.0 RQD = 100	RC18/9MIN	NA	NA			190.5 to 200.5 - SAA: red and grey, fractures noted.
200							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
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Logged by	: M. McCoy
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200	10.0/9.8 RQD = 96.2	RC19/19MIN	NA	NA			200.5 to 209.8 - SAA: soft red grey, occasional ~0.3 siltstone lense, orange mottling, mod weathered.
210	10.0/10.0 RQD = 100	RC20/12MIN	NA	NA			210.5 to 220.5 - SAA: fracture noted.
220							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
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Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220	10.0/10.0 RQD = 100	RC21/10MIN	NA	NA			220.5 to 230.5 - Soft grey SHALE, orange mottling, mod. weathered, fracture noted.
230	10.0/10.0 RQD = 81.7	RC22/11MIN	NA	NA			230.5 to 240.5 - SAA: siltstone interbeds between 230.5 - 232.5, 235.0 - 236.5, 240.0 - 240.5, fractures noted.
240							

Grout

2" ID Sch 40 PVC Riser

Bentonite Pellets

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
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Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

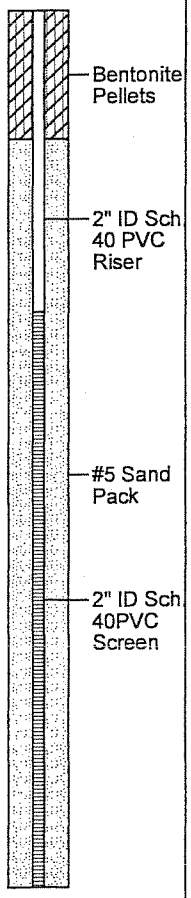
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
240	10.0/10.0 RQD = 87.7	RC23/8MIN	NA	NA			240.5 to 250.5 - Hard blue grey fine grained SANDSTONE, <0.1 siltstone/shale interbeds, grain size increasing with depth below 249.0.
250	10.0/10.0 RQD = 86.2	RC24/10MIN	NA	NA			250.5 to 259.5 - SAA: occasional coarse grained zone, fissile, calcite inclusions.
260							



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
260	10.0/10.0 RQD = 95.6	RC25/8MIN	NA	NA			260.5 to 261.3 - Soft blue grey SHALE, moderately weathered. 261.3 to 265.6 - Hard blue grey SILTSTONE, grain size increasing with depth.
							265.6 to 270.5 - Hard blue grey medium grained SANDSTONE, laminations of mica, moderately weathered.
270	10.0/10.0 RQD = 100	RC26/8MIN	NA	NA			270.5 to 280.5 - Hard blue grey medium grained SANDSTONE, mica laminations, occasional coarse grained zone, fractures noted
280							

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
280	10.0/10.0 RQD = NM	RC27/	NA	NA			280.5 to 290.5 - SAA.
290	10.0/10.0 RQD = 91.9	RC28/12MIN	NA	NA			290.5 to 300.5 - SAA.
300							

REMARKS:

Borings backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-19 BuSW-4.bor

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/27/06
Date Completed	: 05/02/06
Logged by	: M. McCoy
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 310.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-19/BuSW4

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
300							300.5 to 305.8 - SAA; coarse at bottom.
							305.8 to 308.5 - Hard grey/blue fine SANDSTONE/SILTSTONE.
310							308.5 to 310.5 - Hard blue grey and burgundy SHALE, friable, fracture noted. End of Boring @ 310.5.
320							

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

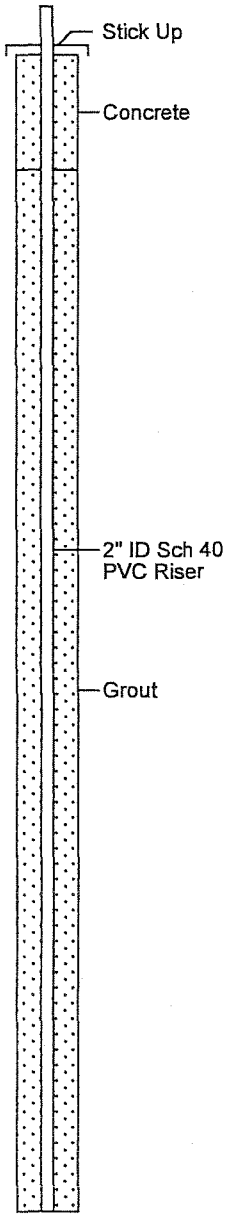
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 - 11.0 - Casing set; no sampling.
11	8.0 / 8.0	R-1 11.0 - 19.0	76%				11.0 - 17.6 - Medium hard, gray SHALE, trace arenaceous laminations; very fine grained, highly weathered, argillaceous, thick bedding, fractures noted.
18							17.6 - 19.0 - Hard, gray SANDSTONE; medium grained, moderately weathered, trace argillaceous laminations, medium bedding, fractures noted.
19	10.0 / 9.6	R-2 19.0 - 29.0	96%				

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

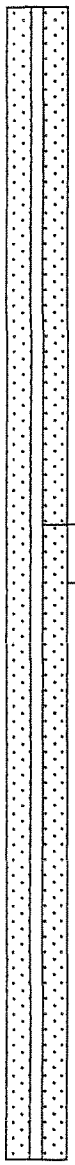
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20–25							19.0 - 25.6 - Medium hard to hard, gray interbedded SHALE and SANDSTONE; very fine to medium grained, moderately to highly weathered, argillaceous, arenaceous, thin to medium bedding, fractures noted.
25–29							25.6 - 29.0 - Becomes a SANDSTONE slightly to moderately interbedded with shale.
29–39	10.0 / 10.0	R-3 29.0 - 39.0	92%				29.0 - 39.0 - Medium hard, gray SHALE slightly interbedded with sandstone and siltstone; very fine grained, moderately weathered, argillaceous, thin to medium bedding, fractures noted.
39–40	10.0 / 10.0	R-4 39.0 - 49.0	94%				

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							39.0 - 49.0 - Soft to medium hard, red to gray SHALE; very fine grained, highly weathered, argillaceous, thick bedding, fractures noted, red in color from 39.6 to 41.7 feet.
41							
42							
43							
44							
45							
46							
47							
48							
49	10.0 / 9.4	R-5 49.0 - 59.0	87%				49.0 - 59.0 - Same as above; red with trace to some brown and gray mottling.
50							
51							
52							
53							
54							
55							
56							
57							
58							
59	10.0 / 10.0	R-6 59.0 - 69.0	100%				59.0 - 62.3 - Same as above.
60							

Well: BuSW-5
Elev.:

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

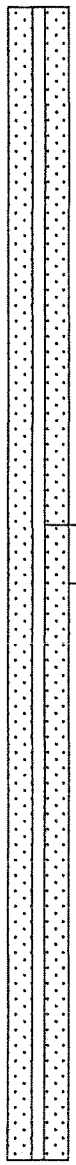
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60–68							62.3 - 69.0 - Hard, gray SANDSTONE; fine to medium grained, slighly weathered, micaceous, thick bedding, unfractured.
69	10.0 / 9.5	R-7 69.0 - 79.0	95%				69.0 - 78.0 - Same as above.
70–78							
78							78.0 - 78.5 - Medium hard, gray SHALE; very fine grained, slightly weathered, argillaceous, thin bedding, unfractured.
79	10.0 / 10.0	R-8 79.0 - 89.0	100%				79.0 - 81.4 - Same as above.
80							

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80–88							
89	10.0 / 10.0	R-9 89.0 - 99.0	100%				89.0 - 92.5 - Same as above; few arenaceous laminations.
90–98							
99	10.0 / 9.8	R-10 99.0 - 109.0	91%				
100							

81.4 - 84.7 - Hard, gray SANDSTONE; fine grained, slighly weathered, micaceous, thick bedding, unfractured.

84.7 - 89.0 - Hard, red with some gray mottling SILTSTONE with trace shale interbeds; very fine grained, slighly weathered, micaceous, argillaceous, thick bedding, unfractured.

92.5 - 99.0 - Medium hard, gray to brown and gray mottled SHALE, trace arenaceous laminations; very fine grained, moderately weathered, medium bedding, fractures noted.

Well: BuSW-5
Elev.:

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-5
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							99.0 - 108.8 - Medium hard, greenish-gray to purple to red SHALE; very fine grained, very highly eenish-brown and rceous, medium bedding, fractures noted.
101							
102							
103							
104							
105							
106							
107							
108							
109	10.0 / 10.0	R-11 109.0 - 119.0	95%				109.0 - 119.0 - Medium hard, mottled purple, greenish-brown and red SHALE; very fine grained, highly weathered, argillaceous, thin bedding, fractures noted.
110							
111							
112							
113							
114							
115							
116							
117							
118							
119	5.4 / 5.4	R-12 119.0 - 124.4	83%				119.0 - 124.4 - Same as above.
120							

2" ID Sch 40 PVC Riser

Grout

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120–139	10.0 / 10.0	R-13 124.4 - 134.4	96%				124.4 - 129.6 - Medium hard, brownish-red SHALE; very fine grained, moderately weathered, argillaceous, thick bedding, fractures noted, contains trace arenaceous interbeds in a gray zone at 128.4 to 129.6 feet.
							129.6 - 134.4 - Hard, gray SANDSTONE; fine grained, slightly weathered, very micaceous, thick bedding, unfractured.
	10.0 / 9.2	R-14 134.4 - 144.4	92%				134.4 - 143.6 - Very hard, gray to brownish-red SANDSTONE; fine grained, unweathered, thick bedding, unfractured; contains siltstone interbeds.
140							

Well: BuSW-5
Elev.:

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

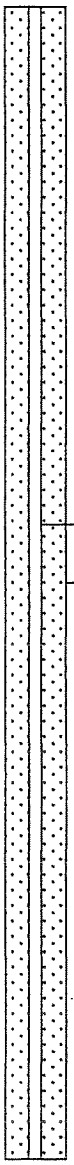
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140–160	10.0 / 10.0	R-15 144.4 - 154.4	89%				144.4 - 147.0 - Same as above.
							147.0 - 150.0 - Medium hard, red SHALE; very fine grained, highly weathered, argillaceous, medium bedding, fractures noted.
							150.0 - 150.9 - Hard, red SILTSTONE.
							150.9 - 154.4 - Hard, gray SANDSTONE; fine grained, slightly weathered, micaceous, thick bedding, unfractured.
	10.0 / 10.0	R-16 154.4 - 164.4	97%				154.4 - 155.8 - Same as above.
							155.8 - 164.4 - Hard, gray SILTSTONE; very fine grained, slighly weathered, arenaceous, thick bedding, unfractured.

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160							
161							
162							
163							
164	10.0 / 10.0	R-17 164.4 - 174.4	100%				164.4 - 169.5 - Hard, gray SANDSTONE; fine grained, slightly weathered, micaceous, thick bedding, unfractured.
165							
166							
167							
168							
169							
170							169.5 - 174.4 - Medium hard to hard, gray with little red banding SHALE; very fine grained, little arenaceous laminations, slightly to moderately weathered, argillaceous, medium bedding, fractures noted.
171							
172							
173							
174	10.0 / 10.0	R-18 174.4 - 184.4	97%				174.4 - 184.4 - Medium hard, predominately gray SHALE with red, purple and greenish-yellow mottling; very fine grained, moderately to highly weathered, argillaceous, thin to medium bedding, fractures noted.
175							
176							
177							
178							
179							
180							

Well: BuSW-5
Elev.:

2" ID Sch 40 PVC Riser

Grout

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
184	10.0 / 9.9	R-19 184.4 - 194.4	97%				184.4 - 194.4 - Same as above.
194	10.0 / 10.0	R-20 194.4 - 204.4	91%				194.4 - 204.4 - Medium hard, gray SHALE with some red and yellow mottling; very fine grained, moderately to highly weathered, argillaceous, thin to medium bedding, fractures noted.

Well: BuSW-5
Elev.:

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

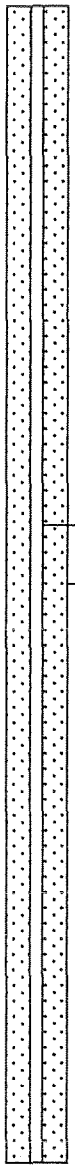
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200–220	10.0 / 9.8	R-21 204.4 - 214.4	90%				204.4 - 214.4 - Medium hard to hard, gray SHALE, abundantly interbedded with sandstone; very fine to medium grained, argillaceous, moderately weathered, thin bedding, fractures noted.
	10.0 / 10.0	R-22 214.4 - 224.4	93%				214.4 - 224.4 - Soft to medium hard gray SHALE; very fine grained, moderately to highly weathered, argillaceous, trace arenaceous laminations, medium bedding, fractures noted.

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
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Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

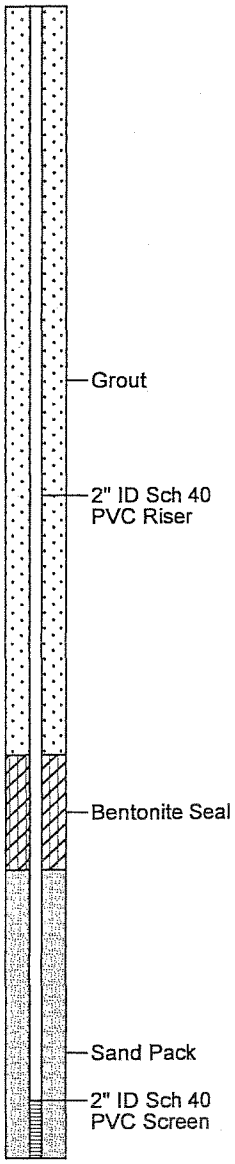
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220							
221							
222							
223							
224	10.0 / 10.0	R-23 224.4 - 234.4	93%				224.4 - 234.4 - Same as above.
225							
226							
227							
228							
229							
230							
231							
232							
233							
234	10.0 / 10.0	R-24 234.4 - 244.4	93%				234.4 - 235.1 - Same as above; dark gray.
235							235.1 - 244.4 - Hard, gray SANDSTONE; fine to medium grained, slightly weathered, thick bedding, unfractured.
236							
237							
238							
239							
240							

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
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Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

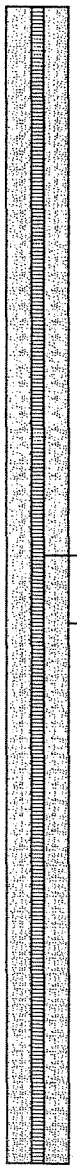
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
240–260	10.0 / 10.0	R-25 244.4 - 254.4	100%				244.4 - 254.4 - Same as above; carbonitic (black carbon banding), micaceous.
240–260	10.0 / 10.0	R-26 254.4 - 264.4	100%				254.4 - 259.4 - Same as above; fine grained, few coal seams, micaceous, pyritic.

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

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Total Depth (ft.)	: 284.4'
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Ground Elevation (ft.)	: N/A

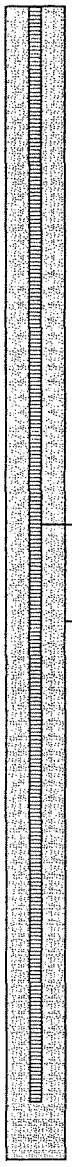
LOG OF BORING BuSW-5

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
260							259.4 - 264.4 - Hard, gray SANDSTONE; medium to coarse grained, slightly weathered, micaceous, pyritic, contains few coal seams, few brecciated zones, medium bedding, unfractured.
264	10.0 / 10.0	R-27 264.4 - 274.4	100%				264.4 - 274.4 - Same as above; lacking breccia and pyrite, micaceous.
274	10.0 / 10.0	R-28 274.4 - 284.4	86%				274.4 - 278.8 - Same as above.
279							278.8 - 281.7 - Medium hard, red SHALE; very fine grained, highly weathered, argillaceous, thick bedding, fractures noted.
280							

Well: BuSW-5
Elev.:



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 8/23/2007
Date Completed	: 8/24/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 284.4'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING BuSW-5

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-5
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
280							
281							281.7 - 284.4 - Same as above, but brown to gray.
282							
283							
284							284.4 - Bottom of boring.
285							
286							
287							
288							
289							
290							
291							
292							
293							
294							
295							
296							
297							
298							
299							
300							

Sand Pack

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

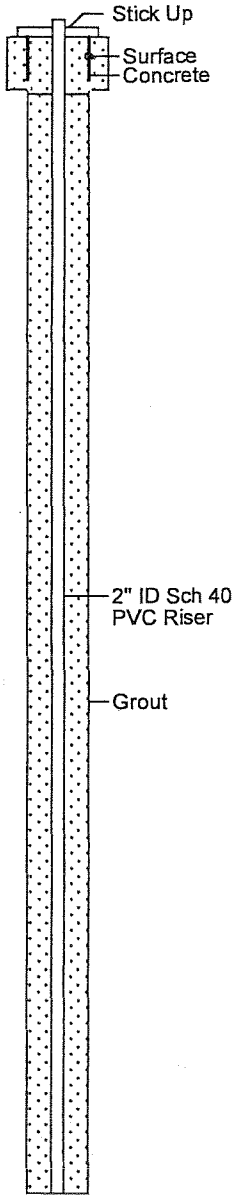
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 - 10.5 - Casing set; no sampling.
10	2.0 / 2.0	R-1 10.5 - 12.5	80%				10.5 - 12.5 - Hard, red SHALE, blocky structure, fractures noted.
12	10.0 / 9.8	R-2 12.5 - 22.3	90%				12.5 - 22.3 - Same As Above (SAA): gray and red, orange staining. Less than 0.1 feet of black shale / coal at 16.9 feet.
20							

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING IMW-1Bu

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21							
22	10.0 / 6.2	R-3 22.5 - 28.7	48%				22.5 - 28.7 - Medium hard, burgandy SHALE, weathered, blocky.
23							
24							
25							
26							
27							
28							
29							
30							
31							
32	10.0 / 2.1	R-4 32.5 - 42.5	21%				32.5 - 34.6 - SAA: core stuck in barrel.
33							
34							
35							
36							
37							
38							
39							
40							

Well: IMW-1Bu

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve-Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

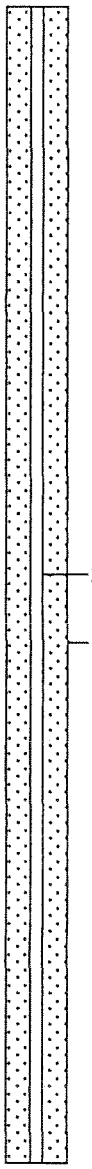
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40–60	10.0 / 10.0	R-5 42.5 - 52.5	87%				42.5 - 47.5 - SAA: burgandy to gray, weathering decreasing with depth.
							47.5 - 52.5 - Hard, gray, fine grained SANDSTONE; thinly bedded, micaceous laminations,fractures noted.
	10.0 / 10.0	R-6 52.5 - 62.5	92%				52.5 - 62.5 - SAA: iron staining in bands, fractures noted.

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60–64	10.0 / 9.8	R-7 62.5 - 72.5	89%				62.5 - 64.9 - SAA.
65							64.9 - 65.7 - Medium hard, gray SHALE, thinly bedded.
66–69							65.7 - 69.5 - Hard, fine grained SANDSTONE grading to SILTSTONE.
70–71							69.5 - 72.5 - Hard, gray SHALE; slightly weathered, orange stained zones, thin silty laminations.
72	10.0 / 8.5	R-8 72.5 - 72.8	100%				72.5 - 73.5 - Hard, fine grained SANDSTONE; micaceous.
73–80							73.5 - 82.5 - Hard, gray SILTSTONE; fine grained, thin bedding, trace shale interbeds between 77.0 and 79.4 feet.

Well: IMW-1Bu

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

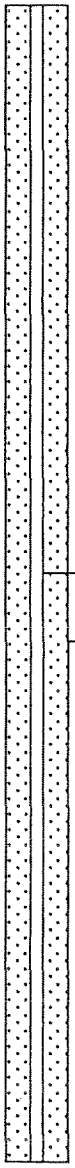
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							
81							
82							
83	10.0 / 10.0	R-9 82.5 - 92.5	90%				82.5 - 92.5 - Hard, gray and red banded interbedded SHALE and SILTSTONE; few pyrite in bottom foot, fractures noted.
84							
85							
86							
87							
88							
89							
90							
91							
92							
93	10.0 / 10.0	R-10 92.5 - 102.5	92%				92.5 - 93.6 - SAA.
94							93.6 - 102.5 - Medium hard to hard, red and gray ures at clghtly weathered, iron staining, fractures noted.
95							
96							
97							
98							
99							
100							

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

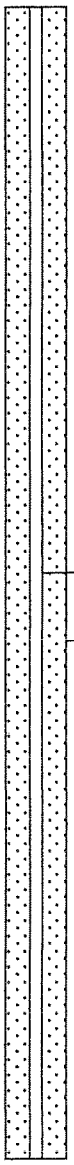
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							
101							
102							
103	10.0 / 9.9	R-11 102.5 - 112.5	96%				102.5 - 112.5 - Hard, red and gray SHALE; slightly weathered.
104							
105							
106							
107							
108							
109							
110							
111							
112							
113	10.0 / 9.8	R-112 112.5 - 122.5	96%				112.5 - 122.5 - SAA.
114							
115							
116							
117							
118							
119							
120							

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							
121							
122							
	10.0 / 10.0	R-13 122.5 - 132.5	99%				122.5 - 132.5 - Hard, red and gray SHALE; orange staining, fractures noted.
123							
124							
125							
126							
127							
128							
129							
130							
131							
132							
	10.0 / 10.0	R-14 132.5 - 142.5	98%				132.5 - 142.5 - SAA.
133							
134							
135							
136							
137							
138							
139							
140							

Well: IMW-1Bu

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

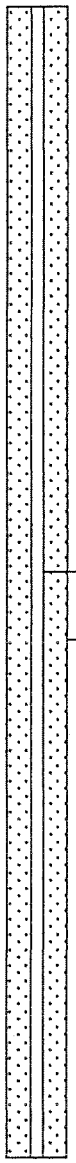
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140–160	10.0 / 9.7	R-15 142.5 - 152.5	79%				142.5 - 152.0 - SAA: pyritic between 144.5 and 147.0 feet.
152	10.0 / 10.0	R-16 152.5 - 162.5	100%				152.0 - 152.3 - Hard, gray SILTSTONE; fine grained.
153							152.5 - 162.5 - Hard, gray, fine grained SANDSTONE.

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

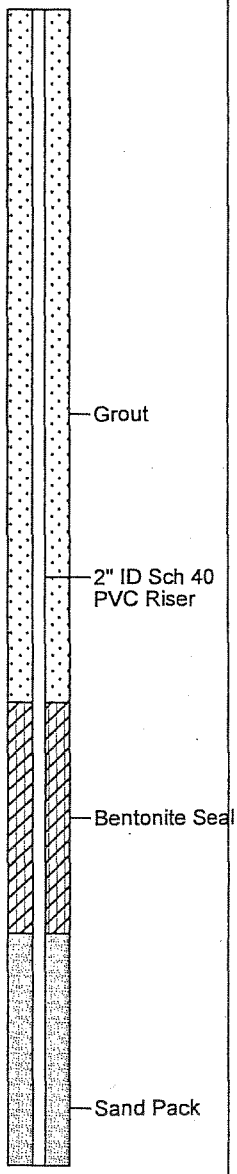
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160–180	10.0 / 10.0	R-17 162.5 - 172.5	83%				162.5 - 168.1 - SAA.
							168.1 - 172.5 - Hard, brown-red to red SHALE; gray mottling and orange staining.
	10.0 / 10.0	R-18 172.5 - 182.5	83%				172.5 - 175.7 - SAA.
							175.7 - 182.5 - Hard, gray, fine grained SANDSTONE; thinly bedded, becomes micaceous with depth, small calcite inclusions.

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

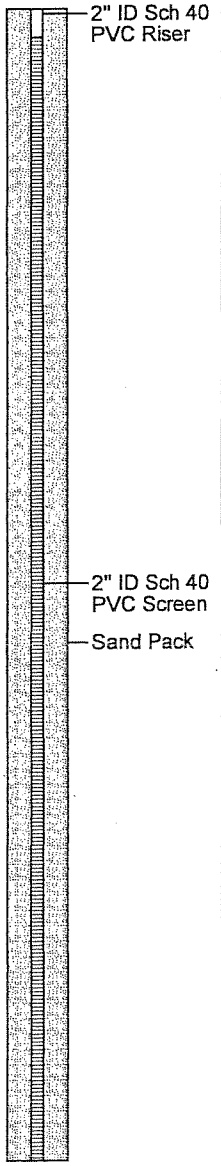
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
180–200	10.0 / 10.0	R-19 182.5 - 192.5	100%				182.5 - 192.5 - SAA: increasing grain size with depth, micaceous laminations.
180–200	10.0 / 9.9	R-20 192.5 - 205.5	100%				192.5 - 200.5 - SAA.

Well: IMW-1Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/5/2007
Date Completed	: 9/5/2007
Logged by	: Matt McCoy
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 201.5'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

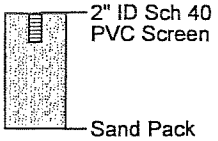
LOG OF BORING IMW-1Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200							
201							200.5 - 202.5 - Hard, gray SHALE; red at bottom.
202							
203							202.5 Bottom of boring.
204							
205							
206							
207							
208							
209							
210							
211							
212							
213							
214							
215							
216							
217							
218							
219							
220							

Well: IMW-1Bu



REMARKS:

BORING NO. ____CCR-1BU__
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek – Landfill	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9-21-15 to 10-12-15	AGES Geologist:	Mike Gelles

Drilling Method:	Rotosonic/Coring	Coring Device Size:	6”	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	8”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	280’	Surface Elevation:	783.41		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0 – 220			Advance casing – no samples.	N/A
220 – 230	6	NA	4’ Brown limestone; 2’ Gray limestone	N/A
230 – 240	10	NA	3’ Brown/Gray limestone; 7’ Gray limestone	N/A
240 – 250	8	NA	4’ Brown limestone; 4’ Gray limestone	N/A
250 – 260	3	NA	2.5’ Gray limestone; 0.5’ Gray fine-medium grained Sandstone	N/A
260 – 270	0	NA		N/A
270 – 280	0	NA		N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. CCR-1BU

Project Number: 2015079

Project Location: Kyger Creek Station – Landfill

Installation Date(s): 10/12/2015

Drilling Method: Rotosonic/Coring

Drilling Contractor: Bowser Morner

Development Date(s): 10/19/2015 – 11/21/2015

Development Method: Bailer

Introducing and purging up to 5 gallons of distilled water on each day of development.

Volume Purged:

Static Water-Level*

Top of Well Casing Elevation: 785.80 ft.(MSL)

Well Purpose:
Groundwater Monitoring

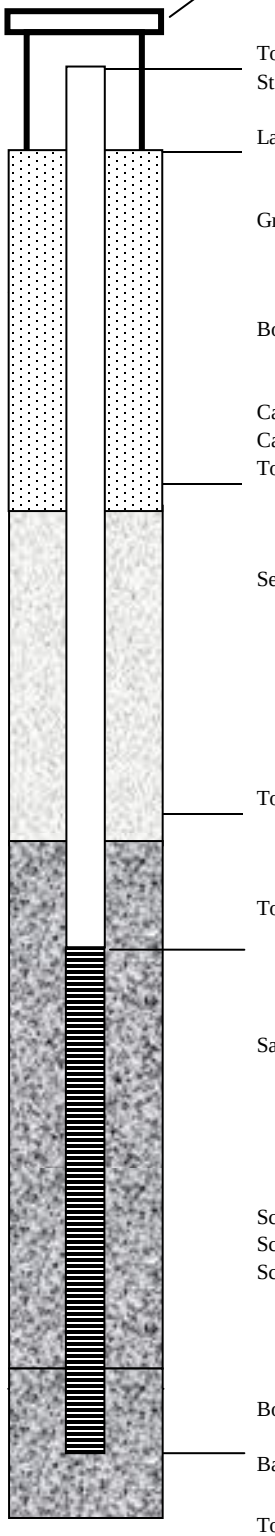
State Plane Coordinates: Northing (Y): 337641.36
Easting (X): 2063220.23

Comments/Notes:
2 inch PVC riser and screen
20 ft of 0.010 screen

Inspector: Mike Gelles

CONSTRUCTION MATERIALS USED:

7	Bags of Sand
1.5	Bags/Buckets Bentonite Pellets
10	Bags Portland for Grout
0	Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 785.80 ft. MSL
Stick-up: 2.39 ft.

Land Surface Elevation: 783.41 ft. MSL

Grout; Type: Portland Grout

Borehole Diameter: 8 inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 251 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 255 ft*

Top of Well Screen 259 ft*

Sand/Gravel Pack; Type: 0.40 mm

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 279 ft.*

Base of Borehole: 279 ft.*

Total Depth of Well
Below Top of Casing: 281.39 ft.

*Indicates Depth Below Land Surface

BORING NO. ____CCR-2BU__
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek – Landfill	Drilling Contractor:	Bowser Morner
Drilling Date(s):	10-13-15 to 10-21-15	AGES Geologist:	Mike Gelles/John Campbell

Drilling Method:	Rotosonic/Coring	Coring Device Size:	6”	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	8”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	247.5	Surface Elevation:	742.28		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0 – 205			Advance casing – no samples.	N/A
205 – 215	7.5	NA	Gray limestone	N/A
215 – 225	4.5	NA	Gray limestone	N/A
225 – 235	2	NA	0.5’ Gray limestone; 1.5’ Brown fine grained sandstone	N/A
235 – 246	2	NA	Gray medium to course grained sandstone	N/A
246 – 247.5		NA	Advance casing – no samples.	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. CCR-2BU

Project Number: 2015079

Project Location: Kyger Creek Station – Landfill

Installation Date(s): 10/21/2015

Drilling Method: Rotosonic/Coring

Drilling Contractor: Bowser Morner

Development Date(s):

Development Method: Bailer

Introducing and purging up to 5 gallons of distilled water on each day of development.

Volume Purged:

Static Water-Level*

Top of Well Casing Elevation: 744.69 ft.(MSL)

Well Purpose:
Ground Water Monitoring

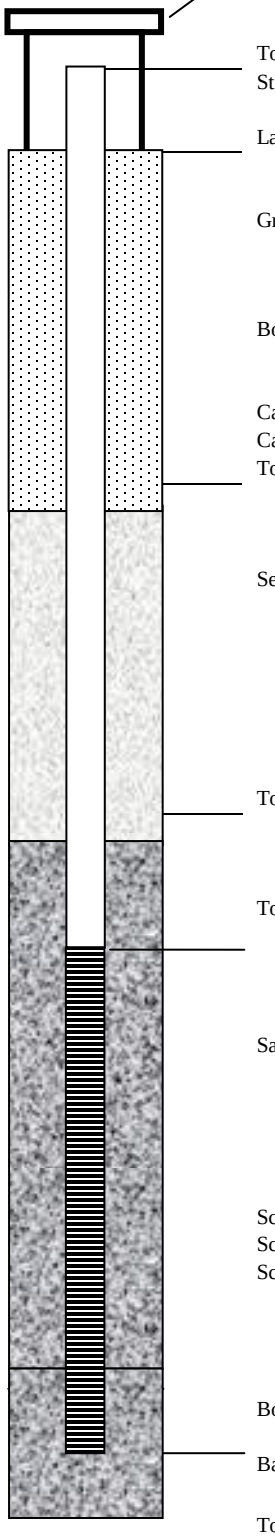
State Plane Coordinates: Northing (Y): 336302.19
Easting (X): 2064286.87

Comments/Notes:
2 inch PVC riser and screen
20 ft of 0.010 screen

Inspector: Mike Gelles/John Campbell

CONSTRUCTION MATERIALS USED:

7	Bags of Sand
1.5	Bags/Buckets Bentonite Pellets
10	Bags Portland for Grout
0	Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 744.69 ft. MS
Stick-up: 2.41 ft.

