GROUNDWATER MONITORING NETWORK EVALUATION
Bottom Ash Ponds
Rockport Plant
Indiana-Michigan Power Company
Rockport, Indiana

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1.0 OBJECTIVE

This Groundwater Monitoring Network Evaluation Report has been prepared by Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), on behalf of American Electric Power Service Corporation (AEP), to document the results of the monitoring well network evaluation conducted for the Bottom Ash (BA) Ponds, at the Rockport Plant in Rockport, Indiana. The Groundwater Monitoring Network Evaluation was conducted to evaluate the adequacy of the existing monitoring well network and, if applicable, to make recommendations for additional well installations.

Specifically, the existing monitoring well network at the BA Ponds was evaluated for compliance with the coal combustion residuals (CCR) Final Rule issued by the U.S. Environmental Protection Agency (USEPA) on 17 April 2015. Regulations pertaining to Groundwater Monitoring and Corrective Action are contained in the Code of Federal Regulations (CFR) 40 CFR Sections (§) 257.90 through 98. The focus of this evaluation was on §257.91 (Groundwater Monitoring Systems).

2.0 BACKGROUND INFORMATION

2.1 Facility Location and Description

The Rockport Power Plant is located in southwest Indiana (**Figure 1**) in Spencer County, on property extending into three Townships: Ohio, Hammond and Grass. The plant is situated on the north bank of the Ohio River, just northeast of the intersection of State Route (SR) 66, and United States (US) Highway 231. SR 66 runs along the river between the Town of Grandview (about 1.5 miles to the east) and the City of Rockport (about 1 mile to the southwest), and US 231 runs south from Interstate 64 (about 20 miles north of the plant), crossing the Ohio River into Kentucky via the William H. Natcher Bridge just southwest of the Power Plant.

The site is owned and operated by Indiana-Michigan Power Company, a regional unit of AEP. The property was developed in the late 1970s and early 1980s. The facility consists of two coal-fired 1,300-megawatt (MW) power generating units. The first unit went into operation in December 1984, and the second in December 1989. The facility has two existing CCR storage/disposal units, consisting of a landfill located north-northeast of the generating plant, and two adjacent bottom ash (BA) ponds located near the generating plant at the north end of a wastewater pond complex. The general layout of the property and the locations of the CCR units are shown on **Figure 2**.

The following description of CCR generation and handling processes at the Rockport Plant is summarized from a letter sent by AEP to the Indiana Department of Environmental Management (IDEM) on 6 May 2009:

> The plant burns about 9-10 million tons of coal per year. The coal, delivered by barge, is off-loaded to the coal storage yard then transported by conveyor into one of the two generating units, where it is pulverized to a powder then injected and burned. The heat produced in burning coal converts water to steam used to drive the turbine generators which produce electricity. The burning of coal

produces two types of ash - fly ash and bottom ash. The Rockport Plant produces about 400,000 tons of fly ash and 140,000 tons of bottom ash per year.

Fly ash is the fine particulate matter entrained in the hot flue gases. To remove the fly ash prior to the gases exiting through the plant stack, the flue gas is routed through an electrostatic precipitator (ESP), where the ash particles adhere to electrically charged plates. Mechanical rappers knock the fly ash off the plates down into a series of collection hoppers. From the hoppers, the fly ash is pneumatically conveyed to a storage silo. From the silo, the ash is either loaded dry into closed trucks and shipped offsite for various uses, or conditioned with a small quantity of water and hauled by truck to the onsite landfill for disposal.

Bottom ash (BA) includes the heavier coal ash particles that fall to the bottom of the steam generator and are collected into refractory-lined hoppers. The hoppers are kept full of water to protect the lining and break the fall of large pieces of hot slag which shatter upon contact with the relatively cool water. From the hoppers, the BA-water mixture is routed to a crusher station where the ash is crushed to a size suitable for pumping. The BA is then pumped to one of the BA ponds located in the wastewater pond complex, where it precipitates out and can be reclaimed after the pond is drained.

2.2 Description of CCR Unit

2.2.1 General

The CCR unit referred to as the BA Ponds is located at the north end of the wastewater pond complex for the plant (**Figure 3**). It consists of two contiguous ponds, referred to as the East and West BA Ponds, which receive CCR. Other ponds in the complex include the east and west wastewater ponds, the reclaim pond, and the clearwater pond. The wastewater pond complex has a total surface area of 137 acres and a design storage capacity of 1,640 acre-feet (O&G 2011).

Water from the BA ponds drains to the two wastewater ponds, and stormwater from several stormwater collection ponds located at the perimeter of the generating station is also routed to the wastewater ponds. From the wastewater ponds, wastewater flows to the reclaim pond. If needed, water can be recirculated into the sluice water system from the reclaim pond. Excess water flows from the reclaim pond to the clearwater pond, and discharges from there to the Ohio River via a fixed weir outlet and a 66-inch CMP pipe. The discharge is permitted under National Pollution Discharge Elimination System (NPDES) permit number IN 0051845.

Two small metal cleaning waste ponds were formerly located east of the East BA Pond. The northernmost of these two ponds was backfilled prior to 1998 and was replaced with a single aboveground tank located in a containment area above the former pond location. The south pond was backfilled in 2014-2015. A stormwater pond (the West Stormwater Pond) was constructed west of the west dike (between the BA Ponds and US 231) in 2006 or early 2007 (based on historical aerial photography available through GoogleEarth).

2.2.2 Embankment Configuration

The wastewater pond complex is a combination incised and diked earthen embankment impoundment. It is incised below grade along most of its perimeter, and is diked only on the west side of the West BA Pond, where the topography decreases in elevation toward a remnant drainage channel.

The embankments, including the west dike, have a crest elevation of 399 feet, and are approximately 30 feet wide. The west dike has a maximum height (from crest to outboard toe) of 13 feet. The inboard slope was constructed at a slope of 2 horizontal to 1 vertical (2H:1V), and the outboard slope at 2.5H:1V. The outer west dike, and the internal splitter dikes (constructed between the BA Ponds, and between each of the BA Ponds and the wastewater ponds to the south) were constructed of natural clayey soils excavated from the interior of the ponds. The inboard slopes were armored with rock riprap. Reportedly, no engineered liner systems are present in the BA Ponds or the other ponds in the wastewater pond complex.

2.2.3 Area/Volume

The East and West BA Ponds each have rough dimensions (at the crest) of 2,000 feet x 650 feet, corresponding to a surface area of approximately 30 acres each (60 acres total). The East BA Pond is deeper than the West BA Pond. The design bottom elevations in the ponds are: 386 feet, or 13 feet below crest elevation in the West BA Pond; and 377 feet, or 22 feet below crest elevation in the East BA Pond.

Assuming two feet of freeboard, the West BA Pond has a design capacity of approximately 310 acre-feet (500,000 cubic yards, or CY), compared to 540 acre-feet (870,000 CY) in the East BA Pond.

2.2.4 Construction and Operational History

The wastewater pond complex was constructed in the late 1970s, commissioned in 1981, and has not been significantly modified since original construction (O&G 2011).

The East and West BA Ponds are used alternately. Bottom ash generated at the plant is hydraulically sluiced to one of the ponds (the active pond) until it is close to full. Bottom ash in the inactive pond is drained and dewatered, and then moved by bulldozer to stockpiles on the north end of the pond. Dry ash in the stockpiles is loaded into trucks and transported to other locations for beneficial reuse. It typically takes approximately six months for the active pond to fill, at which time the second pond (which has been emptied of bottom ash) becomes the active pond, and the first pond is drained.

2.2.5 Surface Water Control

Both BA ponds have two outlet structures: a surface water adjustable weir outlet structure for use during sluicing, as the pond is filling, and a low-level outlet structure used after flow into the pond has stopped, to dewater the accumulated bottom ash. Water from both of these outlets gravity drains to the wastewater ponds.

2.3 Previous Investigations

Site investigations were performed on the Plant property in the late 1970s and early 1980s to support design, construction and permitting in advance of plant start-up, which occurred in December 1984.

The following documents were provided by AEP for this review:

- Portions of a report titled *Foundation Investigations for Rockport Site*, by Casagrande Consultants, dated 25 April 25 1977. The portions provided included a boring location map and boring logs for nine soil borings (BH-361 to BH-369) performed in March 1977 along the proposed alignment for the perimeter and splitter dikes in the wastewater pond complex. The boring location map and boring logs are provided in **Appendix A**.
- AEP design drawing 12-30013-15 titled *Unit No. 1 & 2 Wastewater & Bottom Ash Pond Area - Grading & Drainage*, originally dated 18 July 1977, with revisions through 16 January 1990.
- AEP design drawing 12-30018-1 titled *Unit No. 1 & 2 Wastewater & Bottom Ash Pond Area – Sections and Details*, originally dated 18 July 1977, with revisions through 10 January 1979.
- An AEP Internal Memo titled *Stability Analysis of Bottom Ash Pond West Dike*, dated 21 June 2010, which included the three items listed above.
- Well construction and lithologic logs for four monitoring wells installed by AEP on the perimeter of the wastewater pond complex in June-July 2010. Copies of these logs are provided in **Appendix B**.
- A drawing titled *Boring Location Overall Plan*, by WorleyParsons, dated 7 November 2011.
- A report titled *Dam Safety Assessment of CCW Impoundments, Rockport Power Plant*. Report prepared for USEPA by O'Brien & Gere Engineers, Inc., 24 March 2011 (O&G 2011).

In addition, AEP provided a Landfill Application Package (AEP 1984) containing the methods and findings from a Site Investigation performed in 1983 by AEP Civil Engineering personnel of the northern portion of the plant property, to support permitting of two CCR stockpiles and landfilling areas.

2.4 Hydrogeologic Setting

The following sections provide information on the hydrogeologic setting of the AEP Rockport Plant, including climate, physiography and drainage, geology, hydraulic properties of the principal groundwater flow zone, surface water and interactions between surface water and groundwater, and water users.

2.4.1 Climate and Water Budget

The area of Rockport has a continental climate regime. As described by Ray (1965), summers are long, hot and humid, and winters are damp and relatively mild, with brief periods of intense

cold. Mean monthly temperatures vary from 35 degrees Fahrenheit (ºF) in January to 79ºF in July.

The closest meteorological station with long-term data is Owensboro, Kentucky. Based on National Climatic Data Center (NCDC) data for the period from 1971 through 2000, as reported by the Midwest Regional Climate Center (MRCC, http://mrcc.isws.illinois.edu/), the normal annual precipitation in Owensboro is 45.07 inches. Precipitation is well distributed throughout the year, on average, but can be highly variable from month-to-month. Monthly normal precipitation varies from 2.67 inches in October to 4.66 inches in May. However, monthly extremes during the period from 1928 through 1990 ranged from 0.06 inches in October 1987 to 16.15 inches in March 1964.

Mean annual potential evapotranspiration in Owensboro is between 31 and 33 inches, according to mapped data available from the Kentucky Climate Center (http://www.kyclimate.org/index.html). The adjusted annual potential evaporation estimated in the Landfill Application Package (AEP 1984, Table 10), based on climatic data from Tell City, was 32.22 inches per year. The mean monthly water balance developed for the landfill resulted in the following breakdown (AEP 1984, Table 11) for an estimated annual precipitation of 44.27 Inches:

- Surface Runoff – 13.23 inches (30%);
- Actual Evapotranspiration – 25.69 inches (58%);
- Percolation (groundwater recharge) – 5.44 inches (12%).

2.4.2 Regional and Local Geologic Setting

2.4.2.1 Physiography and Drainage

The area of Rockport lies in the western Interior Low Plateau physiographic province of the United States, in a subarea referred to as the Wabash Lowland. It is an area of broad alluviated valleys and dissected uplands of rolling to hilly terrain with gentle slopes and moderate relief (Ray 1965). The topography in the vicinity of the Rockport Plant is shown on the U.S. Geological Survey (USGS) topographic map reproduced in **Figure 4**. Elevations on the map are shown relative to Mean Seal Level (MSL, also known as the National Geodetic Vertical Datum of 1929, or NGVD29).

Drainage in the area is provided by the Ohio River, which is adjacent to the plant property on the southeast, is over 2,000 feet wide in the vicinity of the plant, and flows to the southwest toward Owensboro, Kentucky. The plant property slopes gently across a terraced surface from elevations greater than 410 feet on its northern edge, where it is bordered by low hills and an upper terrace, to about 390 feet along the top of the bank of the Ohio River. Much of the property is drained by Honey Creek, which flows south-southeast to the Ohio River and is incised down to an elevation of about 380 feet. The power generation plant was developed on the portion of the property between US 231 on the west and Honey Creek on the east. It is located on a watershed divide between Honey Creek and an unnamed tributary offsite to the southwest.

The natural topography over most of the property (outside the channel of Honey Creek) prior to development of the power plant consisted of a relatively flat terrace surface marked by east-west

oriented crests and swales. Multiple low-gradient drainage ditches crossed the area, connecting the two watersheds (Honey Creek and the watershed to the west). Regrading for development of the power plant and associated facilities (including construction of the wastewater pond complex) disrupted some of the existing natural drainage as well as the man-made drainage that existed on the surface of the terrace and is still depicted on the USGS topographic map in **Figure 4**.

2.4.2.2 Geology

The area of the site lies in the southern portion of a broad shallow downwarp structure referred to as the Illinois Basin (also known as the Eastern Interior Basin), and is underlain by sedimentary bedrock of Pennsylvanian age. The bedrock underlying the site and most of Spencer County is the Pennsylvanian age Raccoon Group, consisting of sandstone and shale with minor amounts of mudstone, coal and limestone (Grove 2006). The rock reported from onsite borings that extended through the unconsolidated overburden into bedrock has been described primarily as shale. The boring for bedrock wells finished at the MW-5 location (at the landfill) encountered interbedded sandy claystone, sandy shale, limestone, coal and claystone.

The bedrock surface beneath the overburden is uneven, and includes rounded hills, ridges and valleys (draining southeast) representing the erosional surface that existed prior to filling of the valley with glaciofluvial sediments.

The geology of the near-surface unconsolidated Quaternary sediments associated with the Ohio River valley is depicted on the geology map in **Figure 5** (which excludes the far east portion of the Plant property), and is described in detail by Ray (1965). These sediments range in thickness from about 20 feet on northern sections of the property, to as much as 130 feet along the Ohio River west of the mouth of Honey Creek. They include windblown sediments (loess) up to 30 feet thick that mantle bedrock on the northeast perimeter of the property, possibly merging with lacustrine deposits in the tributary valley at the northwest corner of the property, and two series of Wisconsin age valley-train deposits (Tazewell and Cary) under most of the property. The valley-train sediments that fill the broad river valley were deposited by meltwater from retreating continental glaciers to the north and northeast, and were subsequently reworked by modern drainage systems, including the Ohio River and the Honey Creek drainage on the plant property.

Generally, the valley train deposits thicken and coarsen to the southeast, from the loess-mantled bedrock hills along the valley wall, toward and beyond the course of the modern Ohio River. In the subsurface, the valley train sediments typically coarsen downward, and can be classified generally into finer-grained sediments near the surface (including silt, sandy silt, silty clay and clay), and coarser-grained sediments (fine to coarse sand and some gravel) at depth.

Interpretive cross-sections of the subsurface were generated by AEP from data collected in the 1983 Site Investigation of the landfill area. In the report of the Site Investigation included in the Landfill Application Package (AEP 1984), the unconsolidated sediments encountered above bedrock were grouped into four units, described below in descending order:

- Unit No. 1 – surficial silt and clay. This unit was found to be 2 to more than 15 feet thick. The upper section is predominantly silty, sandy clay that is stiff, and of low to medium plasticity. Very fine-grained sand and silt are stratified with the clay toward the bottom of the unit, suggesting a lacustrine depositional environment where these finer-grained deposits are thickest.
- Unit No.2 – well sorted sand. This unit, where present, was found to extend from the bottom of the fine-grained surficial unit to elevations of 373-376 feet. It was found to consist of fine to medium-grained, well-sorted subangular to subrounded quartz sand.
- Unit No. 3 – poorly sorted sand. This lower sand unit, consisting of poorly sorted, very fine to very coarse-grained sand, is the dominant unit between elevations of 373-376 feet and the underlying bedrock, which is typically found at elevations of 290 to 300 feet under most of the property, and at shallower depths in the north and northwest portions.
- Unit No. 4 – sand and gravel. Unit No. 4, consisting of poorly sorted sand, gravel and gravelly sand, was found to be gradational with Unit No. 3, and to occur as lenses within Unit No. 3. Gravel in this unit is subangular to rounded, ranges in size from 3/8 to 1 inch in diameter, and commonly contains coal particles.

In 2010, AEP installed four monitoring wells at the perimeter of the wastewater pond complex. The lithologic borings for those wells were extended 39 to 46 feet below ground surface (BGS), at elevations of 351 to 359 feet, and did not encounter bedrock. The surficial silt and clay in these borings was found to be 16 to 24 feet thick, extending down to elevations of 373 to 381 feet. The underlying sand was described as primarily fine, grading downward to medium in one boring, and with gravel occurring in the sandy matrix below depths of 28 to 40 feet BGS in three borings.

Monitoring wells installed in 2016 around the BA Ponds extended to bedrock and confirmed the lithology described above. Details of the 2016 well installations, along with interpretive cross-sections, are provided in the report in **Appendix D**. Based on the data available from the 2016 subsurface explorations the fine-grained sediments corresponding to Unit No. 1 extend down to elevations of 369 to 385 feet in the vicinity of the ponds. The well-sorted sand unit corresponding to Unit No. 2 occurs below the fine-grained surficial sediments, extending down to elevations of 356 to 369 feet. Units No. 3 and 4 (interlayered) were found to extend down to shale bedrock at elevations of 274 to 299 feet.

2.4.2.3 Hydraulic Properties of Principal Groundwater Flow Zone

The saturated section of the unconsolidated sand and sand and gravel body comprising subsurface Unit Nos. 2, 3 and 4 (as described in the preceding section) makes up the principal groundwater flow zone underlying the site. This zone is hydraulically connected to the Ohio River but the connection is buffered by lower-permeability sediments that line the river bottom. Because of its relatively high permeability and its connection to the Ohio River, this zone represents an aquifer capable of supplying large yields to pumping wells. The depth to water in this zone typically ranges from 20 to 35 feet BGS, and the saturated thickness (which generally increases toward the river) ranges from less than 15 feet to more than 80 feet. Groundwater occurs in this

zone under unconfined conditions, or semi-confined conditions where the surficial silt and clay directly overlies the saturated zone.

AEP provided information concerning pumping tests of varying lengths performed in this zone using onsite supply wells, including a pumping test performed in 1977 that was documented in the Landfill Application Package (AEP 1984), a pumping test performed in 2004 at a new supply well installed at the landfill for flow augmentation, and yield tests performed in 2011 and 2012 at two new replacement wells used for fire water supply. Based on the information reviewed, the principal groundwater flow zone underlying the site has a transmissivity ranging from 126,000 to 250,000 gallons per day per foot (gpd/ft), corresponding to 17,000 to 34,000 square feet per day (ft^2/day). The hydraulic conductivity of the formation ranges from 420 to 560 feet per day (ft/day), and the storage capacity (specific yield) ranges from 0.07 to 0.22. Pumping well yields range up to 1,000 gallons per minute (gpm), and specific capacities range from 48 to 121 gpm per foot of drawdown (gpm/ft).

2.4.3 Surface Water and Surface Water-Groundwater Interactions

The Ohio River at Owensboro drains a watershed of 97,000 square miles and the average flow is 121,200 cubic feet per second (cfs), according to Ray (1965). The stage in this section of the river is maintained by a downstream dam in Newburgh, Indiana above a minimum pool elevation of about 357.4 feet MSL (358 feet relative to the Ohio River Datum). The AEP Rockport Plant, located at River Mile (RM) 744-745, is halfway between the Newburgh Dam (RM 776) and the upstream Dam at Cannelton (RM 721). The river level at the Rockport Plant can be estimated by averaging the gauge data reported by the US Army Corps of Engineers (USACE) at Newburgh and Cannelton. A hydrograph (graph of water level over time) of the estimated daily stage in the Ohio River at the Rockport Plant from 2010 through 2015 is provided in **Appendix C-1**.

The water level in the Ohio River typically remains close to pool elevation in the summer and fall, and fluctuates at a relatively high frequency (for a few days to weeks), up to 20 feet above pool elevation, in the winter and spring months. The river stage typically reaches an elevation of 377 feet at least once in most years. The elevation of the 10-year flood is 387.7 feet, the 100-year flood level is 392 feet, and the level of the highest flood of record in the area (the flood of 1937) is 397 feet.

Groundwater levels and gradients in the glaciofluvial (valley train) sediments that fill the valley are strongly influenced by the Ohio River. Under low-water (pool) conditions, groundwater in the sediments flows under a low gradient toward the Ohio River. As the river level fluctuates in winter and spring, groundwater levels fluctuate along with it, although the effects are increasingly dampened with distance from the river. During rapid rises in river level, the groundwater gradient can be temporarily reversed to some distance from the river bank, resulting in excess groundwater being stored in the sediment (bank storage), and then draining slowly back toward the river again as the river stage falls.

2.4.4 Water Users

The Indiana Department of Natural Resources (IDNR) Division of Water maintains an online database of Significant Water Withdrawal Facilities (http://www.in.gov/dnr/water/4841.htm). A Significant Water Withdrawal Facility (SWWF) is defined as a facility that has the capacity to withdraw more than 100,000 gallons per day (gpd) in aggregate from surface water and/or groundwater, through one or more registered "sources" (individual pumping wells or stations). There are 10 SWWFs registered in Spencer County, of which the AEP Rockport Plant has the highest capacity.

2.4.4.1 Onsite Water Use

The main source of water used at the plant is the Ohio River. The plant's registered capacity for surface water is 80,000 gpm. According to the IDNR database, in 2011 the plant's actual average usage of river water was 22.3 million gallons per day (mgd), corresponding to an average surface water withdrawal of 15,500 gpm.

The plant also has seven registered water withdrawal wells. The locations of these supply wells are shown on **Figure 2**. The combined average withdrawal from these wells in 2011 was 0.59 mgd (410 gpm). Information available for the onsite water supply wells is summarized below (withdrawal rates are based on 2011 data available in the IDNR database):

- Wells PW-1 and PW-2 are used for plant potable supply. The combined average withdrawal rate for these two wells is approximately 120 gpm.
- Wells PW-3 and PW-4 are used for fire water supply as well as industrial supply. The combined average withdrawal rate for these two wells is approximately 120 gpm.
- Well PW-5 was installed on the west side of US 231 and was intended to be used for landscape watering around an energy education center constructed by AEP at that location. The well is inactive (no withdrawals since it was installed).
- PW-6 is a well installed immediately east of the landfill to fill water trucks used for dust control. The average water withdrawal rate for this well is 17 gpm.
- PW-7 is a well installed southeast of the landfill to provide water for treating landfill leachate through flow augmentation prior to discharge, as required under the plant's NPDES permit. The average water withdrawal rate for this well is 39 gpm.

2.4.4.2 Offsite Water Users

The other nine SWWFs in Spencer County include the following:

- The City of Rockport public supply (five wells with a combined capacity of 1,163 gpm).
- The Town of Grandview public supply (two wells with a combined capacity of 970 gpm).
- Reo Water, Inc., public supply for the City of Richland, west of Rockport (five wells with a combined capacity of 1,130 gpm).
- The City of Boonville public supply, northwest of Rockport (four wells with a combined capacity of 2,050 gpm).

- Corn Island Shipyard, a marine barge manufacturer on the Ohio River in Grandview (one well with a capacity of 450 gpm).
- Three agricultural irrigation users (Christmas Lake GC, Loehr Farms and Allen Gray LP II), all located remotely from the AEP Rockport Plant.
- One coal washing operation (Buckhorn Processing) using surface water, located in Lamar, Indiana north-northwest of the AEP Plant.