Land Surface Elevation: 742.28 ft. MS

Grout; Type: Portland Grout

Borehole Diameter: 8 inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 219.5 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 223.5 ft*

Top of Well Screen 227.5 ft*

Sand/Gravel Pack; Type: 0.40 mm

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 247.5 ft.*

Base of Borehole: 247.5 ft.*

Total Depth of Well
Below Top of Casing: 249.91 ft.

*Indicates Depth Below Land Surface

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/11/06
Date Completed	: 04/11/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 146.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-3/BuSW-8

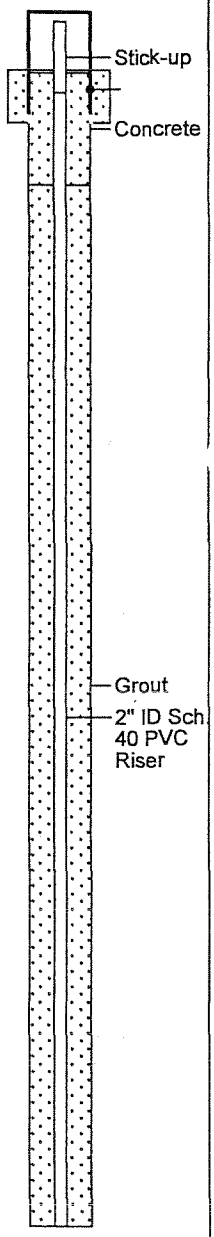
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0	2.0/1.5	SP1/SS1	NA	1-2-3-4			0.0 to 1.5 - Soft red silty CLAY, moist, plastic.
	2.0/1.1	SP2/SS2	NA	4-8-8-12			2.0 to 3.1 - Same As Above (SAA): grey fractures noted.
	2.0/1.6	SP3/SS3	NA	4-7-12-12			4.0 to 5.0- SAA. 5.0 to 5.6 - SAA: beige/yellow, silty.
	2.0/1.5	SP4/SS4	NA	4-7-10-50/2			6.0 to 6.6 - SAA: burgundy. 6.6 to 7.5 - SAA: orange. Hard to light grey/ green shale in shoe.
	3.0/3.0 RQD = 60.0	RC1/9MIN	NA	35-50/1			8.0 to 8.5 - Hard grey fine SANDSTONE. 8.5 to 9.6 - SAA: iron stained.
10							9.6 to 10.5 - Soft beige/grey SHALE, medium weathered.
	10.0/10.0 RQD = 79.2	RC2/9MIN	NA	NA			10.5 to 11.5 - Hard grey SANDSTONE, iron stained nodules. 11.5 to 14.8 - SAA: fractures noted.
							14.8 to 21.5 - Soft beige to blue grey to burgundy medium weathered SHALE, blue/grey below 19.6.
20							

Well: BuSW-8
Elev.:



REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

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LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20							
	10.0/10.0 RQD = 67.6	RC3/12MIN	NA	NA			21.5 to 21.7 - SAA. 21.7 to 23.2 - Hard grey micaceous SANDSTONE, slightly weathered (nodules). 23.2 to 29.2 - Soft grey unweathered SHALE.
30							29.2 to 31.5 - SAA: grades to burgundy, little 1-2 cm iron oxide nodules.
	5.8/5.8 RQD = 41.4	RC4/12MIN	NA	NA			31.5 to 37.3 - SAA: nodules decreasing below 34.5.
	4.2/3.8 RQD = 60.0	RC5/12MIN	NA	NA			37.3 to 41.2 - SAA: fractures noted, iron stained and sand filled.
40							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-3 BuSW-8.bor

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

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Project Manager: Steve Gross

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LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40	9.0/7.7 RQD = 92.0	RC6/15MIN	NA	NA			41.5 to 49.2 - SAA: nodules, soft, burgundy, fractures noted.
50	2.0/1.9 RQD = 46.7	RC7/	NA	NA			49.2 to 51.5 - SAA: medium weathered.
	10.0/10.0 RQD = 46.7	RC8/25MIN	NA	NA			51.5 to 61.5 - SAA: grey/green and burgundy zones. fractures ntoed.
60							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

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LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60	10.0/10.0 RQD = 59.1	RC9/23MIN	NA	NA			61.5 to 69.5 - SAA: burgundy, fractures noted.
70	7.0/6.8 RQD = 77.1	RC10/19MIN	NA	NA			69.5 to 73.5 - SAA: grey below 71.5.
							73.5 to 76.5 - Hard blue/grey fine SILTSONE, medium weathered, fractures noted.
	10.0/10.0 RQD = 95.4	RC11/10MIN	NA	NA			76.5 to 79.7 - SAA.
80							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

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05-30-2008 r:\Clients\APO\APO017\Boring logs\GB-3 BuSW-8.bor

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Hydro Investigation/
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LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							79.7 to 86.5 - Very hard blue grey SANDSTONE, grain size increasing with depth, unweathered, occasional shale seams, fractures noted.
	10.0/10.0 RQD = 99.9	RC12/15MIN	NA	NA			86.5 to 86.9 - SAA.
							86.9 to 96.5 - Medium hard grey SHALE, fractures noted.
90							
	10.0/9.7 RQD = 97.4	RC13/23MIN	NA	NA			96.5 to 104.0 - SAA: fractures noted.
100							

Grout

2" ID Sch 40 PVC Riser

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

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S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							104.0 to 106.5 - SAA: soft burgundy, grey below 105.8, iron stained, mod weathered, fractures noted.
	7.5/7.1 RQD = 70.3	RC14/31MIN	NA	NA			106.5 to 114.0 - SAA: fractures noted.
110							
	2.5/2.1 RQD = 42.1	RC15/13MIN	NA	NA			114.0 to 116.1 - SAA: blue/grey and burgundy, fractures noted.
	10.0/10.0 RQD = 68.7	RC16/30MIN	NA	NA			116.5 to 125.3 - SAA: grading to fine grey sandstone, burgundy interbeds, fractures noted.
120							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
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Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

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Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 146.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-3/BuSW-8

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							
							125.3 to 126.5 - Hard grey fine grained SANDSTONE.
	10.0/10.0 RQD = 65.4	RC17/27MIN	NA	NA			126.5 to 136.5 - SAA: porous, red, coarse grained below 135.9.
130							
	5.0/5.0 RQD = 88.7	RC18/11MIN	NA	NA			136.5 to 141.0 - SAA.
140							

Grout

Bentonite Pellets

2" ID Sch 40 PVC Riser

#5 Sand Pack

2" ID Sch 40PVC Screen

REMARKS:

Boring backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-3 BuSW-8.bor

Hull & associates, inc.

Hydro Investigation/
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Cheshire, Ohio

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Project Manager: Steve Gross

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Sampling Method	: Split Spoon, Rock Core 2"
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S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-3/BuSW-8

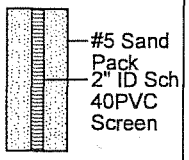
G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: BuSW-8
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140							
							141.0 to 141.5 - Soft grey SHALE.
							141.5 to 142.3 - SAA.
							142.3 to 146.5 - Hard blue/grey fine SANDSTONE.
							End of Boring at 146.5'.
150							
160							



REMARKS:

Boring backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 06/05/2006
Date Completed	: 06/06/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core
Total Depth (ft.)	: 130.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-24/BuSW-10

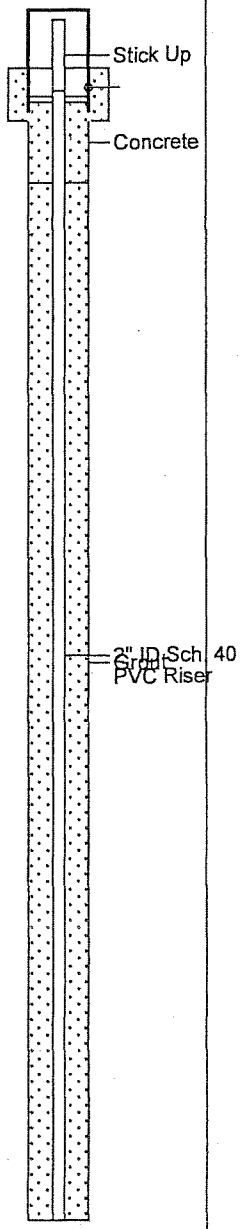
G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0	2.0 / 1.2	SP1/SS1	N/A	3-4-5-6			0.0 to 1.2 - Moderately stiff, dark brown, silty CLAY, trace sand and gravel, slightly moist.
2	2.0 / 0.6	SP2/SS2	N/A	6-6-7-6			2.0 to 2.6 - Same As Above (SAA): soft, dark brown to light brown, mottled.
4	2.0 / 1.4	SP3/SS3	N/A	2-3-4-19			4.0 to 4.3 - SAA: wet.
							4.3 to 4.4 - Organic material, wet.
							4.4 to 5.3 - Soft light brown/dark brown mottled silty CLAY, slightly moist.
6	2.0 / 1.0	SP4/SS4	N/A	2-10-9-9			5.3 to 5.4 - Soft to medium hard micaceous red SHALE, weathered.
							6.0 to 7.0 - Moderately stiff reddish-brown silty CLAY, trace sand and gravel, dry.
8	2.0 / 1.3	SP5/SS5	N/A	4-10-17-19			8.0 to 8.5 - SAA.
							8.5 to 9.3 - SAA: stiff, light brown.
10	2.0 / 1.2	SP6/SS6	N/A	4-11-29-46			10.0 to 10.2 - SAA.
							10.2 to 11.2 - Soft red SHALE, weathered considerably.
12	2.0 / 0.8	SP7/SS7	N/A	20-50/2			12.0 to 12.8 - SAA.
14	2.0 / 0.3	SP8/SS8	N/A	N/A			14.0 to 14.3 - SAA.
15	5.5/5.5 RQD = 67	RC1/12MIN	NA	NA			15.0 to 20.5 - SAA.
20							

Well: BuSW-10
Elev.:



REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 06/05/2006
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Sampling Method	: Split Spoon, Rock Core
Total Depth (ft.)	: 130.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-24/BuSW-10

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21	9.8/10.0 RQD = 97	RC2/28MIN	NA	NA			20.5 to 30.3 - Soft red SHALE, iron staining, highly chemically and physically weathered, gradual change to grey shale at 30.0'.
22							
23							
24							
25							
26							
27							
28							
29							
30							
31	10.0/10.0 RQD = 58	RC3/26MIN	NA	NA			30.5 to 40.5 - SAA: very weathered, gradual change to red shale at 31.0', sudden change to grey shale at 36.1'.
32							
33							
34							
35							
36							
37							
38							
39							
40							

REMARKS:

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LOG OF BORING GB-24/BuSW-10

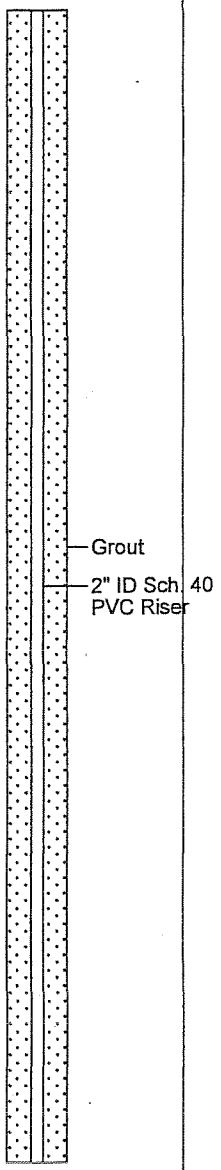
G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							
41	10.0/10.0 RQD = 62	RC4/20MIN	NA	NA			40.5 to 42.3 - SAA: soft to medium hard.
42							42.3 to 50.5 - SAA: iron staining.
43							
44							
45							
46							
47							
48							
49							
50							
51	10.0/10.0 RQD = 60	RC5/15MIN	NA	NA			50.5 to 60.5 - Medium hard grey SHALE, highly weathered.
52							
53							
54							
55							
56							
57							
58							
59							59.2 to 60.5 - SANDSTONE lense.
60							



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LOG OF BORING GB-24/BuSW-10

G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60							
61	10.0/10.0 RQD = 55	RC6/15MIN	NA	NA			60.5 to 64.8 - Medium hard fine to medium grained SANDSTONE, light grey.
62							
63							
64							
65							64.8 to 70.5 - Soft grey SHALE, slightly weathered.
66							
67							
68							
69							
70							
71	10.0/10.0 RQD = 64	RC7/15MIN	NA	NA			70.5 to 80.5 - SAA: medium hard to hard, grey.
72							
73							
74							
75							
76							
77							
78							
79							
80							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Boring backfilled with cement-bentonite grout.

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LOG OF BORING GB-24/BuSW-10

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Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80	10.0/10.0 RQD = 60	RC8/15MIN	NA	NA			80.5 to 82.4 - SAA.
84							84.2 to 87.3 - SAA: soft, red, iron staining, highly weathered.
87							87.3 to 90.5 - SAA: grey.
90	10.0/10.0 RQD =	RC9/16MIN	NA	NA			90.5 to 94.2 - SAA: medium hard, micaceous.
94							94.2 to 100.5 - Medium hard light grey micaceous SANDSTONE.
100							

Grout

2" ID Sch. 40 PVC Riser

Bentonite Pellets

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 06/05/2006
Date Completed	: 06/06/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core
Total Depth (ft.)	: 130.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-24/BuSW-10

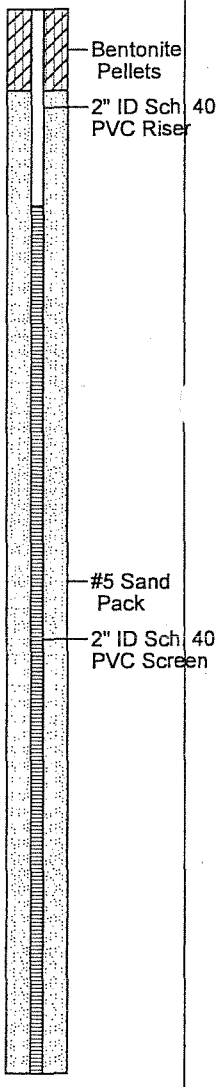
G. Elev. (ft. USGS) :

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							
101	10.0/10.0 RQD = 48	RC10/34MIN	NA	NA			100.5 to 102.5 - SAA.
102							
103							102.5 to 110.5 - SAA: medium to coarse grained, blue-grey, calcite cement.
104							
105							
106							
107							
108							
109							
110							
111	10.0/10.0 RQD = 29	RC11/20MIN	NA	NA			110.5 to 117.7 - SAA.
112							
113							
114							
115							
116							
117							
118							117.7 to 120.5 - Soft grey weathered SHALE, increasing chemical weathering with depth.
119							
120							



REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 06/05/2006
Date Completed	: 06/06/2006
Logged by	: C. Forman
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Reary
Sampling Method	: Split Spoon, Rock Core
Total Depth (ft.)	: 130.5'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-24/BuSW-10

G. Elev. (ft. USGS) :

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Well: BuSW-10
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							120.5 to 121.3 - SAA: some iron staining.
121							121.3 to 129.7 - SAA: medium hard to hard.
122							
123							
124							
125							
126							
127							
128							
129							
130							EOB @ 130.5' bgs.
131							
132							
133							
134							
135							
136							
137							
138							
139							
140							

REMARKS:

Boring backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

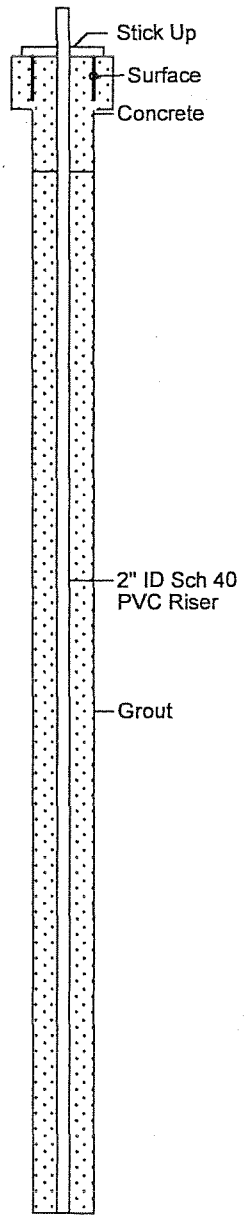
LOG OF BORING IMW-2Bu

Soil Samples
- Sample Recovered
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 - 25.5 - Casing set; no sampling.

Well: IMW-2Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING IMW-2Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
25	7.2 / 7.2	R-1 25.5 - 32.7	83%				25.5 - 32.7 - Soft to medium hard, gray to red with some brown mottling SHALE; very fine grained, highly weathered, argillaceous, medium bedding, fractures noted.
32	10.0 / 10.0	R-2 32.7 - 42.7	100%				32.7 - 42.7 - Same As Above (SAA): red to red and gray mottled.

Well: IMW-2Bu

REMARKS:

05-30-2008 r:\Clients\APO\APO017\Boring logs\IMW-2Bu.bor

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

LOG OF BORING IMW-2Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40–60	10.0 / 10.0	R-3 42.7 - 52.7	92%				42.7 - 52.7 - SAA: changes from red to gray at 45.8 feet, trace arenaceous laminations.
	10.0 / 10.0	R-4 52.7 - 62.7	79%				@ 52.1 to 52.7 feet broken zone. 52.7 - 57.4 - Soft to medium hard, red SHALE; very fine grained, highly weathered, argillaceous, thick bedding, fractures noted. 57.4 - 60.3 - SAA: gray.

Well: IMW-2Bu

REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

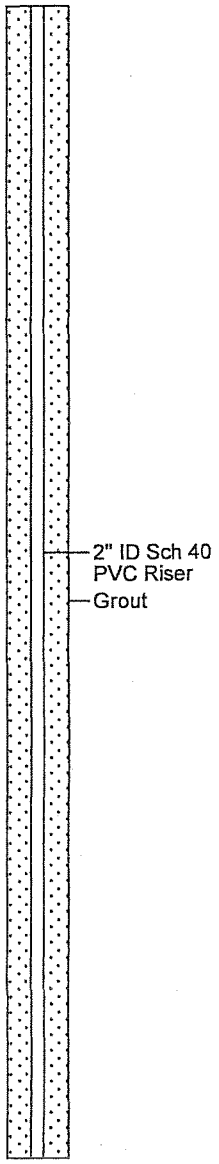
LOG OF BORING IMW-2Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60							60.3 - 62.7 - Hard, gray interbedded SANDSTONE and SILTSTONE, little shale laminations; very fine to medium grained, slightly to moderately weathered, micaceous, thin bedding, fractures noted.
61							
62							
63	10.0 / 9.2	R-5 62.7 - 71.9	92%				62.7 - 64.6 - Hard, gray SANDSTONE; medium to coarse grained, slightly weathered, micaceous, thick bedding, unfractured.
64							
65							64.6 - 71.9 - Hard, gray interbedded SILTSTONE and SANDSTONE; very fine to fine grained, slightly weathered, micaceous, thin bedding, unfractured.
66							
67							
68							
69							
70							
71							
72							
73	10.0 / 9.7	R-6 72.7 - 82.4	97%				72.7 - 77.3 - Hard, gray SILTSTONE with trace sandstone interbeds; very fine grained, slightly weathered, micaceous, medium bedding, unfractured.
74							
75							
76							
77							77.3 - 79.0 - Hard, gray to brown SILTSTONE with some argillaceous laminations; very fine grained, moderately weathered, argillaceous, thin bedding, fractures noted.
78							
79							
80							

Well: IMW-2Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

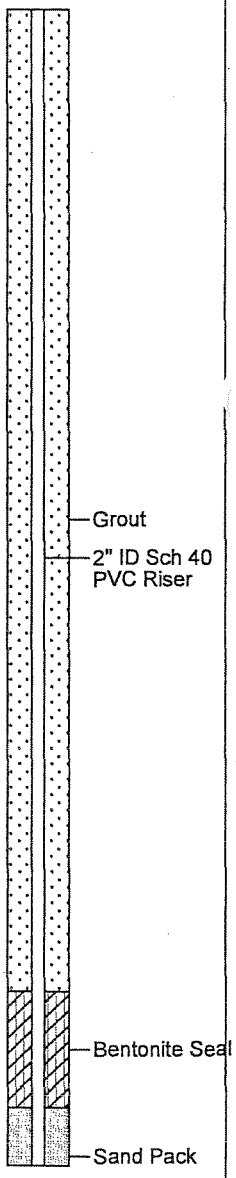
LOG OF BORING IMW-2Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							79.0 - 82.4 - Medium hard, red SHALE; very fine grained, moderately to highly weathered, argillaceous, thick bedding, fractures noted.
81							
82							
83	10.0 / 10.0	R-7 82.7 - 92.7	85%				82.7 - 92.2 - SAA.
84							
85							
86							
87							
88							
89							
90							
91							
92							92.2 - 92.7 - Hard, gray fine grained SANDSTONE.
93	10.0 / 10.0	R-8 92.7 - 102.7	100%				92.7 - 99.7 - Hard, gray SILTSTONE with trace sandstone interbeds; very fine grained, slightly weathered, micaceous, thick bedding, unfractured.
94							
95							
96							
97							
98							
99							
100							99.7 - 102.7 - Hard, gray SANDSTONE with few siltstone interbeds, fine to medium grained, slightly weathered, micaceous, medium bedding, unfractured; grain size increases at 102.6 to 102.7 feet and becomes very micaceous.

Well: IMW-2Bu



REMARKS:

Hull & associates, inc.

Hydro Investigation
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO017

Project Manager: Steve Gross

Date Started	: 9/10/2007
Date Completed	: 9/11/2007
Logged by	: Jay Read
Reviewed by	: Steve Gross
Drilling Contractor	: Thelen
Drilling Method	: HQ Core, Water Rotary
Sampling Method	: Rock Core 2.75"
Total Depth (ft.)	: 117.0'
Water Level (ft.)	: Not Measured
Ground Elevation (ft.)	: N/A

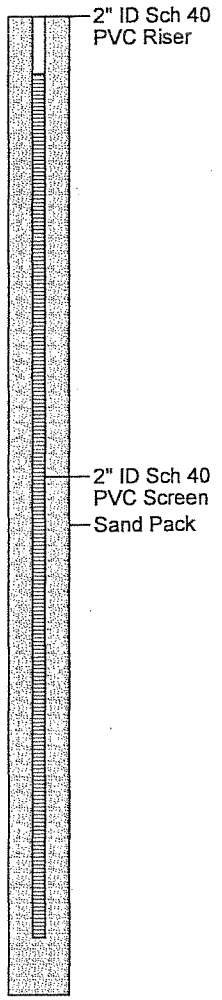
LOG OF BORING IMW-2Bu

Soil Samples: Sample Recovered; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	RQD	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100–120	10.0 / 9.8	R-9 102.7 - 112.5	98%				102.7 - 108.8 - SAA.
							108.8 - 111.1 - Hard, gray SANDSTONE; medium grained, slightly weathered, micaceous, medium bedding, unfractured.
							111.1 - 112.5 - SAA: very coarse grained, very micaceous.
	10.0 / 10.0	R-10 112.7 - 122.7	100%				112.7 - 115.7 - SAA: very coarse grained.
							115.7 - 122.7 - Hard, gray SILTSTONE, moderately interbedded with sandstone; very fine grained, slightly weathered, medium bedding, unfractured.

Well: IMW-2Bu



REMARKS:

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

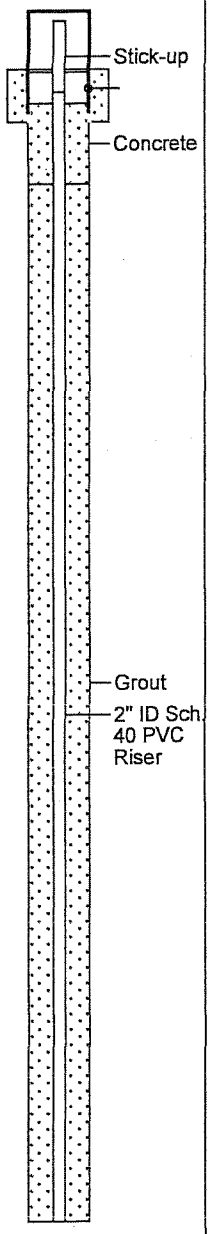
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0	2.0/1.4	SP1/SS1	NA	1-2-3-3			0.0 to 0.3 - TOPSOIL. 0.3 to 1.4 - Stiff reddish brown silty CLAY, few rootlets, moist becoming gray @1.4 bgs.
	2.0/1.3	SP2/SS2	NA	5-5-8-15			2.0 to 3.0 - Same As Above (SAA): medium stiff brownish gray, few vert. fractures w/white mottling, moist. 3.0 to 3.3 - SAA: stiff light brownish gray, becoming highly weathered shale, slightly moist, trace sand.
	2.0/0.7	SP3/SS3	NA	20-50/3			4.0 to 4.7 - Soft light brown and gray heavily weathered SHALE, little sand, trace light gray fracture fill, slightly moist.
	2.0/0.2	SP4/SS4	NA	50/10			6.0 to 6.2 - Soft gray highly weathered SANDSTONE, dry.
	1.0/1.0	SP5/SS5	NA	NA			8.0 to 9.0 - Soft to medium hard light brownish gray interbedded SANDSTONE and SHALE, weathered, dry.
	3.0/3.0 RQD = 12.5	RC1/8MIN	NA	NA			Set Augers at 9.0'. 9.0 to 11.0 - Hard olive brown weathered SANDSTONE, trace white frac fill at 9.5 - 9.8, 11.5 - 12.0 (vertical infilled with red clay).
10	10.0/10.0 RQD = 55.0	RC2/16MIN	NA	NA			12.0 to 17.6 - SAA: brownish grey, trace interbedded shale.
							17.6 to 22.0 - Soft alt. light grey and red weathered SHALE, becoming brownish black at 21.8'.
20							

Well: MW-3D
Elev.:



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McGoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20	10.0/9.6 RQD = 73.3	RC3/16MIN	NA	NA			22.0 to 24.7 - SAA: Soft mottled light brown grey and red.
							24.7 to 25.8 - Hard blueish grey SANDSTONE, little iron staining.
							25.8 to 27.7 - Soft mottled light brown grey and red weathered SHALE.
							27.7 to 29.7 - SAA: medium hard, blueish grey, sandy.
30							29.7 to 30.8 - SAA: soft light olive grey.
							30.8 to 31.6 - SAA: medium hard, light brownish grey, sandy.
	10.0/9.8 RQD = 50.8	RC4/18MIN	NA	NA			32.0 to 33.8 - SAA: mottled light grey and brown.
							33.8 to 34.5 - SAA: hard, light tan, weathered, sandy.
							34.5 to 41.6 - SAA: soft to medium hard, reddish brown and grey, weathered.
40							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							
	5.0/5.0 RQD = 62.5	RC5/8MIN	NA	NA			41.6 to 41.8 - Hard dark grey SANDSTONE, trace interbedded shale. 42.0 to 45.5 - Soft to medium hard reddish brown with little grey weathered SHALE.
	5.0/5.0 RQD = 98.3	RC6/18MIN	NA	NA			45.5 to 47.0 - Hard olive grey SANDSTONE, top 2" stained red. 47.0 to 48.6 - SAA: olive blueish grey, fractures noted.
50							48.6 to 51.2 - Medium hard olive grey and red SHALE.
	10.0/10.0 RQD = 61.6	RC7/18MIN	NA	NA			51.2 to 52.0 - Hard olive blueish grey SANDSTONE, trace pyrite. 52.0 to 59.0 - Medium hard olive grey and red SHALE.
60							59.0 to 62.0 - SAA: hard grey micaceous, brittle.

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60							
	10.0/8.7 RQD = 67.3	RC8/29MIN	NA	NA			62.0 to 67.2 - SAA: medium hard light tan and olive grey.
							67.2 to 70.7 - SAA: medium hard to hard reddish brown, few light grey and brownish grey coloring.
70							
	10.0/9.7 RQD = 68.7	RC9/31MIN	NA	NA			72.0 to 81.7 - SAA: soft to medium hard mottled dark red light tan and purple and grey.
80							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80							
	10.0/9.1 RQD = 93.1	RC10/32MIN	NA	NA			82.0 to 91.1 - SAA: becoming more competant with depth.
90							
	10.0/9.5 RQD = 75.4	RC11/27MIN	NA	NA			92.0 to 99.0 - SAA: hard mottled dark red, grey purple and light tan, trace fractures.
							99.0 to 99.6 - Hard gray interbedded LIMESTONE and SHALE.
100							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
100							99.6 to 101.5 - Hard reddish brown SHALE, very competent.
	10/.0/10.0 RQD = 80.0	RC12/27MIN	NA	NA			102.0 to 103.5 - SAA.
							103.5 to 106.4 - Hard blueish dark grey fine grain SANDSTONE, few interbedded mications, shale layers, little mica, barding, trace pyrite, fractures noted.
							106.4 to 112.0 - Medium to hard reddish brown SHALE, interbedded with grey shale.
110							
	5.0/5.0 RQD = 44.2	RC13/17MIN	NA	NA			112.0 to 114.9 - SAA: blueish.
							114.9 to 115.5 - Hard grey SILTSTONE.
							115.5 to 117.0 - Hard blueish grey fine grained SANDSTONE, little pyrite nodules, and little mica.
	5.0/4.9 RQD = 89.7	RC14/10MIN	NA	NA			117.0 to 121.9 - SAA: little interbedded grey shale, trace calcite deposits.
120							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

05-30-2008 F:\Clients\APO\APO017\Boring logs\GB-6 MW-3D.bor

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
120							
	8.5/8.5 RQD = 95.1	RC15/7MIN	NA	NA			122.0 to 128.3 - Hard dark grey SHALE, fractures noted.
							128.3 to 130.5 - Hard grey SANDSTONE with interbedded shale.
130	RQD = 100 1.5/1.5	RC16/	NA	NA			130.5 to 132.0 - SAA: some black mica banding, little pyrite nodules.
	10.0/10.0 RQD = 85.0	RC17/27MIN	NA	NA			132.0 to 133.1 - SAA.
							133.1 to 142.0 - Medium hard to hard grey and reddish brown SHALE, few calcite deposits, little interbedded sandstone.
140							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
140							
	5.0/5.0 RQD = 76.7	RC18/17MIN	NA	NA			142.0 to 147.0 - Medium hard to hard grey olive grey and reddish brown SHALE.
	5.0/3.8 RQD = 61.4	RC19/20MIN	NA	NA			147.0 to 150.8 - SAA: mottled olive grey reddish brown.
150							
	10.0/9.7 RQD = 45.5	RC20/31MIN	NA	NA			152.0 to 161.7 - SAA: medium hard turning to soft.
160							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
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Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
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Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
160							160.0 to 170.8 - SAA: few calcite deposits and grainy fractures noted.
	10.0/8.83 RQD = 59.4	RC21/32MIN	NA	NA			
170							
	9.0/9.0 RQD = 77.8	RC22/29MIN	NA	NA			170.0 to 181.0 - SAA: trace pyrite, trace calcite deposit filled vugs, fractures noted.
180							

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	DESCRIPTION
180					
	4.0/4.0 RQD = 85.4	RC23/12MIN	NA	NA	181.0 to 185.0 - SAA: medium hard light grey and brown.
	2.0/2.0 RQD = 36.7	RC24/10MIN	NA	NA	185.0 to 187.0 - SAA: dark grey with trace reddish brown, trace interbedded soft grey shale @ 185.7 and 185.8.
	5.0/5.0 RQD = 36.7	RC25/17MIN	NA	NA	
190					
	7.0/7.0 RQD = 72.6	RC26/19MIN	NA	NA	192.0 to 196.5 - SAA.
					196.5 to 197.0 - Hard grey LIMESTONE, trace calcite filled vugs.
					197.0 to 199.0 - Medium hard to hard grey SHALE, fractures noted with staining sides.
	3.0/3.0 RQD = 94.4	RC27/8MIN	NA	NA	199.0 to 202.0 - SAA: medium hard to hard dark grey.
200					

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: MW-3D
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
200							
	10.0/9.75 RQD = 79.1	RC28/31MIN	NA	NA			202.0 to 211.75 - SAA: medium hard to hard dark grey, little interbedded soft light grey siltstone.
210							
	10.0/10.0 RQD = 96.7	RC29/29MIN	NA	NA			212.0 to 216.6 - SAA: medium hard to hard dark grey.
							216.6 to 222.0 - Medium hard to hard dark grey SHALE, few interbedded grey sandstone, trace interbedded soft grey siltstone.
220							

Grout

2" ID Sch. 40 PVC Riser

Bentonite Pellets

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 04/18/06
Date Completed	: 04/26/06
Logged by	: M. Begley
Reviewed by	: M. McCoy
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 240.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-6/MW-3D

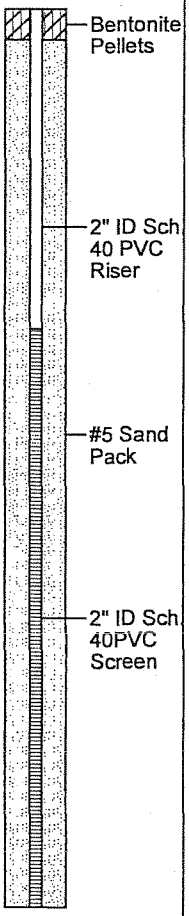
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
220							
	10.0/10.0 RQD = 80.0	RC30/32MIN	NA	NA			222.0 to 227.6 - SAA: medium hard to hard dark grey, trace interbedded grey sandstone beds.
							227.6 to 232.0 - Hard grey coarse SANDSTONE, trace mica banding, trace grey shale interbedding, trace calcite filled vugs.
230							
	8.0/8.0 RQD = 81.3	RC31/24MIN	NA	NA			232.0 to 233.6 - SAA: limestone clasts interbedded in top of foot.
							233.6 to 236.7 - Medium hard to hard grey SHALE, few interbedded grey sandstone.
							236.7 to 239.5 - Soft to medium hard grey and olive brown SHALE.
240							239.5 to 240.0 - Hard reddish brown and olive SILTSTONE. End of Boring @ 240.0'.