The Ohio River navigation charts (USACE 2014) show surface water intakes and other major structures along the river. The charts for sections of the river adjacent to and immediately downstream of the AEP Rockport Plant show the industrial intakes for the AEP plant and Rockport Terminals (a coal barging facility), and shoreline facilities in Rockport for one commercial marina, two crushed stone operations, and two loading facilities (ADM and Coal Inland).

3.0 MONITORING NETWORK EVALUATION

3.1 Hydrostratigraphic Units

Based on the available information, two generalized hydrostratigraphic units can be distinguished within the unconsolidated subsurface materials of the AEP Rockport Plant.

The upper unit (corresponding to the unit identified as Unit No. 1 in previous work by AEP, discussed above in Section 2.4.2.2), consists of surficial silt and clay (locally containing sand). It is typically 8 to 25 feet thick, and is generally not saturated. However, it can serve as a perching layer above which water can accumulate in surface depressions or in more permeable surface fill. Soil sampling and permeability testing performed as part of the 1983 landfill Site Investigation indicates the bulk vertical permeability of the material in this unit is on the order of 10^{-7} to 10^{-6} centimeters per second (cm/sec), or 0.003 to 0.0003 ft/day.

The lower unit (corresponding to combined Unit Nos. 2, 3 and 4, as discussed above in Section 2.4.2.2) extends from the bottom of the surficial silt and clay to the top of bedrock, and consists of granular outwash deposits. These deposits consist primarily of sand, ranging from well-sorted fine sand to poorly-sorted fine to coarse sand, with lenses of gravelly sand and sandy gravel. This unit has an uneven bottom surface, but generally thickens to the southeast, toward the Ohio River. The lower section of this unit is saturated and represents the principal groundwater flow zone beneath the property. The saturated thickness in this unit ranges from less than 15 to more than 80 feet, and the bulk horizontal permeability (hydraulic conductivity) of this unit is on the order of 500 ft/day.

Bedrock underlying the unconsolidated deposits consists predominantly of shale, and is expected to have low permeability. Bedrock in the area of the Rockport Plant does not represent a significant medium for flow or storage of recently recharged (meteoric) groundwater, and is not a reliable source of fresh water supply, relative to the much more available source in the sandy overburden.

3.1.1 Horizontal and Vertical Position Relative to CCR Unit

The BA Ponds have design bottom elevations of 386 feet (West BA Pond) and 377 feet (East BA Pond). This is the reported elevation of the interface between CCR and the underlying material. The underlying material consists of native sediments, locally supplemented with addition of clay soil excavated from the interior of the ponds and used to line the sides and possibly the bottom of the ponds (if needed).

Stratigraphic information for the subsurface in the area of the wastewater pond complex is provided in the logs available for several soil borings advanced in 1977 (**Appendix A**), 2010 (**Appendix B**) and early 2016 (**Appendix D**). Subsurface stratigraphy is also illustrated in the cross-sections developed from the boring logs for the new monitoring wells installed in 2016 (**Figures 5-7** in **Appendix D**).

The interface between the two uppermost native hydrostratigraphic units (surficial silt and clay, and underlying sand) is transitional, usually encompassing several feet of interlayered sandy and silty beds. However, it is apparent that the interface slopes to the south, from approximate elevations of 380-386 feet on the north and east (MW-1600, MW-1601, MW-1602 and MW-1002, MW-1603, MW-1001, BH-363, BH-366) to elevations of 369-377 feet on the south and southwest (MW-1606, MW-1605, MW-1606, MW-1003, MW-1004, BH-364, BH-365). A comparison of the reported pond bottom elevations to these data indicates there is at least 9 feet of native fine-grained sediments underlying the south end of the West BA Pond, and 4 feet under the north end of the West BA Pond. However, native fine-grained sediments may be thin or absent below the south end of the East BA Pond, which has a design bottom elevation of 377 feet.

3.1.2 Piezometric Conditions

Groundwater level data are available from piezometric measurements made from 2010 to 2016 in four monitoring wells (MW-1001 through MW-1004) installed in 2010 at the perimeter of the wastewater pond complex. Well construction details are summarized in **Table 1**, and well construction logs are provided in **Appendix B**. The wells are finished at depths of 38.0 to 45.5 feet BGS, with 10 feet of screen set close to the top of the lower sandy unit (approximately 10 feet below the bottom of the silt and clay deposits). The well piezometric data are provided in **Appendix C**, along with hydrographs (graphs of water levels over time) for the wells and the Ohio River, and piezometric maps for selected events. The available data include eight monitoring events conducted semi-annually in May and November, from May 2011 to May 2015 (except for May 2012, for which piezometric data are missing). In **Appendix D** (**Table 2** and **Attachment 3**), the piezometric data set has been updated with water level readings collected by Amec Foster Wheeler in early 2016 (in January in the 2010 wells, and on March 17 in the 2010 and 2016 wells).

The piezometric data for the four initial monitoring wells installed in 2010 show that water levels vary seasonally, typically fluctuating between 1 and 2.5 feet in an individual well, with higher water levels in May and lower water levels in November. This is consistent with river levels, which are low in summer and fall, and spike to higher levels for short periods in winter and spring. In the three wells closest to the BA Ponds (MW-1001 through MW-1003), groundwater levels occur most

commonly between elevations of 367 and 370 feet, in sand or sand and gravel below the surficial silts and clays (see **Figures 5-7** in **Appendix D**). This is more than 7 feet below the design bottom of the East BA Pond (the deeper pond), and more than 9 feet above the river low pool elevation of 357.4 feet. In six of the eight monitoring events between collected from 2011 to 2015, the hydraulic gradient was toward the river, to the east-southeast, with water elevations occurring in descending order in the wells as follows: MW-1001, MW-1003, MW-1002, and MW-1004. In the last event (7 May 2015), the water level elevations in all four wells were within 0.60 feet of each other, and the highest water levels were observed in the middle wells (MW-1003 and MW-1002), reflecting a shallow divide most likely related to a spike in river level that was subsiding at the time of the monitoring (river gauge data not available for that period). The first event (17 May 2011) was conducted during a period of very high river levels: the Ohio River had spiked at 387.7 feet (the 10-year flood level) on April 28, and had dropped to 366.6 feet on 17 May. The water levels in the wells were lagging slightly behind the river, ranging from 376.13 feet in MW-1004 (closest to the river) to 371.61 feet in MW-1001 (farthest from the river), with the middle wells MW-1002 and MW-1003 (closer to the BA Ponds than MW-1004) having water levels of 373.20 and 373.72 feet respectively.

In early 2016, 20 new monitoring wells were installed in seven clusters of three wells each (including well MW-1002 installed in 2010). Water level elevations measured between January and March 2016 ranged between approximately 368 and 370 feet. A round of water level measurements was made after well construction was completed, on March 17, 2016 (**Table 2** and **Figure 3** in **Appendix D**). Piezometric levels measured on that date ranged between 369.09 and 370.20 feet, corresponding to a slight gradient to the east. Differences in water level elevations between wells in a single cluster were small, ranging from 0.01 to 0.33 feet, and averaging 0.08 feet.

Based on the available data and the analysis described above, a water level elevation of 374 feet can be considered a high groundwater level, and a level of 372 feet can be considered a typical seasonal high water level, in the sandy outwash deposits beneath the BA Ponds.

3.1.3 Overall Flow Conditions

The principal groundwater flow zone underlying the ponds is the lower overburden unit consisting of granular outwash deposits (poorly sorted sand with interlayered sand and gravel). Recharge into this unit occurs laterally from hills and buried tributary valleys to the north-northwest. Recharge also occurs from the Ohio River to the southeast during relatively brief periods (spikes) of high water level in the river. Areal recharge also occurs vertically from the surface. The rate of areal recharge varies locally according to the thickness and bulk permeability of the overlying silt and clay unit. Artificial recharge can also occur from units containing standing surface water, such as the wastewater pond complex including the BA Ponds (when they contain water), depending on the hydraulic separation provided by natural materials and engineered soil lining the bottoms of these units.

Groundwater flow in this zone is predominantly to the east-southeast, toward the Ohio River. Flow reversals occur during brief periods of high river level, but are temporary, without long-term effects on flow or migration of constituents in groundwater. Supply wells are present to the north and northeast of the BA Ponds, but these wells pump intermittently, at rates that are insufficient to affect flow directions at significant distances from the pumping centers.

Based on available data, the estimated hydraulic gradient (i) under typical flow conditions is 0.0015 feet/foot, and the hydraulic conductivity (K) is on the order of 500 ft/day. Assuming an effective porosity (n) of 0.20, the average flow velocity (v) can be estimated from the Darcy flow equation [v = (Ki)/n] as 3.75 ft/day, or 1,370 ft/year. Given the occurrence of temporary flow reversals in most years, the actual rate of groundwater flow toward the river would be expected to be somewhat less.

3.2 Uppermost Aquifer

3.2.1 CCR Rule Definition

As defined in the federal CCR Rule (§257.53 Definitions):

- *Aquifer* means a geologic formation, group of formations, or portion of a formation capable of yielding usable quantities of groundwater to wells or springs.
- *Groundwater* means water below the land surface in a zone of saturation.
- *Uppermost aquifer* means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural ground surface to which the aquifer rises during the wet season.

3.2.2 Identified Onsite Hydrostratigraphic Unit

Consistent with the definition in the CCR Rule, the hydrostratigraphic unit identified as the uppermost aquifer in this case is the saturated granular outwash deposit that underlies the Rockport Plant property including the BA Ponds. The top of this unit would be the typical seasonal high water level of 372 feet, 27 feet below the crest elevation of the pond embankments (399 feet).

The bottom of the unit would be the top of bedrock. The shale bedrock underlying the granular outwash deposits does not represent a significant groundwater flow zone. The bedrock surface in the vicinity of the pond is irregular, generally sloping to the southeast, and occurs at elevations of 274 to 300 feet (111 to 126 feet immediately below the BA Pond embankment crest level). The saturated thickness of this unit, therefore, is expected to range from 70 to 100 feet, thickening to the southeast.

3.3 Review of Existing Monitoring Network

3.3.1 General CCR Rule Requirements

In summary, the performance standard for groundwater monitoring systems in the CCR Rule (§257.91) states that the system should consist of 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, and
- Accurately represent the quality of the groundwater passing the waste boundary of the CCR unit in the uppermost aquifer, and
- Monitor all potential contaminant pathways.

The following sections review the existing groundwater monitoring network at the BA Ponds in terms of these requirements.

3.3.2 Monitoring Wells Installed in 2010

Four shallow monitoring wells (MW-1001 through MW-1004) were installed in 2010 at the perimeter of the wastewater pond complex. Three of the wells are located adjacent or close to the BA Ponds; MW-1004 is located farther downgradient, at the southeast corner of the wastewater pond complex.

Well construction details are summarized in **Table 1**, and well construction logs are provided in **Appendix B**. Well piezometric data are provided in **Appendix C**. The 2010 monitoring wells are finished at depths of 38.0 to 45.5 feet BGS, with 10 feet of screen set approximately 10 feet below the bottom of the silt and clay deposits, and close to the top of the uppermost aquifer. Well bottom elevations range from 360 feet in MW-1001 to 353 and 352 in MW-1002 and MW-1003 respectively.

A review of the available groundwater monitoring network for the BA Ponds was made in late 2015, and identified the following gaps:

- MW-1001, although located in an upgradient position relative to the BA Ponds, is not a suitable background monitoring well because it is installed through CCR (bottom ash in a thin layer at 9-10 ft BGS), and is located too close to the ponds given the occasional temporary reversals in groundwater flow direction.
- MW-1004 is located remotely from the BA Ponds, and MW-1003 is also offset from the waste boundary. Therefore, only one well (MW-1002) was located at a downgradient boundary, and a minimum of three downgradient wells are required by the CCR rule.
- There were no wells intercepting deeper flow zones within the uppermost aquifer (between elevations of 350 and 280 feet).

As a result of the review, it was recommended that MW-1002 be included in the downgradient monitoring network, and that the other three wells (MW-1001, MW-1003, and MW-1004) be retained for use as piezometers, to monitor groundwater levels and aide in the interpretation of flow directions.

3.3.3 Monitoring Wells Installed in 2016

Twenty new wells were installed in January-March 2016, in seven three-well clusters that include MW-1002. The clusters are designated MW-1600 through MW-1606, and locations are shown on the monitoring network layout map (**Figure 1** in **Appendix D**). Three wells are included in each cluster, finished at shallow (S), intermediate (I) and deep (D) levels. Well construction details for the monitoring wells installed in 2016 are provided in **Table 1** and **Attachment 1** of **Appendix D**.

3.3.3.1 Background Monitoring Well Locations

A significant challenge in monitoring this site is the occurrence of temporary flow reversals in the uppermost aquifer that underlies the BA Ponds. Data available for the existing wells indicate that the dominant flow direction in the uppermost aquifer is to the southeast, toward the Ohio River. However, during short-term spikes in river level, the direction of groundwater flow can be temporarily reversed so that, for a short period, groundwater under the BA Ponds will flow northwest, followed by a flattening of the gradient, and then a return to the dominant flow direction. In eight monitoring events over five years, the groundwater hydraulic gradient was to the southeast in six events, transitional (with a divide under the ponds) in one event (May 2015), and fully reversed under the full length of the wastewater pond complex in one event (May 2011).

Another short-term influence on groundwater flow direction is pumping from the plant's supply wells, which are located north and northeast of the BA Ponds. However, based on distance, intermittent pumping schedule, and relatively low rates of pumping from these wells (see Section 2.4.1.1 above), they are not expected to exert a significant influence on groundwater flow directions under the BA Ponds in the way that the river does. Based on review of river stage data, and experience at similar sites elsewhere along the Ohio River, flow reversals related to river stage would not be expected to last longer than two to three weeks. Based on the groundwater velocity estimated above in Section 3.1.3 (3.75 ft/day), contaminants would be unlikely to travel more than approximately 75 feet from the pond during a three-week flow reversal, even using liberal estimates of migration (not subject to adsorption in the formation matrix). However, to be conservative and account for dispersion, it was recommended that background monitoring wells be located at least 200 feet north-northwest of the BA Ponds. Final locations for the two sets of upgradient monitoring wells are shown on **Figure 1** in **Appendix D**. The background well clusters, designated MW-1600S/I/D and MW-1601S/I/D, are located approximately 1,000 feet and 850 feet, respectively, from the edge of the BA Ponds.

3.3.3.2 Downgradient Monitoring Well Locations

The East and West BA Ponds each have rough dimensions of 2,000 feet x 650 feet, corresponding to a surface area of approximately 30 acres each (60 acres total). The two BA Ponds are currently monitored as a single (multiunit) system. Downgradient monitoring wells are designated by cluster as MW-1602 through MW-1606, with MW-1002 included as the shallow well in the MW-1602 cluster. The downgradient monitoring well clusters were installed on the perimeter segments of the ponds in the dominant downgradient directions (east and south), as shown on **Figure 1** in **Appendix D**.

The downgradient wells were located as close as practical to the edge of the BA Ponds, just outside the road at the crest of the embankment, in order to be as close as possible to the *waste boundary* (defined in the CCR Rule as "the vertical surface located at the downgradient limit of the CCR unit, that extends down into the uppermost aquifer").

3.3.4 Vertical Screening Levels

The saturated thickness of the upper aquifer in the vicinity of the BA Ponds is 70 to 100 feet. The 2010 monitoring wells are screened across 10 feet in the top 20 feet of the saturated zone.

In order to monitor all potential contaminant pathways in the upper aquifer, the groundwater monitoring system includes monitoring wells at three depths (shallow, intermediate and deep) at each of the seven cluster locations (including the two upgradient locations and the five downgradient locations), for a total of 21 wells that can serve as piezometric and/or water quality monitoring points. The 21 clustered monitoring wells are supplemented by three shallow wells installed in 2010 (MW1001, MW-1003 and MW-1004), which can serve as additional piezometric monitoring points, to improve interpretation of groundwater flow directions.

Screen lengths in all of the wells are 10 feet (the maximum allowable screen length for clustered wells in the Indiana waste regulations), installed approximately at the following elevations: just above the bedrock surface (D level, between elevations of 275 and 309 feet), at a level approximately midway up in the saturated zone (I level, between elevations of 321 to 333 feet, and at a shallow level near the top of the saturated zone (S level, between elevations of 353 and 364 feet).

3.3.5 Monitoring Well Construction and Maintenance

The monitoring wells are constructed of 2-inch flush-threaded Schedule 40 PVC riser and 10-slot screen. Monitoring well construction has been documented in detail in the report in **Appendix D**.

Monitoring wells should be maintained consistent with minimum Indiana requirements as well as the requirements of §257.91(e) of the CCR Rule, including:

- Monitoring wells and piezometers should be maintained to insure continued performance through the life of the monitoring program.
- Design, installation and development of any new wells, and repair of existing wells, should be documented, and documentation maintained in the operating record for the unit.
- All new wells, and existing wells having modifications made to the wellhead at the surface, should be surveyed to determine ground surface elevation and a reference point elevation for piezometric monitoring
- Abandonment or decommissioning of any wells or piezometers should be documented, and documentation maintained in the operating record for the unit.

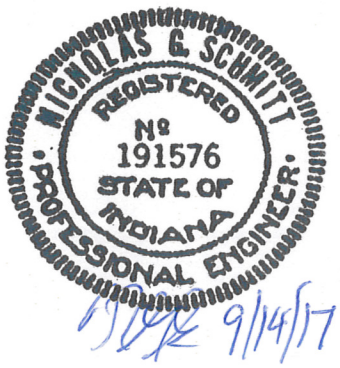
3.3.6 Summary

Based on the information reviewed and presented in this report (including appendices), the groundwater monitoring network currently installed at the BA Ponds at the AEP Rockport plant

can be considered appropriate under the requirements of the CCR Rule as a multiunit system for detection monitoring in the uppermost aquifer at the waste boundary.

4.0 P.E. CERTIFICATION

By means of this certification, I certify that I have reviewed the available documents (discussed in this report) for the groundwater monitoring system at the existing BA Ponds at the AEP Rockport Plant located in Spencer County, Indiana, and have found that it meets the requirements in 40 CFR §257.91.



Nicholas G. Schmitt
Printed Name of Registered Professional Engineer

Signature

191576	Indiana	14 September 2017
Registration No.	Registration State	Date

5.0 REFERENCES

American Electric Power Company (AEP), 18 July 1977. Design drawings No. 12-30013-15 and 12-30018-1 from *Unit No. 1 & 2 Wastewater & Bottom Ash Pond Area* (AEP 1977).

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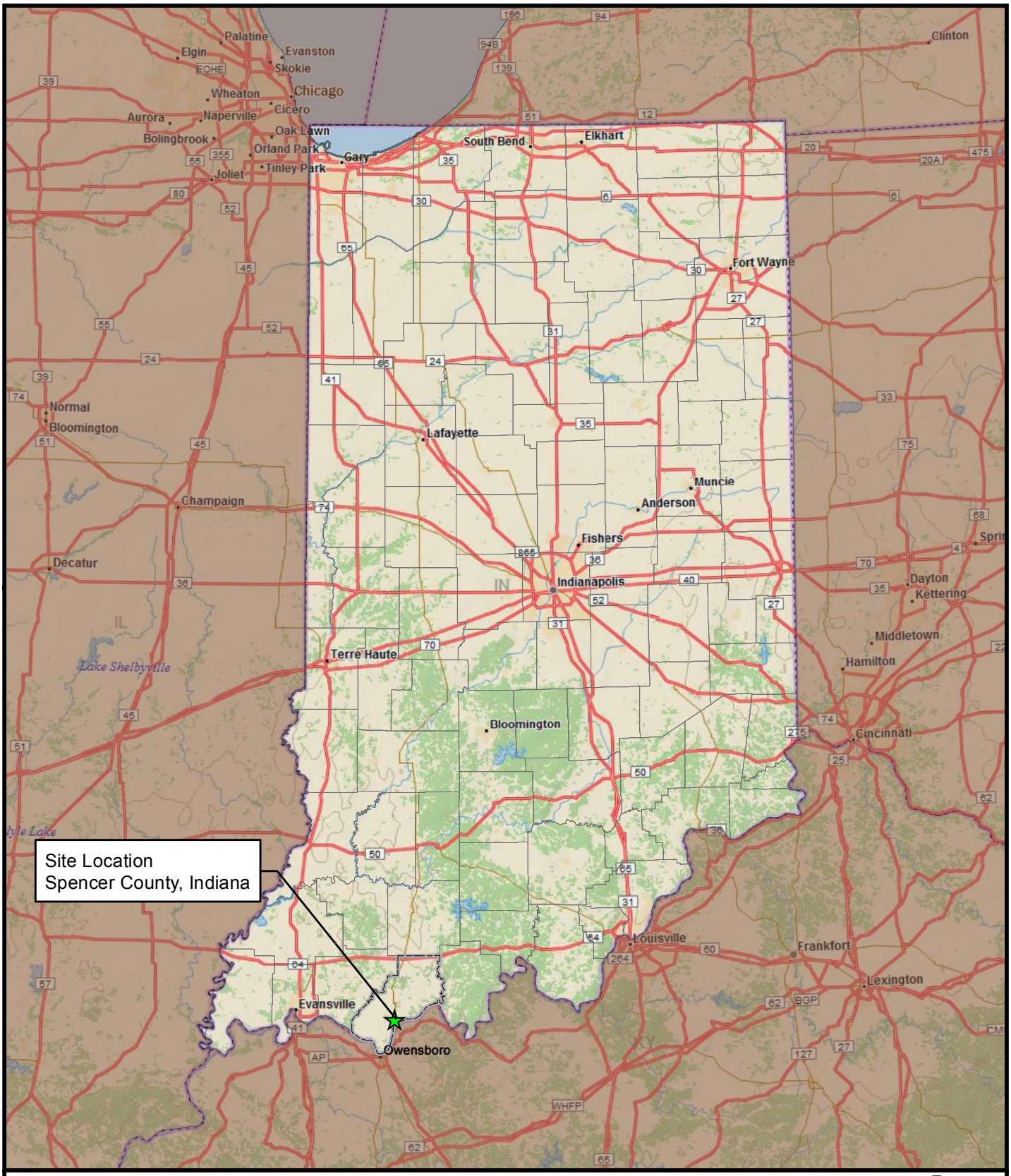
WorleyParsons, 7 November 2011. Design drawing No. 12-300410, *Boring Location – Overall Plan*. (WP 2011).