Well: MW-3D
Elev.:



REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/05/2006
Date Completed	: 05/05/2006
Logged by	: M. McCoy
Reviewed by	: T. Baehr
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 83.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-12/ MW-4

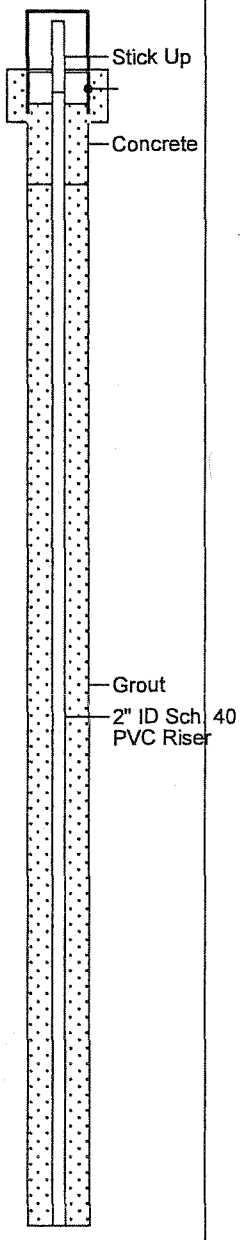
G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
0							See Log of SB010 for more detail.
	2.0/1.2	SP1/SS1	NA	2-2-2-3			5.0 to 5.8 - Soft dark brown/burgundy sandy CLAY, few gravel and ss frags, iron stained, very moist.
							5.8 to 6.2 - Soft grey CLAY, few ss and shale frags, moist, plastic.
10	2.0/1.6	SP2/SS2	NA	2-3-3-5			10.0 to 11.0 - Same As Above (SAA).
							11.0 to 11.5 - Soft blue grey sandy CLAY, little ss frags, little gravel, moist, blue/grey clay in shoe.
	2.0/1.5	SP3/SS3	NA	6-9-7-8			15.0 to 15.5 - Soft to medium stiff blue grey CLAY, trace sand, moist, plastic.
							15.5 to 16.5 - Medium stiff green/grey and brown ss and shale frags in clay matrix, moist.
20							

Well: MW-4
Elev.:



REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/05/2006
Date Completed	: 05/05/2006
Logged by	: M. McCoy
Reviewed by	: T. Baehr
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 83.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-12/ MW-4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
20	2.0/1.4	SP4/SS4	NA	6-4-6-8			20.0 to 21.4 - Soft to medium stiff blue grey silty CLAY, trace ss and shale frags, moist, plastic, ss and shale in clay matrix in shoe.
	2.0/0.5	SP5/SS5	NA	52/4			25.0 to 25.5 - Very hard blue grey SHALE.
30	2.6/2.6	SP6/SS6	NA	NA			29.9 to 30.3 - Hard blue grey fine grained SANDSTONE.
							30.3 to 31.5 - Soft grey SILTSTONE to SHALE.
	10.0/10.0 RQD = 76.2	RC1/10MIN	NA	NA			31.5 to 32.5 - Hard blue grey fine grained SILTSTONE, moderate weathered.
							32.5 to 35.3 - SAA.
							35.3 to 36.5 - Hard blue grey medium grained SANDSTONE, moderate weathered.
							36.5 to 42.5 - Hard blue grey SILTSTONE.
40							

Grout

2" ID Sch. 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

Project Manager: Steve Gross

Date Started	: 05/05/2006
Date Completed	: 05/05/2006
Logged by	: M. McCoy
Reviewed by	: T. Baehr
Drilling Contractor	: Pennsylvania Drilling
Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 83.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-12/ MW-4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
40							
	10.0/10.0 RQD = 92.3	RC2/15MIN	NA	NA			42.5 to 43.5 - SAA: grades to hard shale.
							43.5 to 52.5 - Hard blue grey and burgundy SHALE, moderate weathered, soft below 49.0'. Frac at 49.0'.
50							
	10.0/10.0 RQD = 74.2	RC3/13MIN	NA	NA			52.5 to 57.2 - SAA.
							57.2 to 62.5 - Hard blue grey fine and medium grained SANDSTONE, moderate weathered micaceous laminations, calcite inclusions.
60							

Well: MW-4
Elev.:

Grout

2" ID Sch 40 PVC Riser

REMARKS:

Borings backfilled with cement-bentonite grout.

Hull & associates, inc.

Hydro Investigation/
Proposed Residual Waste Landfill
Cheshire, Ohio

Project Number: APO006

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Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 83.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-12/ MW-4

G. Elev. (ft. USGS) :

Soil Samples: Sampled Interval; Sample sent to lab.

Water Levels: Static; During Drilling

Well: MW-4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
60							
	10.0/10.0 RQD = NM	RC4/6MIN	NA	NA			62.5 to 72.5 - SAA: coarse grained below 65.0'.
70							
	10.0/10.0 RQD = 100	RC5/7MIN	NA	NA			72.5 to 82.5 - Hard, grey, coarse grained SANDSTONE, calcitic cement, trace micas.
80							

Grout
Bentonite Pellets
2" ID Sch. 40 PVC Riser
#5 Sand Pack
2" ID Sch. 40 PVC Screen

REMARKS:

Borings backfilled with cement-bentonite grout.

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Hull & associates, inc.

Hydro Investigation/
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Cheshire, Ohio

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Project Manager: Steve Gross

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Drilling Method	: S.S., NQ Core, Air Rotary
Sampling Method	: Split Spoon, Rock Core 2"
Total Depth (ft.)	: 83.0'
S. Water Level Date	: Not Measured
S. Water Level (ft.)	: Not Measured

LOG OF BORING GB-12/ MW-4

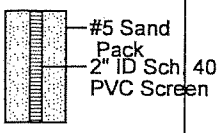
G. Elev. (ft. USGS) :

Soil Samples
- Sampled Interval
- Sample sent to lab.

Water Levels
- Static
- During Drilling

Well: MW-4
Elev.:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-6"-6")	Samples	GRAPHIC	DESCRIPTION
80	0.5/0.5 RQD = 80	RC6/	NA	NA			82.5 to 83.0 - Medium hard, light grey and light tan SHALE. EOB @ 83.0' bgs.
90							
100							



REMARKS:

Borings backfilled with cement-bentonite grout.

BORING NO. KC-15-01
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant – Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-4-15 to 8-5-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	72’	Surface Elevation:	579.77’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-58	8	NA	Orange brown clayey sand, fine to medium, wet	N/A
58-60	2	NA	Gray sand, fine to medium, trace silt, wet	N/A
60-72	10	NA	Brown sand, fine to medium, gravel, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-01

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/5/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8-18-15 and 8-26-15

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 1.64 NTUs

Volume Purged: 245 gallons

Static Water-Level* 39.35’

Top of Well Casing Elevation: 579.20’

Well Purpose:
Groundwater Monitoring

Northing (Y): 332114.55

Easting (X): 2072393.84

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

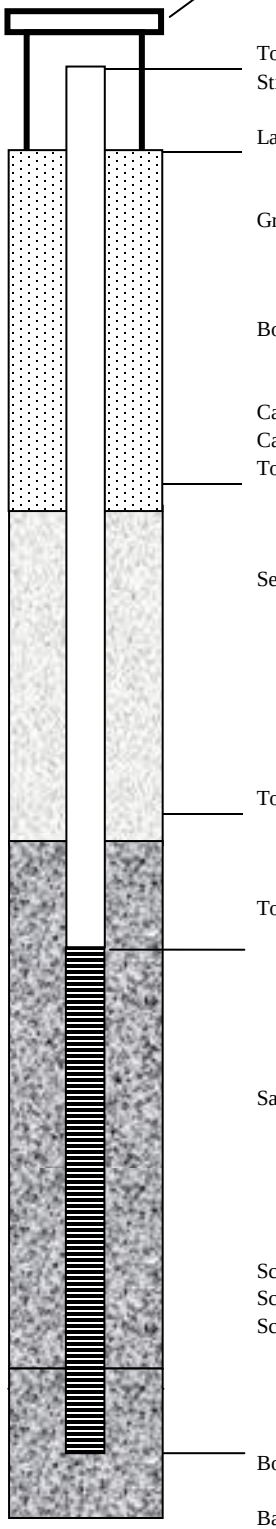
CONSTRUCTION MATERIALS USED:

4 Bags of Sand

2 Bags/Buckets Bentonite Pellets

7.5 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 579.20 ft.

Stick-up: -0.57 ft.

Land Surface Elevation: 579.77 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 54 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 58 ft*

Top of Well Screen 60 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 70 ft.*

Base of Borehole: 72 ft.*

Total Depth of Well
Below Top of Casing: 69.43 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-02
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-5-15 to 8/7/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	72’	Surface Elevation:	580.79’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-58	8	NA	Orange brown clayey sand, fine to medium, wet	N/A
58-60	2	NA	Orange brown sand, fine to medium, trace silt, wet	N/A
60-72	10	NA	Orange brown sand, fine to medium, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-02

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/7/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/18/15

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 2.44 NTUs

Volume Purged: 311 gallons

Static Water-Level* 40.16'

Top of Well Casing Elevation: 580.25'

Well Purpose:
Groundwater Monitoring

Northing (Y): 332500.654

Easting (X): 2072569.222

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

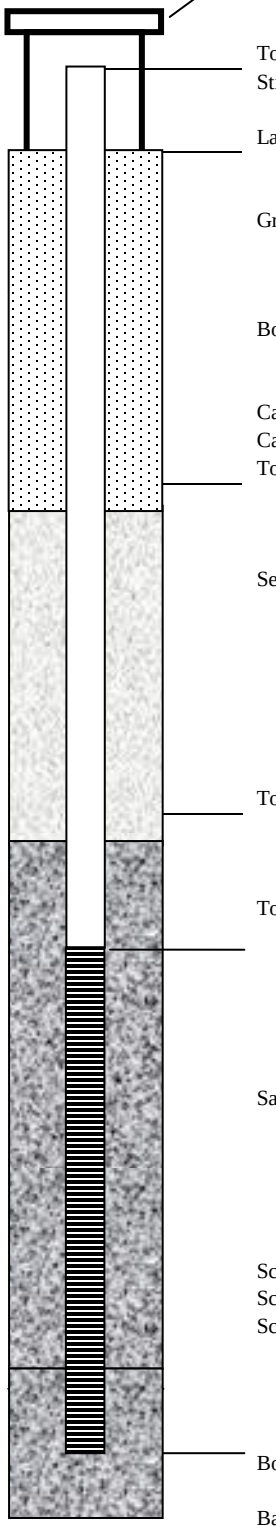
CONSTRUCTION MATERIALS USED:

4 Bags of Sand

2 Bags/Buckets Bentonite Pellets

7.5 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 580.25 ft.

Stick-up: -0.54 ft.

Land Surface Elevation: 580.79 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 54 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 58 ft*

Top of Well Screen 60 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 70 ft.*

Base of Borehole: 72 ft.*

Total Depth of Well
Below Top of Casing: 69.46 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-03
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-13-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	70’	Surface Elevation:	582.03’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Orange brown clay, with fine to medium sand, silt, moist	N/A
60-70	10	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-03

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/13/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/18/2015

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 4.89 NTUs

Volume Purged: 230 gallons

Static Water-Level* 40.45’

Top of Well Casing Elevation: 581.55’

Well Purpose:
Groundwater Monitoring

Northing (Y): 332546.402

Easting (X): 2073001.342

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

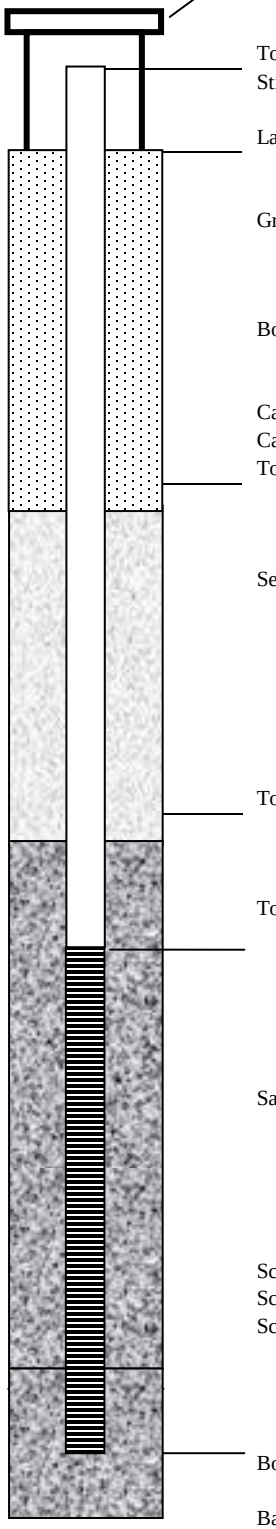
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 581.55 ft.
Stick-up: -0.48 ft.

Land Surface Elevation: 582.03 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6” inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 56 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 60 ft*

Top of Well Screen 62 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 72 ft.*

Base of Borehole: 72 ft.*

Total Depth of Well
Below Top of Casing: 71.52 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-04
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-12-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	70’	Surface Elevation:	579.89’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-55	10	NA	Orange brown clay, fine to medium sand, silt, moist	N/A
55-58	3	NA	Clayey sand, fine to medium, moist	N/A
58-68	10	NA	Orange brown sand and cobbles, fine to medium, trace silt, wet	N/A
68-70	2	NA	Gray bown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-04

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/12/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/19/2015 & 8/26/2015

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 4.02 NTUs

Volume Purged: 285.5'

Static Water-Level* 40.17'

Top of Well Casing Elevation: 579.37'

Well Purpose:
Groundwater Monitoring

Northing (Y): 331782.439

Easting (X): 2073755.607

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

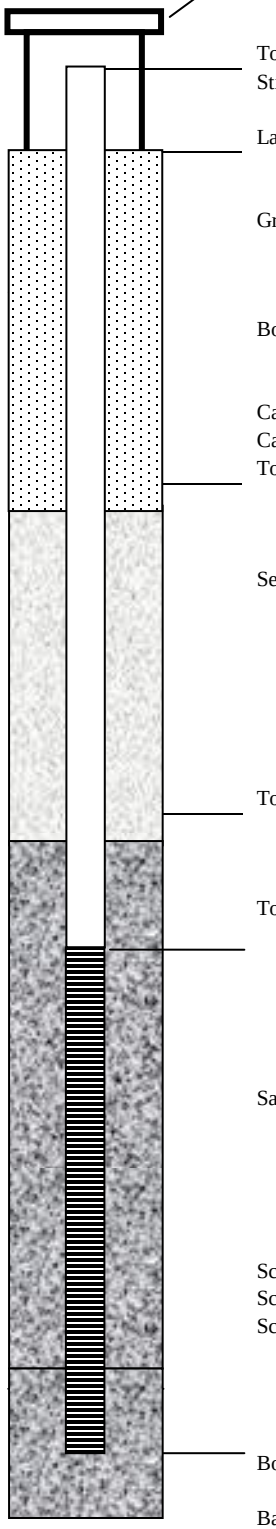
CONSTRUCTION MATERIALS USED:

5.5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

24 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 579.37 ft.

Stick-up: -0.52 ft.

Land Surface Elevation: 579.89 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 54 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 58 ft*

Top of Well Screen 60 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 70 ft.*

Base of Borehole: 72 ft.*

Total Depth of Well Below Top of Casing: 69.48 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-05
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-18-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	70”	Surface Elevation:	580.52’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-54	4	NA	Brown gray clay, fine sand, trace silt, moist	N/A
54-58	2	NA	Orange brown clay, fine sand, trace silt, moist	N/A
58-70	8	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-05

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/20/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s):

Development Method: Submersible Pump

Field Parameters stabilized

Turbidity = 1.52 NTUs

Volume Purged: 222 gallons

Static Water-Level* 42.20’

Top of Well Casing Elevation: 580.07’

Well Purpose:
Groundwater Monitoring

Northing (Y): 331569.994

Easting (X): 2073574.832

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

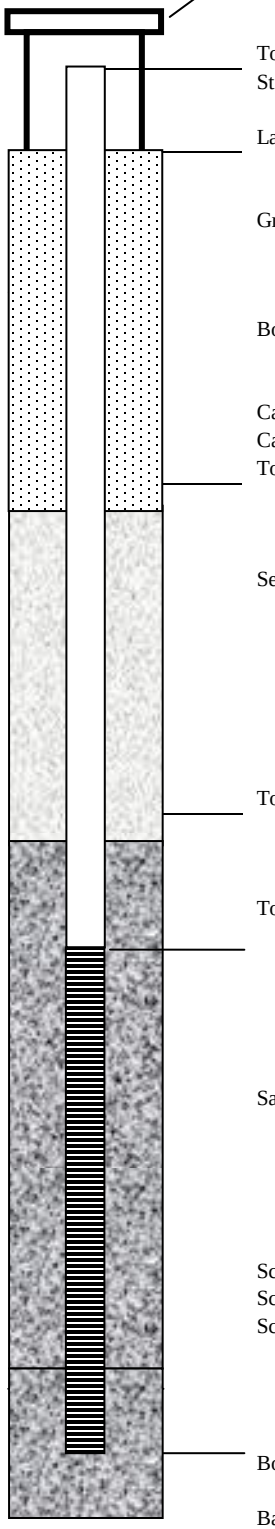
CONSTRUCTION MATERIALS USED:

5.5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

9 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 580.07 ft.

Stick-up: -0.45 ft.

Land Surface Elevation: 580.52 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6” inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 54 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 58 ft*

Top of Well Screen 60 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 70 ft.*

Base of Borehole: 70 ft.*

Total Depth of Well
Below Top of Casing: 69.55 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-06
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-17-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	70’	Surface Elevation:	579.98’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Orange brown clayey sand, trace silt, fine to medium, moist	N/A
58-60	2	NA	Orange brown sand, fine to medium, trace silt, wet	N/A
60-68	8	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
68-70	1	NA	Light brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-06

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/20/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/20/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 0.98 NTUs

Volume Purged: 214 gallons

Static Water-Level* 42.02’

Top of Well Casing Elevation: 579.48’

Well Purpose:
Groundwater Monitoring

Northing (Y): 331218.52

Easting (X): 2073210.42

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

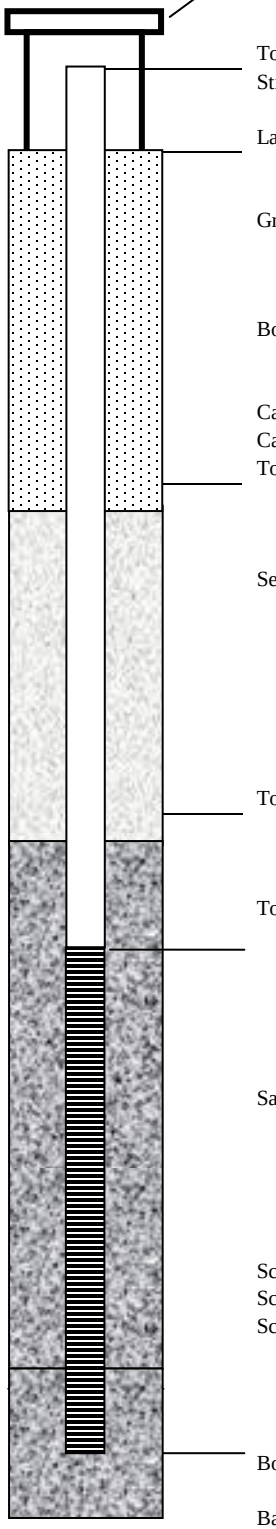
CONSTRUCTION MATERIALS USED:

5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

9 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 579.48 ft.

Stick-up: -0.5 ft.

Land Surface Elevation: 579.98 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6” inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 54 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 58 ft*

Top of Well Screen 60 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 70 ft.*

Base of Borehole: 70 ft.*

Total Depth of Well Below Top of Casing: 69.50 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-07
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-11-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	80’	Surface Elevation:	578.54’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Brown gray clayey silt, moist	N/A
60-68	8	NA	Brown gray clay, trace silt, moist	N/A
68-80	12	NA	Brown gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-07

Project Number: 2015079

Project Location: Kyger Creek Plant – Boiler Slag Pond

Installation Date(s): 8/10/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/19/15

Development Method: Submersible Pump

Field parameters stabilized

Turbidity = 4.06 NTUs

Volume Purged: 220 gallons

Static Water-Level* 39.45'

Top of Well Casing Elevation: 578.04'

Well Purpose:
Groundwater Monitoring

Northing (Y): 331291.75

Easting (X): 2072957.79

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

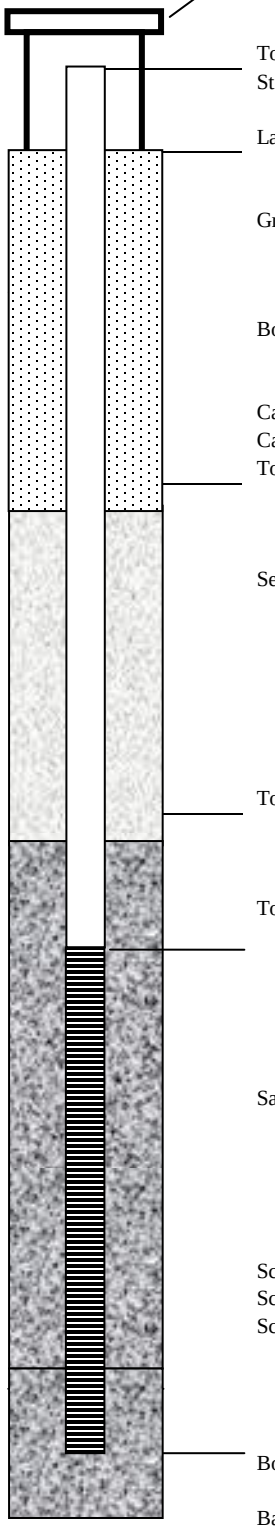
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

45 Small Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 578.04 ft.

Stick-up: -0.5 ft.

Land Surface Elevation: 578.54 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 64 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 68 ft*

Top of Well Screen 70 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 80 ft.*

Base of Borehole: 82 ft.*

Total Depth of Well Below Top of Casing: 79.50 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-08
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant Boiler Slag Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8-10-15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	80’	Surface Elevation:	579.41 MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Orange brown clayey sand, fine to medium, wet	N/A
60-68	8	NA	Brown gray clay, shell fragments, trace silt	N/A
68-80	12	NA	Brown gray sand, fine to medium, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-08

Project Number: 2015079

Project Location: Kyger Creek Plant, West Boiler Slag Pond

Installation Date(s): 8/10/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/18/15

Development Method: Submersible Pump

Field parameters stabilized

Turbidity = 2.25 NTUs

Volume Purged: 225 gallons

Static Water-Level* 39.35'

Top of Well Casing Elevation: 578.75'

Well Purpose:
Groundwater Monitoring

Northing (Y): 331460.59

Easting (X): 2072675.87

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

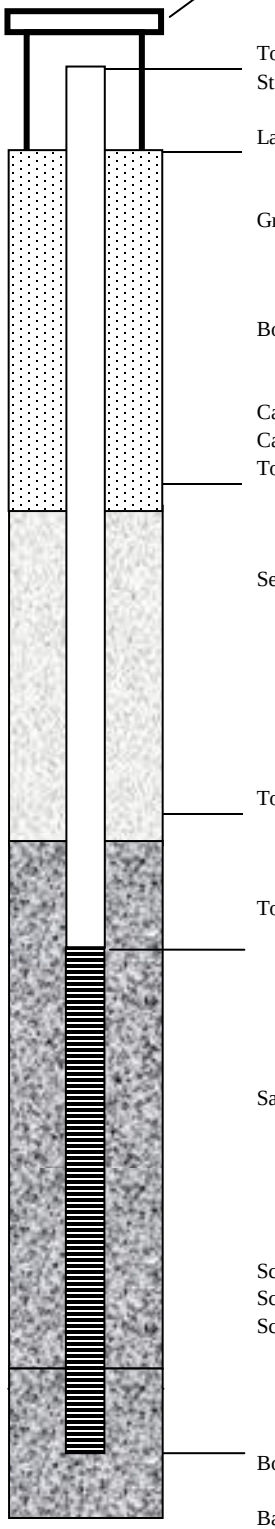
CONSTRUCTION MATERIALS USED:

5.5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

15 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 578.75 ft.

Stick-up: -0.66 ft.

Land Surface Elevation: 579.41 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 64 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 68 ft*

Top of Well Screen 70 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 80 ft.*

Base of Borehole: 82 ft.*

Total Depth of Well
Below Top of Casing: 79.34 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-09

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant-South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/11/15 to 9/14/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	81’	Surface Elevation:	587.85’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Gray silty clay with shell fragments, moist	N/A
60-69	9	NA	Gray silty clay with shell fragments, moist	N/A
69-81	4	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-09

Project Number: 2015079

Project Location: Kyger Creek Plant – South Fly Ash Pond

Installation Date(s): 9/14/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/23/15

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 4.89 NTUs

Volume Purged: 223 gallons

Static Water-Level* 46.43'

Top of Well Casing Elevation: 587.47'

Well Purpose:
Groundwater Monitoring

Northing (Y): 334631.959

Easting (X): 2072494.446

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre=packed well screen with an inner filter pack of 0.40 mm clean quarts sand and an outer layer of food grade nylon mesh.

Inspector: Michael Gelles

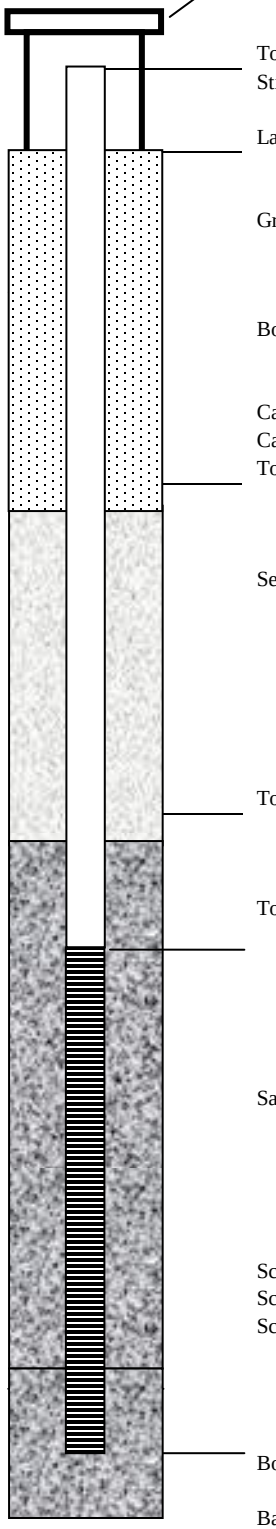
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.47 ft.
Stick-up: -0.38 ft.

Land Surface Elevation: 587.85 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 65 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 69 ft*

Top of Well Screen 71 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 81 ft.*

Base of Borehole: 81 ft.*

Total Depth of Well
Below Top of Casing: 80.62 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-10

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/15/15 to 9/16/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74”	Surface Elevation:	587.75’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Gray silty clay, moist	N/A
60-67	7	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
67-74	4	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-10

Project Number: 2015079

Project Location: Kyger Creek Plant – South Fly Ash Pond

Installation Date(s): 9/16/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/23/15

Development Method: Submersible Pump

Field parameters stabilized

Turbidity = 3.82 NTUs

Volume Purged: 295 gallons

Static Water-Level* 46.51'

Top of Well Casing Elevation: 587.45'

Well Purpose:
Groundwater Monitoring

Northing (Y): 335018.949

Easting (X): 20272695.744

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

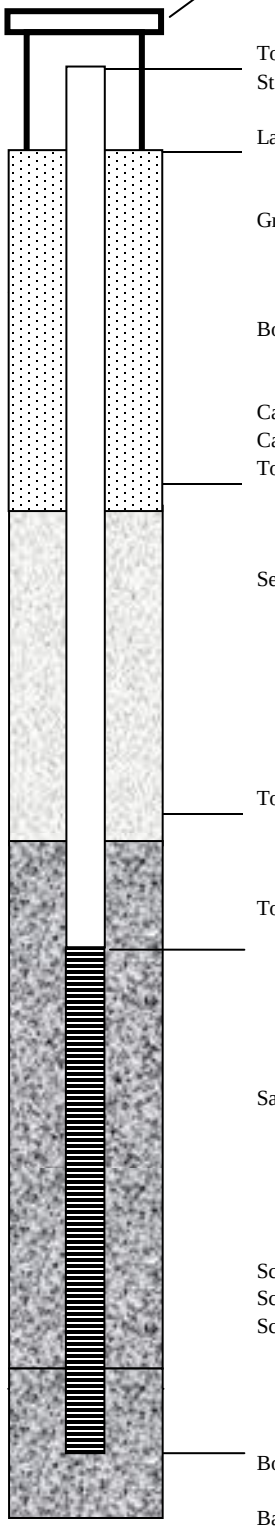
CONSTRUCTION MATERIALS USED:

5.5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.45 ft.

Stick-up: -0.3 ft.

Land Surface Elevation: 587.75 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well Below Top of Casing: 73.70 ft.