FIGURES



AMERICAN ELECTRIC POWER

Legend

★ Site Location

Service Layer Credits: Copyright:© 2015 DeLorme

0 40

Miles

NORTH

amec foster wheeler

2456 Fortune Drive, Suite 100
Lexington, Kentucky 40509
Phone: (859) 255-3308

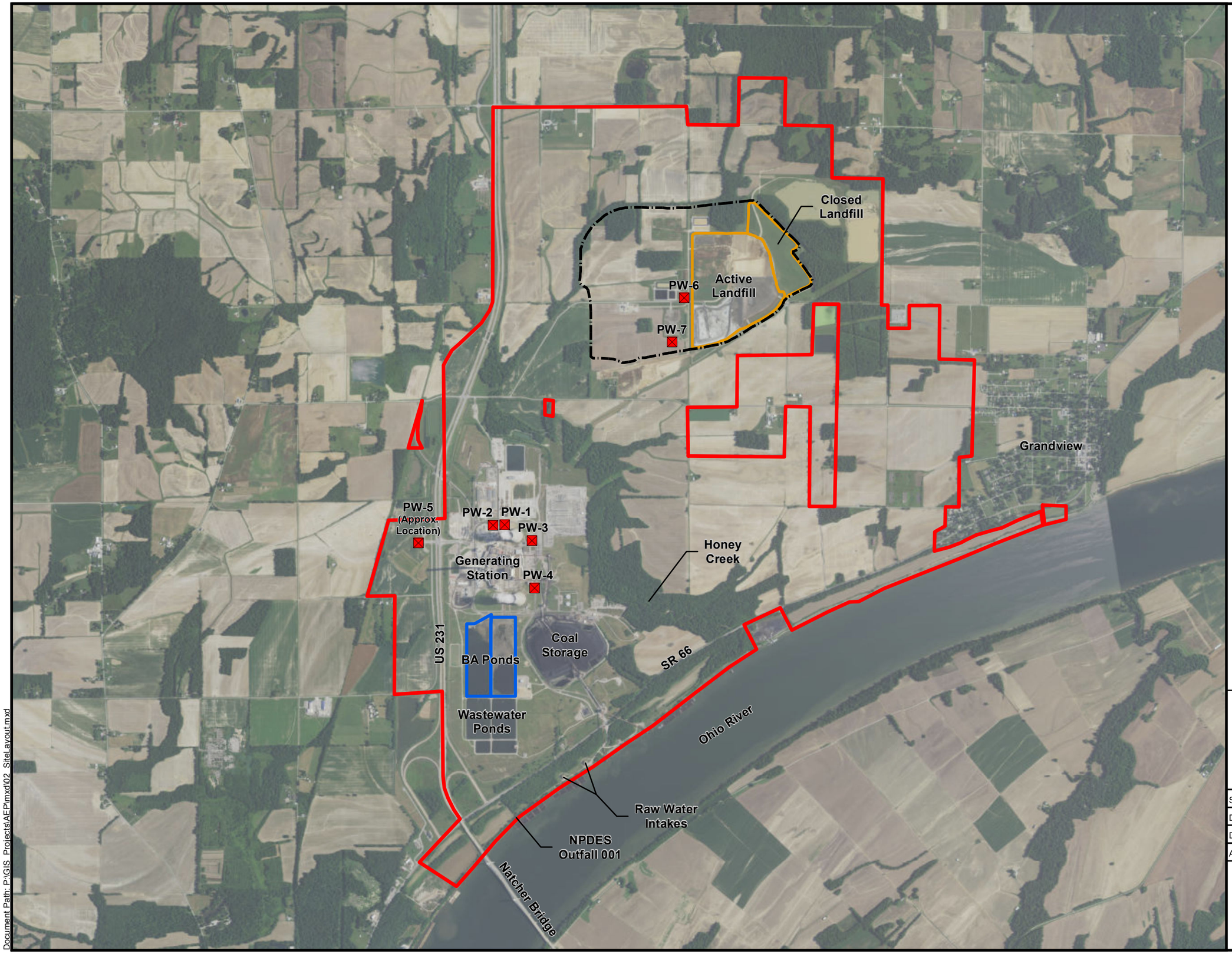
SITE LOCATION MAP

American Electric Power, Rockport Plant
Rockport, Indiana

PROJECT NUMBER: 7382153161

SCALE	1" = 40 miles
DATE	9/11/2015
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 1



Legend

- Property Boundary
- 1984 Landfill Permit Boundary (Area 1)
- Landfill Area 1A (Active and Closed)
- Bottom Ash Pond
- Water Supply Well

Data Sources

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 1,200 2,400
SCALE IN FEET

SITE LAYOUT MAP

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 2,400'
DATE	9/13/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 2

amec foster wheeler
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Lexington, Kentucky 40509
Phone: (859) 255-3308

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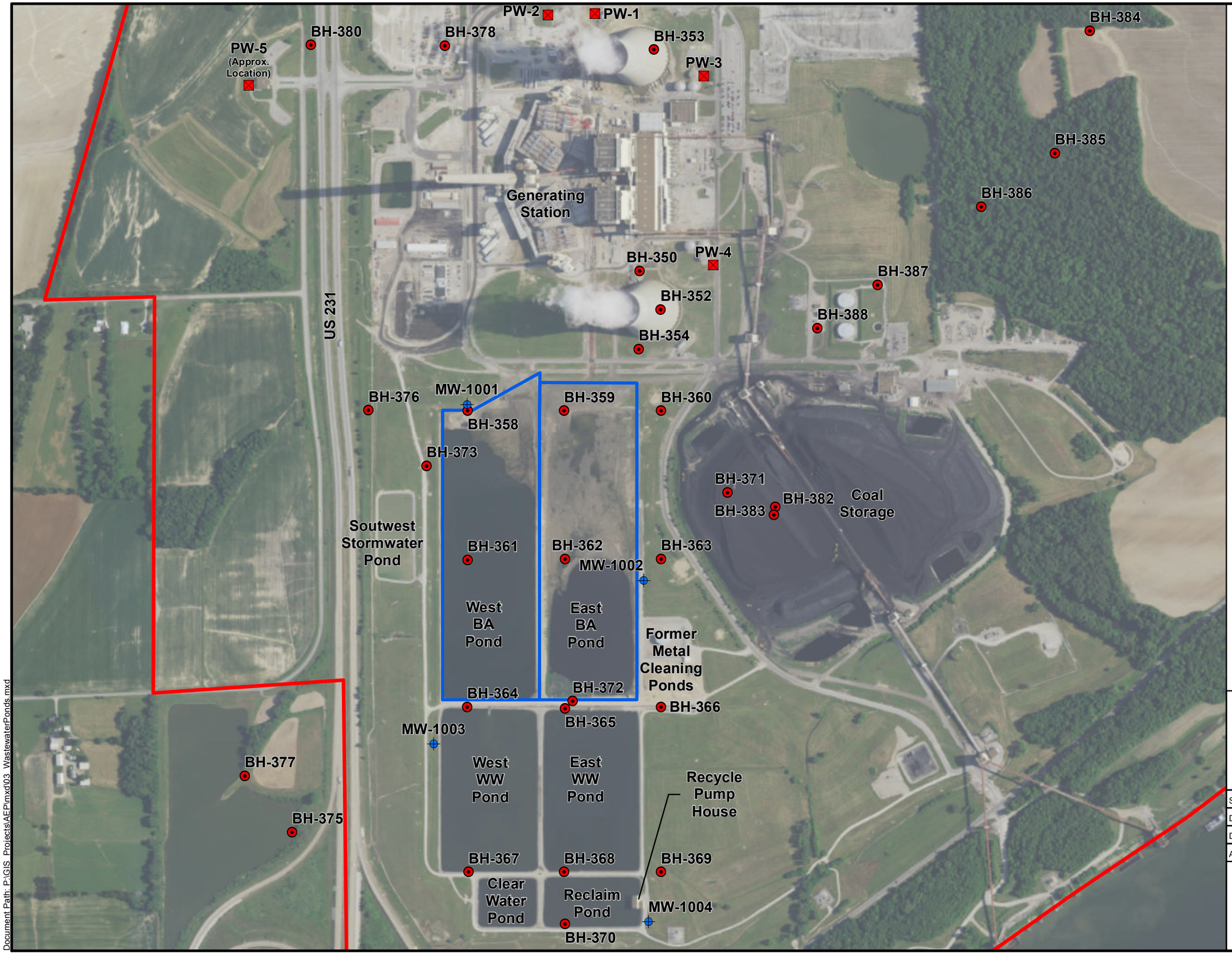

Document Path: P:\GIS_Projects\AEP\mxd\03_WastewaterPonds.mxd

Legend

- Property Boundary
- Bottom Ash
- Water Supply Well
- USWAG Monitoring Well
- Geotechnical Boring

Data Sources

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 300 600
SCALE IN FEET

WASTEWATER POND COMPLEX

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 600'
DATE	9/13/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 3

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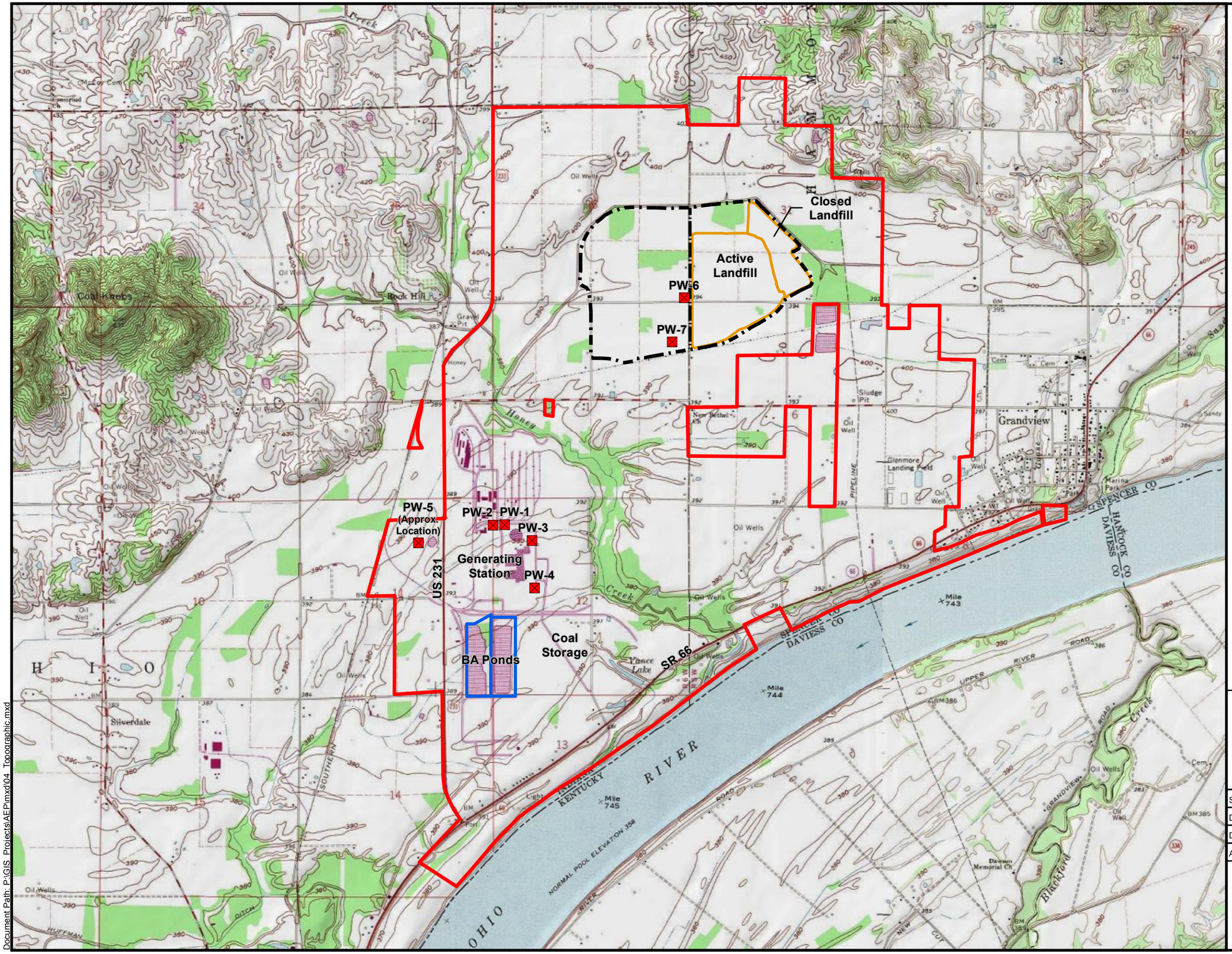
Lexington, Kentucky 40509
Phone: (859) 255-3308



Legend

- Property Boundary
- 1984 Landfill Permit Boundary (Area 1)
- Landfill Area 1A (Active and Closed)
- Bottom Ash Pond
- Water Supply Well

Data Sources

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

Source: USGS Rockport and Lewisport (IN/KY) Topographic Quadrangle Maps, 1964, photorevised 1982

0 1,200 2,400

SCALE IN FEET

TOPOGRAPHIC MAP

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 2,400'
DATE	9/13/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 4

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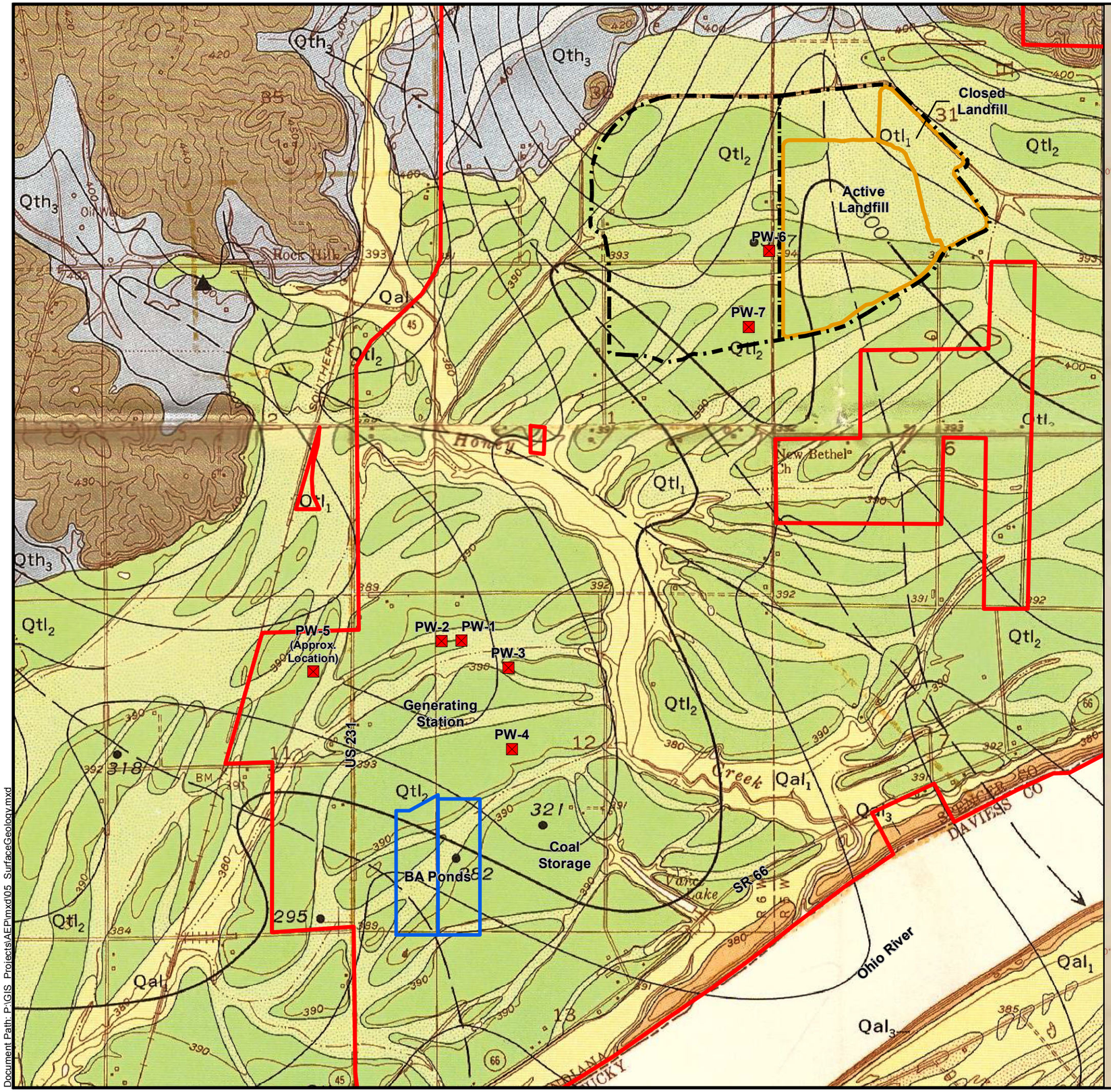
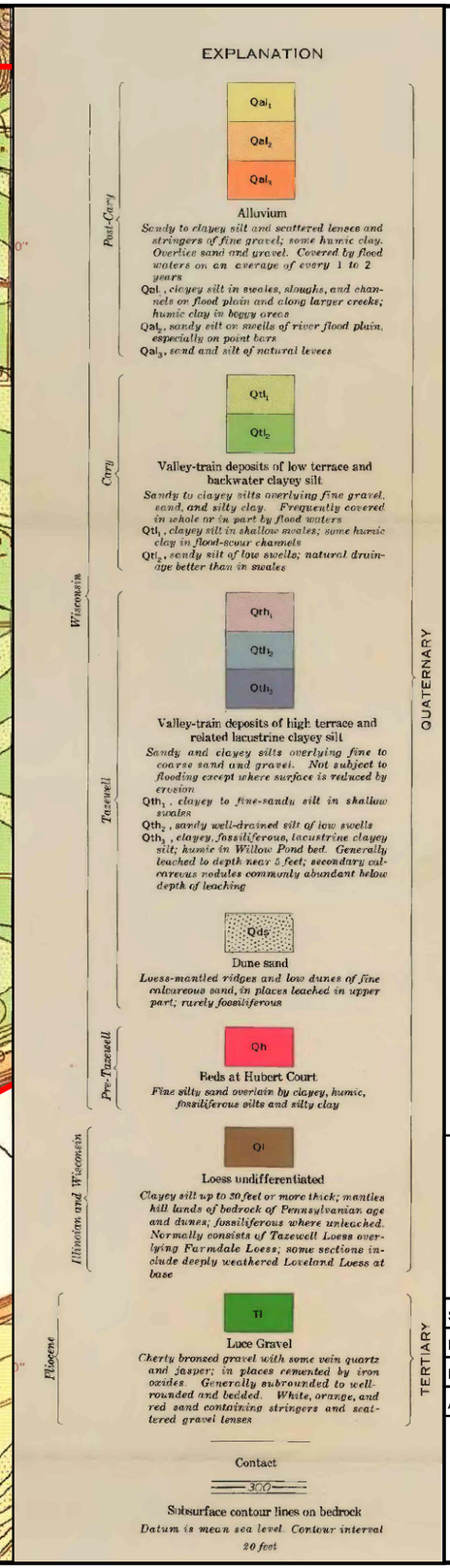
Lexington, Kentucky 40509
Phone: (859) 255-3308

Document Path: P:\GIS_Projects\AEP\mxd\04_Topographic.mxd





Legend

- Property Boundary
- 1984 Landfill Permit Boundary (Area 1)
- Landfill Area 1A (Active and Closed)
- Bottom Ash Pond
- Water Supply Well

Data Sources

Source: Geologic Map of the Owensboro Quadrangle, Indiana and Kentucky, USGS Professional Paper 488, 1965

0 800 1,600

SCALE IN FEET

SURFACE GEOLOGY MAP

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 1,600'
DATE	9/13/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 5

amec foster wheeler
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Document Path: P:\GIS Projects\AEP\mxd\05_SurfaceGeology.mxd

TABLE

Table 1
Monitoring Well Construction Details
Wastewater Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well ID	Date Installed	Northing SPCS NAD27 (ft)	Easting SPCS NAD27 (ft)	Length of Screen (ft)	Casing Type	Casing Diameter (in)	Borehole Diameter (in)	Total Depth to Bottom of Well (ft BMP)	Total Depth to Bottom of Well (ft BGS)	Total Depth of Bore Hole (ft BGS)	Depth to Bedrock (ft BGS)
MW-1001	6/2/2010	153488.0	513047.6	9.7	PVC	2	6.25	42.3	40.0	41	no refusal
MW-1002	6/2/2010	152307.4	514231.0	9.7	PVC	2	6.25	47.8	45.5	46.5	no refusal
MW-1003	6/2/2010	151208.1	512820.7	9.7	PVC	2	6.25	40.4	38.0	39	no refusal
MW-1004	6/3/2010	150013.4	514264.7	9.7	PVC	2	6.25	44.8	42.5	43.5	no refusal

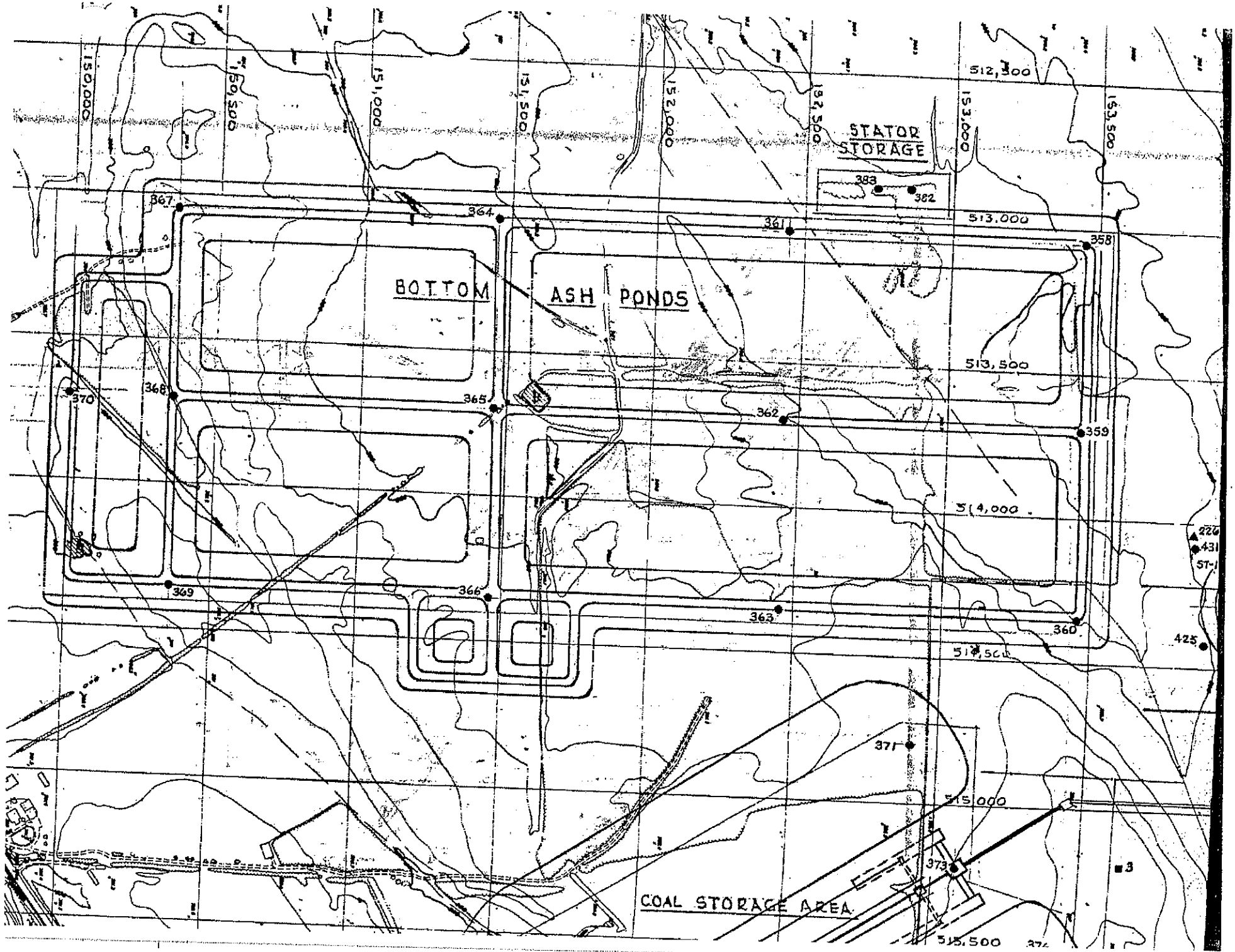
Well ID	Ground Surface Elevation (ft APD)	Top of Casing Elevation (ft APD)	Casing Stickup (ft AGS)	Top of Seal Elevation (ft APD)	Top of Sand Elevation (ft APD)	Top of Screen Elevation (ft APD)	Bottom of Screen Elevation (ft APD)	Bottom of Well Elevation (ft APD)	Bottom of Sand Elevation (ft APD)	Bottom of Borehole Elevation (ft APD)	Bedrock Elevation (ft APD)
MW-1001	400.03	402.35	2.3	374.33	372.33	370.33	360.63	360.03	359.03	359.03	no refusal
MW-1002	399.09	401.42	2.3	368.19	366.09	363.89	354.19	353.59	352.59	352.59	no refusal
MW-1003	390.84	393.23	2.4	368.04	365.14	363.14	353.44	352.84	351.84	351.84	no refusal
MW-1004	394.25	396.55	2.3	366.55	364.55	362.05	352.35	351.75	350.75	350.75	no refusal

Notes:
ft = feet
in = inches
BMP = below measuring point (top of casing)
BGS = below ground surface
APD = above plant datum
AGS = above ground surface

APPENDICES

APPENDIX A

MAP AND BORING LOGS
1977 SOIL BORINGS AT WASTEWATER POND COMPLEX


STATOR STORAGE
BOTTOM ASH PONDS
COAL STORAGE AREA
512,500
513,000
513,500
514,000
515,000
515,500
150,000
150,500
151,000
151,500
152,000
152,500
153,000
153,500
367
364
361
358
370
368
365
362
359
369
366
363
360
371
373
383
382
220
431
425

PROJECT: Rockport Site PROJECT NO W6-1482 BORING: BH-361

DATE: 3/17/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
		Topsoil									
	1.0										
1.0		Very stiff brown and gray silty clay		SS	1	5.0	6.5	5	8	11	10
		Very stiff brown and gray silty clay		SS	2	10.0	11.5	8	13	14	9
	13.0										
13.0		Firm brown silty fine sand		SS	3	15.0	16.5	5	5	6	8
	19.0										
19.0		Very loose brown silty fine sand		SS	4	20.0	21.5	1	2	2	1
		Very loose brown silty fine sand		SS	5	25.0	26.5	1	2	2	16
	30.0										
30.0		Very dense dark brown silty fine sand		SS	6	30.0	31.5	66	43	30	16
	34.0										
34.0		Firm brown medium to coarse silty sand		SS	7	35.0	36.5	9	10	13	8
	41.0										
41.0		Firm brown silty fine sand		SS	8	40.0	41.5	9	11	13	16
	44.0										
44.0		Firm brown medium and coarse sand		SS	9	45.0	46.5	8	11	19	16
	48.0										
48.0	51.5	Dense grayish brown silty fine to medium sand		SS	10	50.0	51.5	21	21	24	14
		Boring Terminated @ 51.5 3/17/77									

METHOD OF DRILLING (Check One)

a. AUGER XXXX Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

SPOON: SIZE N/W LENGTH 5.0

DISTURBED SAMPLES: NO. SIZE

ROCK SAMPLES: NO.

WATER LOSSES: % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER Overcast 45 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Lockport Site PROJECT NO. N6-1482 BORING: BE-362

DATE: 3/18/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392.7

DEPTH FROM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	1.2										
1.2		Very stiff brown and gray fine sandy silty		SS	1	5.0	6.5	7	10	12	15
	7.5	clay									
7.5		Stiff brown fine sandy silt		SS	2	10.0	11.5	4	4	6	16
	13.0										
13.0		Firm brown silty fine sand		SS	3	15.0	16.5	4	5	6	12
		Firm brown silty fine sand		SS	4	20.0	21.5	4	5	7	4
	23.5										
23.5		Loose brown silty fine to medium sand		SS	5	25.0	26.5	4	3	4	5
	29.0										
29.0		Firm brown silty fine to medium sand		SS	6	30.0	31.5	4	5	8	10
		Firm brown silty fine to medium sand		SS	7	35.0	36.5	7	6	10	9
	37.0										
37.0		Dense brown medium to coarse sand		SS	8	40.0	41.5	12	14	22	10
	44.0										
44.0		Firm brownish gray fine to medium silty sand		SS	9	45.0	46.5	12	12	11	10
51.5		Firm brownish gray fine to medium silty		SS	10	50.0	51.5	8	8	12	9
		Boring Terminated @ 51.5 3/18/77									

METHOD OF DRILLING (Check One)

a XXXXX Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED

CASING: SIZE N/W LENGTH 5'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES NO.

WATER LOSSES DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 45 degrees Overcast & windy

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-363

DATE: 3/18/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	RE
0	0.8	Topsoil									
0.8	8.0	Very stiff brown fine sandy silty clay		SS	1	5.0	6.5	6	9	12	14
8.0		Loose brown silty fine sand		SS	2	10.0	11.5	4	4	5	15
	20.5	Loose brown silty fine sand		SS	3	15.0	16.5	4	5	5	12
20.5	23.5	Firm brown silty fine sand		SS	4	20.0	21.5	2	5	8	10
23.5		Firm brown fine to medium sand		SS	5	25.0	26.5	5	6	6	8
		Firm brown fine to medium sand		SS	6	30.0	31.5	6	7	9	10
	38.0	Firm brown fine to medium sand		SS	7	35.0	26.5	8	8	14	7
38.0		Firm brown medium to coarse sand		SS	8	40.0	41.5	9	10	16	12
		Firm brown medium to coarse sand		SS	9	45.0	46.5	8	14	13	8
	47.0										
47.0	51.5	Firm grayish brown silty fine to medium sand		SS	10	50.0	51.5	7	10	10	12
		Boring Terminated @ 51.5 3/18/77									

METHOD OF DRILLING (Check One)

a. AUGER Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE N/W LENGTH 5.0

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 45 degrees Overcast Windy

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AS THE CLASSIFICATIONS HAVE

AW ENGINEERING TESTING COMPANY — TEST BORING FIELD RECORD

ROJECT: Rockport Site — PROJECT NO. W6-1482 — BORING: BH=364

DATE: 3/15/77 — DRILLER: G. Powers — CREW: J. Hardman/J. Selbe — SURFACE ELEV. 389.5

DEPTH FM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0		Topsoil									
	1.4										
1.4		Stiff brown and gray silty clay traces		SS	1	5.0	6.5	4	6	7	16
		fine sand									
		Stiff brown and gray silty clay traces		SS	2	10.0	11.5	3	4	6	12
	13.0	fine sand									
13.0		Loose brown silty fine sand		SS	3	15.0	16.5	3	4	3	17
		Loose brown silty fine sand		SS	4	20.0	21.5	3	3	3	8
	24.0										
24.0		Firm brown fine to medium sand		SS	5	25.0	26.5	6	8	8	7
		Firm brown fine to medium sand		SS	6	30.0	31.5	6	8	9	8
	34.5										
34.5		Firm brown medium to coarse sand		SS	7	35.0	36.5	5	8	10	8
		Firm brown medium to coarse sand		SS	8	40.0	41.5	5	6	8	7
	43.0										
43.0		Loose brown medium to coarse sand & gravel		SS	9	45.0	46.5	4	3	3	8
	47.0										
47.0	51.5	Firm brown medium to coarse sand		SS	10	50.0	51.5	8	9	13	8
		traces gravel									
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

a. AUGER XXXXX Rod SIZE A

b. WASH XX WATER MUD XX

B NG SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 70 degrees clear

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG

AW ENGINEERING TESTING COMPANY

OJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH=365

ATE: 3/15/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0		Topsoil									
	1.3										
1.3		Stiff brown and gray silty clay traces		SS	1	5.0	6.5	3	5	9	18
	11.0										
11.0		Stiff brown fine sandy silty tan clay		SS	2	10.0	11.5	4	4	8	18
	13.5										
13.5		Loose brown silty fine sand		SS	3	15.0	16.5	2	3	4	12
	19.0										
19.0		Firm brown fine sand silt traces clay		SS	4	20.0	21.5	3	2	3	14
	25.5										
25.5		Firm brown and gray silty fine sand		SS	5	25.0	26.5	2	5	8	12
	28.0										
28.0		Firm brown silty fine sand		SS	6	30.0	31.5	8	10	10	6
	35.5										
35.5		Firm brown silty medium to coarse sand		SS	7	35.0	36.5	6	11	10	9
	38.0										
.0		Dense brown silty medium tocoarse sand		SS	8	40.0	41.5	13	25	25	10
	42.0	traces gravel									
42.0		Firm brown silty medium to coarse sand traces		SS	9	45.0	46.5	10	12	12	8
	47.5	gravel									
47.5	51.5	Firm gray fine to medium silty sand traces gravel		SS	10	50.0	51.5	8	7	9	8
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

a. AUGER Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER 65 degrees clear

NON DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG A THE CLASSIFICATIONS HAVE N BEEN REVIEWED BY AN ENGINE

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-366

DATE: 3/15/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
		Topsoil									
	1.5										
1.5		Very stiff brown and gray silty clay		SS	1	5.0	6.5	3	7	14	18
	9.0	traces fine sand									
9.0		Firm brown silty fine sand traces clay		SS	2	10.0	11.5	4	5	8	16
	15.0										
15.0		Loose brown silty fine sand traces clay		SS	3	15.0	16.5	2	4	6	16
	17.0										
17.0		Loose brown silty fine sand		SS	4	20.0	21.5	4	4	6	8
	24.0										
24.0		Firm brown fine to medium fine sand		SS	5	25.0	26.5	4	7	12	7
		Firm brown fine to medium fine sand		SS	6	30.0	31.5	5	8	9	7
	33.5										
33.5		Firm brown fine to medium sand traces		SS	7	35.0	36.5	5	8	9	6
	37.0										
37.0		Firm brown medium to coarse silty sand		SS	8	40.0	41.5	8	11	12	7
		Firm brown medium to coarse silty sand		SS	9	45.0	46.5	7	12	16	11
	47.5										
47.5	51.5	Firm brown medium to coarse sand some gravel		SS	10	50.0	51.5	7	7	9	8
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

Auger XX Rod SIZE A

Bucket XX WATER MUD XX

BORING SITE BIT USED 2-7/8" Side Discharge HAULING WATER STANDBY

CASING: SIZE NW LENGTH 5.0

UNDISTURBED SAMPLES: NO SIZE

BAG SAMPLES: NO

WATER LEVEL: DEPTH

SPECIAL TESTS (Yes & Explain)

WEATHER 50 degrees Overcast

NON-DRILLING TIME

BORING LAYOUT MOVING

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: Bh-367

DATE: 3/16/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	1.2										
1.2		Firm brown silty fine sand traces clay		SS	1	5.0	6.5	3	4	7	14
	8.0										
8.0		Loose brown silty fine sand		SS	2	10.0	11.5	3	3	5	12
		Loose brown silty fine sand		SS	3	15.0	16.5	3	3	4	10
		Loose brown silty fine sand		SS	4	20.0	21.5	3	5	5	8
	23.0										
23.0		Firm brown silty fine to medium sand		SS	5	25.0	26.5	7	10	14	7
		Firm brown silty fine to medium sand		SS	6	30.0	31.5	7	8	9	6
		Firm brown silty fine to medium sand		SS	7	35.0	36.5	5	7	10	6
		Firm brown silty fine to medium sand		SS	8	40.0	41.5	8	11	14	6
	44.0										
44.0		Firm brown silty medium to coarse sand		SS	9	45.0	46.5	10	15	13	8
	51.5	Firm brown silty medium to coarse sand		SS	10	50.0	51.5	7	12	11	10
		Boring Terminated @ 51.5									

METHOD OF DRILLING (Check One)

a. ~~AUGER~~ XXXX Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0'

UNDISTURBED SAMPLES: NO. SIZE

JAR SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER Clear 60 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-368

DATE: 3/16/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392.3

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	0.7										
0.7		Very stiff brown silty clay		SS	1	5.0	6.5	3	12	15	18
	9.0										
9.0		Firm brown silty fine sand		SS	2	10.0	11.5	7	7	8	14
		Firm brown silty fine sand		SS	3	15.0	16.5	5	5	6	9
		Firm brown silty fine sand		SS	4	20.0	21.5	5	6	8	8
	24.0										
24.0		Firm brown silty fine to medium sand		SS	5	25.0	26.5	8	10	13	6
		Firm brown silty fine to medium sand		SS	6	30.0	31.5	5	7	7	7
	33.0										
33.0		Firm brown medium to coarse sand		SS	7	35.0	36.5	6	6	8	5
	37.5										
37.5		Firm brown fine to medium silty sand		SS	8	40.0	41.5	5	7	8	6
	44.0										
44.0		Firm brown medium to coarse sand		SS	9	45.0	46.5	5	10	13	9
	51.5										
51.5		Firm brown medium to coarse sand		SS	10	50.0	51.5	10	12	12	12
		Boring Terminated @ 51.5'									

METHOD OF DRILLING (Check One)

a. ~~XXXXX~~ Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES, % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER Clear 45 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AN THE CLASSIFICATIONS HAVE NO BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-369

DATE: 3/18/77 DRILLER: R. Stevens CREW: B. Blackford/D. Wooden SURFACE ELEV. 394.3

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0	12"	Topsoil									
		Very stiff brown and tan clay		SS	1	5	6.5	8	12	15	18
	9.0										
9.0		Loose brown very silty fine sand		SS	2	10	11.5	3	3	4	12
	12.7										
12.7		Firm brown medium sand		SS	3	15	16.5	5	6	7	5
	18.0										
18.0		Loose gray and brown silty fine to medium		SS	4	20	21.5	3	4	5	6
	22.1	sand									
22.1		Firm brown medium sand		SS	5	25.	26.5	9	10	10	6
	28.5										
28.5		Loose brown medium sand w/traces fine gravel		SS	6	30	31.5	3	4	4	5
	32.0										
32.0		Firm brown medium to coarse sand		SS	7	35	36.5	7	10	16	8
		Firm brown medium to coarse sand		SS	8	40	41.5	10	11	13	7
	44.0										
44.0		Dense brown medium to coarse sand		SS	9	45	46.5	11	15	18	10
	47.5										
47.5		Dense brown medium to coarse sand w/fine gravel		SS	10	50	51.5	11	19	26	10
		Boring Terminated @ 51.5'									

METHOD OF DRILLING (Check One)

a AUGER XXX Rod SIZE A

b WASH XX WATER MUD XX

BORING SIZE 2-7/8" BIT USED 2-7/8" Side Discharge

CASING: SIZE NW 5' LENGTH

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER Cloudy 50 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

APPENDIX B

WELL CONSTRUCTION AND LITHOLOGIC LOGS
2010 WASTEWATER POND COMPLEX MONITORING WELLS

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **41510694-01**

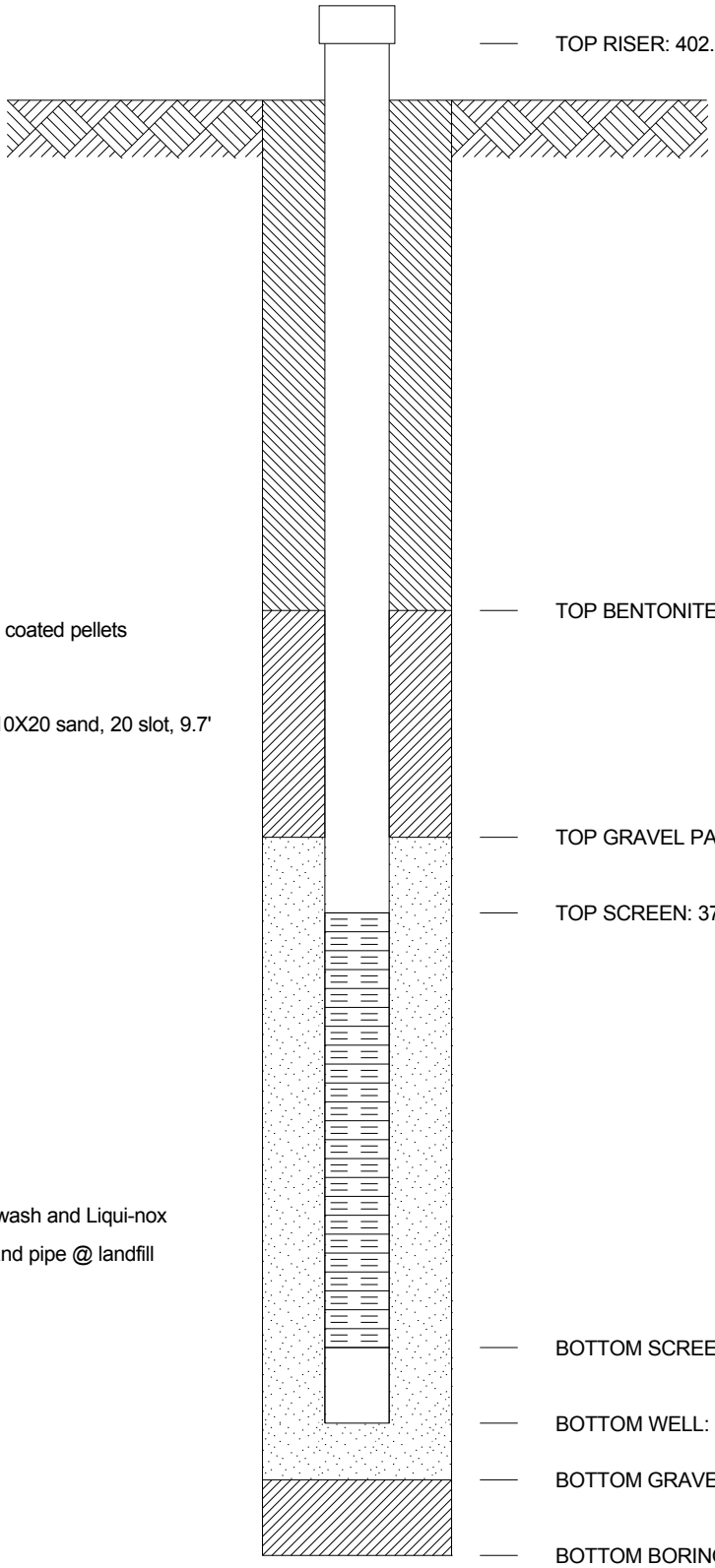
COMPANY **AMERICAN ELECTRIC POWER** WELL No. **MW-1001** BORING No. **MW-1001** INSTALLED **6/2/10**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 153,488.0 E 513,047.6**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 400.03 FT.



GROUT SEAL: 200 gal Volclay

BENTONITE SEAL: 75 lbs 3/8" coated pellets

SCREEN: 2" dia., Prepacked, 10X20 sand, 20 slot, 9.7'

GRAVEL PACK: #5 sand

RISER PIPE: 2", dia., PVC

SPACERS, DEPTH: 20'

Notes:
-Deconned with high pressure wash and Liqui-nox
-Drilled w/ 6.25" augers
- Drill and decon water from stand pipe @ landfill
- Well installed 6/2/10
-SWL @ install = 25.5'

GEOMCNST ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **41510694-01**

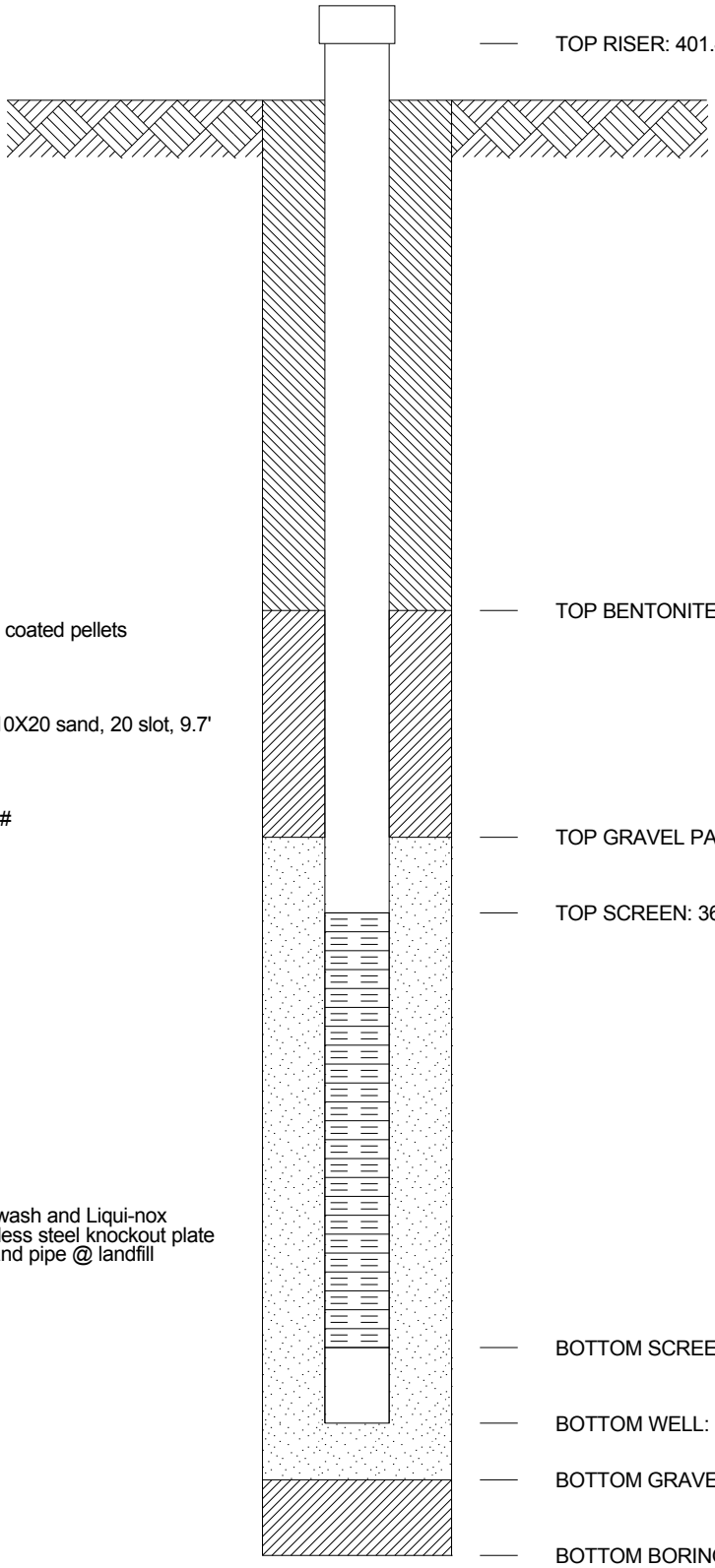
COMPANY **AMERICAN ELECTRIC POWER** WELL No. **MW-1002** BORING No. **MW-1002** INSTALLED **6/2/10**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 152,307.4 E 514,231.0**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.09 FT.