*Indicates Depth Below Land Surface

BORING NO. SFAP-B-1/KC-15-11

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/20/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74”	Surface Elevation:	588.07’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Brown gray clay, silt, shell fragments, moist	N/A
60-70	5	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
70-74	2	NA	Gray brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-11

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/20/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/25/15

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 0.87 NTUs

Volume Purged: 242 gallons

Static Water-Level* 46.07'

Top of Well Casing Elevation: 587.71'

Well Purpose:
Groundwater Monitoring

Northing (Y): 335428.144

Easting (X): 2072970.304

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

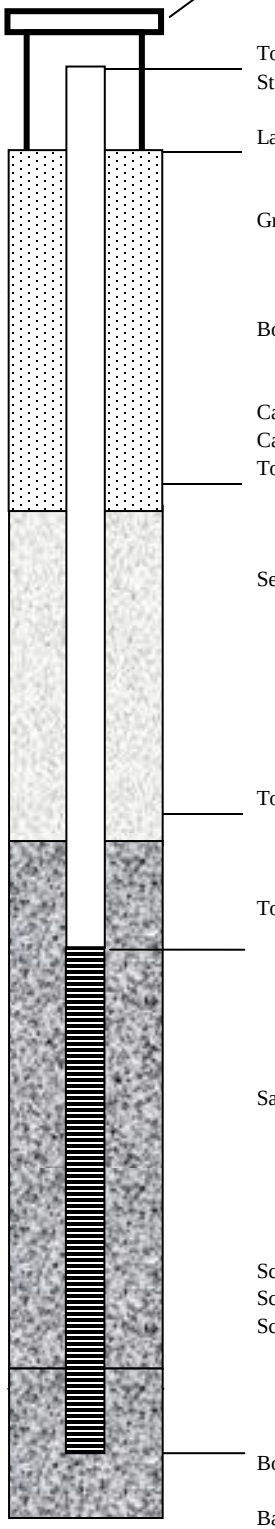
CONSTRUCTION MATERIALS USED:

6.5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

9 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.71 ft.

Stick-up: -0.36 ft.

Land Surface Elevation: 588.07 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.64 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-12

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/15/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.40’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-55	5	NA	Gray silty clay, moist	N/A
55-60	5	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
60-66	6	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
66-74	5	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-12

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 9/17/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/22/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 2.41 NTUs

Volume Purged: 245 gallons

Static Water-Level* 46.64'

Top of Well Casing Elevation: 587.94'

Well Purpose:
Groundwater Monitoring

Northing (Y): 335867.034

Easting (X): 2073268.666

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

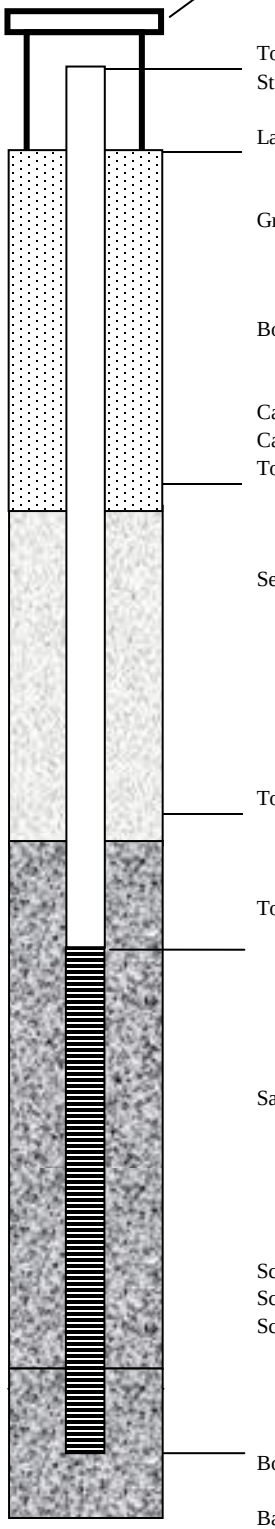
CONSTRUCTION MATERIALS USED:

5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.94 ft.

Stick-up: -0.46 ft.

Land Surface Elevation: 588.40 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.54 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-13

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/31/15 to 9/1/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	77’	Surface Elevation:	588.23’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Gray brown clay with silt, moist	N/A
60-65	5	NA	Gray brown clay with silt, moist	N/A
65-67	2	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
67-74	2	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
74-77	3	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-13

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 9/1/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/3/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 4.69 NTUs

Volume Purged: 220 gallons

Static Water-Level* 45.09'

Top of Well Casing Elevation: 587.86'

Well Purpose:
Groundwater Monitoring

Northing (Y): 336047.047

Easting (X): 2073665.155

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

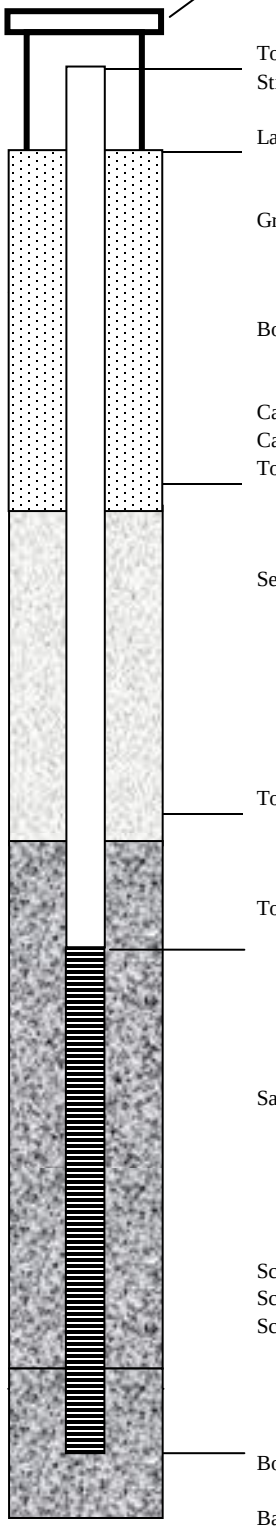
CONSTRUCTION MATERIALS USED:

7 Bags of Sand

2 Bags/Buckets Bentonite Pellets

24 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.86 ft.

Stick-up: -0.27 ft.

Land Surface Elevation: 588.23 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 61 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 65 ft*

Top of Well Screen 67 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 77 ft.*

Base of Borehole: 77 ft.*

Total Depth of Well
Below Top of Casing: 76.73 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-14
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/19/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.85’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Gray brown clay, sand silt, moist	N/A
60-64	4	NA	Gray brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
64-74	8	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-14

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/19/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/21/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 1.20 NTUs

Volume Purged: 267 gallons

Static Water-Level* 43.19'

Top of Well Casing Elevation: 587.80

Well Purpose:
Groundwater Monitoring

Northing (Y): 335808.537

Easting (X): 2074057.138

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

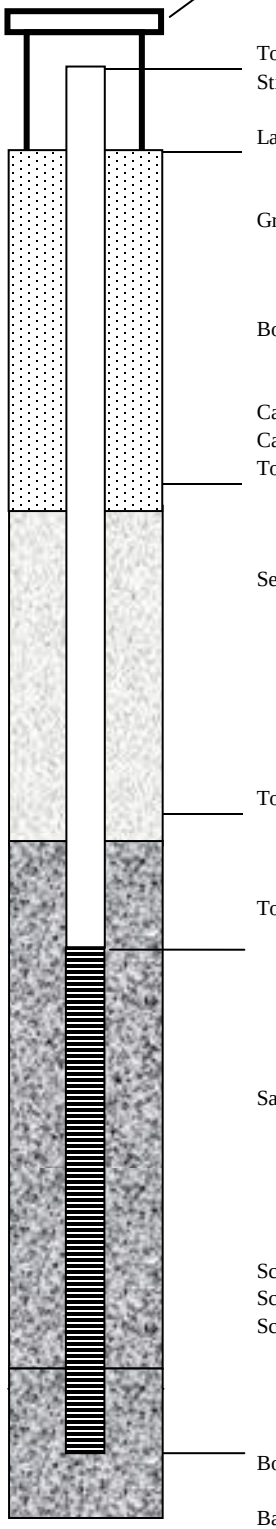
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

11 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.80 ft.
Stick-up: -1.05 ft.

Land Surface Elevation: 588.85 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 72.95 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-15

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/1/15 to 9/2/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	587.95’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-59	7	NA	Orange brown silty clay with sand, fine to medium, moist	N/A
59-74	9	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-15

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/31/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/3/15

Development Method: Submersible Pump

Field Parameter Stabilized

Turbidity = 2.59 NTUs

Volume Purged: 225 gallons

Static Water-Level* 46.40’

Top of Well Casing Elevation: 587.63’

Well Purpose:
Groundwater Monitoring

Northing (Y): 335558.54

Easting (X): 2074472.666

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

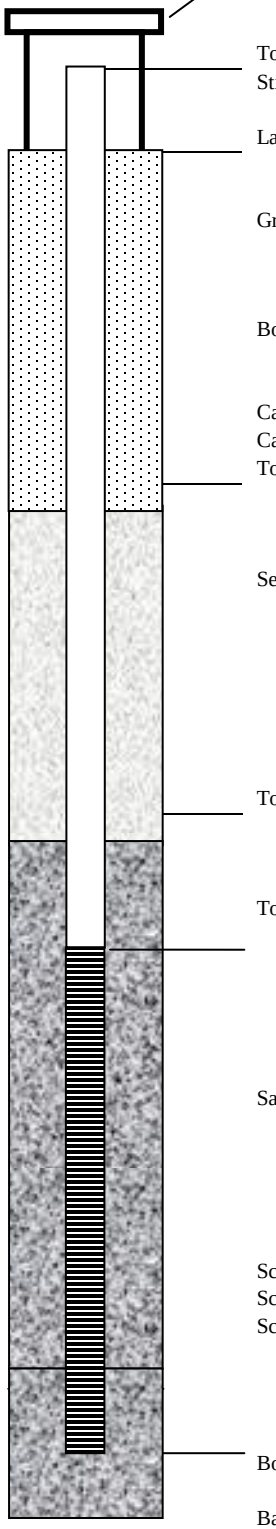
CONSTRUCTION MATERIALS USED:

5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

24 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.63 ft.
Stick-up: -0.32 ft.

Land Surface Elevation: 587.95 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6” inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.68 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-16

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/2/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.82’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-56	6	NA	Orange brown silty clay with sand, fine to medium, moist	N/A
56-60	4	NA	Gray silty clay with sand, fine to medium, moist	N/A
60-74	11	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-16

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 9/2/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/4/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 0.64 NTUs

Volume Purged: 215 gallons

Static Water-Level* 46.75'

Top of Well Casing Elevation: 588.38'

Well Purpose:
Groundwater Monitoring

Northing (Y): 335223.916

Easting (X): 2074799.53

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

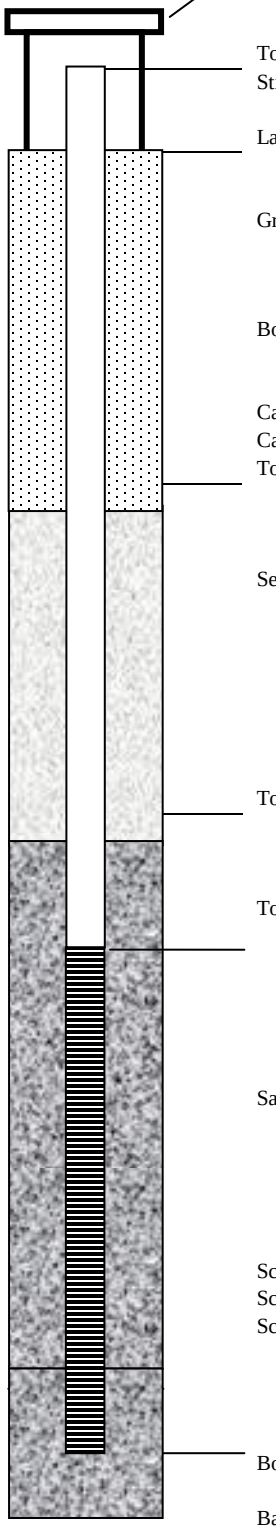
CONSTRUCTION MATERIALS USED:

5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 588.38 ft.
Stick-up: -0.5 ft.

Land Surface Elevation: 588.82 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.50 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-17
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek-South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/3/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.68’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-57	7	NA	Orange brown clay with silt and sand, fine to medium, moist	N/A
57-59	2	NA	Gray clay with silt and sand, fine to medium, moist	N/A
59-74	9	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-17

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 9/3/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/21/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 2.90 NTUs

Volume Purged: 232 gallons

Static Water-Level* 47.44'

Top of Well Casing Elevation: 588.13'

Well Purpose:
Groundwater Monitoring

Northing (Y): 334881.253

Easting (X): 2074480.308

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

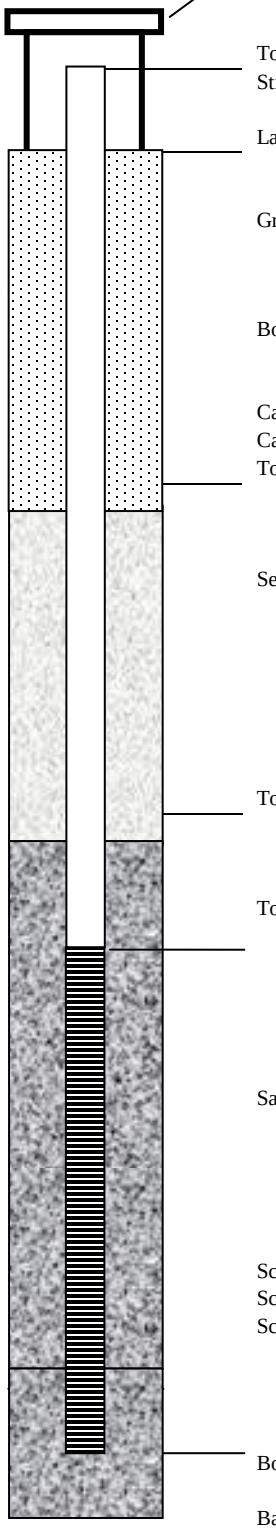
CONSTRUCTION MATERIALS USED:

5 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 588.13 ft.
Stick-up: -0.55 ft.

Land Surface Elevation: 588.68 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.45 ft.

*Indicates Depth Below Land Surface

BORING NO. SFAP-B-2/KC-15-18

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/24/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.27’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-56	6	NA	Orange brown clay, silt, moist	N/A
56-60	4	NA	Gray clay, silt, moist	N/A
60-74	14	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-18

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/25/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/26/15

Development Method: Submersible Pump

Field Parameters stabilized

Turbidity = 2.39 NTUs

Volume Purged: 206 gallons

Static Water-Level* 32.66'

Top of Well Casing Elevation: 587.72'

Well Purpose:
Groundwater Monitoring

Northing (Y): 334507.455

Easting (X): 2074126.888

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

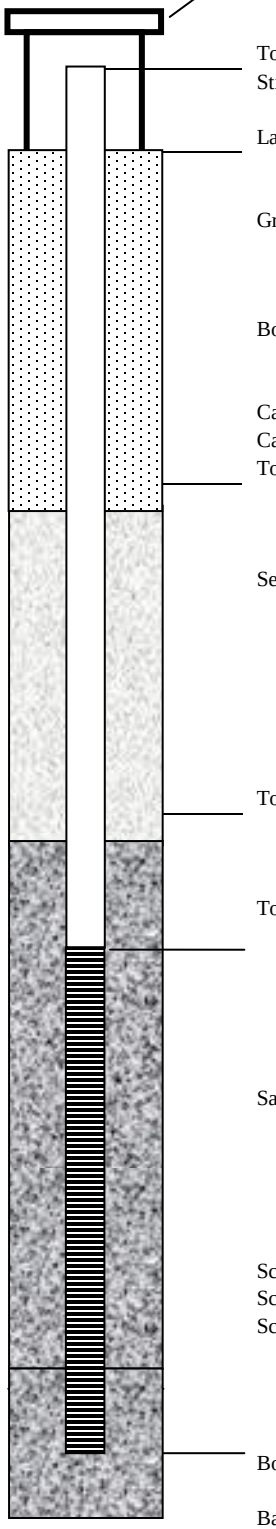
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

9 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.72 ft.

Stick-up: -0.55 ft.

Land Surface Elevation: 588.27 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.45 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-19

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/8/15 to 9/9/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	74’	Surface Elevation:	588.47’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-56	6	NA	Orange brown clay with sand, fine to medium, silt, moist	N/A
56-60	4	NA	Gray clay with sand, fine to medium, silt, moist	N/A
60-74	11	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-19

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/31/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/21/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 3.17 NTUs

Volume Purged: 317 gallons

Static Water-Level* 43.76'

Top of Well Casing Elevation: 588.18'

Well Purpose:
Groundwater Monitoring

Northing (Y): 334132.454

Easting (X): 2073771.27

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

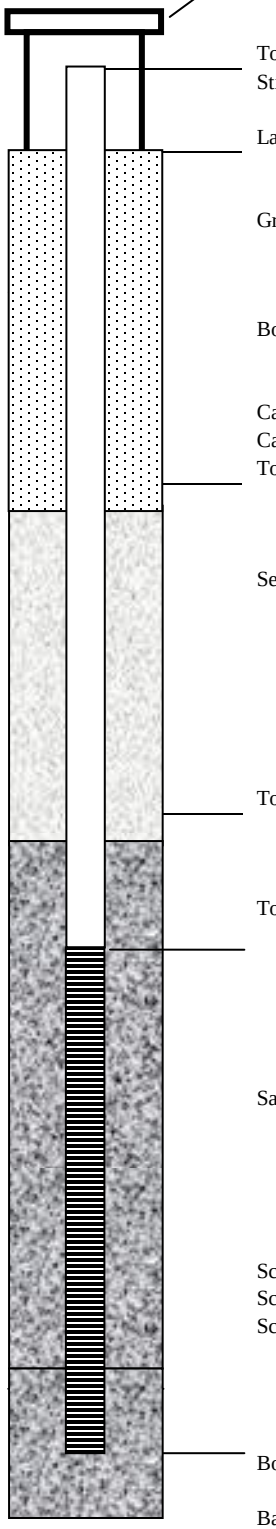
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 588.18 ft.
Stick-up: -0.29 ft.

Land Surface Elevation: 588.47 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.71 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-20

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/27/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	84’	Surface Elevation:	589.45’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	10	NA	Gray silty clay, moist	N/A
60-61	1	NA	Gray silty clay, moist	N/A
61-74	8	NA	Orange brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
74-79	5	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
79-84	5	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-20

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/27/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/2/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 4.26 NTUs

Volume Purged: 210 gallons

Static Water-Level* 48.34'

Top of Well Casing Elevation: 588.72'

Well Purpose:
Groundwater Monitoring

Northing (Y): 333841.393

Easting (X): 2073452.842

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

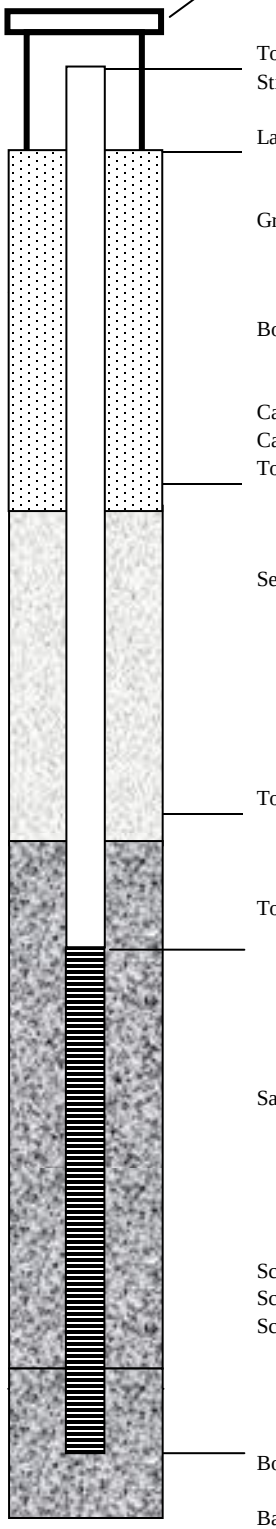
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 588.72 ft.

Stick-up: -0.74 ft.

Land Surface Elevation: 589.45 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 58 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 62 ft*

Top of Well Screen 64 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 74 ft.*

Base of Borehole: 74 ft.*

Total Depth of Well
Below Top of Casing: 73.26 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-21

SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	8/25/15 to 8/26/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	84’	Surface Elevation:	588.28’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-54	4	NA	Brown clay with silt, moist	N/A
54-66	12	NA	Gray clay with silt, moist	N/A
66-74	8	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
74-79	5	NA	Brown sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
79-84	5	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-21

Project Number: 2015079

Project Location: Kyger Creek Plant South Fly Ash Pond

Installation Date(s): 8/25/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 8/27/15

Development Method: Submersible Pump

Field Parameters stabilized.

Turbidity = 3.89 NTUs

Volume Purged: 209 gallons

Static Water-Level* 28.02'

Top of Well Casing Elevation: 587.84'

Well Purpose:
Groundwater Monitoring

Northing (Y): 334089.953

Easting (X): 207009.526

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

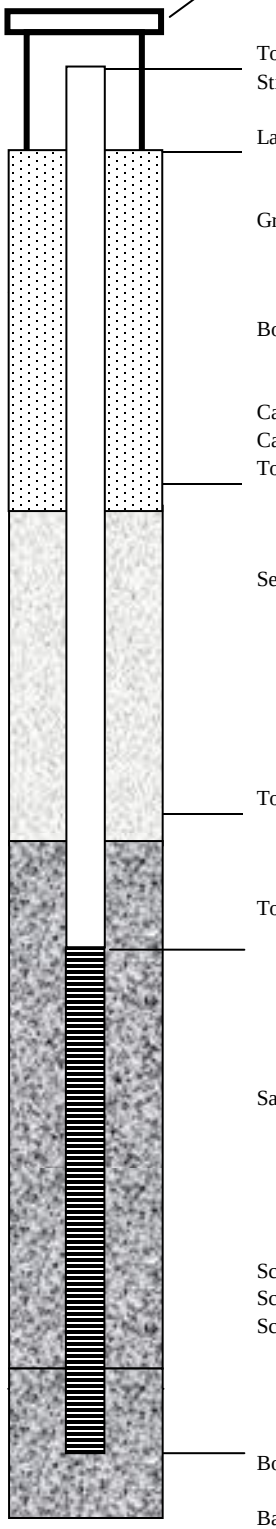
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

15 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.84 ft.

Stick-up: -0.44 ft.

Land Surface Elevation: 588.28 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6" inch

Casing Diameter: 2 Inch

Casing Material: PVC

Top of Seal: 64 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 68 ft*

Top of Well Screen 70 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch

Screen Slot-Size: 0.010 Inch

Screen Material: PVC

Bottom of Well Screen 80 ft.*

Base of Borehole: 84 ft.*

Total Depth of Well
Below Top of Casing: 79.56 ft.

*Indicates Depth Below Land Surface

BORING NO. KC-15-22
SAMPLE/CORE LOG

Project Number:	2015079	Log Page 1 of 1	
Project Location:	Kyger Creek Plant South Fly Ash Pond	Drilling Contractor:	Bowser Morner
Drilling Date(s):	9/9/15 to 9/10/15	AGES Geologist:	Mike Gelles

Drilling Method:	Roto-Sonic	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6”	Drilling Fluid Used:	Water		
Sampling Interval:	NA	Borehole Depth:	79’	Surface Elevation:	587.51’ MSL		

NOTES/COMMENTS:

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-50			Advance casing – no samples	N/A
50-60	17	NA	Gray silty clay with shell fragments, moist	N/A
60-67	14	NA	Gray silty clay with shell fragments, moist	N/A
67-79	11	NA	Gray sand, fine and medium to coarse, cobbles, trace silt, wet	N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A
				N/A

WELL CONSTRUCTION LOG
WELL NO. KC-15-22

Project Number: 2015079

Project Location: Kyger Creek Plant – South Fly Ash Pond

Installation Date(s): 9/10/15

Drilling Method: Roto-Sonic

Drilling Contractor: Bowser Morner

Development Date(s): 9/22/15

Development Method: Submersible Pump

Field parameters stabilized.

Turbidity = 1.83 NTUs

Volume Purged: 222 gallons

Static Water-Level* 41.39'

Top of Well Casing Elevation: 587.27'

Well Purpose:
Groundwter Monitoring

Northing (Y): 334307.567

Easting (X): 2072647.434

Comments/Notes:
2 inch PVC riser and screen

10 ft of 0.010 pre-packed well screen with an inner filter pack of 0.40 mm clean quartz sand and an outer layer of food-grade nylon mesh.

Inspector: Michael Gelles

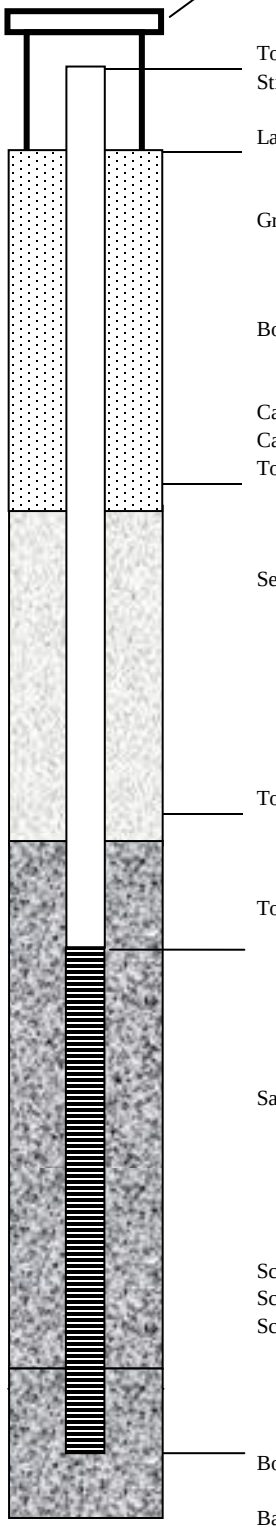
CONSTRUCTION MATERIALS USED:

6 Bags of Sand

2 Bags/Buckets Bentonite Pellets

12 Bags Portland for Grout

____ Bags Concrete/Sakrete



Protective Casing with Locking Cap

Top of Casing Elevation: 587.27 ft.
Stick-up: -0.24 ft.

Land Surface Elevation: 587.51 ft.

Grout; Type: Portland cement/ Grout

Borehole Diameter: 6 inch

Casing Diameter: 2 Inch
Casing Material: PVC
Top of Seal: 63 ft*

Seal Type: Bentonite Pellets/Chips

Top of Sand/Gravel Pack: 67 ft*

Top of Well Screen 69 ft*

Sand/Gravel Pack; Type: Global #5

Screen Diameter: 2 Inch
Screen Slot-Size: 0.010 Inch
Screen Material: PVC

Bottom of Well Screen 79 ft.*

Base of Borehole: 79 ft.*

Total Depth of Well
Below Top of Casing: 78.76 ft.