GROUT SEAL: 150 gal Volclay

BENTONITE SEAL: 50 lbs 3/8" coated pellets

SCREEN: 2" dia., Prepacked, 10X20 sand, 20 slot, 9.7'

GRAVEL PACK: #5 sand - 375#

RISER PIPE: 2", dia., PVC

SPACERS, DEPTH: 25'

Notes:
-Deconned with high pressure wash and Liqui-nox
-Drilled w/ 6.25" augers & stainless steel knockout plate
- Drill and decon water from stand pipe @ landfill
- Well installed 6/2/10
-SWL @ install = 29.8'

GEOMCNST ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **41510694-01**

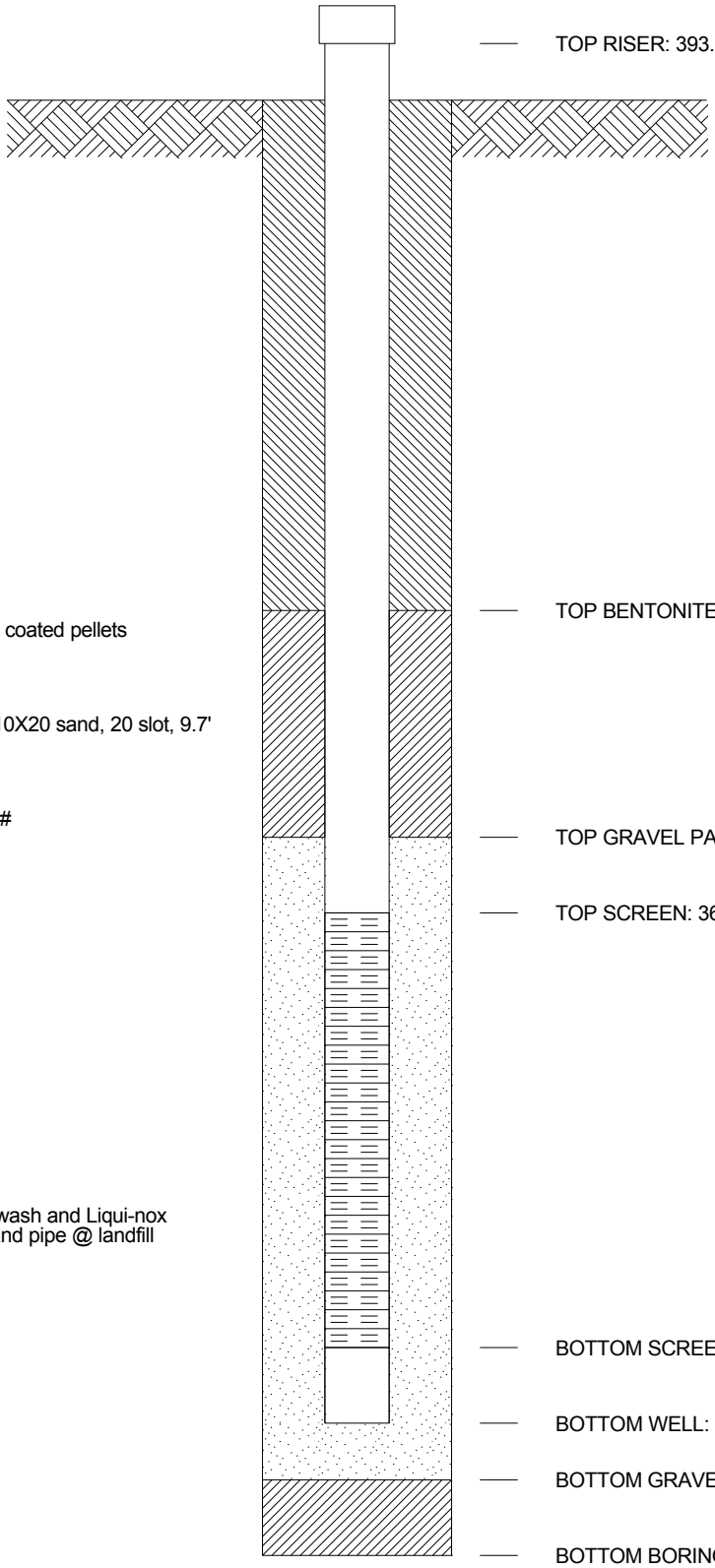
COMPANY **AMERICAN ELECTRIC POWER** WELL No. **MW-1003** BORING No. **MW-1003** INSTALLED **6/2/10**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 151,208.1 E 512,820.7**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 390.84 FT.



GROUT SEAL: 100 gal Volclay

BENTONITE SEAL: 75 lbs 3/8" coated pellets

SCREEN: 2" dia., Prepacked, 10X20 sand, 20 slot, 9.7'

GRAVEL PACK: #5 sand - 375#

RISER PIPE: 2", dia., PVC

SPACERS, DEPTH: 18'

Notes:
-Deconned with high pressure wash and Liqui-nox
- Drill and decon water from stand pipe @ landfill
- Well installed 6/2/10
-SWL @ install = 23.5'

GEOMCNST ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **41510694-01**

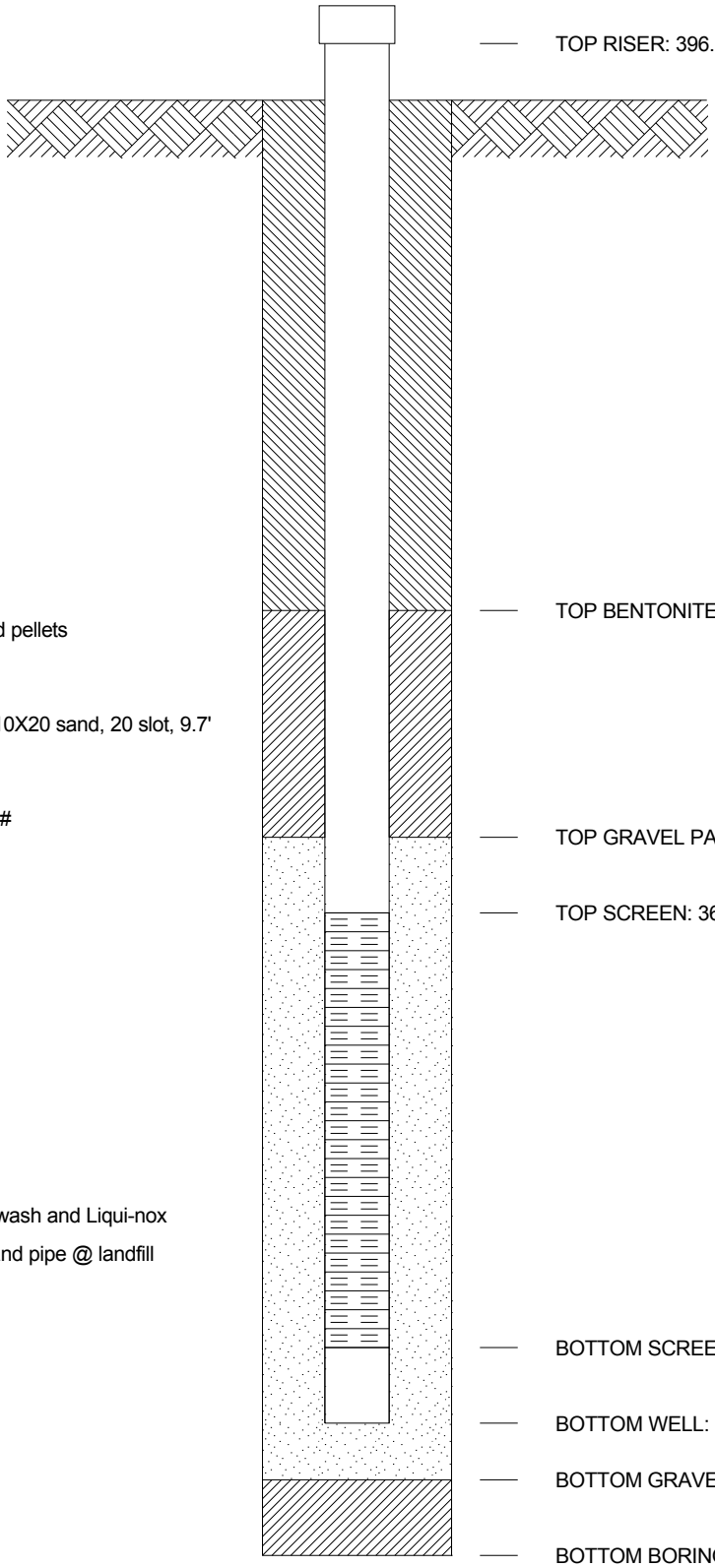
COMPANY **AMERICAN ELECTRIC POWER** WELL No. **MW-1004** BORING No. **MW-1004** INSTALLED **6/3/10**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 150,013.4 E 514,264.7**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 394.25 FT.



GROUT SEAL: 125 gal Volclay

BENTONITE SEAL: 3/8" coated pellets

SCREEN: 2" dia., Prepacked, 10X20 sand, 20 slot, 9.7'

GRAVEL PACK: #5 sand - 350#

RISER PIPE: 2", dia., PVC

SPACERS, DEPTH: 22'

Notes:
-Deconned with high pressure wash and Liqui-nox
-Drilled w/ 6.25" augers
- Drill and decon water from stand pipe @ landfill
- Well installed 6/3/10
-SWL @ install = 27.0'

GEOMCNST ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 153,488.0 E 513,047.6**

GROUND ELEVATION **400.0** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽ 31.5	▼	▼
TIME			
DATE			

BORING NO. **MW-1001** DATE **7/16/10** SHEET **1** OF **2**

BORING START **5/25/10** BORING FINISH **6/2/10**

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

HGT. RISER ABOVE GROUND **2.32** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **29.7** BOTTOM **39.4**

WELL DEVELOPMENT _____ BACKFILL **VOLCLAY**

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SPT	0.0	1.5	4-8-13	1.4					**MODERATE YELLOWISH BROWN 10YR 5/4 FINE SAND** w/some clay		GROUNDING PROCEDURE NOT IN USE / WATER FROM STANDPIPE @ LANDFILL / DECONED 05/25/10 / DRILLED w/ 4.25 HSA
2	SPT	1.5	3.0	6-9-10	1.5							
3	SPT	3.0	4.5	3-4-7	1.3					**MODERATE YELLOWISH BROWN 10YR 5/4 FINE SAND** w/medium stiff clay mixed		
4	SPT	4.5	6.0	3-6-9	1.3		5					
5	SPT	6.0	7.5	2-4-6	1.2					**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** tsf 0.5		
6	SPT	7.5	9.0	3-6-8	1.5					**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** w/some fine sands mixed		
7	SPT	9.0	10.5	3-4-6	1.5					**GREENISH GRAY 5G 6/1 BOTTOM ASH**		
8	SPT	10.5	12.0	1-1-3	1.4		10			**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 CLAY**		
9	SPT	12.0	13.5	2-2-4	1.4					**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** tsf 0.5		
10	SPT	13.5	15.0	4-4-6	1.4					**SOFT GRAYISH ORANGE 10YR 7/4 CLAY** tsf 0.5, wet		
11	SPT	15.0	16.5	4-4-7	1.5					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** tsf 1.5		
12	SPT	16.5	18.0	4-4-8	1.4		15			**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** tsf 1.0		
13	SPT	18.0	19.5	4-4-4	1.4					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 CLAY** tsf 2.0		
14	SPT	19.5	21.0	2-3-4	1.5					**MODERATE YELLOWISH BROWN 10YR 5/4 FINE SAND**		
										SOFT MODERATE YELLOWISH BROWN		

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TYPE OF CASING USED

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

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

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

RECORDER **REB**

AEP ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER** BORING NO. **MW-1001** DATE **7/16/10** SHEET **2** OF **2**

PROJECT **Rockport Bottom Ash Pond USWAG** BORING START **5/25/10** BORING FINISH **6/2/10**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
										CLAYEY SAND tsf 1.0		
15	SPT	21.0	22.5	2-4-7	1.4					**MODERATE YELLOWISH BROWN 10YR 5/4 FINE SAND**		
16	SPT	22.5	24.0	4-5-5	1.5					**DARK YELLOWISH ORANGE 10YR 6/6 MEDIUM SAND**		
17	SPT	24.0	25.5	3-6-7	1.5		25					
18	SPT	25.5	27.0	3-5-5	1.4							
19	SPT	27.0	28.5	4-4-5	1.5							
20	SPT	28.5	30.0	5-7-7	1.4		30					
21	SPT	30.0	31.5	5-7-7	1.5					**DARK YELLOWISH ORANGE 10YR 6/6 MEDIUM SAND** moist	▽	
22	SPT	31.5	33.0	5-6-8	1.5					**DARK YELLOWISH ORANGE 10YR 6/6 MEDIUM SAND** wet		
23	SPT	33.0	34.5	4-6-6	1.5					**DARK YELLOWISH ORANGE 10YR 6/6 MEDIUM SAND**		
24	SPT	34.5	36.0	4-6-6	1.5		35					
25	SPT	36.0	37.5	5-5-6	1.4							
26	SPT	37.5	39.0	6-6-6	1.4							
27	SPT	39.0	40.5	4-4-5	1.5		40					

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 152,307.4 E 514,231.0**

GROUND ELEVATION **399.1** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽ 30.0	▼	▼
TIME			
DATE			

BORING NO. **MW-1002** DATE **7/16/10** SHEET **1** OF **3**

BORING START **5/27/10** BORING FINISH **6/2/10**

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

HGT. RISER ABOVE GROUND **2.33** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **35.2** BOTTOM **44.9**

WELL DEVELOPMENT _____ BACKFILL **VOLCLAY**

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SPT	0.0	1.5	4-4-6	1.4					**YELLOWISH ORANGE 10YR 6/6 SAND CLAY** dry		NO GROUNDING PROCEDURE IN USE / WATER FROM STAND PIPE @ LANDFILL / DECON 05/27/10
2	SPT	1.5	3.0	8-10-13	1.3					**STIFF MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** dry		
3	SPT	3.0	4.5	4-7-7	1.5					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** dry		
4	SPT	4.5	6.0	4-4-7	1.3		5			**MEDIUM STIFF MEDIUM LIGHT GRAY N6 CLAY** tsf 1.5		
5	SPT	6.0	7.5	4-4-5	1.4					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** tsf 1.5, dry		
6	SPT	7.5	9.0	4-4-4	1.3					**MEDIUM STIFF MEDIUM LIGHT GRAY N6 CLAY** tsf 1.5		
7	SPT	9.0	10.5				10			**MEDIUM STIFF MIXTURE OF BROWN & GRAY CLAY** tsf 2.0		
8	SPT	10.5	12.0	4-6-6	1.4							
9	SPT	12.0	13.5	5-6-10	1.3					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY**		
10	SPT	13.5	15.0	5-7-9	1.5					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 W/MIXTURE OF MEDIUM LIGHT GRAY N6 SANDY CLAY**		
11	SPT	15.0	16.5	5-6-7	1.4		15			**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** tsf 1.5		
12	SPT	16.5	18.0	3-3-5	1.5					**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** tsf 1.0		
13	SPT	18.0	19.5	2-3-4	1.5					**SOFT MODERATE YELLOWISH BROWN 10YR 5/4 SANDY CLAY** tsf .5		
14	SPT	19.5	21.0	2-2-4	1.3					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **REB**

AEP ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER** BORING NO. **MW-1002** DATE **7/16/10** SHEET **2** OF **3**

PROJECT **Rockport Bottom Ash Pond USWAG** BORING START **5/27/10** BORING FINISH **6/2/10**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SPT	21.0	22.5	2-2-2	1.4					**SOFT YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf .5, moist		
16	SPT	22.5	24.0	2-2-2	1.3							
17	SPT	24.0	25.5	5-6-7	1.2		25			**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
18	SPT	25.5	27.0	3-4-7	1.5					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** moist		
19	SPT	27.0	28.5	2-2-4	1.4							
20	SPT	28.5	30.0	2-2-2	1.4		30			**YELLOWISH ORANGE 10YR 6/6 SAND FINE** wet	▽	
21	SPT	30.0	31.5	3-3-3	1.2					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
22	SPT	31.5	33.0	2-2-4	1.4							
23	SPT	33.0	34.5	4-4-4	1.3							
24	SPT	34.5	36.0	5-6-6	1.4		35					
25	SPT	36.0	37.5	5-5-6	1.4							
26	SPT	37.5	39.0	4-4-8	1.3					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/some pebbles		
27	SPT	39.0	40.5	4-6-9	1.5					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
28	SPT	40.5	42.0	6-8-10	1.3		40			**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/some pebbles		
29	SPT	42.0	43.5	7-6-10	1.4							
30	SPT	43.5	45.0	6-8-11	1.4							
31	SPT	45.0	46.5	7-9-11	1.4		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER** BORING NO. **MW-1002** DATE **7/16/10** SHEET **3** OF **3**

PROJECT **Rockport Bottom Ash Pond USWAG** BORING START **5/27/10** BORING FINISH **6/2/10**

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

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 151,208.1 E 512,820.7**

GROUND ELEVATION **390.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽ 23.1	▼	▼
TIME			
DATE			

BORING NO. **MW-1003** DATE **7/16/10** SHEET **1** OF **2**

BORING START **5/26/10** BORING FINISH **6/2/10**

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

HGT. RISER ABOVE GROUND **2.39** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **27.7** BOTTOM **37.4**

WELL DEVELOPMENT _____ BACKFILL **VOLCLAY**

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SPT	0.0	1.5	5-12-13	1.5					**DARK YELLOWISH ORANGE 10RY 6/6 CLAYSHALE** dry		NO GROUNDING IN USE / WATER FROM STAND PIPE @ LANDFILL / DECON 05/26/10
2	SPT	1.5	3.0	4-7-11	1.5					**DARK YELLOWISH ORANGE 10RY 6/6 CLAYSHALE**		
3	SPT	3.0	4.5	3-4-5	1.4					**MEDIUM STIFF DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf 2.0		
4	SPT	4.5	6.0	3-4-6	1.4		5			**MEDIUM STIFF DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf 2.5		
5	SPT	6.0	7.5	2-3-5	1.4					**MEDIUM STIFF DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf 1.5		
6	SPT	7.5	9.0	3-3-5	1.5							
7	SPT	9.0	10.5	4-4-4	1.5		10			**SOFT DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf 1.0		
8	SPT	10.5	12.0	2-2-4	1.4					**SOFT DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf 1.5		
9	SPT	12.0	13.5	2-3-4	1.5					**SOFT DARK YELLOWISH ORANGE 10YR 6/6 SANDY CLAY** tsf .5		
10	SPT	13.5	15.0	2-2-4	1.5							
11	SPT	15.0	16.5	2-2-2	1.5		15					
12	SPT	16.5	18.0	2-4-6	1.3					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
13	SPT	18.0	19.5	4-4-4	1.4							
14	SPT	19.5	21.0	4-4-6	1.5							

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TYPE OF CASING USED

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

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

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

RECORDER **REB**

AEP ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER** BORING NO. **MW-1003** DATE **7/16/10** SHEET **2** OF **2**

PROJECT **Rockport Bottom Ash Pond USWAG** BORING START **5/26/10** BORING FINISH **6/2/10**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SPT	21.0	22.5	3-8-10	1.5					**MODERATE YELLOWISH BROWN 10YR 5/4 SAND FINE** moist		
16	SPT	22.5	24.0	4-4-6	1.4					**MODERATE YELLOWISH BROWN 10YR 5/4 SAND FINE** wet	▽	
17	SPT	24.0	25.5	4-6-6	1.5		25					
18	SPT	25.5	27.0	3-5-7	1.4							
19	SPT	27.0	28.5	4-5-7	1.4							
20	SPT	28.5	30.0	6-6-8	1.4		30					
21	SPT	30.0	31.5	4-5-9	1.3							
22	SPT	31.5	33.0	2-2-3	1.4							
23	SPT	33.0	34.5	5-6-8	1.3							
24	SPT	34.5	36.0	5-6-7	1.4		35					
25	SPT	36.0	37.5	5-5-5	1.3					**MODERATE YELLOWISH BROWN 10YR 5/4 SAND FINE** w/pebbles, wet		
26	SPT	37.5	39.0	6-6-6	1.4							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER**

PROJECT **Rockport Bottom Ash Pond USWAG**

COORDINATES **N 150,013.4 E 514,264.7**

GROUND ELEVATION **394.3** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽ 28.8	▼	▼
TIME			
DATE			

BORING NO. **MW-1004** DATE **7/16/10** SHEET **1** OF **2**

BORING START **6/3/10** BORING FINISH **6/3/10**

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

HGT. RISER ABOVE GROUND **2.30** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **32.2** BOTTOM **41.9**

WELL DEVELOPMENT _____ BACKFILL **VOLCLAY**

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SPT	0.0	1.5	10-11-10	1.3					**MODERATE YELLOWISH BROWN 10YR 5/6 CLAYSHALE** dry		NO GROUNDING IN USE / WATER FROM STAND PIPE @ LANDFILL / DECON 06/03/10
2	SPT	1.5	3.0	5-6-7	1.4					**MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 1.5, dry		
3	SPT	3.0	4.5	4-6-8						**MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 1.5, w/limestone mixed, dry		
4	SPT	4.5	6.0	4-4-6	1.4		5			**GRAY N6 CLAY** tsf 1.5, dry		
5	SPT	6.0	7.5	3-4-4	1.3					**GRAY N6 SANDY CLAY** tsf 1.5, dry		
6	SPT	7.5	9.0	4-4-8	1.4					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 2.0		
7	SPT	9.0	10.5	3-6-9	1.4		10			**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 3.0		
8	SPT	10.5	12.0	3-6-9	1.4							
9	SPT	12.0	13.5	3-5-8	1.4							
10	SPT	13.5	15.0	4-6-6	1.3							
11	SPT	15.0	16.5	3-5-9	1.5		15					
12	SPT	16.5	18.0	4-4-8	1.3					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 3.0, w/more sand		
13	SPT	18.0	19.5	4-4-6	1.5					**MEDIUM STIFF MODERATE YELLOWISH BROWN 10YR 5/6 SANDY CLAY** tsf 2.5, moist		
14	SPT	19.5	21.0	2-3-5	1.4					**STIFF MODERATE YELLOWISH BROWN**		

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TYPE OF CASING USED

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

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

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

RECORDER **REB**

AEP ROCKPORT BA POND USWAG.GPJ AEP.GDT 7/16/10

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **41510694-01**

COMPANY **AMERICAN ELECTRIC POWER** BORING NO. **MW-1004** DATE **7/16/10** SHEET **2** OF **2**

PROJECT **Rockport Bottom Ash Pond USWAG** BORING START **6/3/10** BORING FINISH **6/3/10**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
										10YR 5/6 SANDY CLAY tsf 2.0		
15	SPT	21.0	22.5	2-4-7	1.4					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
16	SPT	22.5	24.0	2-4-7	1.4							
17	SPT	24.0	25.5	2-4-6	1.5		25					
18	SPT	25.5	27.0	3-4-7	1.4					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/some pebbles, wet		
19	SPT	27.0	28.5	4-4-8	1.5					**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
20	SPT	28.5	30.0	2-3-5	1.2					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/pebbles, wet	▽	
21	SPT	30.0	31.5	5-7-7	1.3		30			**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/pebbles		
22	SPT	31.5	33.0	3-4-6	1.4					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/gravels		
23	SPT	33.0	34.5	6-7-9	1.2					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/gravels, wet		
24	SPT	34.5	36.0	4-5-5	1.3		35			**YELLOWISH ORANGE 10YR 6/6 SAND FINE**		
25	SPT	36.0	37.5	3-4-6	1.4					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** w/pebbles, wet		
26	SPT	37.5	39.0	3-4-5	1.2							
27	SPT	39.0	40.5	3-4-4	1.3					**YELLOWISH ORANGE 10YR 6/6 SAND FINE** wet		
28	SPT	40.5	42.0	3-4-5	1.1		40					
29	SPT	42.0	43.5	5-6-9								

APPENDIX C

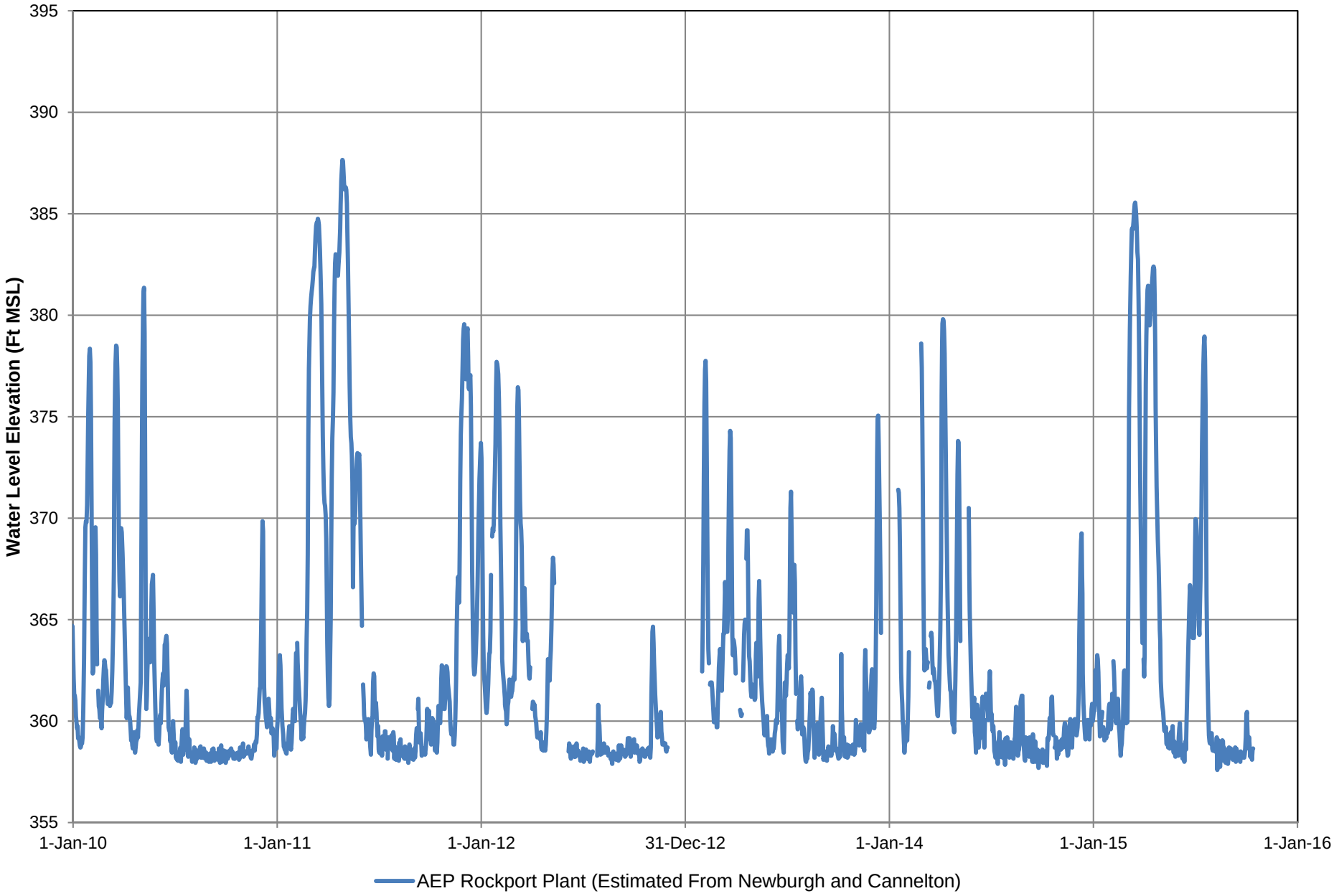
PIEZOMETRIC DATA

Appendix C-1

Ohio River Hydrograph, 2010-2015

AEP Rockport Plant

Ohio River Hydrograph, 2010-2015



Appendix C-2

Wastewater Pond Complex Monitoring Well
Piezometric Data, 2010-2015

Appendix C-2
Monitoring Well Piezometric Data
Wastewater Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well:	**MW 1001**	**MW 1002**	**MW 1003**	**MW 1004**
Maximum:	371.61	373.20	373.72	376.13
Minimum:	368.38	366.99	367.49	365.57
Date:				
5/17/2011	371.61	373.20	373.72	376.13
11/17/2011	370.77	369.17	369.64	367.35
11/15/2012	368.91	367.48	367.83	365.93
5/20/2013	369.11	367.95	368.61	367.38
11/13/2013	368.38	366.99	367.49	366.43
5/12/2014	370.06	369.55	369.93	368.84
11/12/2014	368.57	367.03	367.64	365.57
5/7/2015	370.75	371.16	371.35	370.93

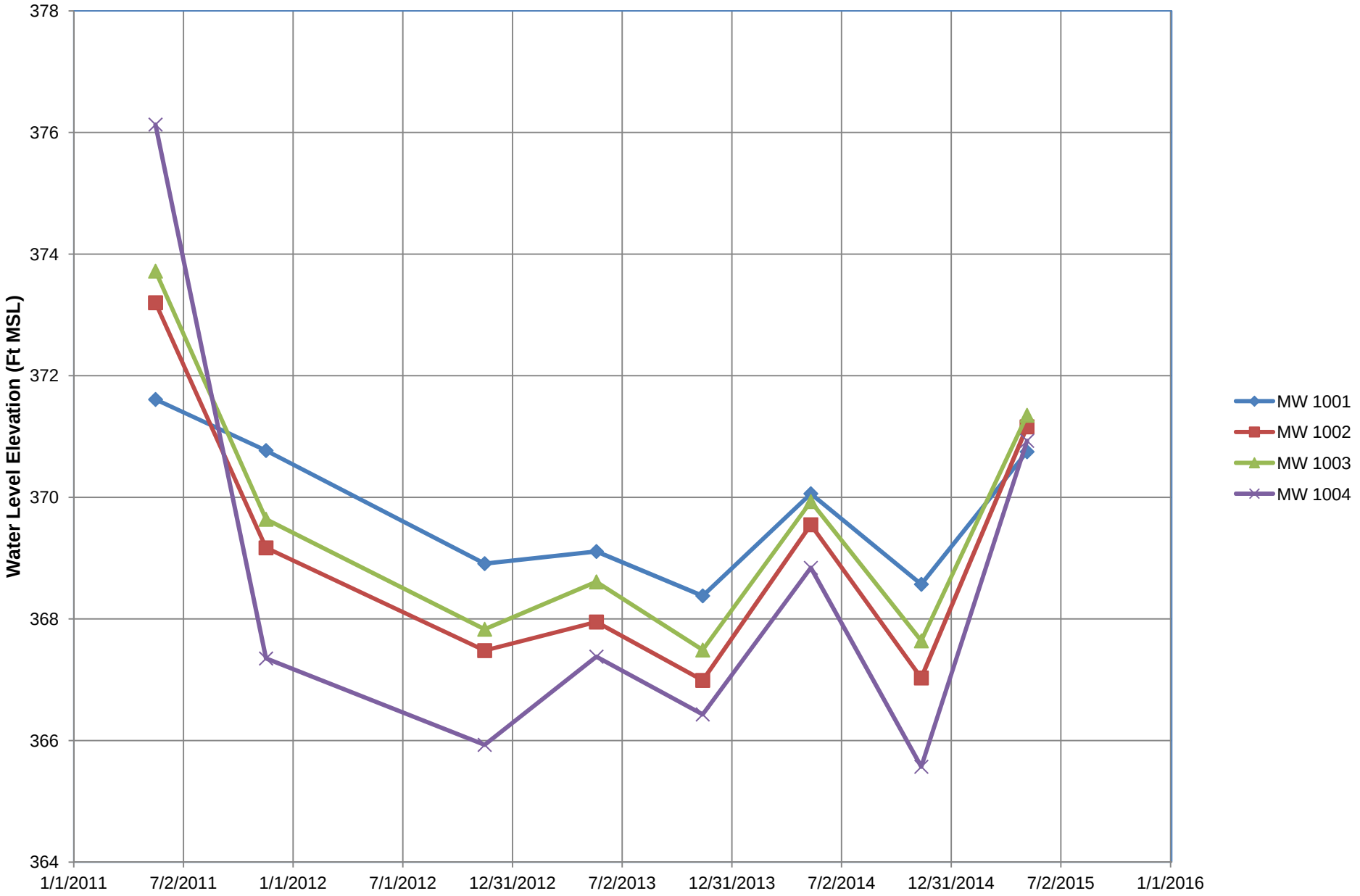
Note: Elevations reported by AEP in feet above Plant datum

Appendix C-3

Wastewater Pond Complex Monitoring Well Hydrographs, 2010-2015

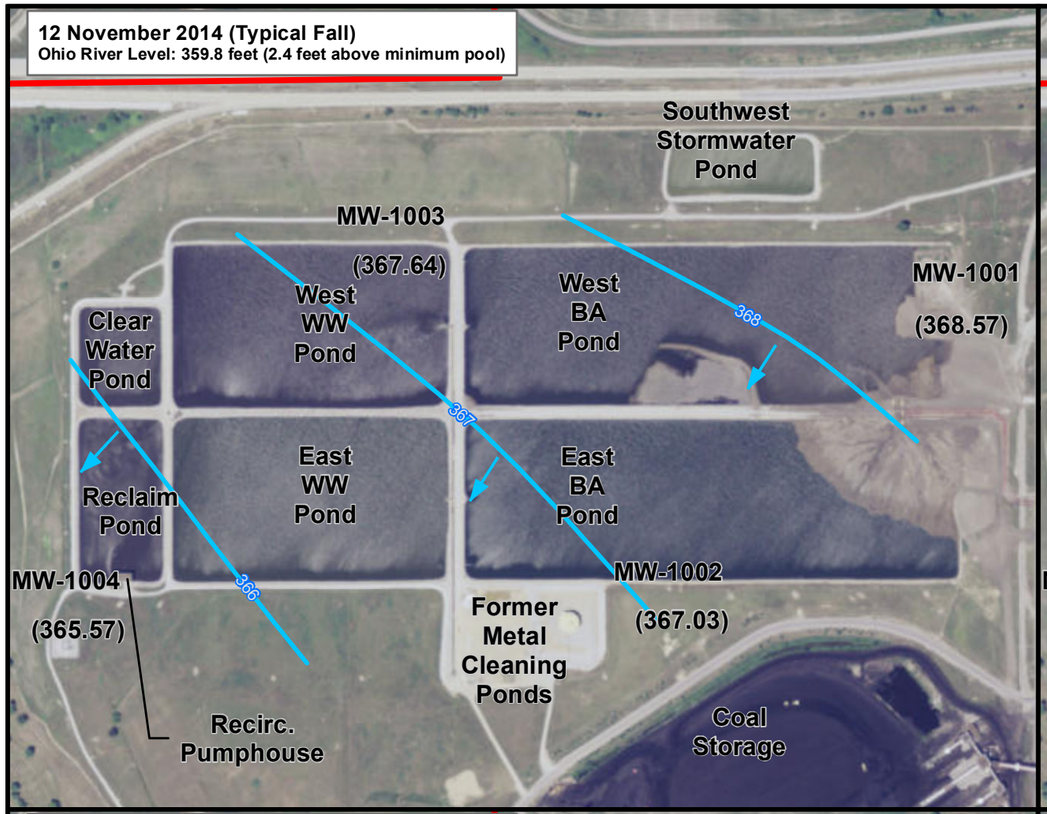
AEP Rockport Plant

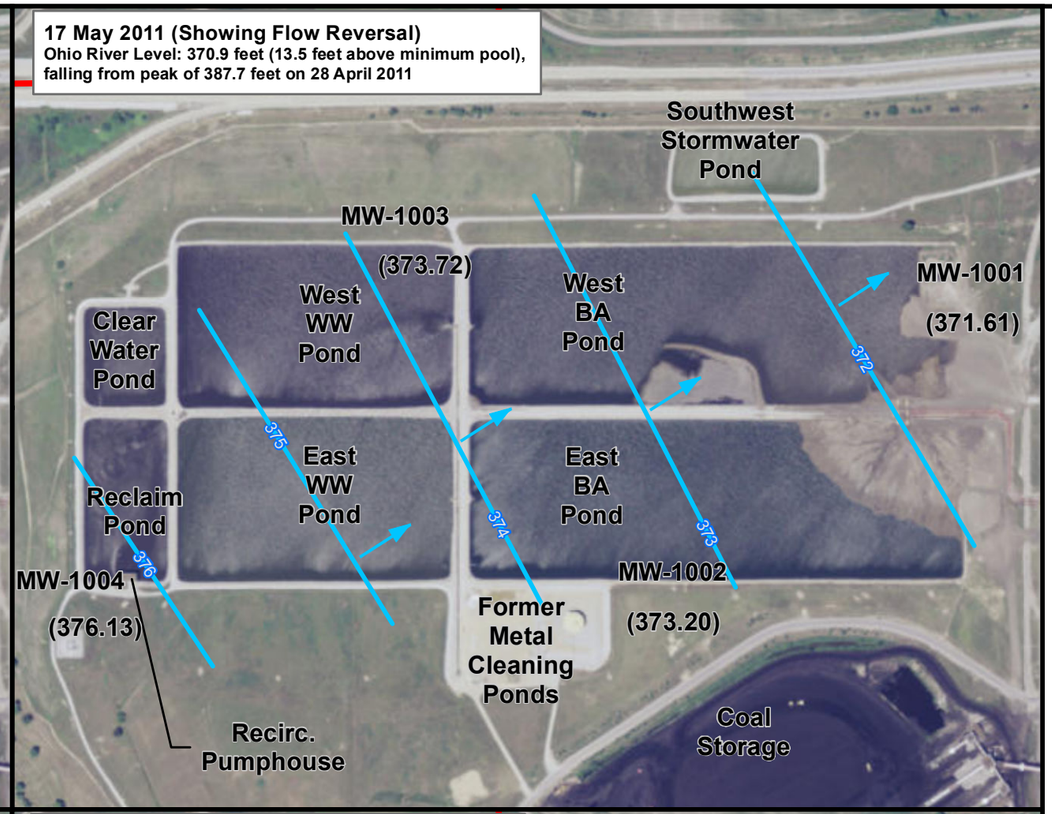
Wastewater Pond Complex - Monitoring Well Hydrographs

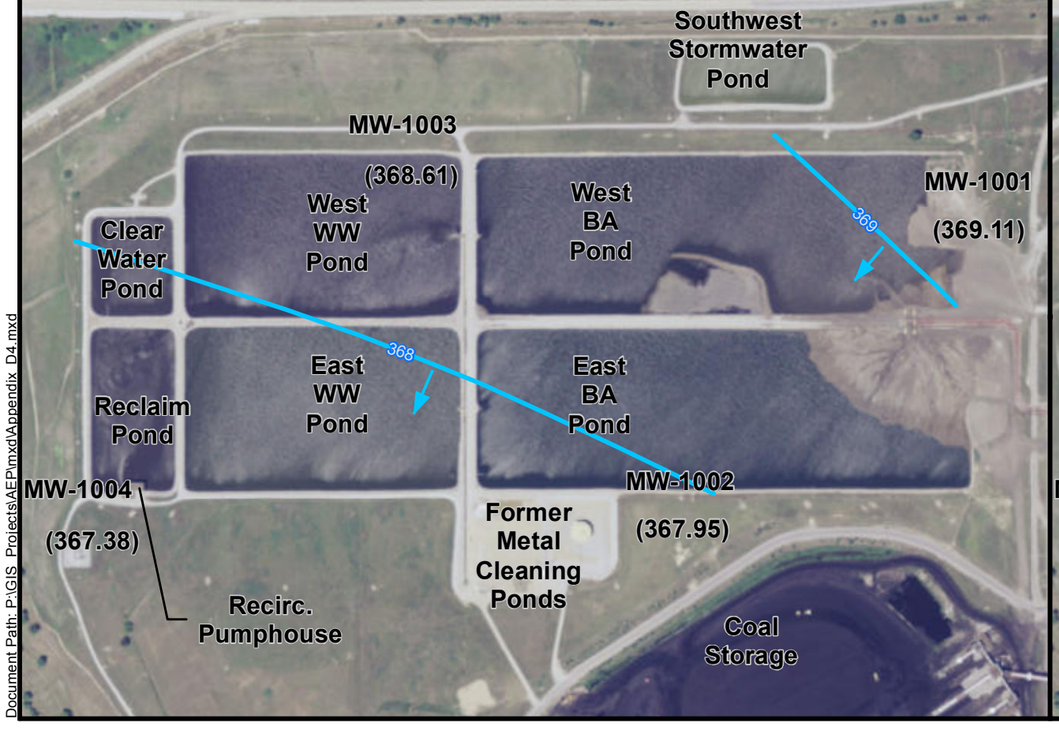


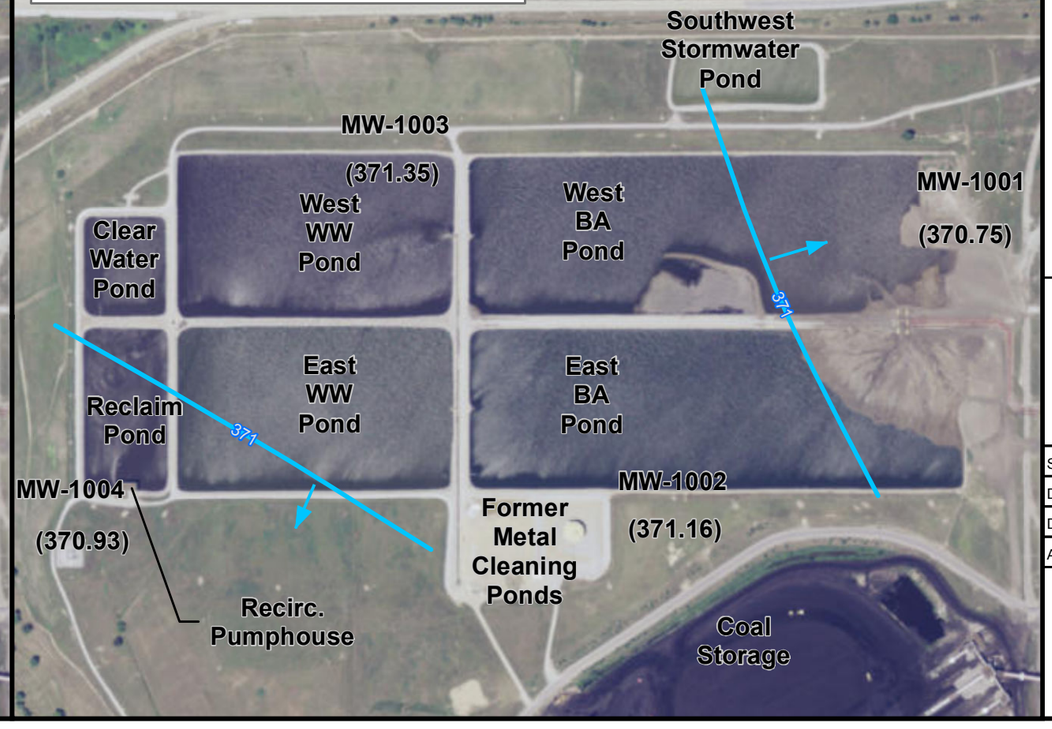
Appendix C-4

Wastewater Pond Complex Monitoring Well Piezometric Maps









Legend

- Property Boundary
- Piezometric Surface Contour

MW-1001 - Well ID
(368.57) - Piezo Elevation

Note:
Elevations in feet NGVD29 (MSL)
Ohio River minimum pool: 357.4 feet MSL

Data Sources

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Date of Photography: July 2014
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 300 600
SCALE IN FEET

PIEZOMETRIC SURFACE

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 600'
DATE	6/3/2016
DRAWN BY	TMR
APPROVED BY	ALD

FIG. C-4

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Document Path: P:\GIS_Projects\AEP\mxd\Appendix_D4.mxd

APPENDIX D

2016 MONITORING WELL INSTALLATION REPORT

2016 MONITORING WELL INSTALLATION REPORT
Bottom Ash Ponds
Rockport Plant
Indiana-Michigan Power Company
Rockport, Indiana

Prepared for:
American Electric Power Service Corporation
and Indiana-Michigan Power Company
1 Riverside Plaza
Columbus, Ohio 43215

Prepared by:
Amec Foster Wheeler Environment & Infrastructure, Inc.
11003 Bluegrass Parkway, Suite 690
Louisville, Kentucky 40299

14 September 2017

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ATTACHMENTS

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) was retained by American Electric Power Service Corporation (AEP) to observe and document drilling and monitoring well installation activities in the vicinity of the Bottom Ash (BA) Ponds at the AEP Rockport Plant.

The BA Ponds are located at the north end of the wastewater pond complex for the plant. The two contiguous ponds, referred to as the East and West BA Ponds, receive CCR on an alternating schedule. The ponds each have rough dimensions (at the crest of the embankments) of 2,000 feet x 650 feet, corresponding to a surface area of approximately 30 acres each (60 acres total).

Four shallow monitoring wells (MW-1001 through MW-1004) were installed in 2010 at the perimeter of the wastewater pond complex. Based on data collected from those wells, the dominant direction of groundwater flow beneath the ponds is to the east-southeast.

For the purpose of groundwater monitoring under the federal CCR Rule (40 CFR Part 257), AEP has elected to monitor groundwater at the BA Ponds using a multiunit groundwater monitoring system. The long-term groundwater monitoring network (GWMN) for the BA Ponds (including potentiometric and water quality monitoring) will consist of seven clusters of three wells each, installed at shallow, intermediate and deep levels in the unconsolidated overburden above bedrock. Five locations are along the downgradient sections of the pond perimeter, and two are at upgradient locations north of the BA Ponds. One of the existing shallow wells (MW-1002) has been incorporated into the GWMN. The other three existing wells (MW-1001, MW-1003, and MW-1004) have also been retained for water level monitoring (also known as potentiometric or piezometric monitoring) only. Twenty new monitoring wells were installed in early 2016 to complete the GWMN.

Monitoring well locations are shown on the map in **Figure 1**. Drilling, well construction and well development activities related to the new monitoring wells installed in 2016 are documented in this report.

2.0 FIELD ACTIVITIES

2.1 Schedule

Amec Foster Wheeler along with an AEP drilling crew mobilized to the site to kickoff drilling, well installation, and well development activities on 12 January 2016. A summary of key dates related to specific activities is provided below.

1) Amec Foster Wheeler and drill crew personnel attended safety orientation on 12 January 2016.
2) All drilling locations were identified and staked on 12 January 2016.
3) Locations and ground surface elevations were surveyed on 21 January 2016.

4) Drilling and monitoring well installation began on 13 January 2016 and was completed on 3 March 2016.

5) Locations, ground surface elevations, and top of casing elevations were surveyed on 3-4 March 2016.

6) Well Development began on 8 March 2016 and was completed by AEP on 29 March 2016. Amec Foster Wheeler observed well development activities 17 March 2016.

2.2 Staking, Surveying and Utility Clearances

1) All boring and monitoring well locations were staked prior to drilling.

2) All boring and monitoring well locations were surveyed both horizontally (northing and easting) and vertically (elevation) before and after installation, by AEP surveyors.

3) Coordinates were provided in the North American Datum of 1927 (NAD27), State Plane Coordinate System (SPCS) Indiana West Zone and elevations were provided in the North Geodetic Vertical Datum of 1929 (NGVD29), also known as Mean Sea Level (MSL).

4) Ground surface elevations were provided for all boring and monitoring well locations before and after well installation. Top of PVC casing elevations were provided for all monitoring well locations after well installation.

5) Prior to drilling activities, AEP located underground utilities near the new boring and monitoring well locations. Amec Foster Wheeler coordinated with onsite AEP personnel and drillers to make sure drilling locations were sufficiently removed from the located utilities to avoid damage.

2.3 Drilling and Soil Sampling

1) At each multi-level well location, three monitoring wells (shallow, intermediate, and deep) were installed. Because one shallow monitoring well already existed at the location for MW-1602 (MW-1002), only intermediate and deep wells were installed.

2) Drilling and monitoring well installation was performed by a drill rig equipped with hollow-stem augers with an inside diameter of 4¼ inches. Mud-rotary drilling was used below the water table due to running sands infiltrating the auger.

3) Continuous standard penetration testing (SPT) was performed from ground surface to refusal at all deep monitoring wells. Blow counts were recorded and used to develop N values for each sampled interval. For SPTs, AEP provided the hammer calibration record for review by Amec Foster Wheeler.

4) Recovered samples were described by Amec Foster Wheeler personnel and retained by AEP for laboratory analysis.

5) At each location, the deep monitoring well was installed first. Descriptions of subsurface materials recorded during the installation of the deep monitoring well were used to determine the depths of the screened intervals in the shallow and intermediate wells.

6) Boring logs including lithologic descriptions, blow counts, N values, and field observations are included as **Attachment 1.**

2.4 Geotechnical Sample Testing

1) AEP retained and transported samples collected during drilling to the AEP's Civil Engineering laboratory in Groveport, Ohio for geotechnical testing.

2) AEP tested selected samples from the screened intervals for gradation (ASTM D6913) and percent passing #200 sieve (ASTM D1140).

3) Gradation curves are provided as **Attachment 2**.

2.5 Monitoring Well Construction

1) Final well construction dimensions are provided in **Table 1**.

2) Monitoring wells were constructed of 2-inch schedule 40 PVC casing and 2-inch schedule 40 PVC 0.010-inch factory slotted screen.

3) A filter pack was placed in the annular space extending from a minimum of 6 inches below the bottom of the well to a minimum of 1 foot above the top of the screen.