*Indicates Depth Below Land Surface

BORING NO. BAP-B-2
SAMPLE/CORE LOG

Project Number:	2015078	Log Page 1 of 2	
Project Location:	Kyger Creek Plant– Boiler Slag Pond	Drilling Contractor:	Stantec
Drilling Date(s):	7/7/15	AGES Geologist:	Mike Gelles

Drilling Method:	HSA	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6.5”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	70’	Surface Elevation:	~580’		

NOTES/COMMENTS: Samples collected for grain size analysis @ 50 – 60’ and 60 – 70’

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-2	N/A	N/A	Dark red brown silty clay and ash, dry	N/A
2-16	N/A	N/A	Gray brown silty clay, moist	N/A
16-18	N/A	N/A	Brown silty clay, moist	N/A
18-31	N/A	N/A	Gray silty clay, moist	N/A
31- 32	N/A	N/A	Brown silty clay, moist	N/A
32-34	N/A	N/A	Gray silty clay, most	N/A
34-36	3-3-5-5	2.0	Brown silty clay, stiff, moist	N/A
36-38	3-3-3-5	2.0	36-37.5’ Same as above; 37.5-38’ Brown sandy clay, fine & medium, wet	N/A
38-40	1-1-3-4	2.0	Brown sandy clay, fine, wet	N/A
40-42	1-2-2-3	2.0	Brown sandy clay, fine, wet	N/A
42-44	1-3-3-4	2.0	Brown sandy clay, fine, wet	N/A
44-46	3-3-5-5	2.0	Brown sandy clay, fine, wet	N/A
46-48	3-3-3-3	2.0	Brown sandy clay, fine, wet	N/A
48-50	3-4-5-7	2.0	48-49.5’ Same as above; 49.5-50’ Sand, brown fine & medium, wet, trace silt	N/A
50-52	5-7-13-15	2.0	Sand, brown fine & medium, wet, trace silt	N/A
52-54	8-10-3-4	2.0	Brown sand, fine & medium, wet, trace silt	N/A
54-56	9-12-6-7	2.0	Brown sand, fine & medium, wet, trace silt	N/A

Project No: 2015078 AGES Inspector: Mike Gelles Page 2 of 2

56-58	7-8-8-8	2.0	Brown sand, fine & medium, wet, trace silt	N/A
58-60	4-7-17-15	2.0	Brown sand, fine & medium, wet, trace silt	N/A
60-62	9-20-21-29	2.0	Brown sand, fine & medium, wet, trace silt	N/A
62-64	19-24-17-13	2.0	Brown sand, fine & medium, wet	N/A
64-66	7-15-13-15	2.0	Brown sand, fine & medium, wet	N/A
66-68	7-7-8-12	2.0	Brown sand fine & medium, wet, gravel round, silt	N/A
68-70	7-9-9-15	2.0	Brown sand fine & medium, wet, trace silt	N/A

BORING NO. BAP-B-1
SAMPLE/CORE LOG

Project Number:	2015078	Log Page 1 of 2	
Project Location:	Kyger Creek Plant – Boiler Slag Pond	Drilling Contractor:	Stantec
Drilling Date(s):	7/1/2015 -7/2/2015	AGES Geologist:	Mike Gelles

Drilling Method:	HSA	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6.5”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	72’	Surface Elevation:	~580’		

NOTES/COMMENTS: Sample collected for grain size analysis @ 62 – 70’

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-2	N/A	N/A	Red brown silty clay, moist	N/A
2-16	N/A	N/A	Brown silty clay, moist	N/A
16-25	N/A	N/A	Yellow brown silty clay, moist	N/A
25-28	N/A	N/A	Orange brown silty clay, moist	N/A
28-29	N/A	N/A	Brown gray clay, moist	N/A
29-34	N/A	N/A	Brown gray silty clay, moist	N/A
34-36	2.0	2-3-4-4	Orange brown silty clay, moist	N/A
36-38	2.0	1-3-3-4	Orange brown silty clay, moist	N/A
38-40	2.0	3-3-3-4	Orange brown silty clay, moist	N/A
40-42	2.0	1-3-3-4	Orange brown sandy clay fine & medium, moist	N/A
42-44	2.0	3-4-5-6	Orange brown sandy clay fine & medium, moist	N/A
44-46	2.0	1-4-4-5	Sandy clay orange brown fine & medium, wet	N/A
46-48	2.0	3-2-4-4	Sandy clay orange brown fine & medium, wet	N/A
48-50	2.0	4-3-4-5	Sandy clay orange brown fine & medium, wet	N/A
50-52	2.0	1-3-3-3	Clayey sand orange brown fine & medium, wet	N/A
52-54	2.0	1-2-2-3	Clayey sand orange brown fine & medium, wet	N/A
54-56	2.0	1-2-3-2	Clayey sand orange brown fine & medium, wet	N/A

56-58	2.0	1-2-2-3	Brown gray clayey sand fine & medium, wet	N/A
58-60	2.0	4-2-4-4	Brown gray sandy clay, fine & medium, wet	N/A
60-62	2.0	2-3-3-4	60-61.7' Same as above; 61.7-62' Gray clay, shell fragments, trace sand	N/A
62-64	2.0	8-18-24-20	Brown gray sand fine & medium, gravel angular, trace silt, wet	N/A
64-66	1.7	7-20-25-14	Brown gray sand fine & medium, gravel round, trace silt, wet	N/A
66-68	1.3	6-10-25-20	Brown gray sand fine & medium, gravel round & angular, trace silt, wet	N/A
68-70	1.5	5-6-8-10	Brown gray sand fine - medium & course, trace silt, wet	N/A

BORING NO. SFAP-B-1
SAMPLE/CORE LOG

Project Number:	2015078	Log Page 1 of 2	
Project Location:	Kyger Creek Plant – South Fly Ash Pond	Drilling Contractor:	Stantec
Drilling Date(s):	6-29-15 to 6-30-15	AGES Geologist:	Mike Gelles

Drilling Method:	HSA	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6.5”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	78’	Surface Elevation:	~588’		

NOTES/COMMENTS: Samples collected for grain size analysis @ 62 – 68’ and 70 – 78’

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-0.33	N/A	N/A	Fly ash black, brown silty clay, moist	N/A
0.33 - 6	N/A	N/A	Brown silty clay, moist	N/A
6-10	N/A	N/A	Red brown silty clay, moist	N/A
10-12.5	N/A	N/A	Gray-brown silty clay, moist	N/A
12.5-17.5	N/A	N/A	Red brown silty clay, moist	N/A
17.5-27.5	N/A	N/A	Gray brown silty clay, moist	N/A
27.5-40.0	N/A	N/A	Red brown silty clay, moist	N/A
40.0-52.0	N/A	N/A	Red brown clay with silt, moist	N/A
52.0-54.0	N/A	N/A	Brown gray clay, sand, shell fragments	N/A
54.0-56.0	2.0	1-1-4-5	Brown gray clay, sand , shell fragments, moist, soft	N/A
56.0-58.0	2.0	1-4-4-6	Brown gray clay, sand, shell fragments, moist, stiff	N/A
58.0-60.0	2.0	2-3-3-4	Brown gray clay, sand, shell fragments, moist, stiff	N/A
60.0-62.0	2.0	1-3-5-3	60-61.5’ Brown gray clay, shell fragments, moist, stiff; 61.5-62’ Sand fine & medium, yellow brown, silt, dense, moist	N/A
62.0-64.0	2.0	18-40-50/4	Sand, fine & medium, yellow brown, gravel rounded, trace silt, wet, dense	N/A
64.0-66.0	1.5	18-44-34-26	Sand, fine & medium, yellow brown, gravel rounded, trace silt, wet, dense	N/A
66.0-68.0	1.4	11-16-10-9	Sand, fine & medium & course, yellow brown, gravel rounded, trace silt, wet, dense	N/A
68.0-70.0	0.2	8-8-8-9	Clay, sandstone fragments, poor recovery	N/A

70.0-72.0	1.1	8-8-8-7	Sand, fine & medium & course, brown, fly ash, trace silt, wet, gravel round	N/A
72.0-74.0	1.2	5-10-13-13	Sand, fine & medium & course, brown, trace silt, wet, gravel round	N/A
74.0-76.0	1.6	9-10-11-15	Sand, fine & medium & course, brown, fly ash, trace silt, wet, some gravel round	N/A
76.0-78.0	1.4	3-4-8-10	Sand, fine & medium & course, brown, some gravel round, trace silt, wet	N/A

BORING NO. SFAP-B-2
SAMPLE/CORE LOG

Project Number:	2015078	Log Page 1 of 2	
Project Location:	Kyger Creek Plant - South Fly Ash Pond	Drilling Contractor:	Stantec
Drilling Date(s):	6-30-15 to 7-1-15	AGES Geologist:	Mike Gelles

Drilling Method:	HSA	Coring Device Size:	NA	Hammer Wt.	NA	and Drop	NA
Sampling Method:	NA	Borehole Diameter:	6.5”	Drilling Fluid Used:	None		
Sampling Interval:	NA	Borehole Depth:	70’	Surface Elevation:	~588’		

NOTES/COMMENTS: Sample collected for grain size analysis @ 60 – 70’

Depth Interval (feet)	Sample Recovery (feet)	Penetration (Hyd. Pres. or Blow Counts)	Sample/Core Description	PID (PPM)
0-11	N/A	N/A	Red brown silty clay, moist	N/A
11-16	N/A	N/A	Brown gray silty clay, moist	N/A
16-18	N/A	N/A	Red brown silty clay, moist	N/A
18-20	N/A	N/A	Brown gray silty clay, Moist	N/A
20-26	N/A	N/A	Red brown silty clay, moist	N/A
26-28	N/A	N/A	Red brown clay, moist	N/A
28-30	N/A	N/A	Gray brown clay, moist	N/A
30-35	N/A	N/A	Yellow brown sand fine & medium, moist	N/A
35-36	N/A	N/A	Brown gray sand fine & medium, moist	N/A
36-37	N/A	N/A	Gray brown clay, moist	N/A
37-38	N/A	N/A	Yellow brown clay, plastic, moist	N/A
38-41	N/A	N/A	Gray brown silty clay, moist	N/A
41-52	N/A	N/A	Yellow brown clay, moist	N/A
52-56	N/A	N/A	Yellow brown clay, moist	N/A
56-58	0.8	4-3-4-5	Orange brown silty clay, sand, trace clay, moist	N/A
58-60	1.3	5-15-17-21	Brown sand fine & medium, gravel round, trace silt, wet	

BORING NO. SFAP-B-2
CONTINUED SAMPLE/CORE LOG

Project No: 2015078 AGES Inspector: Mike Gelles Page 2 of 2

60-62	1.4	24-24-22-21	Sand fine & medium, gravel, trace silt, wet, angular gravel	N/A
62-64	1.3	9-27-33-26	Sand fine & medium brown, gravel round, trace silt, wet	N/A
64-66	1.2	13-16-7-12	Sand fine & medium + course brown, gravel round, trace silt, wet	N/A
66-68	0.8	8-12-18-12	Sand fine & medium +course brown, gravel round, trace silt, wet	N/A
68-70	0.9	4-6-8-10	Sand fine & medium +course brown, gravel round, trace silt, wet	N/A

APPENDIX D

WELL DEVELOPMENT DATA

TABLE D-1
SUMMARY OF WELL DEVELOPMENT DATA
KYGER CREEK PLANT
GALLIA COUNTY, OHIO

Well/ Piezometer	Dates	Method	Volume (gal)	Final Turbidity (NTU)
Type III Residual Waste Landfill				
CCR-1BU	10/21/2015 - 11/20/2015	Pump/Bailer	146	2976
CCR-2BU	10/22/2016 - 11/20/2016	Pump/Bailer	215	4066
Boiler Slag Pond				
KC-15-01	8/11/2015 - 8/18/2015	Pump	230	4.52
KC-15-02	8/12/2015 - 8/18/2015	Pump	311	2.44
KC-15-03	8/18/2015	Pump	230	4.89
KC-15-04	8/19/2015	Pump	268	3.81
KC-15-05	8/20/2015	Pump	222	1.52
KC-15-06	8/20/2015	Pump	214	0.98
KC-15-07	8/14/2015 - 8/19/2015	Pump	220	4.06
KC-15-08	8/13/2015 - 8/18/2015	Pump	225	2.25
South Fly Ash Pond				
KC-15-09	9/23/2015	Pump	223	4.89
KC-15-10	9/23/2015	Pump	295	3.82
KC-15-11	8/25/2015	Pump	242	0.87
KC-15-12	9/22/2015	Pump	245	2.41
KC-15-13	9/3/2015	Pump	220	4.69
KC-15-14	8/21/2015	Pump	267	1.2
KC-15-15	9/3/2015	Pump	225	2.59
KC-15-16	9/4/2015	Pump	215	0.64
KC-15-17	9/14/2015 - 9/21/2015	Pump	232	2.90
KC-15-18	8/26/2015	Pump	206	2.39
KC-15-19	9/15/2015 - 9/21/2015	Pump	317	3.17
KC-15-20	9/2/2015	Pump	210	4.26
KC-15-21	8/27/2015	Pump	209	3.89
KC-15-22	9/22/2015	Pump	222	1.83

APPENDIX E

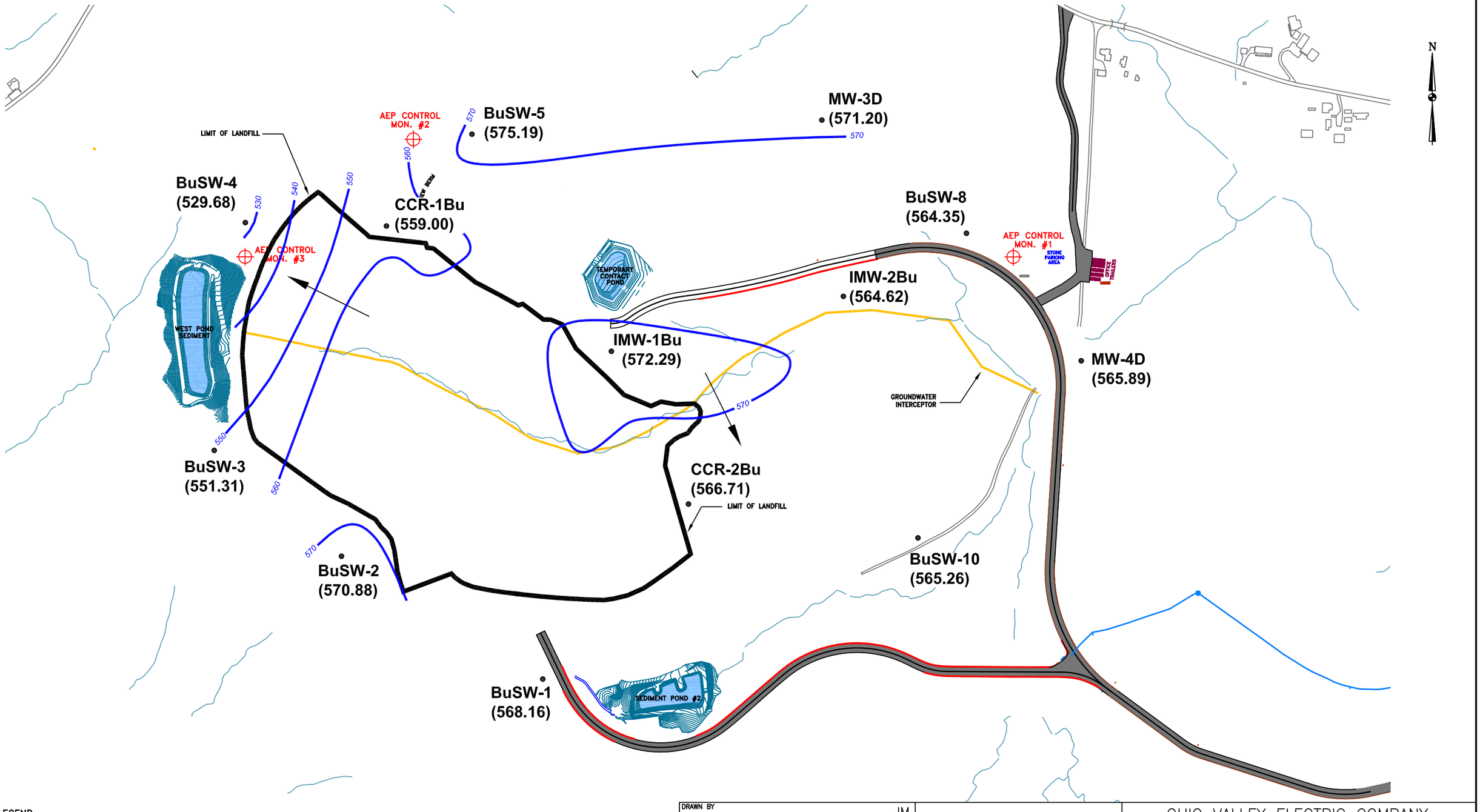
GROUNDWATER LEVELS
January 2016 through May 2016

TABLE E-1
KYGER CREEK PLANT
SUMMARY OF GROUNDWATER ELEVATION DATA
JANUARY 2016 - MAY 2016

Monitoring Well Designation	Jan-16 Groundwater Elevation (ft)	Mar-16 Groundwater Elevation (ft)	May-16 Groundwater Elevation (ft)
LANDFILL			
BuSW-1	568.16	568.21	568.04
BuSW-2	570.88	570.89	570.78
BuSW-3	551.31	548.21	556.72
BuSW-4	529.68	529.35	529.05
BuSW-5	575.19	575.1	574.27
BuSW-8	564.35	564.33	564.21
BuSW-10	565.26	565.38	565.24
1MW-1Bu	572.29	571.92	570.77
IMW-2Bu	564.62	564.57	564.44
MW-4D	565.89	566.2	565.76
MW-3D	571.20	573.05	560.3
CCR-1BU	559.00	575.76	577.45
CCR-2BU	566.71	564.75	566.61
BOILER SLAG POND			
KC-15-01	539.27	540.23	539.56
KC-15-02	539.48	540.46	539.79
KC-15-03	539.32	540.27	539.63
KC-15-04	538.52	539.20	538.52
KC-15-05	538.49	539.12	538.47
KC-15-06	538.39	539.03	538.40
KC-15-07	538.46	539.19	538.54
KC-15-08	538.86	539.68	539.03
SOUTH FLY ASH POND			
KC-15-09	469.729	470.509	469.90
KC-15-10	476.905	477.695	477.10
KC-15-11	477.131	477.911	477.32
KC-15-12	477.201	477.951	477.38
KC-15-13	477.09	477.92	477.42
KC-15-14	477.00	477.82	477.20
KC-15-15	476.76	477.63	476.97
KC-15-16	476.47	477.30	476.75
KC-15-17	476.66	477.46	476.84
KC-15-18	476.39	477.30	476.61
KC-15-19	476.21	477.15	476.46
KC-15-20	476.14	476.97	476.30
KC-15-21	470.38	471.18	470.54
KC-15-22	471.58	472.40	471.74

APPENDIX F

GROUNDWATER CONTOUR MAPS
January 2016 through May 2016



LEGEND:

- POTENTIOMETRIC SURFACE CONTOUR
- BuSW-1 — MONITORING WELL
- (570.88) — GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

400' 0' 400' 800'

SCALE: 1"= 400'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG. FILE	KYGER MW INSTALL_CONTOURS 01-16 b14 F1.dwg
DRAWING SCALE	AS SHOWN

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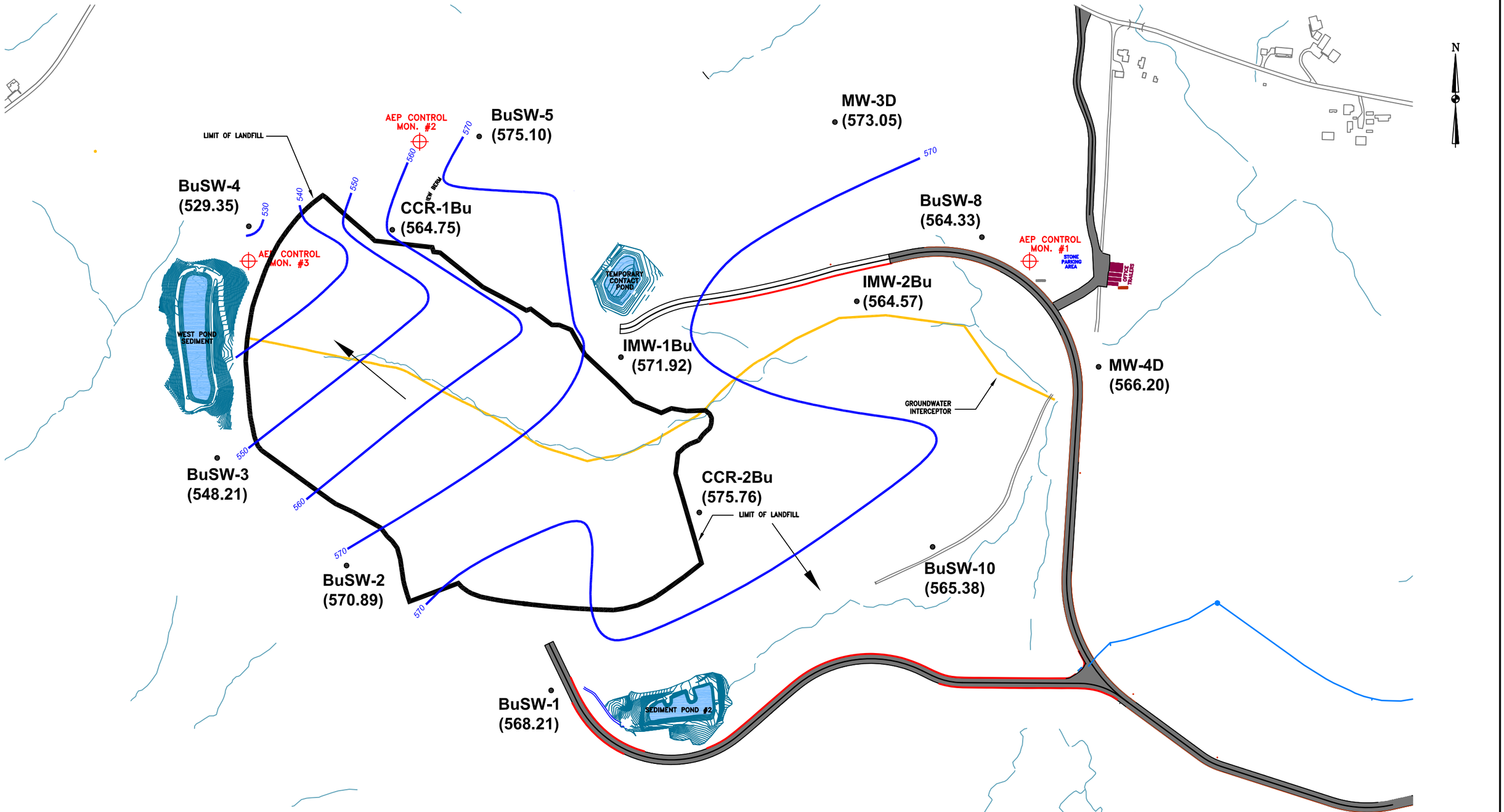
412.264.6453

OHIO VALLEY ELECTRIC COMPANY
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GROUNDWATER CONTOUR MAP
JANUARY 2016

DRAWING NAME: FIGURE F-1

REV.: 0

Plot: 08/15/2016 15:26 _PROGRAM-KYGER OVEC\Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 01-16 b14 F1.dwg\BUFFALO



LEGEND:

- POTENTIOMETRIC SURFACE CONTOUR
- BuSW-1 — MONITORING WELL
- (570.89) — GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

400' 0' 400' 800'

SCALE: 1"= 400'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_CONTOURS 03-16 b15 F2.dwg
DRAWING SCALE	AS SHOWN

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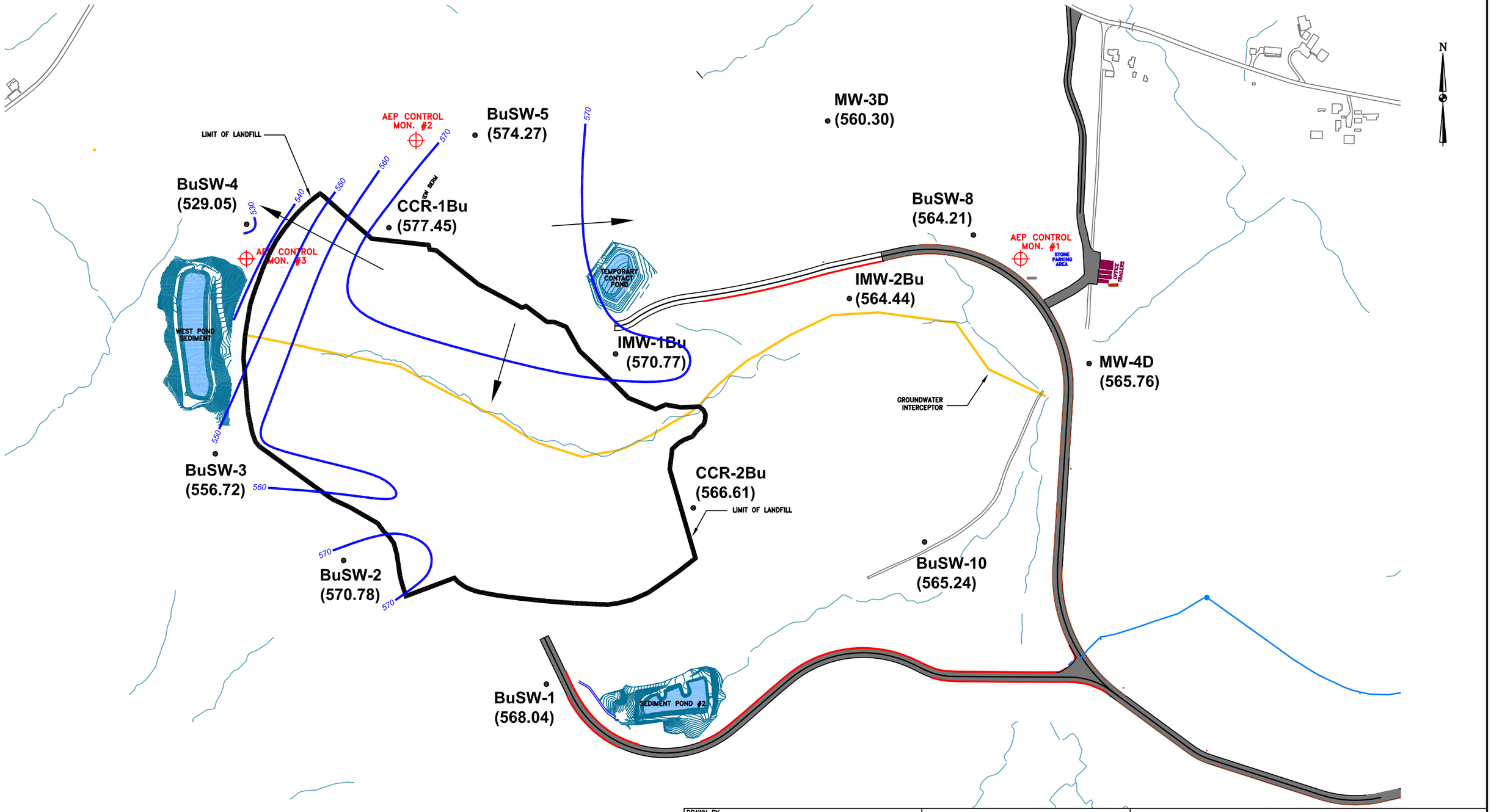
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GROUNDWATER CONTOUR MAP
MARCH 2016

DRAWING NAME: FIGURE F-2

REV.: 0

Plot: 08/15/2016 15:33 _PROGRAM-KYGER OVEC\Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 03-16 b15 F2.dwg\BUFFALO



LEGEND:

- POTENTIOMETRIC SURFACE CONTOUR
- BuSW-1 MONITORING WELL
- (570.89) GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

400' 0' 400' 800'

SCALE: 1"= 400'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_CONTOURS 05-16 b16 F3.dwg
DRAWING SCALE	AS SHOWN

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KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
TYPE III RESIDUAL WASTE LANDFILL
GROUNDWATER CONTOUR MAP
MAY 2016

DRAWING NAME: FIGURE F-3

REV.: 0

Plot: 08/15/2016 15:35 _PROGRAM-KYGER OVEC\Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 05-16 b16 F3.dwg\BUFFALO

N

OHIO ROUTE 7

KC-15-02
539.97

KC-15-03
539.81

KC-15-01
539.78

539.60

539.40

BOILER SLAG POND

KC-15-04
539.07

539.20

KC-15-05
539.07

KC-15-08
539.38

539.00

KC-15-07
539.04

KC-15-06
538.88

CLEARWATER POND

KYGER CREEK

OHIO RIVER

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

200' 0' 200' 400'

SCALE: 1"= 200'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_CONTOURS 01-16 SLAG b17 F4.dwg
DRAWING SCALE	1"=200'

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
BOILER SLAG POND
GROUNDWATER CONTOUR MAP – JANUARY 2016

DRAWING NAME	REV.
FIGURE F-4	0

Plot: 08/15/2016 15:37 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 01-16 SLAG b17 F4.dwg\BOILER SLAG POND

N

OHIO ROUTE 7

KC-15-02
540.46

KC-15-03
540.27

KC-15-01
540.23

540.40

540.20

540.00

539.80

539.60

539.40

539.20

BOILER SLAG POND

KC-15-04
539.20

KC-15-05
539.12

KC-15-08
539.68

KC-15-07
539.19

KC-15-06
539.03

CLEARWATER POND

KYGER CREEK

OHIO RIVER

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

200' 0' 200' 400'

SCALE: 1"= 200'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_CONTOURS 03-16 SLAG b18 F5.dwg
DRAWING SCALE	1"=200'

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
BOILER SLAG POND
GROUNDWATER CONTOUR MAP – MARCH 2016

DRAWING NAME	REV.
FIGURE F-5	0

Plot: 08/15/2016 15:40 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 03-16 SLAG b18 F5.dwg\BOILER SLAG POND

N

OHIO ROUTE 7

KC-15-02
539.79

KC-15-03
539.63

539.80

539.60

539.40

KC-15-01
539.56

539.20

BOILER
SLAG
POND

539.00

KC-15-04
538.52

538.80

KC-15-05
538.47

538.60

KYGER CREEK

KC-15-08
539.03

KC-15-07
538.54

KC-15-06
538.40

CLEARWATER POND

OHIO RIVER

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

200' 0' 200' 400'

SCALE: 1"= 200'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_CONTOURS 05-16 SLAG b19 F6.dwg
DRAWING SCALE	1"=200'

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
BOILER SLAG POND
GROUNDWATER CONTOUR MAP – MAY 2016

DRAWING NAME: FIGURE F-6

REV.: 0

Plot: 08/15/2016 15:42 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_CONTOURS 05-16 SLAG b19 F6.dwg\BOILER SLAG POND

N

KYGER CREEK

RAILROAD TRACKS

DRAINAGE DITCH

NORTH FLY ASH POND

KC-15-13
477.21

KC-15-12
477.22

KC-15-14
477.10

C

KC-15-11
477.21

KC-15-15
476.96

KC-15-16
476.78

SOUTH FLY ASH POND

476

478

480

KC-15-10
477.04

474

476

KC-15-17
480.98

KC-15-09
469.88

470

474

KC-15-18
476.69

OHIO ROUTE 7

C'

472

KC-15-22
471.79

KC-15-21
470.57

KC-15-19
476.58

KC-15-20
476.37*

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

* GROUNDWATER ELEVATION IS ESTIMATED

POWER PLANT

OHIO RIVER

300' 0' 300' 600'

SCALE: 1"= 300'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_GW CONTOURS 01-2016 b20 FAP F7.dwg
DRAWING SCALE	1"=300'

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SOUTH FLY ASH POND
GROUNDWATER CONTOUR MAP – JANUARY 2016

DRAWING NAME: FIGURE F-7

REV.: 0

N

KYGER CREEK

RAILROAD TRACKS

DRAINAGE DITCH

NORTH FLY ASH POND

KC-15-13
477.92

KC-15-12
477.95

KC-15-14
477.82

C

KC-15-11
477.91

KC-15-15
477.63

KC-15-16
477.30

SOUTH FLY ASH POND

476

KC-15-10
477.70

474

KC-15-17
477.46

KC-15-09
472.51

KC-15-18
477.30

OHIO ROUTE 7

C'

KC-15-22
472.40

472

474

476

KC-15-21
471.18

KC-15-19
477.15

KC-15-20
476.97

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

POWER PLANT

OHIO RIVER

300' 0' 300' 600'

SCALE: 1"= 300'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_GW CONTOURS 03-2016 FAP b21 F8.dwg
DRAWING SCALE	1"=300'

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OHIO VALLEY ELECTRIC COMPANY

KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SOUTH FLY ASH POND
GROUNDWATER CONTOUR MAP – MARCH 2016

DRAWING NAME: FIGURE F-8

REV.: 0

Plot: 08/15/2016 15:52 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_GW CONTOURS 03-2016 FAP b21 F8.dwg\FLY ASH POND

N

KYGER CREEK

RAILROAD TRACKS

DRAINAGE DITCH

NORTH FLY ASH POND

KC-15-13
477.42

KC-15-12
477.38

KC-15-14
477.20

C

KC-15-15
476.97

KC-15-16
476.75

KC-15-11
477.32

SOUTH FLY ASH POND

476

KC-15-10
477.10

474

KC-15-17
476.84

KC-15-09
469.90

OHIO ROUTE 7

KC-15-22
471.74

474

476

KC-15-18
476.61

C'

472

KC-15-21
470.54

KC-15-19
476.46

KC-15-20
476.30

LEGEND:

PRIMARY GROUNDWATER FLOW DIRECTION

SECONDARY GROUNDWATER FLOW DIRECTION

POWER PLANT

OHIO RIVER

300' 0' 300' 600'

SCALE: 1"= 300'

DRAWN BY	JM
DATE	
CHECKED BY	
JOB NO.	2015079-KYGER
DWG FILE	KYGER MW INSTALL_GW CONTOURS 05-2016 FAP b22 F9.dwg
DRAWING SCALE	1"=300'

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OHIO VALLEY ELECTRIC COMPANY

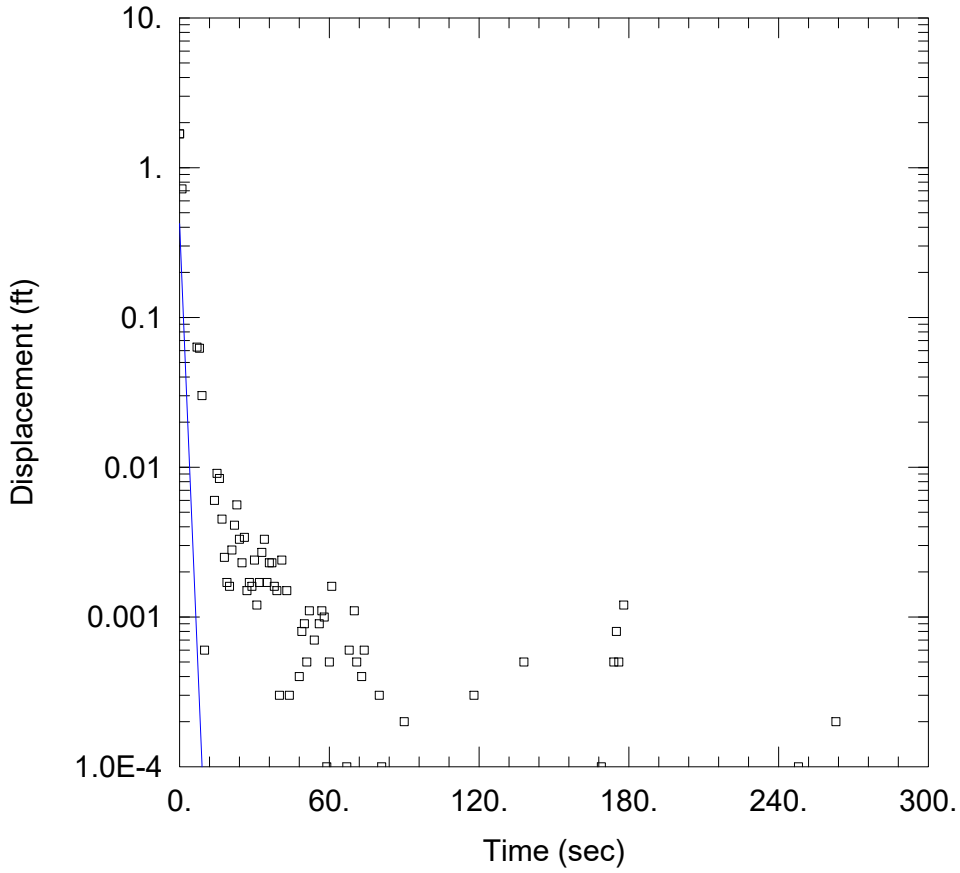
KYGER CREEK STATION
CHESHIRE, GALLIA COUNTY, OHIO
SOUTH FLY ASH POND
GROUNDWATER CONTOUR MAP – MAY 2016