4) A bentonite pellet seal was placed in the annular space above the filter pack and extended to a minimum of 2 feet above the filter pack. The bentonite pellets were hydrated as they were installed.

5) High solids bentonite grout was placed in the annular space from the bentonite seal to within 2 feet of ground surface using a tremie pipe.

6) A lockable steel protective casing, extending 2.5 to 3 ft above ground surface) was set in a concrete pad measuring 2 feet by 2 feet in area and 6 inches in thickness. The pad was constructed to slope away from the protective casing.

2.6 Well Development

1) Well development began on 8 March 2016 and was completed on 29 March 2016.

2) Well development was conducted by pumping using two Geotech Reclaimer pumps powered by a compressor. During pumping, each well was gently surged by moving the pump up and down the screened interval to mobilize fine-grained sediment and facilitate its removal.

3) Water quality parameters (discussed in **Section 2.8**) were monitored using a multi-parameter sonde, water quality meter, and flow-through cell (Geotech YSI ProDSS) in the final period of development.

4) During development, depth to water and flow rate measurements were also collected.

5) Pumping rates during well development ranged from 0.3 to 0.7 gallons per minute (gpm).

2.7 Water Level Gauging

1) Water level readings were collected periodically during drilling activities and during well development, using an electronic water level indicator, by measuring depth to water from the top of the inside casing.

2) Following well installation, while development of selected wells was still being conducted, a full round of water levels was collected on 17 March 2016.

3) All water level readings were converted to elevations relative to MSL using the surveyed top of casing elevations.

4) A summary of measured depths to water and water level elevations is provided in **Table 2**. The data in **Table 2** include historical water level elevations in the existing wells provided by AEP, two rounds of readings collected in existing wells by Amec Foster Wheeler on 14 January and 17 March 2016, and one round of water levels collected from the new wells on 17 March 2016. Updated hydrographs for the existing wells are provided in **Attachment 3**.

2.8 Water Quality Parameters

1) Water quality field parameters were collected during well development in a flow-through cell using a Geotech multiparameter digital sampling system (YSI ProDSS).

2) Water quality parameters monitored included temperature, pH, specific conductance (SC), dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity.

3) Water quality parameters were monitored in the final period of well development at a reduced flow rate.

4) A summary of stabilized water quality parameters is provided in **Table 3**.

3.0 SUMMARY AND FINDINGS

Figure 1 is a map showing the locations of the monitoring wells as installed. Full boring and well construction logs are provided in **Attachment 1**. **Table 1** is a summary of well construction details. **Table 2** summarizes water level measurements collected over multiple events in the four monitoring wells installed in 2010, as well as measurements collected on 17 March 2016. **Table 2** also includes water level measurements collected on 17 March 2016, from the 20 new monitoring wells installed in 2016.

Geologic and hydraulic interpretations are provided in **Figures 2 through 7**. **Figure 2** is a contour map of the bedrock surface in the vicinity of the BA Ponds, and **Figure 3** is a contour map of the potentiometric surface on 17 March 2016, based on the water level measurements collected on that date from the wells installed in the shallow zone. **Figure 4** shows the lines of three geologic cross-sections through the area of the BA Ponds, provided in **Figures 5, 6 and 7**.

The information obtained during drilling and installation of the new monitoring wells has been compared to background information (published data for the area, as well as site documents provided for review by AEP) summarized in the report titled *Groundwater Monitoring Network Evaluation, Bottom Ash Ponds, Rockport Plant, Indiana-Michigan Power Company, Rockport, Indiana* (GWMN Report) prepared for AEP by Amec Foster Wheeler. Full citations are provided in that report for sources referenced in this discussion.

The bedrock elevations encountered in the deep soil borings near the BA Ponds, which ranged in elevation from 274.1 to 298.8 ft MSL, along with the east-southeasterly slope of the bedrock surface (in the direction of the Ohio River), are generally consistent with the site information and published documents reviewed in the GWMN Report.

Core samples from bedrock were not obtained, but fragments recovered in split spoons and cuttings indicate that bedrock beneath the area of the BA Ponds consists of gray shale. This is consistent with the information from other site borings, and with published geologic mapping (Grove 2006), which indicates that the bedrock underlying the site and most of Spencer County is the Pennsylvanian Age Raccoon Group, consisting of sandstone and shale with minor amounts of mudstone, coal and limestone.

The unconsolidated overburden materials above bedrock generally agreed with historical information available for the site and discussed in Section 2.4.2.2 of the Groundwater Monitoring Network Evaluation Report, which grouped unconsolidated material into four units. This terminology has been maintained for the discussion of unconsolidated materials encountered during monitoring well installation and has been carried over to the cross sections presented in **Figures 5 through 7**.

- Fill – silt and clay (presumed to be reworked native soils) associated with the pond dikes. Because all but two locations (MW-1600 S,I,D and MW-1601 S,I,D) were positioned on top of the dikes, a substantial amount of fill material was encountered from ground surface to depths up to 15 BGS. Fill material generally consisted of silty clay, clay, and small amounts of sand.
- Unit No. 1 – surficial silt and clay. This unit was encountered beneath the fill material extending to a depth of between 15 and 29 feet BGS. The unit is a stiff silty to sandy clay with small amounts of interbedded sand layers.
- Unit No. 2 – well sorted sand. Below the surficial silts and clays was a poorly graded (well sorted) fine to medium grained sand to a maximum depth of approximately 32 to 43 feet BGS.
- Unit No. 3 – poorly sorted sand. This unit was encountered below Unit No. 2 and extended (along with Unit No. 4) to bedrock. Unit No. 3 consists of fine to coarse grained sand grading to sand and gravel of Unit No. 4.

- Unit No. 4 – sand and gravel. This unit was encountered interbedded within Unit No. 3 and consisted of fine to coarse, poorly to well sorted sand with variable amounts of gravel and coal particles.

At each well location a shallow, intermediate, and deep monitoring well was installed. Because one shallow monitoring well already existed at the location for MW-1602, only two new wells (an intermediate and a deep well) were installed. Screening intervals for each well were selected based on lithology described from the deep boring and are provided in **Table 1**. Elevations of screened intervals for shallow and intermediate were generally consistent across all locations. Top of screen elevations ranged from 362.9 to 363.2 ft MSL for shallow wells and 330.7 to 332.3 ft MSL for intermediate wells. Screened intervals for deep wells varied more than the other wells due to differences in the depth to bedrock. Top of screen elevations ranged from 284.3 to 308.8 ft MSL.

Following installation and during development, water levels were collected from all wells. Previous data from the four monitoring wells installed in 2010 indicate that the horizontal hydraulic gradient and groundwater flow direction beneath the ponds is typically to the east-southeast, toward the Ohio River. However, the historical data also indicate that temporary gradient reversals can occur in response to rapidly rising river stage conditions. The elevation of the water table can be expected to range between 366 and 372 ft MSL, with occasional (less than annual frequency) rises up to 376 ft MSL. The horizontal hydraulic gradient measured on 17 March 2016, as depicted in **Figure 3** based on the water levels in the shallow wells, was low (on the order of 0.0003 ft/ft) with a slope to the east.

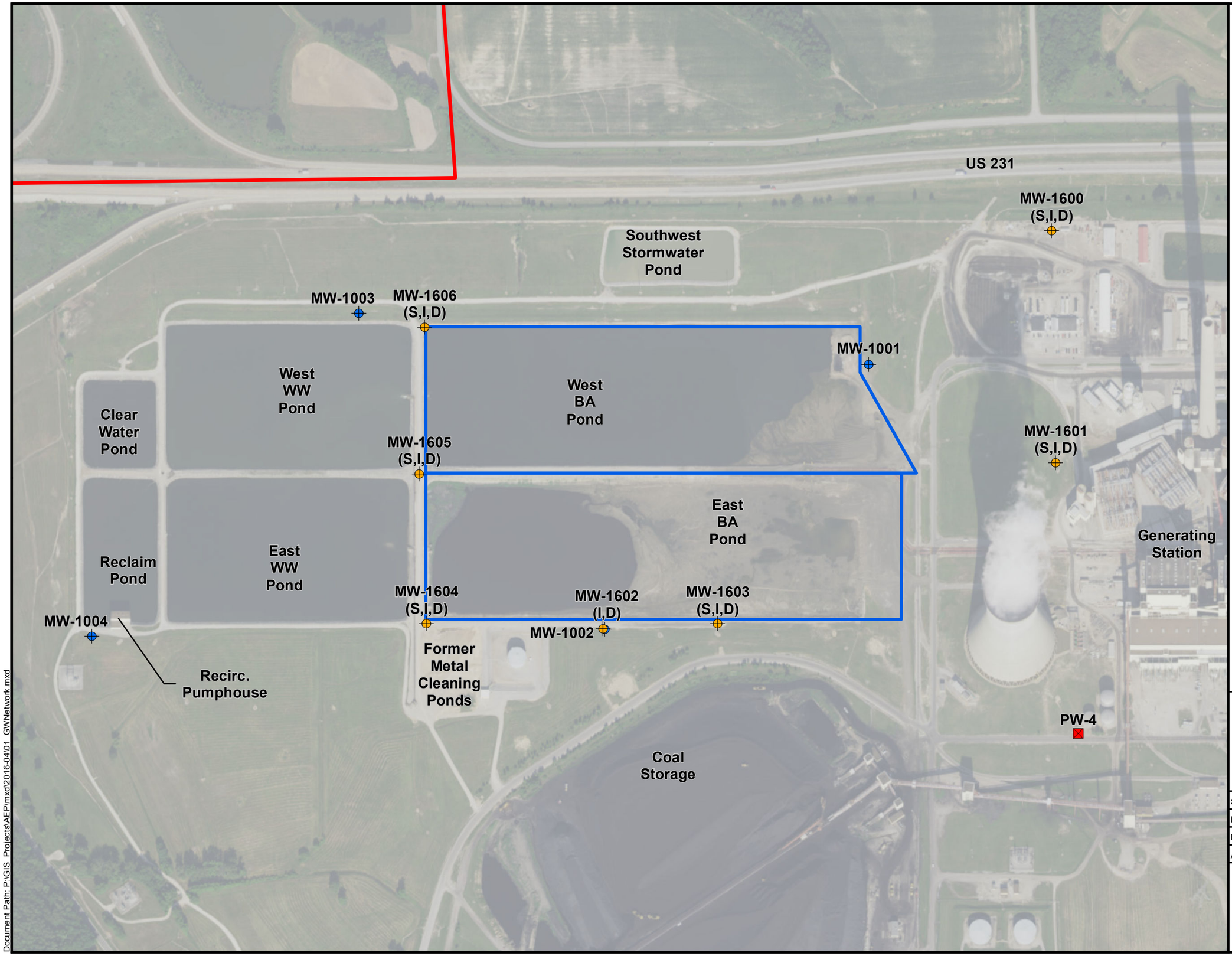
Water level measurements collected in the three-well clusters installed in 2016 indicate there is very little difference in water levels between the three levels (shallow, intermediate and deep) at any location, and the direction of the vertical gradient is variable. Water level elevation differences on 17 March 2016, between wells in any cluster ranged from 0.01 to 0.33 ft, averaging 0.08 feet.

Field water quality data collected during well development is summarized in **Table 3**. Groundwater temperature ranged from 13.7° C in MW-1606I to 20.3° C in MW-1602D. The pH was neutral, ranging from 6.74 standard units (S.U.) in MW-1600S to 7.37 S.U. in MW-1604I. Specific Conductance (SC) ranged from 553 µS/cm in MW-1604D to 1,365 µS/cm in MW-1605D. Dissolved oxygen (DO) and oxidation-reduction potential (ORP) indicate a reducing to slightly oxidizing environment. DO ranged from 0.18 mg/L at MW-1606I to 6.61 at MW-1601I, while ORP ranged from -126 mV at MW-1606D to 219 mV at MW-1606S. Turbidity, stabilized at or below 5 NTU at all but one well and ranged from 0.7 NTU at MW-1604D to 5.8 NTU MW-1606S.

During well development, pumping rate and drawdown were recorded in the field notes. These data were used to calculate the specific capacity of each well to determine if additional hydraulic testing would be necessary. The specific capacity is the discharge in gallons per minute (gpm) per foot of drawdown. Specific capacity ranged from 0.2 gpm/ft at MW-1601D and MW-1603D

to a maximum of 11 gpm/ft at MW-1600D. In 11 out of 20 wells there was no drawdown so specific capacity, which was essentially too high to measure from available pumping rates, could not be calculated.

FIGURES



Legend

- Monitoring Well Cluster (2016)
- USWAG Monitoring Well (2010)
- Water Supply Well
- Property Boundary
- Bottom Ash

Data Sources

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculature Imagery Program (NAIP)

0 200 400
SCALE IN FEET

GROUNDWATER MONITORING NETWORK BOTTOM ASH PONDS

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 400'
DATE	9/14/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 1

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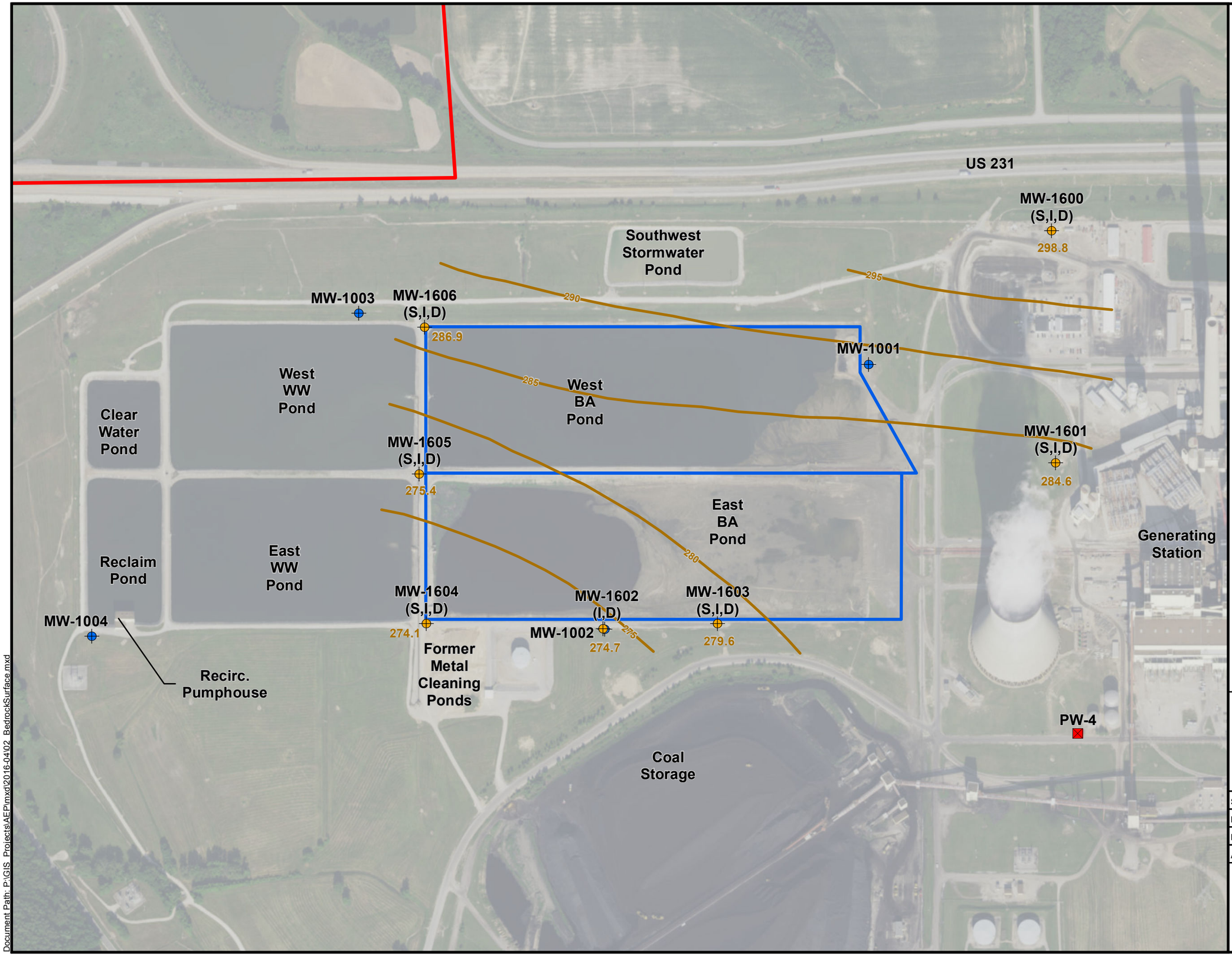
Document Path: P:\GIS_Projects\AEP\mxd\2016-04\01_GWNetwork.mxd



Legend

- Monitoring Well Cluster
- USWAG Monitoring Well
- Water Supply Well
- Bedrock Elevation Contour (FT
- Property Boundary
- Bottom Ash

Bedrock Elevation (FT MSL)

298.8 Bedrock elevation in the deep monitoring well boring

Data Sources

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 200 400
SCALE IN FEET

BEDROCK SURFACE CONTOUR MAP BOTTOM ASH PONDS

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 400'
DATE	9/14/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 2

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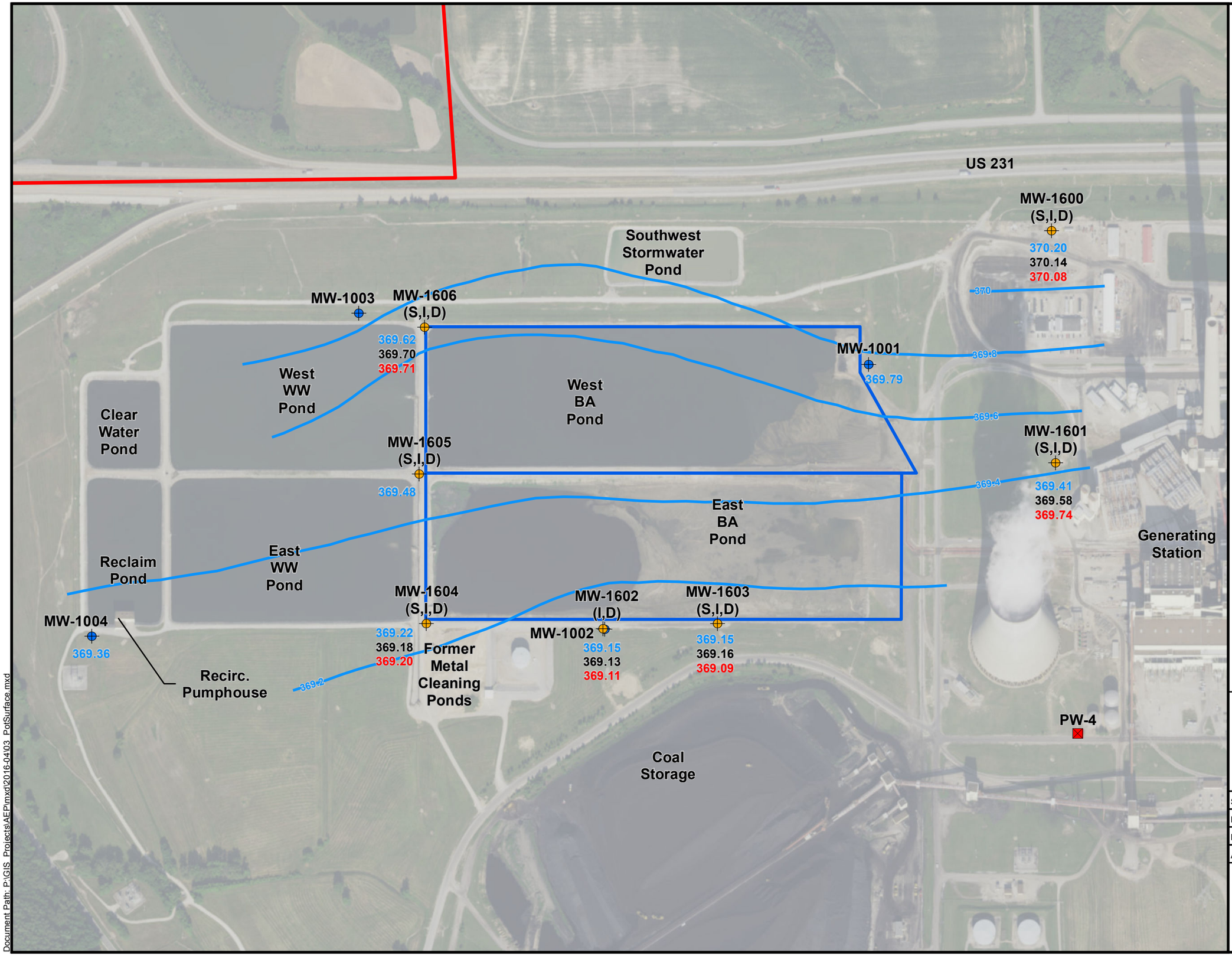

Legend

- Monitoring Well Cluster
- USWAG Monitoring Well
- Water Supply Well
- Potentiometric Elevation Contour (FT MSL) Contour Interval: 0.2 FT
- Property Boundary
- Bottom Ash

Groundwater Potentiometric Elevation (FT MSL)

369.22	Shallow Well
369.18	Intermediate Well
369.20	Deep Well

Data Sources

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 200 400
SCALE IN FEET

POTENTIOMETRIC SURFACE CONTOUR MAP 17 MARCH 2016

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 400'
DATE	9/14/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 3

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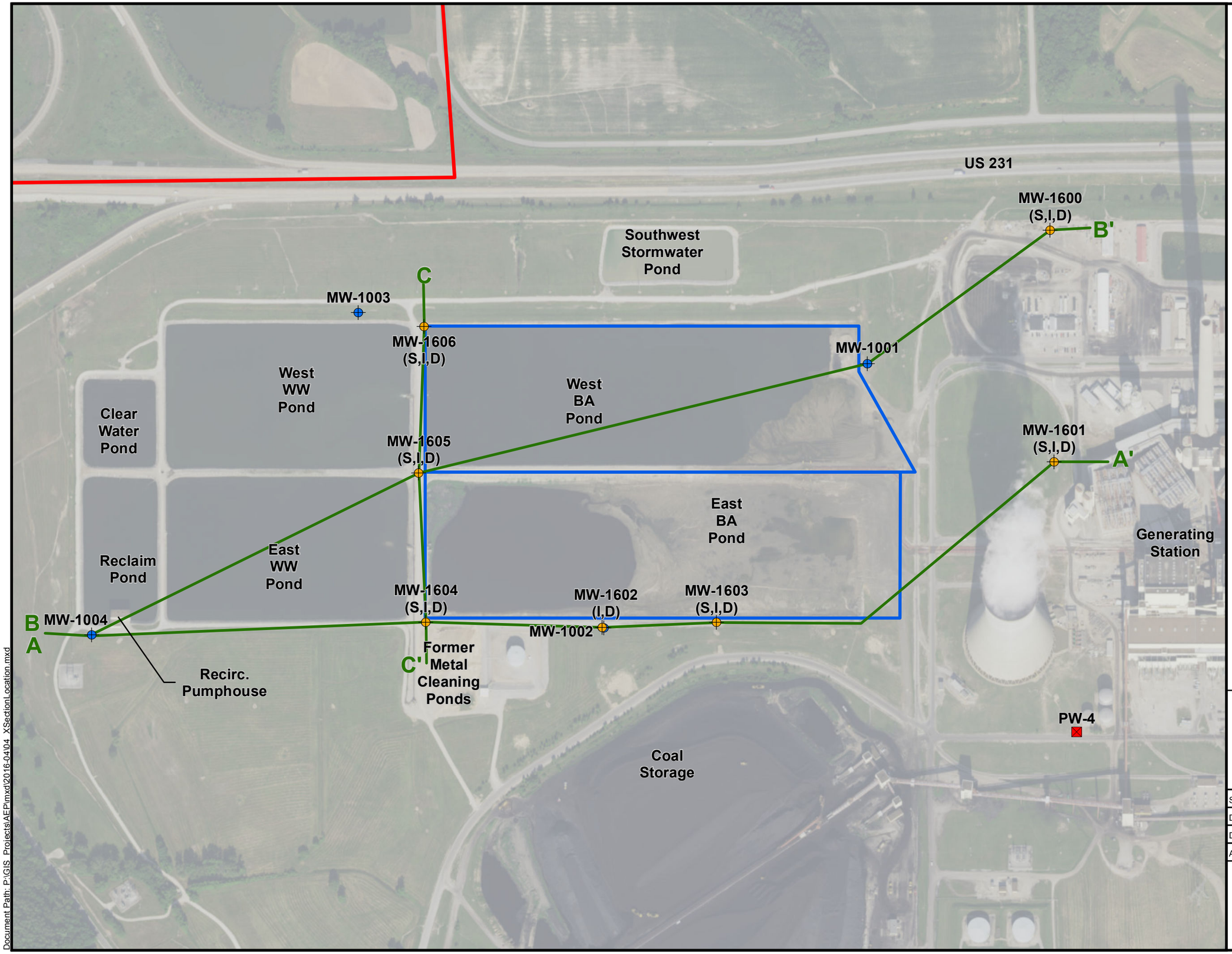
Document Path: P:\GIS_Projects\AEP\mxd\2016-04\03_PotSurface.mxd