DRAWING NAME	REV.
FIGURE F-9	0

Plot: 08/15/2016 15:54 \Kyger Creek-CCR Program\CAD\WELL INSTALLATION\APPENDIX F\KYGER MW INSTALL_GW CONTOURS 05-2016 FAP b22 F9.dwg\FLY ASH POND

APPENDIX G

AQUIFER TESTING RESULTS
May 2016



IN-A

Data Set: Y:\...\KC-15-02_IN-A_BR.aqt
Date: 08/18/16 Time: 15:23:41

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

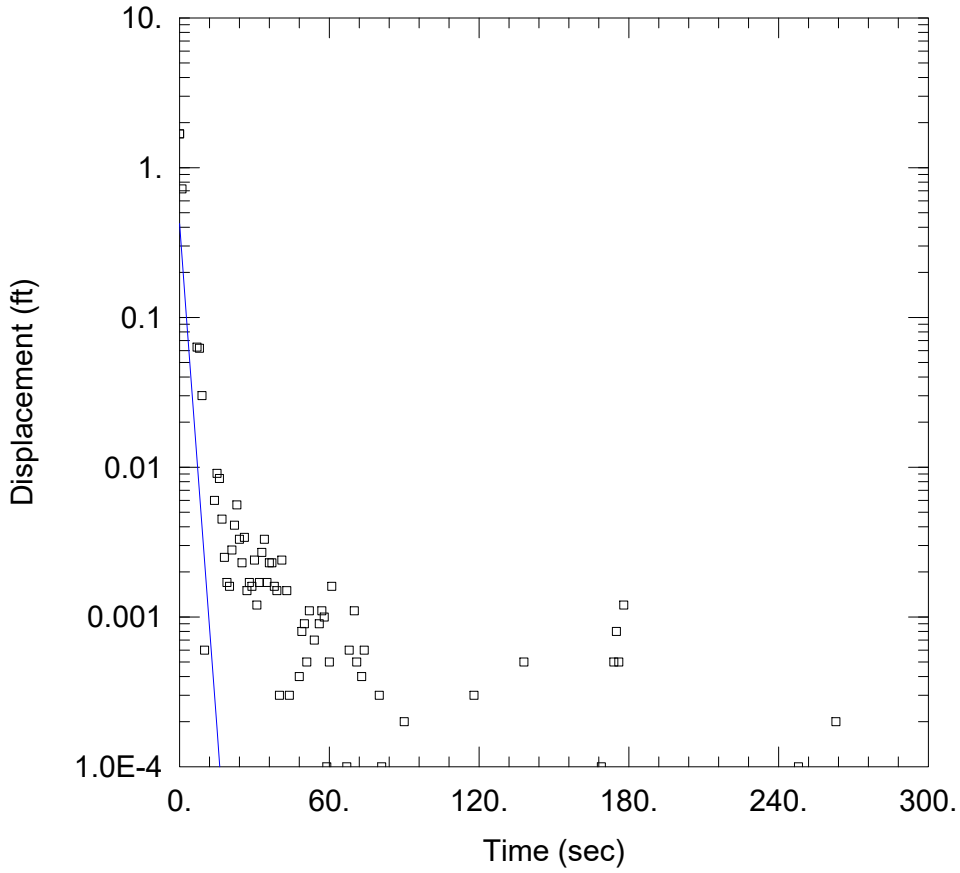
Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 1.682 ft Static Water Column Height: 26.15 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.03584 cm/sec y0 = 0.4234 ft



IN-A

Data Set: Y:\...\KC-15-02_IN-A_H.aqt
Date: 08/18/16 Time: 15:24:43

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

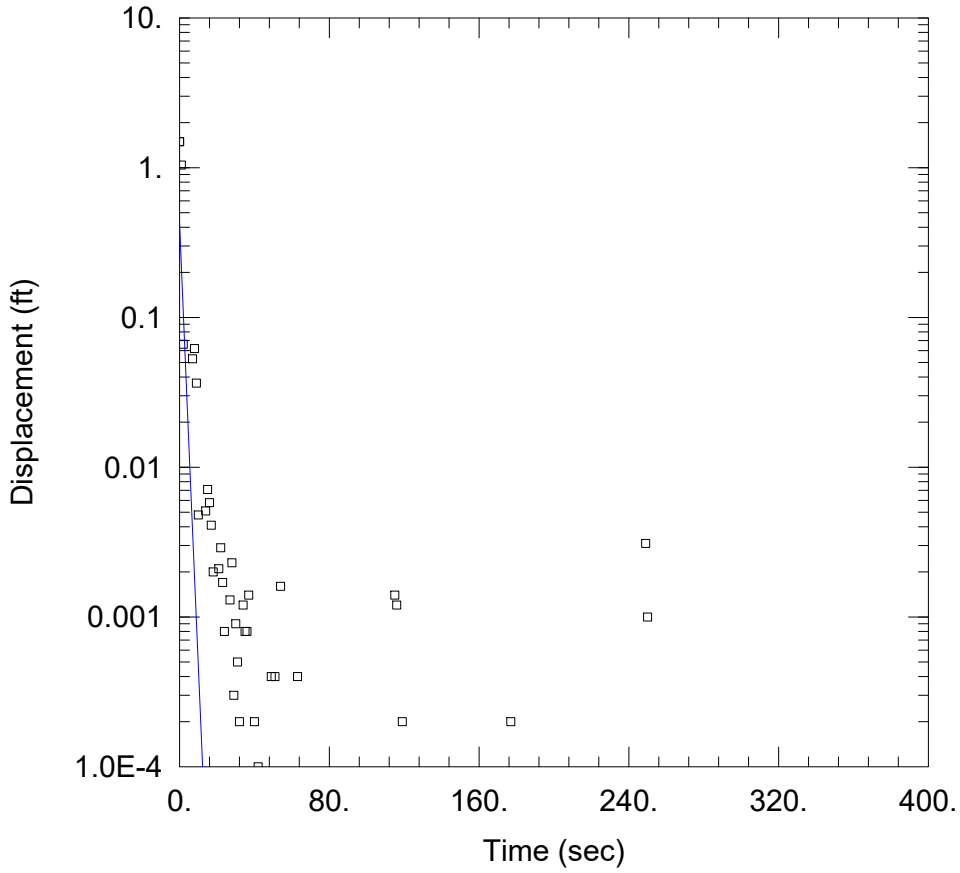
Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 1.682 ft
Total Well Penetration Depth: 71. ft
Casing Radius: 0.083 ft
Static Water Column Height: 26.15 ft
Screen Length: 10. ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.02225 cm/sec
y0 = 0.4234 ft



IN-B

Data Set: Y:\...\KC-15-02_IN-B_BR.aqt
Date: 08/18/16 Time: 15:28:00

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

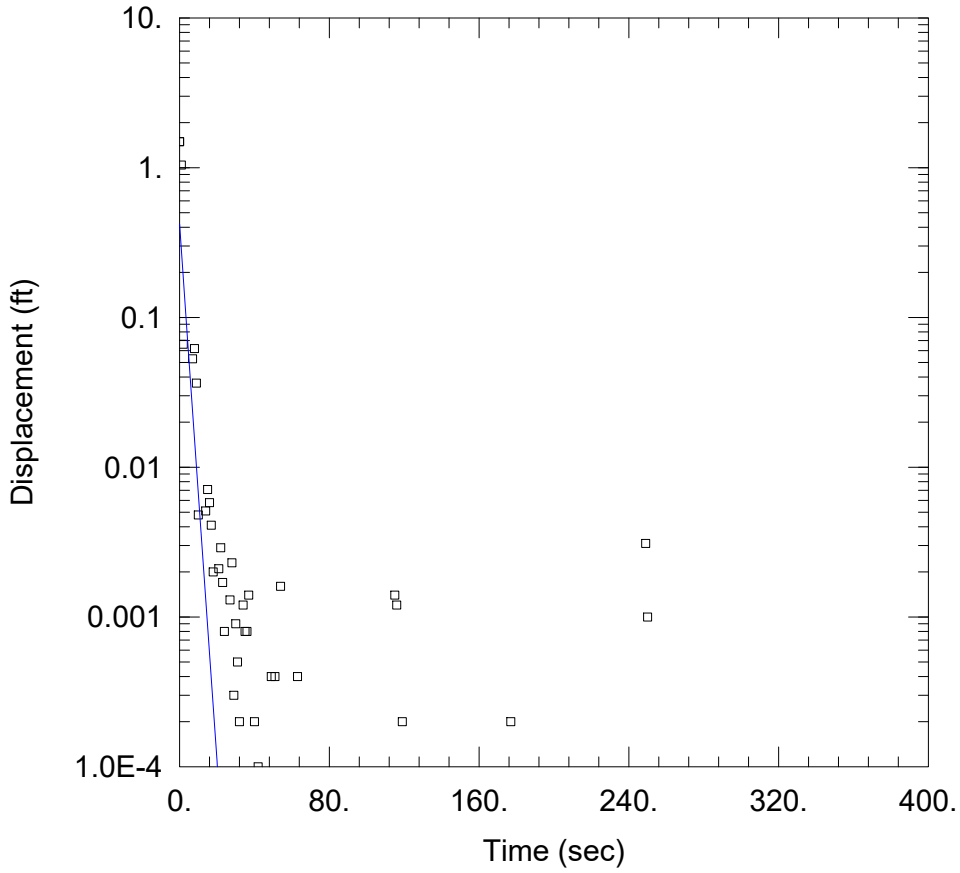
WELL DATA (KC-15-02)

Initial Displacement: 1.491 ft Static Water Column Height: 26.14 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.02623 cm/sec y0 = 0.4207 ft



IN-B

Data Set: Y:\...\KC-15-02_IN-B_H.aqt
Date: 08/18/16 Time: 15:29:06

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

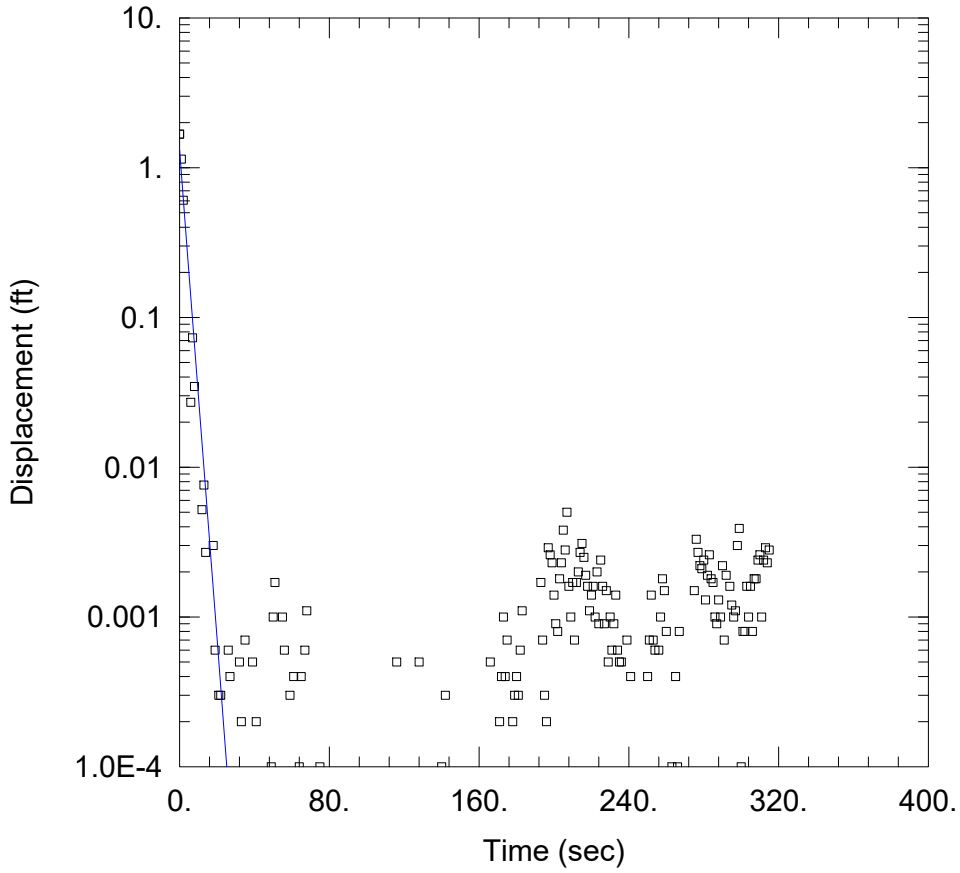
Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-02)

Initial Displacement: 1.491 ft Static Water Column Height: 26.14 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.01774 cm/sec y0 = 0.4207 ft



RISING HEAD #1

Data Set: Y:\...\KC-15-02_OUT-A_BR.aqt
Date: 08/18/16 Time: 15:30:53

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

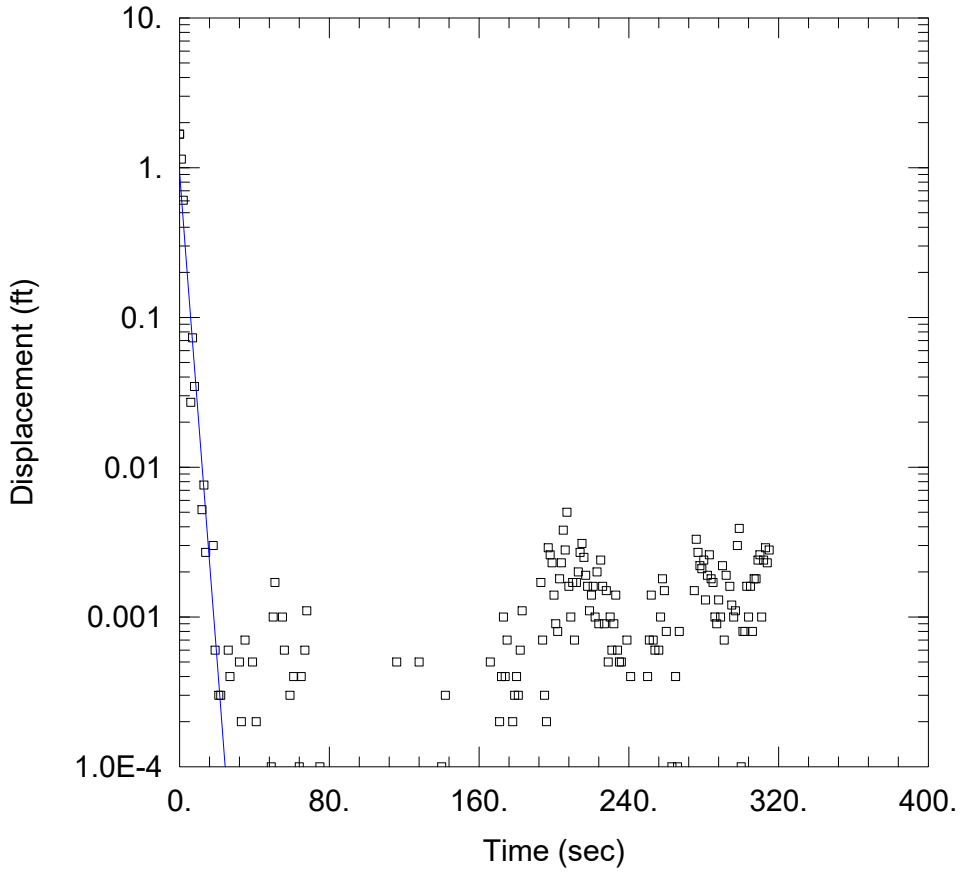
WELL DATA (KC-15-02)

Initial Displacement: 1.675 ft Static Water Column Height: 26.15 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.01455 cm/sec y0 = 1.319 ft



RISING HEAD #1

Data Set: Y:\...\KC-15-02_OUT-A_H.aqt
Date: 08/18/16 Time: 15:32:07

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

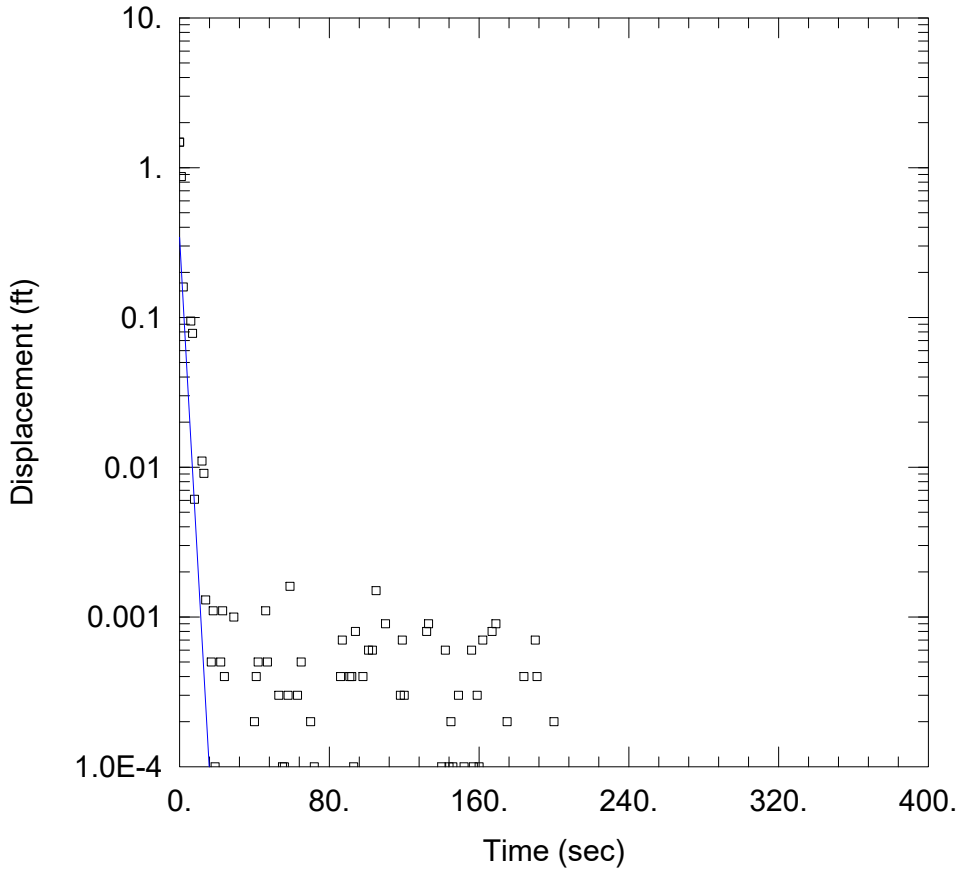
Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-02)

Initial Displacement: 1.675 ft Static Water Column Height: 26.15 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.01609 cm/sec y0 = 0.9277 ft



OUT-B

Data Set: Y:\...\KC-15-02_OUT-B_BR.aqt
Date: 08/18/16 Time: 15:33:54

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

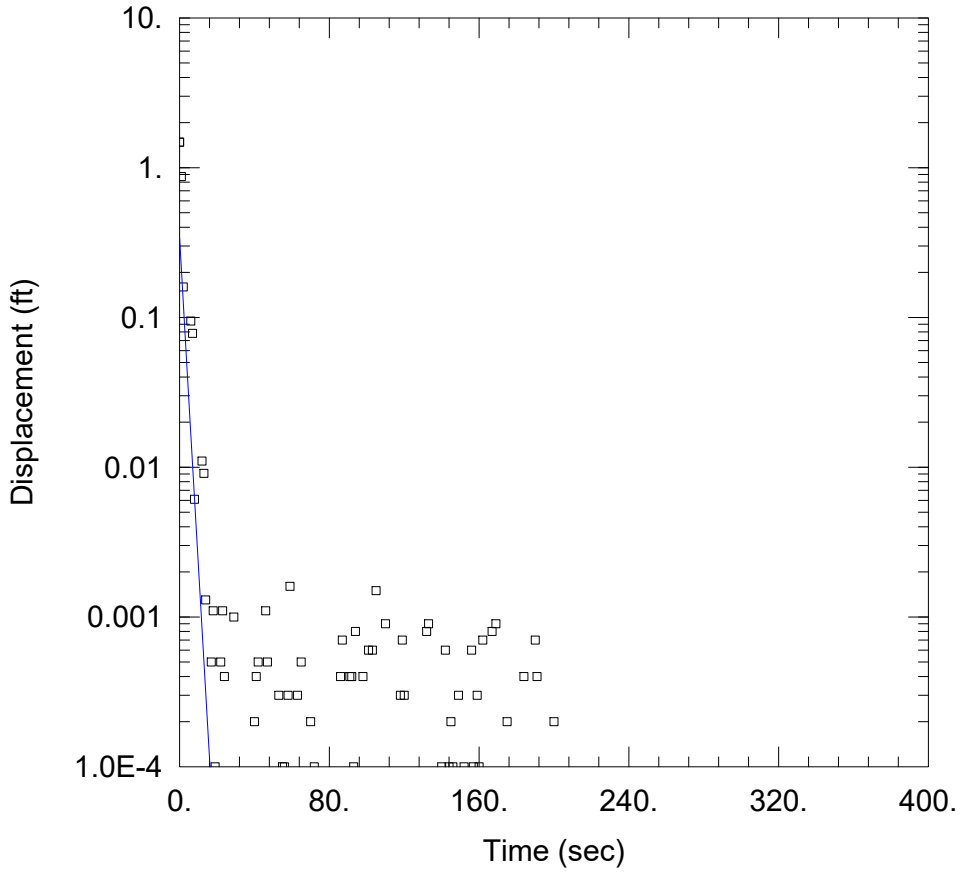
WELL DATA (KC-15-02)

Initial Displacement: 1.479 ft Static Water Column Height: 26.13 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.01995 cm/sec y0 = 0.3427 ft



OUT-B

Data Set: Y:\...\KC-15-02_OUT-B_H.aqt
Date: 08/18/16 Time: 15:35:18

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-02
Test Date: 05/18/2016

AQUIFER DATA

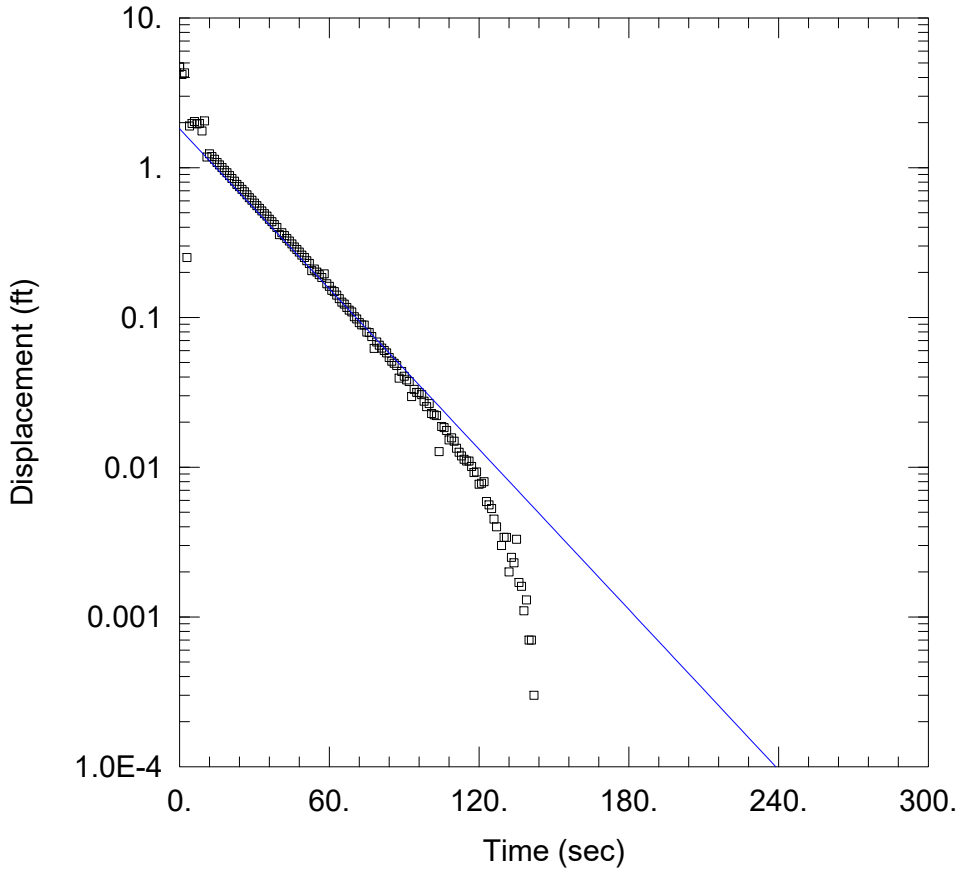
Saturated Thickness: 30.11 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-02)

Initial Displacement: 1.479 ft Static Water Column Height: 26.13 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.02153 cm/sec y0 = 0.3427 ft



IN-A

Data Set: Y:\...\KC-15-05_IN-A_BR.aqt
Date: 08/18/16 Time: 15:38:21

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

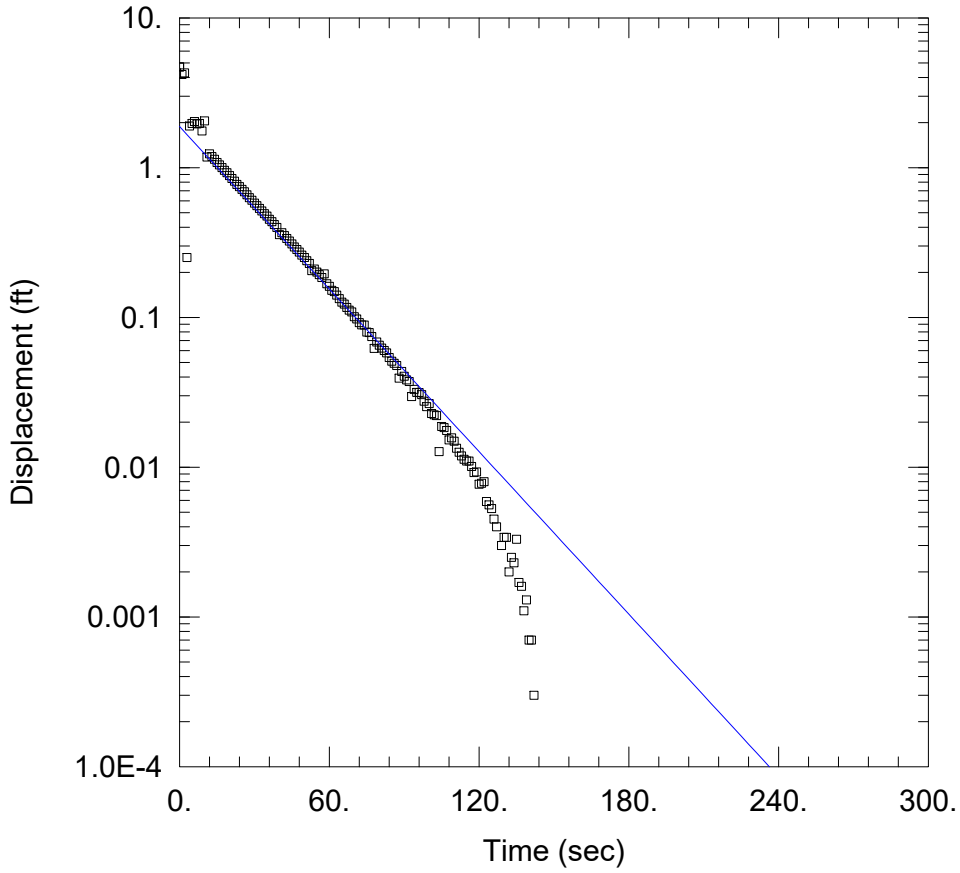
WELL DATA (KC-15-05)

Initial Displacement: 4.705 ft Static Water Column Height: 29.44 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001589 cm/sec y0 = 1.822 ft



IN-A

Data Set: Y:\...\KC-15-05_IN-A_H.aqt
Date: 08/18/16 Time: 15:40:16

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

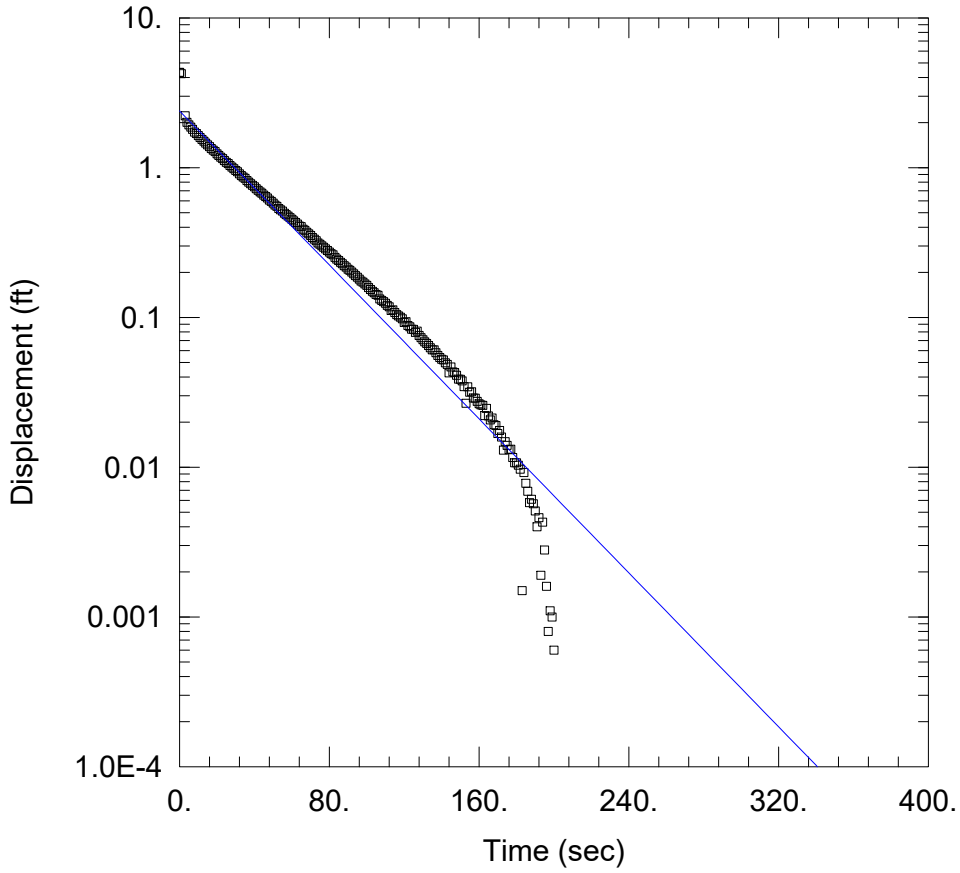
WELL DATA (KC-15-05)

Initial Displacement: 4.705 ft Static Water Column Height: 29.44 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev

K = 0.001791 cm/sec y0 = 1.883 ft



IN-B

Data Set: Y:\...\KC-15-05_IN-B_BR.aqt
Date: 08/18/16 Time: 15:41:39

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

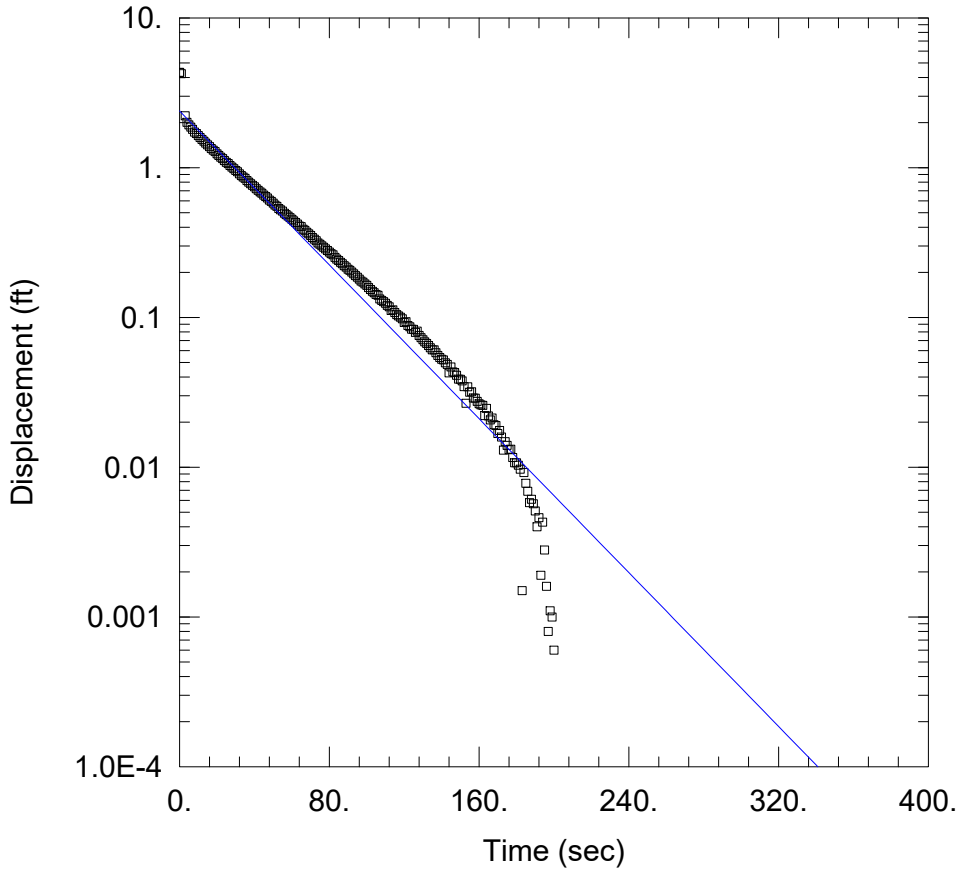
WELL DATA (KC-15-05)

Initial Displacement: 4.329 ft Static Water Column Height: 29.44 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001147 cm/sec y0 = 2.391 ft



IN-B

Data Set: Y:\...\KC-15-05_IN-B_H.aqt
Date: 08/18/16 Time: 15:42:30

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

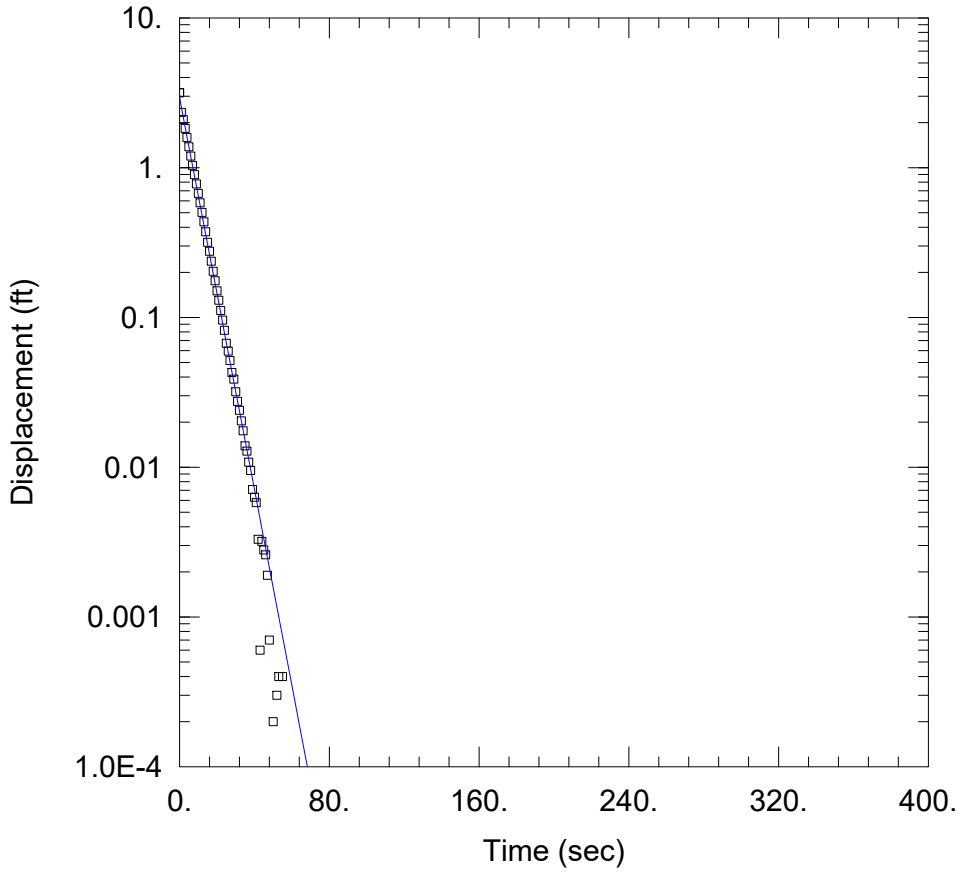
Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-05)

Initial Displacement: 4.329 ft Static Water Column Height: 29.44 ft
Total Well Penetration Depth: 71. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.001271 cm/sec y0 = 2.39 ft



OUT-A

Data Set: Y:\...\KC-15-05_OUT-A_BR.aqt
Date: 08/18/16 Time: 15:43:50

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

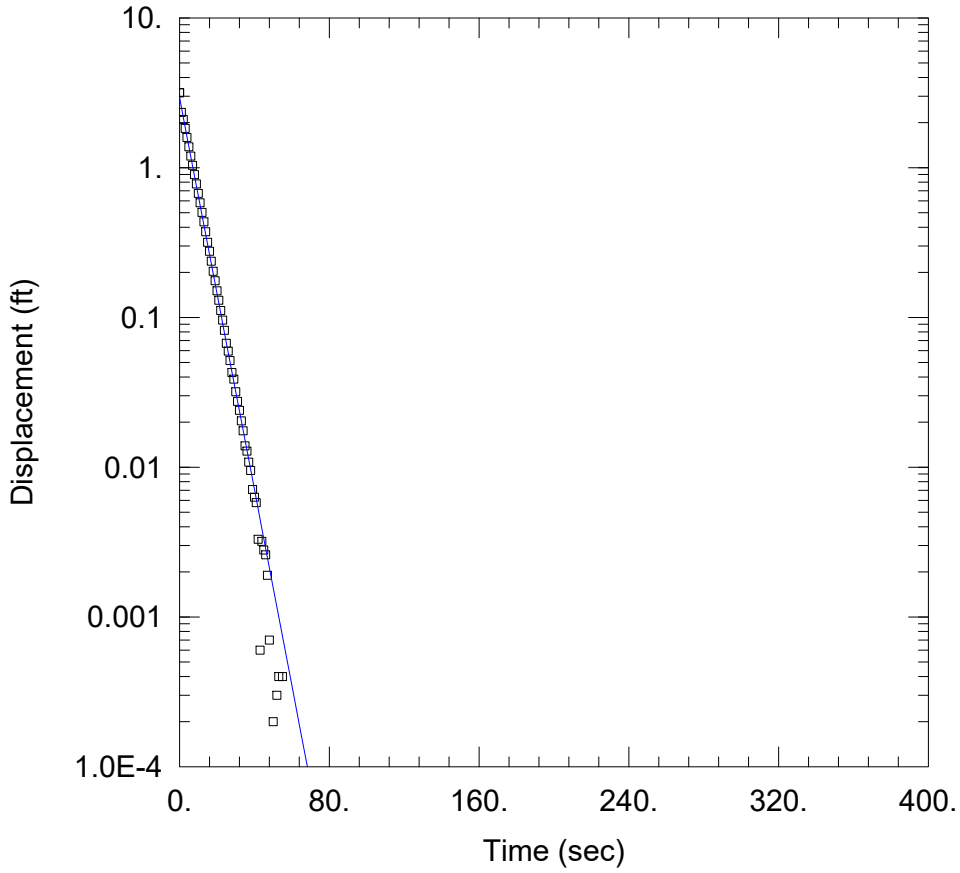
WELL DATA (KC-15-05)

Initial Displacement: 3.163 ft Static Water Column Height: 29.43 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.00583 cm/sec y0 = 2.94 ft



OUT-A

Data Set: Y:\...\KC-15-05_OUT-A_H.aqt
Date: 08/18/16 Time: 15:45:11

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

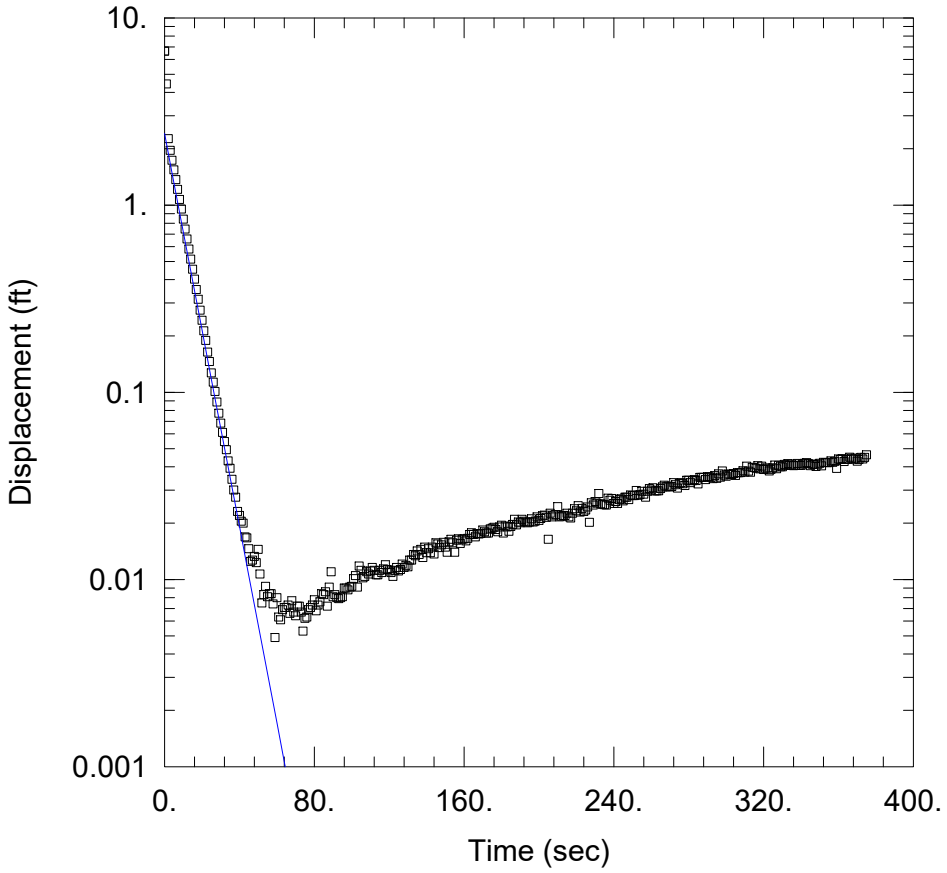
Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-05)

Initial Displacement: 3.163 ft Static Water Column Height: 29.43 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.006477 cm/sec y0 = 2.94 ft



OUT-B

Data Set: Y:\...\KC-15-05_OUT-B_BR.aqt
Date: 08/18/16 Time: 15:46:15

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

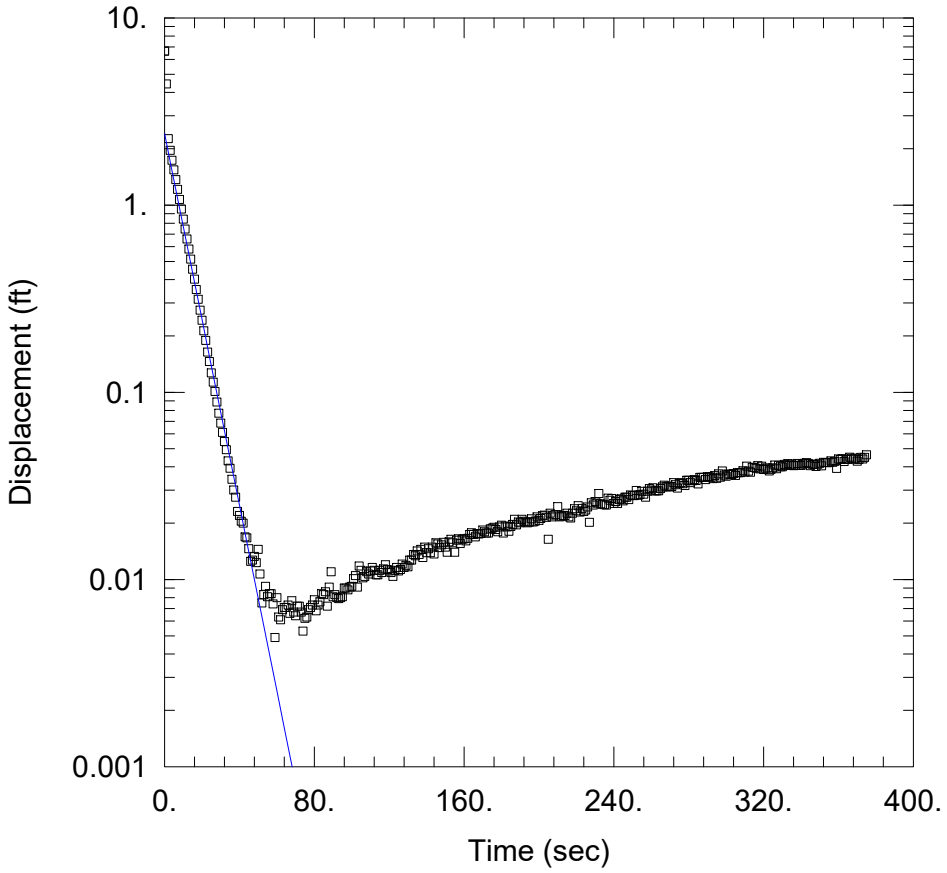
WELL DATA (KC-15-05)

Initial Displacement: 6.646 ft Static Water Column Height: 29.39 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.004673 cm/sec y0 = 2.413 ft



OUT-B

Data Set: Y:\...\KC-15-05_OUT-B_H.aqt
Date: 08/18/16 Time: 15:46:40

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - BSP
Test Well: KC-15-05
Test Date: 05/18/2016

AQUIFER DATA

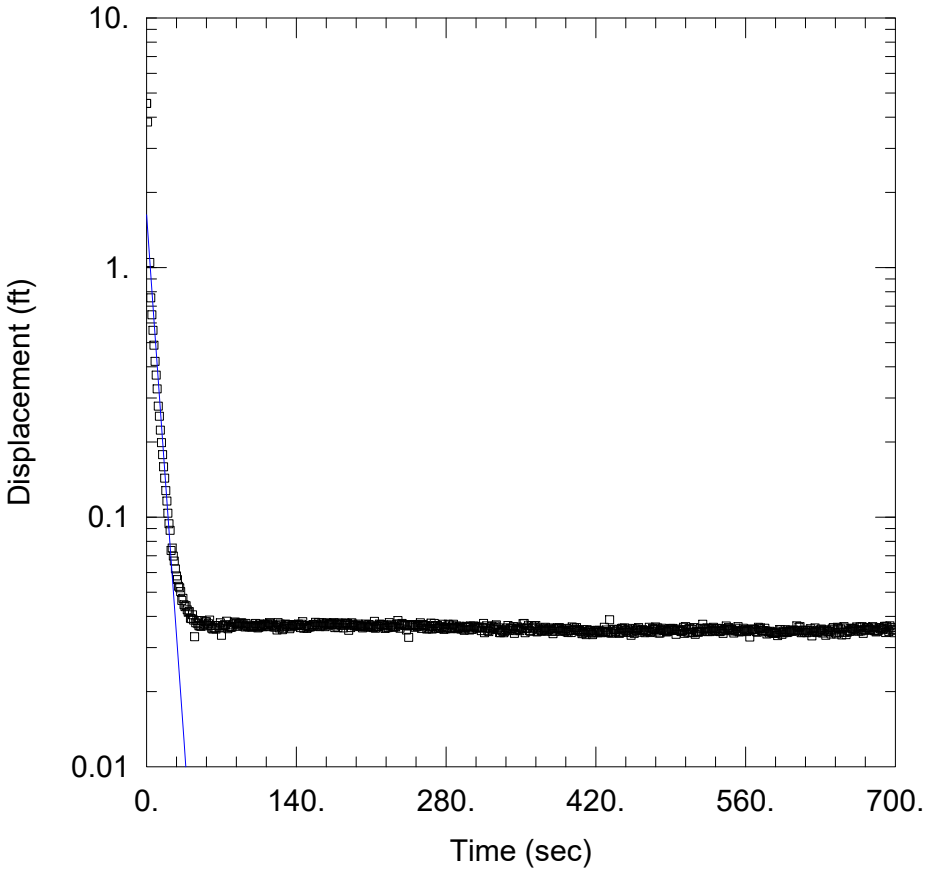
Saturated Thickness: 27.76 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-05)

Initial Displacement: 6.646 ft Static Water Column Height: 29.39 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.004912 cm/sec y0 = 2.413 ft



IN-A

Data Set: Y:\...\KC-15-14_IN-A-BR.aqt
Date: 08/18/16 Time: 15:49:09

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

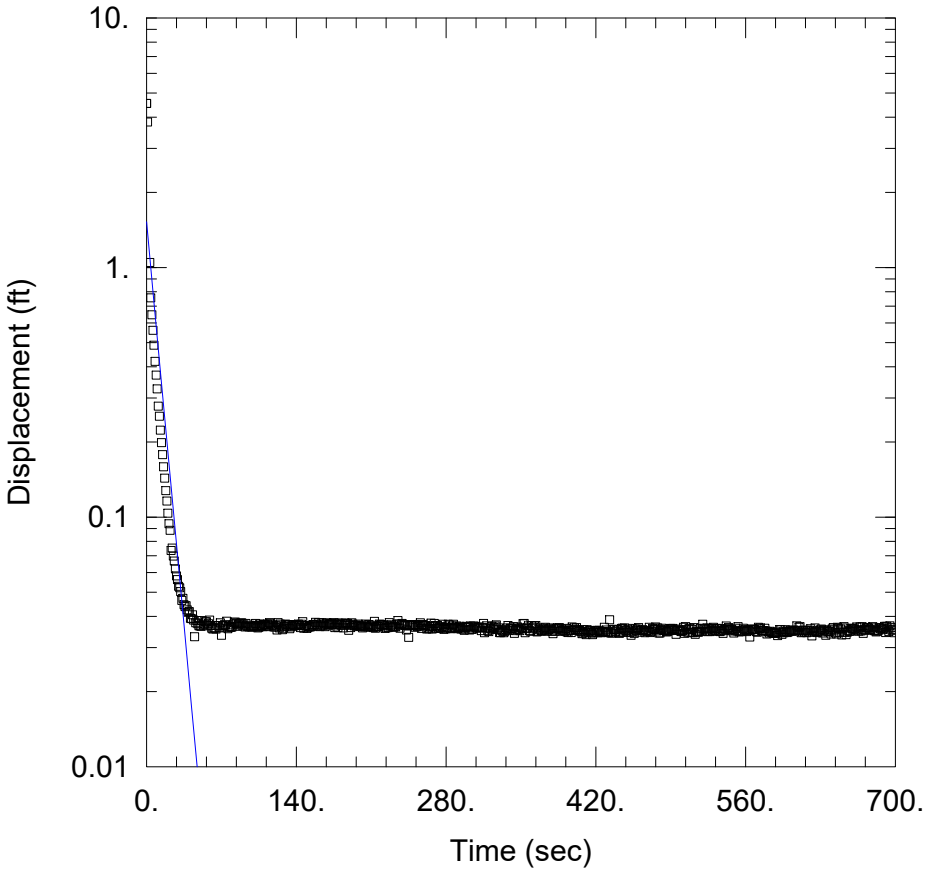
WELL DATA (KC-15-14)

Initial Displacement: 4.543 ft Static Water Column Height: 23.94 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.005407 cm/sec y0 = 1.627 ft



IN-A

Data Set: Y:\...\KC-15-14_IN-A-H.aqt
Date: 08/18/16 Time: 15:49:55

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

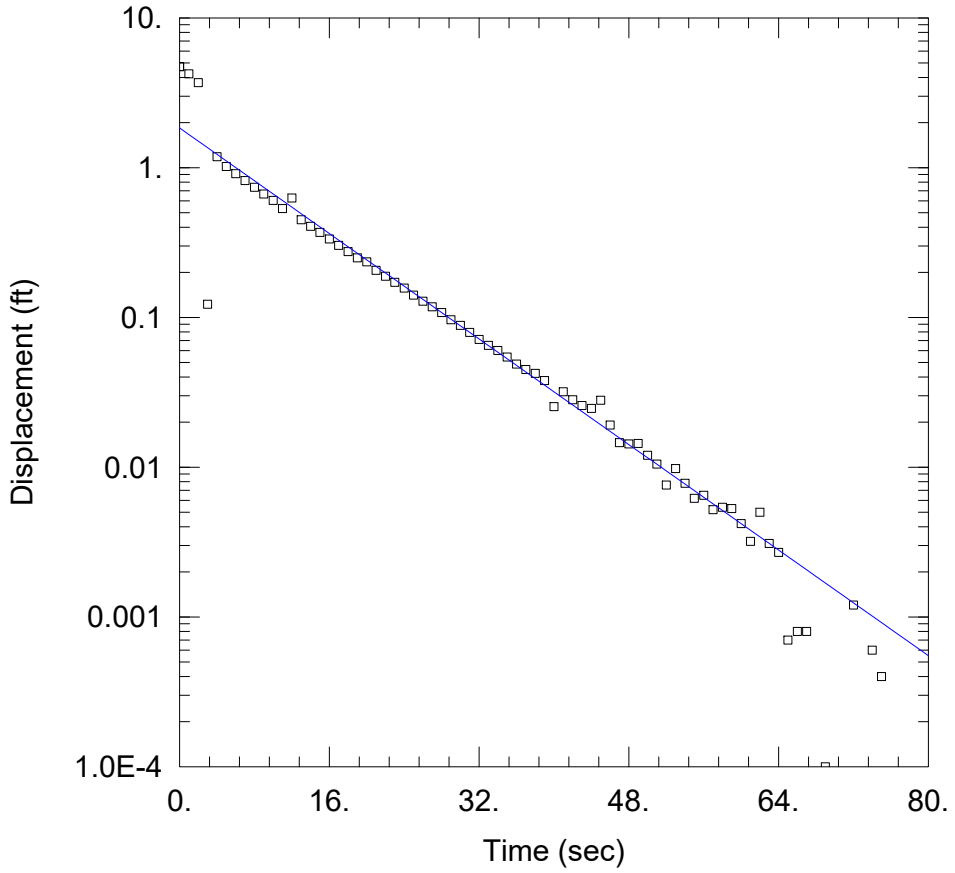
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 4.543 ft Static Water Column Height: 23.94 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.004569 cm/sec y0 = 1.525 ft



IN-B

Data Set: Y:\...\KC-15-14_IN-B-BR.aqt
Date: 08/18/16 Time: 15:51:30

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

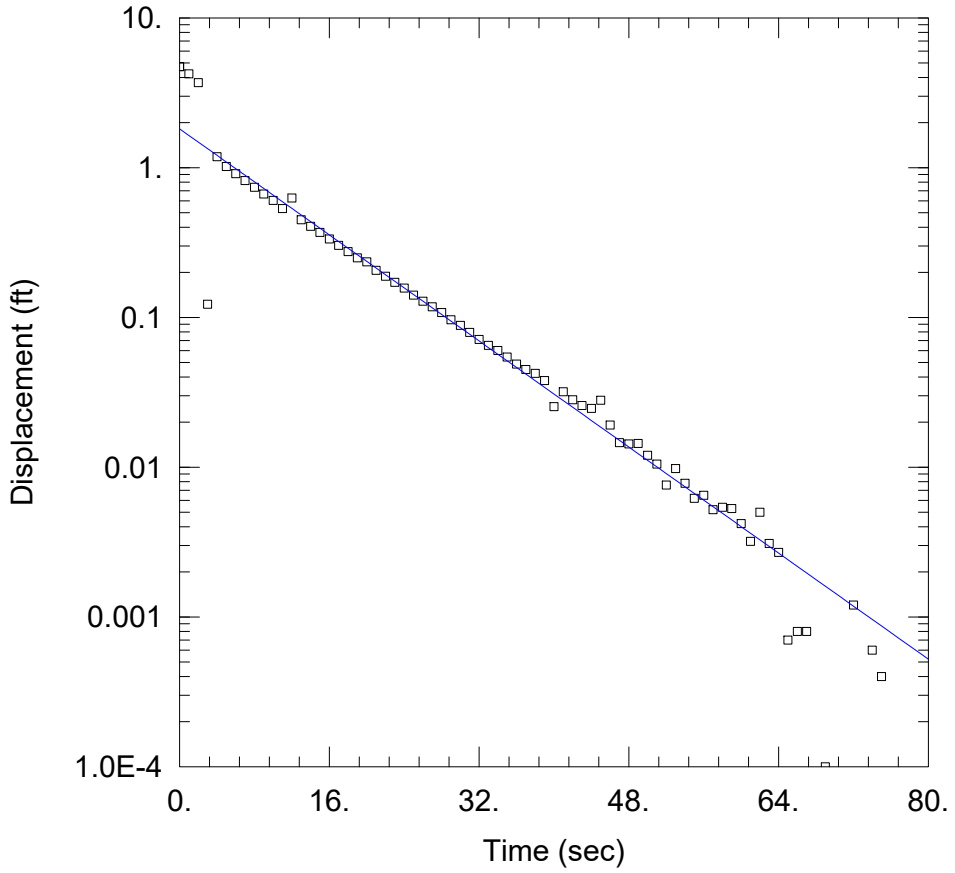
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 4.722 ft Static Water Column Height: 23.98 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.003955 cm/sec y0 = 1.842 ft



IN-B

Data Set: Y:\...\KC-15-14_IN-B-H.aqt
Date: 08/18/16 Time: 15:52:01

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

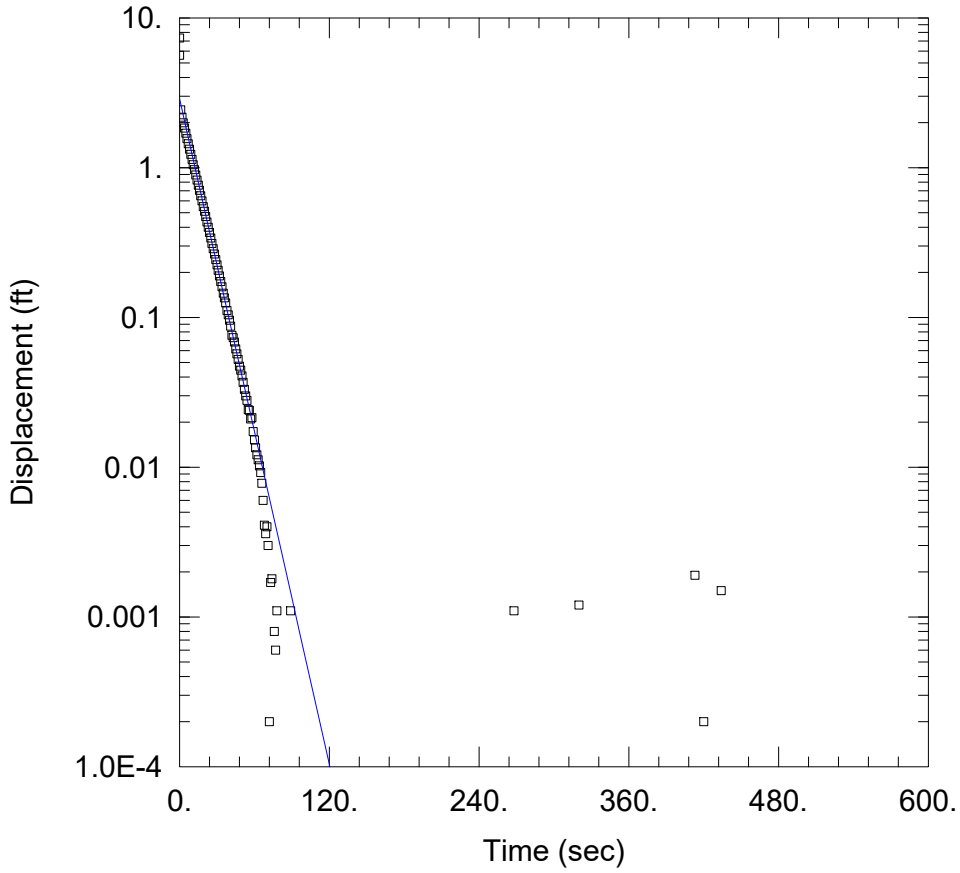
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 4.722 ft Static Water Column Height: 23.98 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.004383 cm/sec y0 = 1.817 ft



OUT-A

Data Set: Y:\...\KC-15-14_OUT-A-BR.aqt
Date: 08/18/16 Time: 15:52:55

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

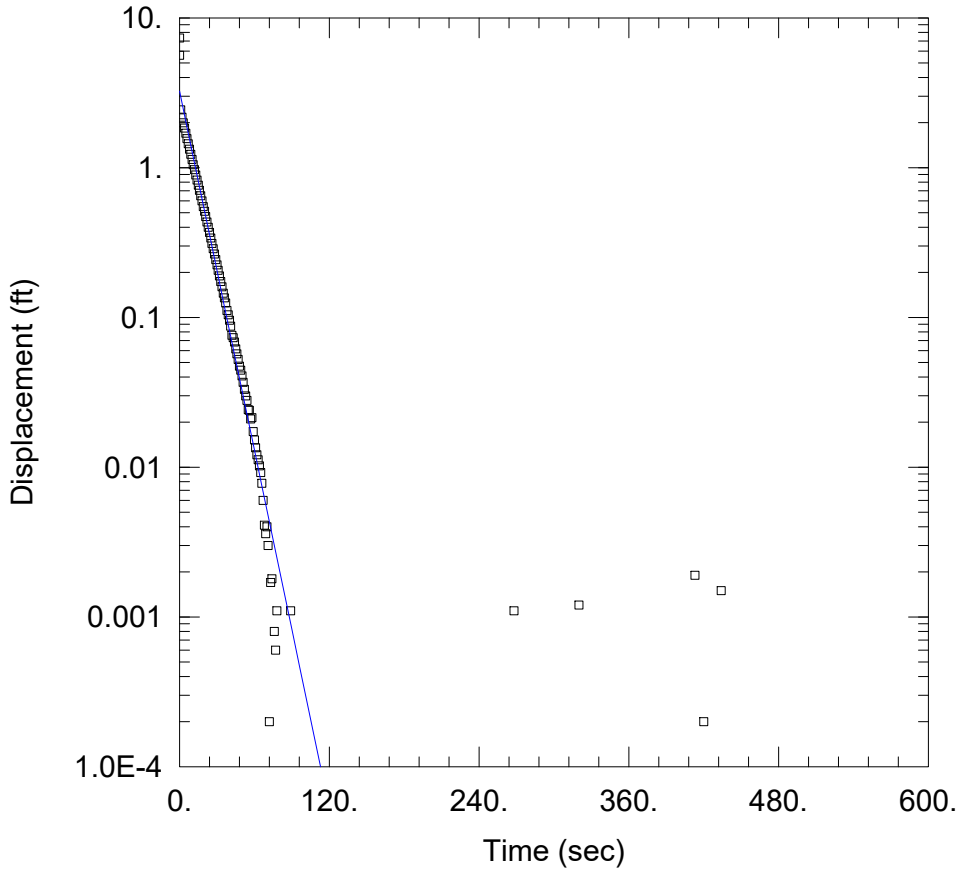
WELL DATA (KC-15-14)

Initial Displacement: 5.635 ft Static Water Column Height: 23.97 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.003327 cm/sec y0 = 2.893 ft



OUT-A

Data Set: Y:\...\KC-15-14_OUT-A-H.aqt
Date: 08/18/16 Time: 15:53:26

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

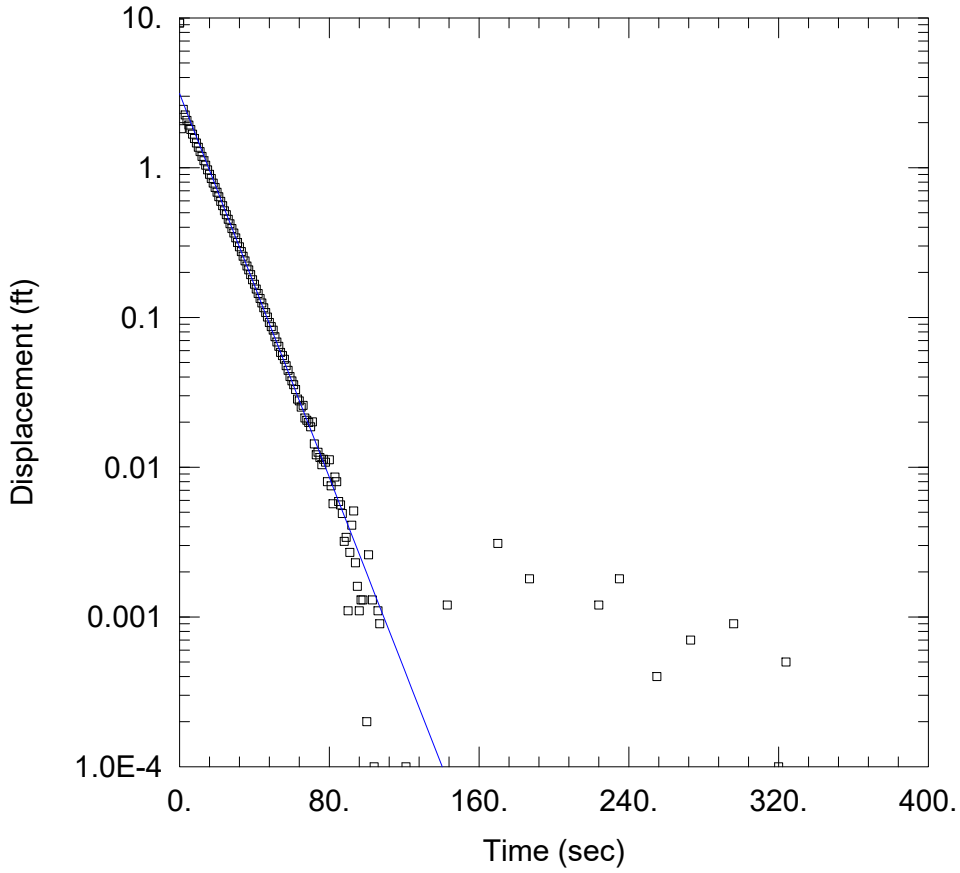
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 5.635 ft Static Water Column Height: 23.97 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.003953 cm/sec y0 = 3.242 ft



OUT-B

Data Set: Y:\...\KC-15-14_OUT-B-BR.aqt
Date: 08/18/16 Time: 15:54:42

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

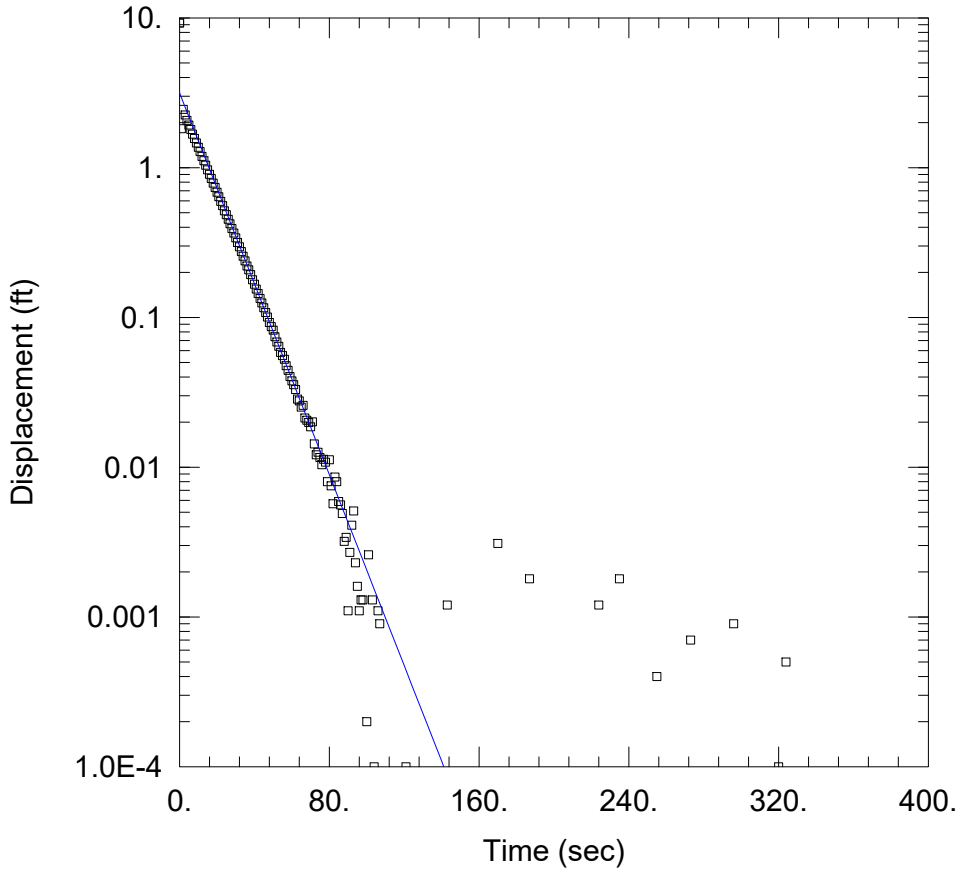
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 9.258 ft
Static Water Column Height: 23.97 ft
Total Well Penetration Depth: 74. ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.002877 cm/sec
y0 = 3.128 ft



OUT-B

Data Set: Y:\...\KC-15-14_OUT-B-H.aqt
Date: 08/18/16 Time: 15:55:41

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-14
Test Date: 05/18/2016

AQUIFER DATA

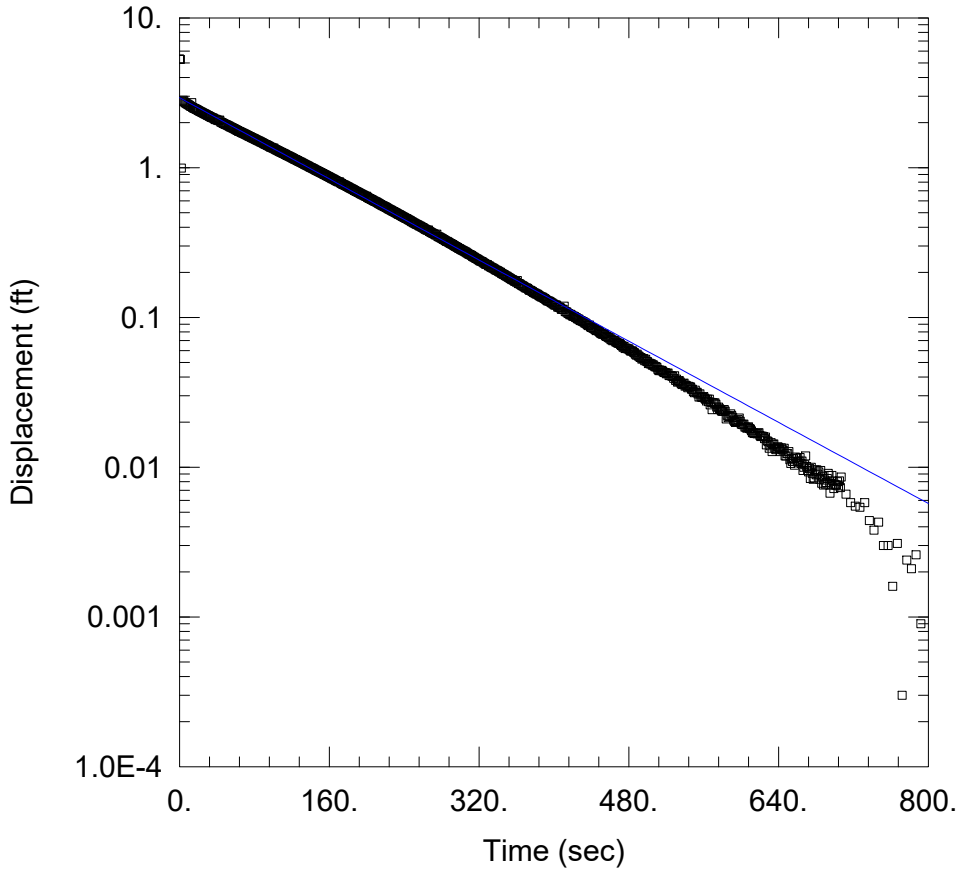
Saturated Thickness: 24.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-14)

Initial Displacement: 9.258 ft Static Water Column Height: 23.97 ft
Total Well Penetration Depth: 74. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.003156 cm/sec y0 = 3.162 ft



IN-A

Data Set: Y:\...\KC-15-21_IN-A-BR.aqt
Date: 08/18/16 Time: 15:57:14

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 33.33 ft Anisotropy Ratio (Kz/Kr): 1.

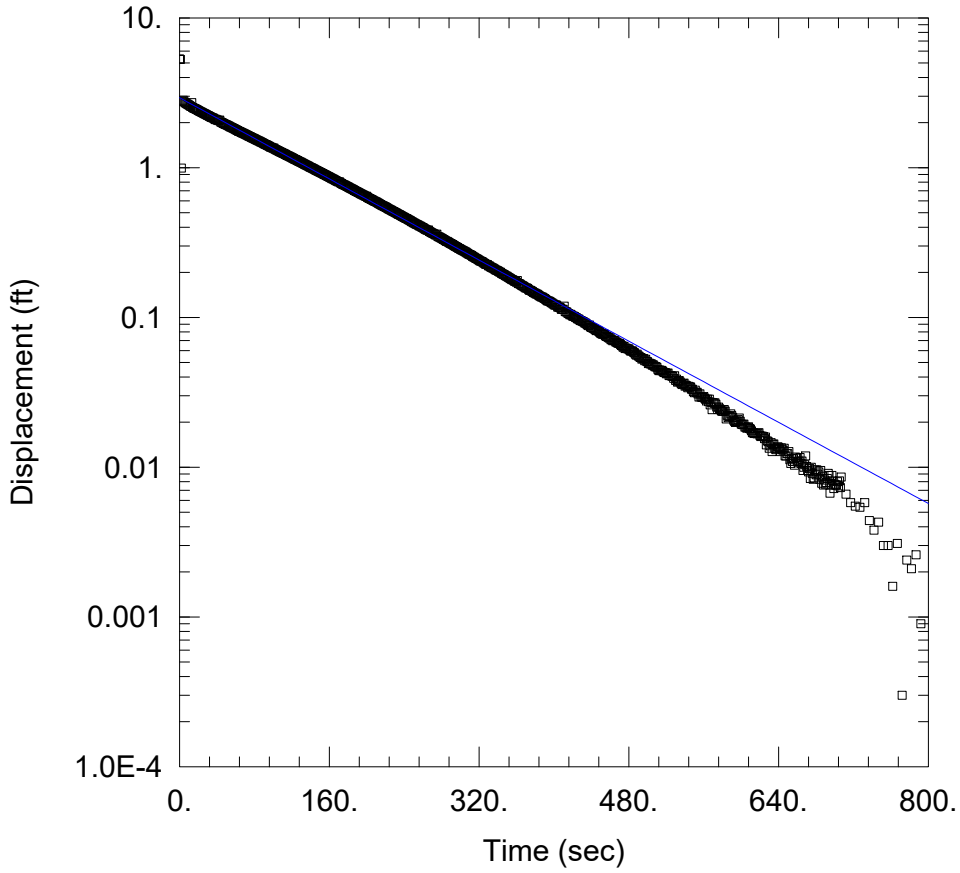
WELL DATA (KC-15-21)

Initial Displacement: 5.308 ft Static Water Column Height: 23.27 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.000308 cm/sec y0 = 2.932 ft



IN-A

Data Set: Y:\...\KC-15-21_IN-A-H.aqt
Date: 08/18/16 Time: 15:58:14

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

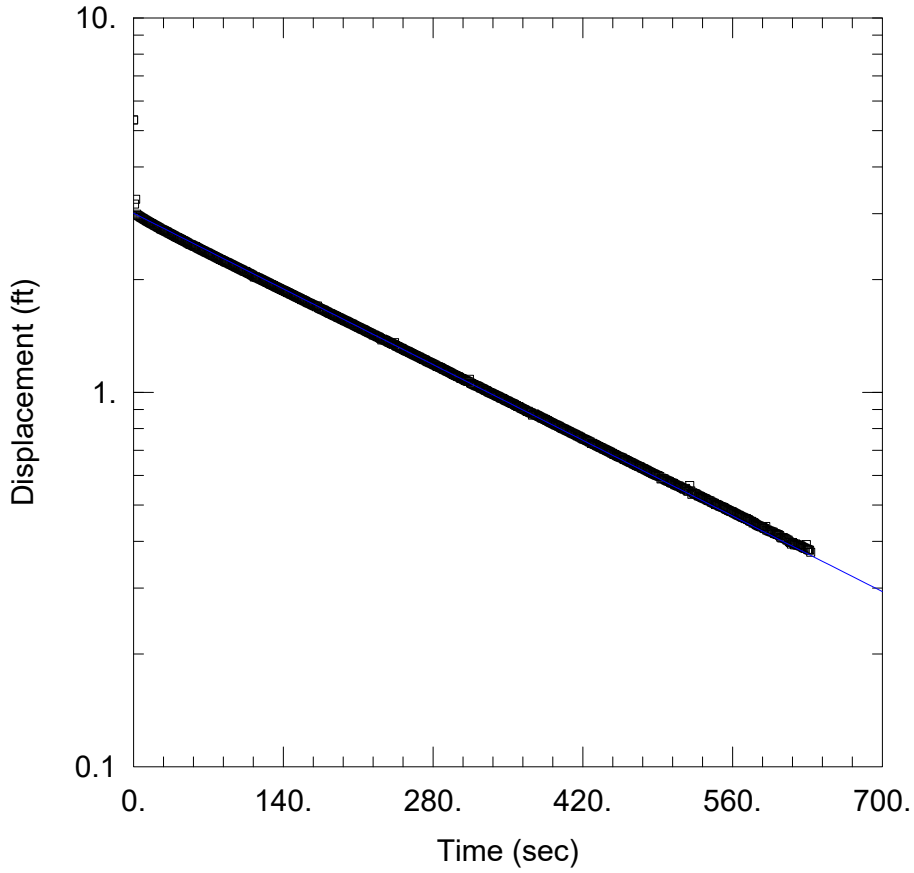
Saturated Thickness: 33.33 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-21)

Initial Displacement: 5.308 ft Static Water Column Height: 23.27 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.0003353 cm/sec y0 = 2.932 ft



IN-B

Data Set: Y:\...\KC-15-21_IN-B-BR.aqt
Date: 08/18/16 Time: 15:58:52

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

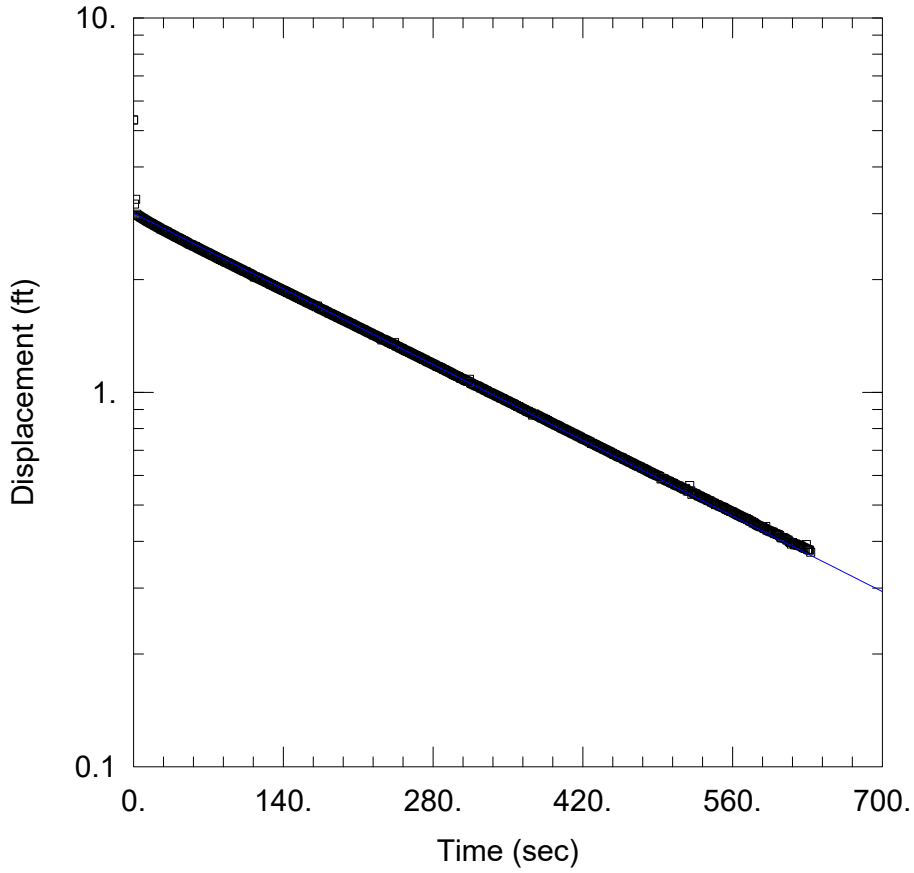
WELL DATA (KC-15-21)

Initial Displacement: 5.34 ft Static Water Column Height: 23.19 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.0001313 cm/sec y0 = 3.01 ft



IN-B

Data Set: Y:\...\KC-15-21_IN-B-H.aqt
Date: 08/18/16 Time: 15:59:17

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

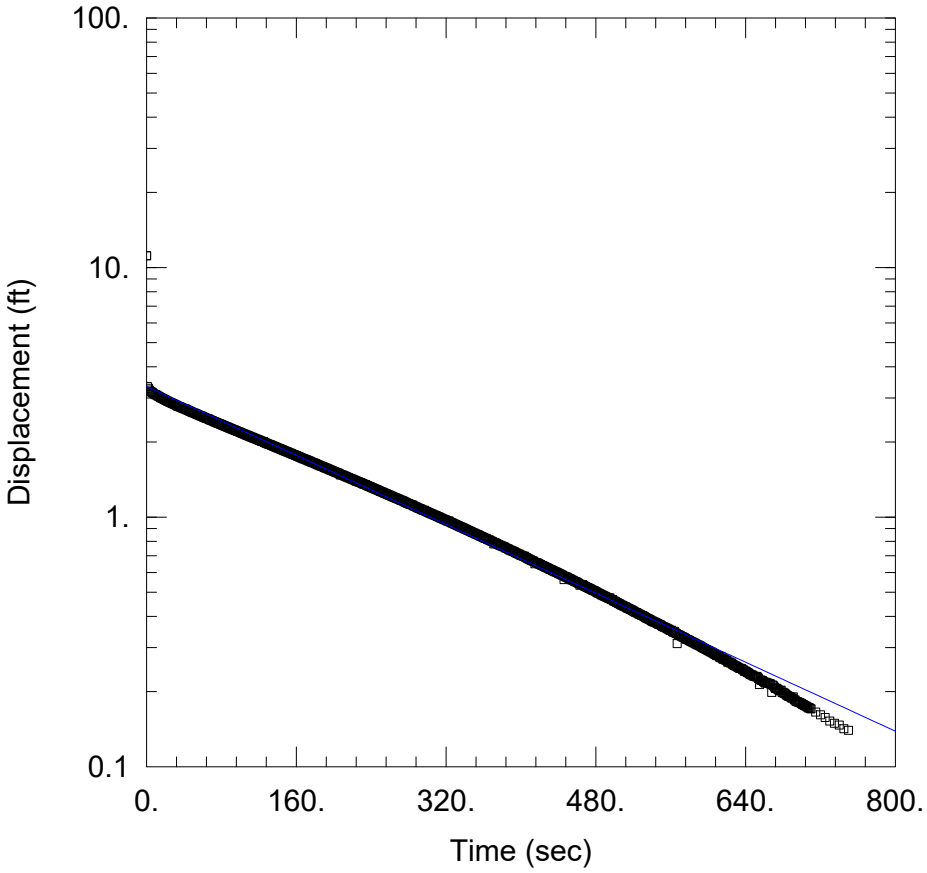
WELL DATA (KC-15-21)

Initial Displacement: 5.34 ft Static Water Column Height: 23.19 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev

K = 0.000143 cm/sec y0 = 3.01 ft



OUT-A

Data Set: Y:\...\KC-15-21_OUT-A-BR.aqt
Date: 08/18/16 Time: 16:00:12

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

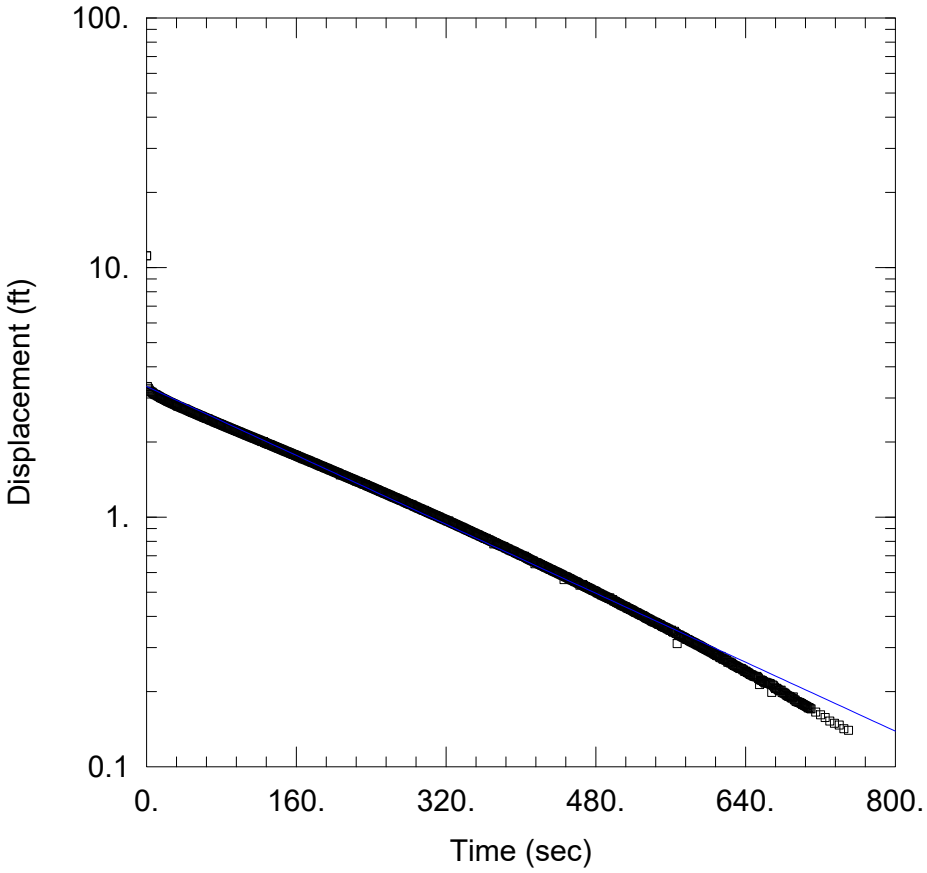
WELL DATA (KC-15-21)

Initial Displacement: 11.15 ft Static Water Column Height: 23.27 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.000157 cm/sec y0 = 3.34 ft



OUT-A

Data Set: Y:\...\KC-15-21_OUT-A-H.aqt
Date: 08/18/16 Time: 16:00:56

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

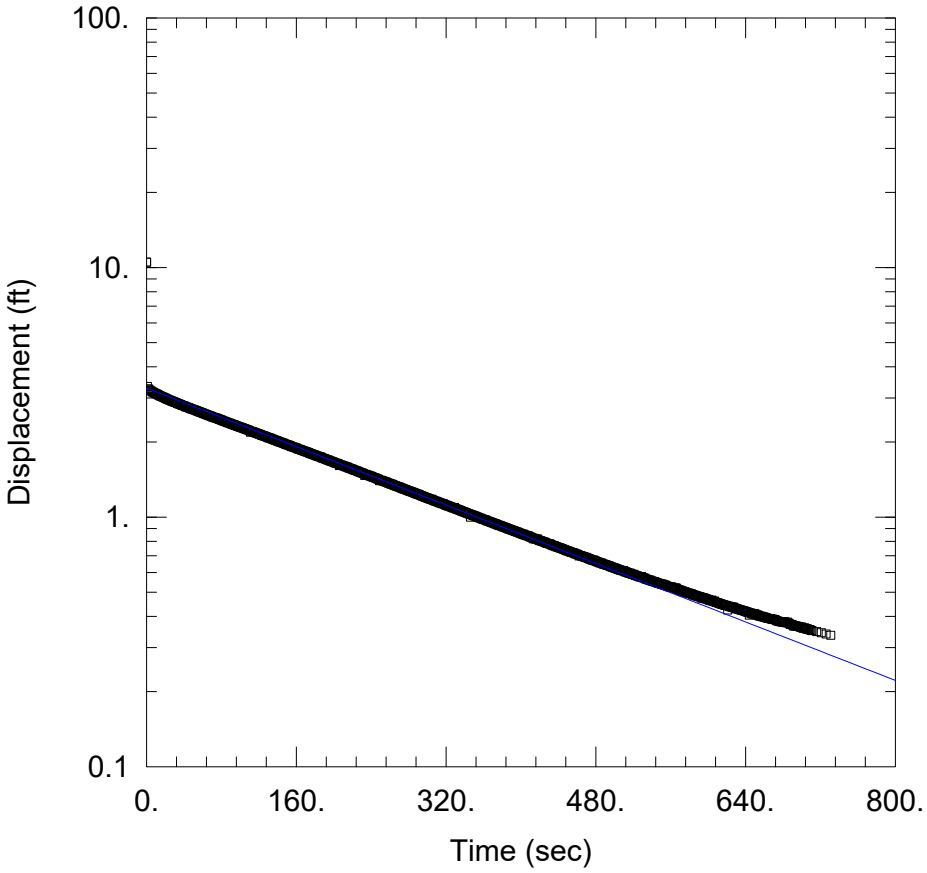
Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-21)

Initial Displacement: 11.15 ft Static Water Column Height: 23.27 ft
Total Well Penetration Depth: 81. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 0.0001709 cm/sec y0 = 3.34 ft



OUT-B

Data Set: Y:\...\KC-15-21_OUT-B-BR.aqt
Date: 08/18/16 Time: 16:01:29

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

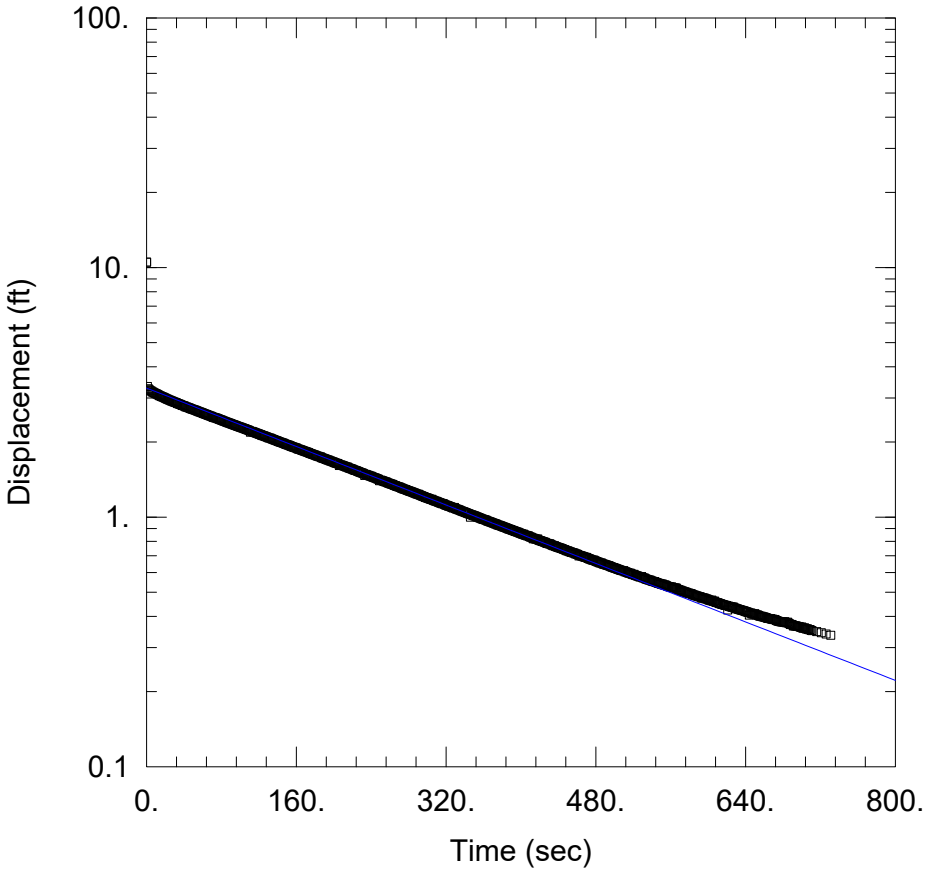
Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-21)

Initial Displacement: 10.5 ft
Static Water Column Height: 23.48 ft
Total Well Penetration Depth: 81. ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.0001332 cm/sec
y0 = 3.29 ft



OUT-B

Data Set: Y:\...\KC-15-21_OUT-B-H.aqt
Date: 08/18/16 Time: 16:01:55

PROJECT INFORMATION

Company: AGES, Inc.
Client: OVEC
Project: 2016002
Location: Kyger Creek Station - SFAP
Test Well: KC-15-21
Test Date: 05/18/2016

AQUIFER DATA

Saturated Thickness: 33.3 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (KC-15-21)

Initial Displacement: 10.5 ft
Static Water Column Height: 23.48 ft
Total Well Penetration Depth: 81. ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.000145 cm/sec
y0 = 3.29 ft