Legend

- Monitoring Well Cluster
- USWAG Monitoring Well
- Water Supply Well
- Cross Section Lines
- Property Boundary
- Bottom Ash

Data Sources

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculature Imagery Program (NAIP)

0 200 400
SCALE IN FEET

CROSS SECTION LOCATION MAP BOTTOM ASH PONDS

AEP - ROCKPORT, IN

PROJECT NUMBER: 7382153161

SCALE	1" = 400'
DATE	9/14/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 4

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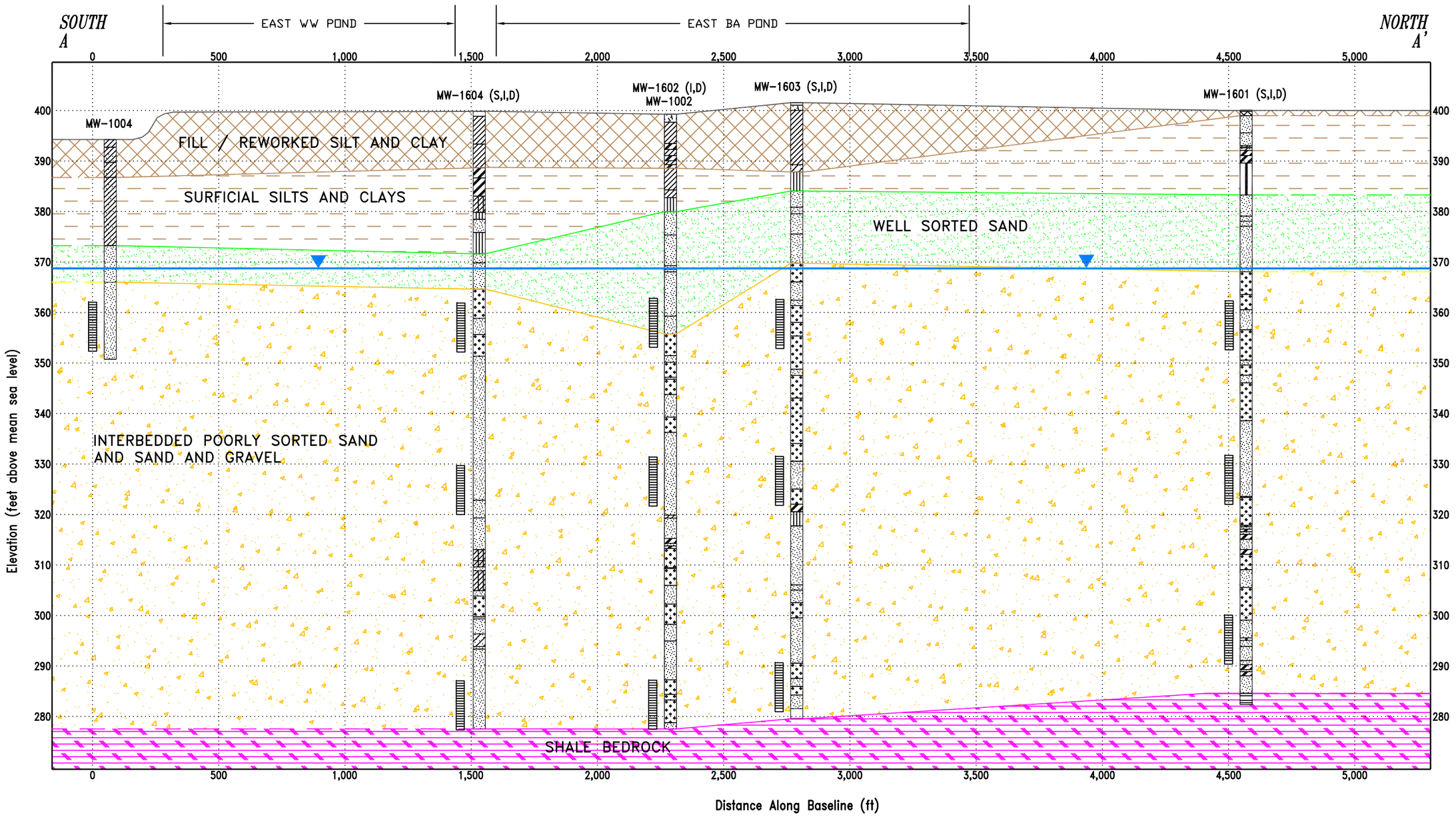

0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

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Lexington, Kentucky 40509
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BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

CROSS SECTION A - A'

PROJECT NUMBER: 7382-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 5

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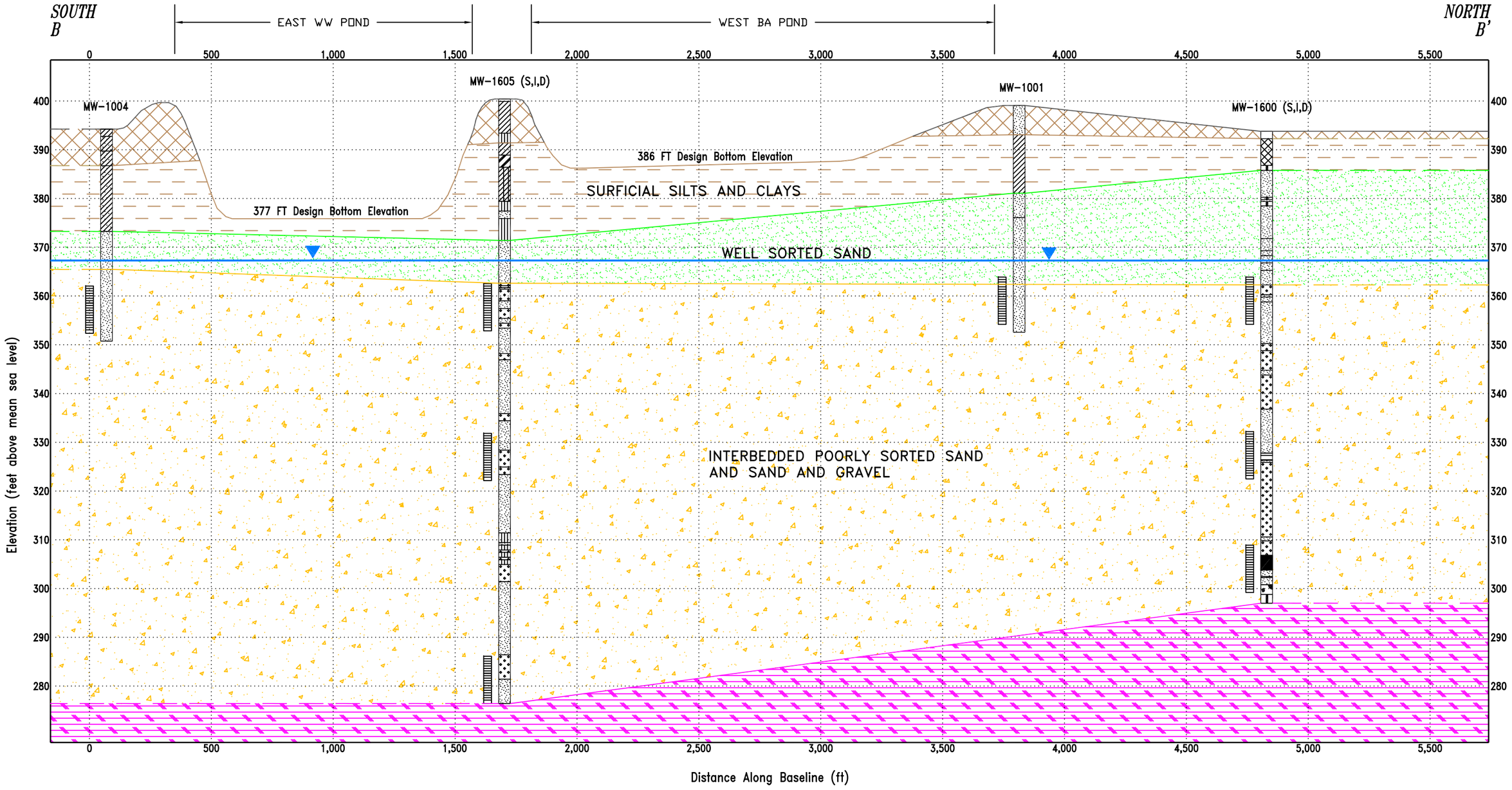

0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

amec foster wheeler

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BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

CROSS SECTION B - B'

PROJECT NUMBER: 7362-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 6

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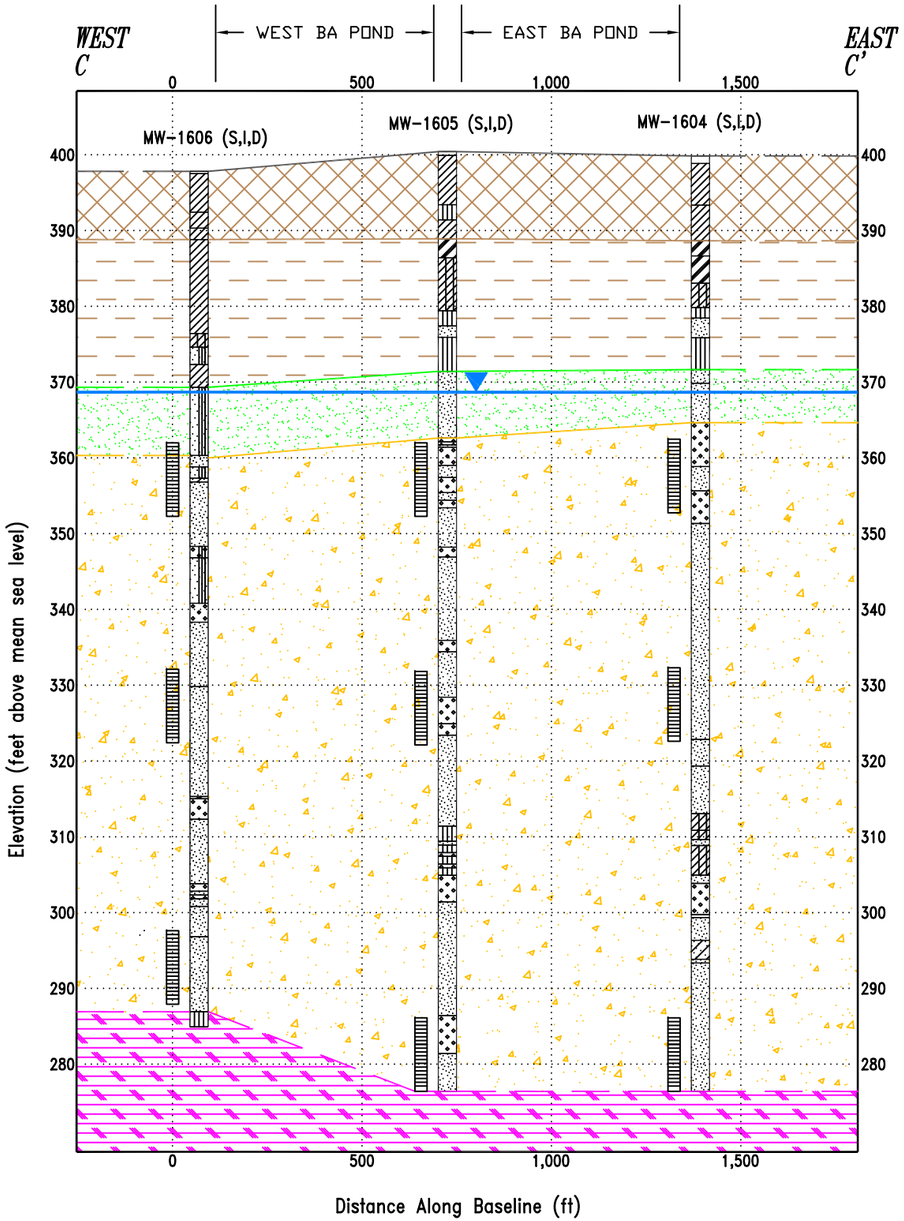

LEGEND:

- USCS Low Plasticity Clay
- USCS High Plasticity Clay
- USCS Low Plasticity Silty Clay
- USCS Silt
- USCS Poorly-graded Sand
- USCS Well-graded Sand
- Shale
- USCS Clayey Sand
- USCS Poorly-graded Sand with Silt
- USCS Well-graded Sand with Silt
- USCS Well-graded Gravel
- Fill or Reworked Soil
- Surficial Silt and Clay
- Well Sorted Sand
- Interbedded Poorly Sorted Sand and Sand and Gravel
- Shale Bedrock
- Screened Interval
- Water level elevation measured in shallow wells on 17 March 2016

0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

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2456 Fortune Drive, Suite 100
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Phone: (859) 255-3308

BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

CROSS SECTION C - C'

PROJECT NUMBER: 7382-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 7

TABLES

Table 1
Monitoring Well Construction Details
Bottom Ash Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well ID	Date Installed	Northing SPCS NAD27 (ft)	Easting SPCS NAD27 (ft)	Top of Casing (TOC) Elevation* (ft MSL)	Ground Surface Elevation (ft MSL)	Casing Stick-Up (ft AGS)	Length of Screen (ft)	Type of Screen (PVC)	Total Depth of Boring (ft BGS)	Depth to Top of Bedrock (ft BGS)	Sounded Depth of Well (ft BMP)	Depth to Top of Screen (ft BGS)	Bottom of Boring Elevation (ft MSL)	Top of Bedrock Elevation (ft MSL)	Bottom of Well Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Top of Screen Elevation (ft MSL)
MW-1001	6/2/2010	153488.0	513047.6	402.35	400.03	2.3	9.7	2" x 0.010"	41.0	---	---	29.7	359.0	---	360.0	360.6	370.3
MW-1002	6/2/2010	152307.4	514231.0	401.42	399.09	2.3	9.7	2" x 0.010"	46.5	---	---	35.2	352.6	---	353.6	354.2	363.9
MW-1003	6/2/2010	151208.1	512820.7	393.23	390.84	2.4	9.7	2" x 0.010"	39.0	---	---	27.7	351.8	---	352.8	353.4	363.1
MW-1004	6/3/2010	150013.4	514264.7	396.55	394.25	2.3	9.7	2" x 0.010"	43.5	---	---	32.2	350.8	---	351.8	352.4	362.1
MW-1600-S	2/29/2016	154305.946	512458.043	396.73	393.69	3.0	9.6	2" x 0.010"	41.6	---	43.59	30.6	352.1	---	353.1	353.5	363.1
MW-1600-I	2/29/2016	154306.008	512454.030	396.65	393.72	2.9	9.6	2" x 0.010"	73.0	---	74.59	61.7	320.7	---	322.1	322.5	332.1
MW-1600-D	2/17/2016	154306.313	512448.952	396.31	393.79	2.5	9.6	2" x 0.010"	96.8	95.0	97.52	85.0	297.0	298.8	298.8	299.2	308.8
MW-1601-S	2/27/2016	154327.617	513479.660	402.65	399.77	2.9	9.6	2" x 0.010"	48.0	---	49.74	36.9	351.8	---	352.9	353.3	362.9
MW-1601-I	2/26/2016	154325.290	513483.510	402.83	399.96	2.9	9.6	2" x 0.010"	79.8	---	80.95	68.1	320.2	---	321.9	322.3	331.9
MW-1601-D	2/26/2016	154323.168	513487.454	402.84	400.09	2.8	9.6	2" x 0.010"	117.7	115.5	112.77	100.0	282.4	284.6	290.1	290.5	300.1
MW-1602-I	2/9/2016	152295.035	514229.173	402.03	399.38	2.6	9.6	2" x 0.010"	78.7	---	80.45	67.8	320.7	---	321.6	322.0	331.6
MW-1602-D	1/26/2016	152300.217	514229.384	401.91	399.28	2.6	9.6	2" x 0.010"	125.0	124.6	126.96	114.3	274.3	274.7	275.0	275.4	285.0
MW-1603-S	2/3/2016	152802.696	514206.885	403.85	401.46	2.4	9.6	2" x 0.010"	49.3	---	50.63	38.2	352.2	---	353.2	353.6	363.2
MW-1603-I	2/1/2016	152807.294	519207.223	404.15	401.41	2.7	9.6	2" x 0.010"	79.6	---	81.67	68.9	321.8	---	322.5	322.9	332.5
MW-1603-D	1/29/2016	152811.949	514207.457	403.85	401.56	2.3	9.6	2" x 0.010"	122.0	122.0	123.14	110.9	279.6	279.6	280.7	281.1	290.7
MW-1604-S	1/29/2016	151503.132	514197.320	402.46	399.76	2.7	9.6	2" x 0.010"	48.0	---	49.35	36.7	351.8	---	353.1	353.5	363.1
MW-1604-I	1/28/2016	151506.473	514201.037	402.19	399.74	2.4	9.6	2" x 0.010"	79.0	---	81.46	69.0	320.7	---	320.7	321.1	330.7
MW-1604-D	1/15/2016	151510.165	514204.869	402.44	399.85	2.6	9.6	2" x 0.010"	126.6	125.8	128.15	115.6	273.3	274.1	274.3	274.7	284.3
MW-1605-S	3/1/2016	151478.765	513528.386	403.38	400.33	3.1	9.6	2" x 0.010"	49.0	---	50.60	37.6	351.3	---	352.8	353.2	362.8
MW-1605-I	3/2/2016	151478.914	513532.565	403.22	400.60	2.6	9.6	2" x 0.010"	80.0	---	81.50	68.9	320.6	---	321.7	322.1	331.7
MW-1605-D	2/3/2016	151478.903	513537.066	403.78	400.42	3.4	9.6	2" x 0.010"	127.5	125.0	128.00	114.6	272.9	275.4	275.8	276.2	285.8
MW-1606-S	3/2/2016	151498.907	512889.413	400.65	397.62	3.0	9.6	2" x 0.010"	46.0	---	47.62	34.6	351.6	---	353.0	353.4	363.0
MW-1606-I	3/1/2016	151500.402	512885.504	400.75	397.75	3.0	9.6	2" x 0.010"	77.0	---	78.41	65.4	320.8	---	322.3	322.7	332.3
MW-1606-D	2/12/2016	151502.092	512881.487	400.73	397.82	2.9	9.6	2" x 0.010"	112.9	110.9	113.15	100.2	284.9	286.9	287.6	288.0	297.6

Prepared By: TMR 4/19/16
Checked By: SGW 4/21/2016

Notes:
* Top of casing on new wells surveyed 3-4 March 2016.
--- = Data not available or not applicable
ft = feet
in = inches
BMP = below measuring point (top of casing)
BGS = below ground surface
MSL = above Mean Sea Level, equivalent to the National Geodetic Vertical Datum of 1929 (NGVD29)
AGS = above ground surface
TOC = top of casing (PVC pipe)
SPCS = State Plane Coordinate System
NAD27 = North American Datum of 1927

Table 2
Groundwater Elevation Summary
Bottom Ash Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well No.	MW 1001	MW 1002	MW 1003	MW 1004	MW-1600-S	MW-1600-I	MW-1600-D	MW-1601-S
Date Installed	6/2/2010	6/2/2010	6/2/2010	6/2/2010	2/29/2016	2/29/2016	2/17/2016	2/27/2016
MP Elevation (ft MSL)*	402.35	401.42	393.23	396.55	396.73	396.65	396.31	402.65
Depth to Well Bottom (ft BMP)	42.32	47.83	40.39	44.80	43.59	74.59	97.52	49.74
Well Bottom Elevation (ft MSL)	360.0	353.6	352.8	351.8	353.1	322.1	298.8	352.9
Depth to Water (ft BMP)								
5/17/2011	---	---	---	---	---	---	---	---
11/17/2011	---	---	---	---	---	---	---	---
11/15/2012	---	---	---	---	---	---	---	---
5/20/2013	---	---	---	---	---	---	---	---
11/13/2013	---	---	---	---	---	---	---	---
5/12/2014	---	---	---	---	---	---	---	---
11/12/2014	---	---	---	---	---	---	---	---
5/7/2015	---	---	---	---	---	---	---	---
1/14/2016	33.01	32.87	24.20	28.58	---	---	---	---
3/17/2016	32.56	32.27	23.40	27.19	26.53	26.51	26.23	33.24
Water Level Elevation (ft MSL)								
5/17/2011	371.61	373.20	373.72	376.13	---	---	---	---
11/17/2011	370.77	369.17	369.64	367.35	---	---	---	---
11/15/2012	368.91	367.48	367.83	365.93	---	---	---	---
5/20/2013	369.11	367.95	368.61	367.38	---	---	---	---
11/13/2013	368.38	366.99	367.49	366.43	---	---	---	---
5/12/2014	370.06	369.55	369.93	368.84	---	---	---	---
11/12/2014	368.57	367.03	367.64	365.57	---	---	---	---
5/7/2015	370.75	371.16	371.35	370.93	---	---	---	---
1/14/2016	369.34	368.55	369.03	367.97	---	---	---	---
3/17/2016	369.79	369.15	369.83	369.36	370.20	370.14	370.08	369.41

Table 2
Groundwater Elevation Summary
Bottom Ash Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well No.	MW-1601-I	MW-1601-D	MW-1602-I	MW-1602-D	MW-1603-S	MW-1603-I	MW-1603-D	MW-1604-S
Date Installed	2/26/2016	2/26/2016	2/9/2016	1/26/2016	2/3/2016	2/1/2016	1/29/2016	1/29/2016
MP Elevation (ft MSL)*	402.83	402.84	402.03	401.91	403.85	404.15	403.85	402.46
Depth to Well Bottom (ft BMP)	80.95	112.77	80.45	126.96	50.63	81.67	123.14	49.35
Well Bottom Elevation (ft MSL)	321.9	290.1	321.6	275.0	353.2	322.5	280.7	353.1
Depth to Water (ft BMP)								
5/17/2011	---	---	---	---	---	---	---	---
11/17/2011	---	---	---	---	---	---	---	---
11/15/2012	---	---	---	---	---	---	---	---
5/20/2013	---	---	---	---	---	---	---	---
11/13/2013	---	---	---	---	---	---	---	---
5/12/2014	---	---	---	---	---	---	---	---
11/12/2014	---	---	---	---	---	---	---	---
5/7/2015	---	---	---	---	---	---	---	---
1/14/2016	---	---	---	---	---	---	---	---
3/17/2016	33.25	33.10	32.90	32.80	34.70	34.99	34.76	33.24
Water Level Elevation (ft MSL)								
5/17/2011	---	---	---	---	---	---	---	---
11/17/2011	---	---	---	---	---	---	---	---
11/15/2012	---	---	---	---	---	---	---	---
5/20/2013	---	---	---	---	---	---	---	---
11/13/2013	---	---	---	---	---	---	---	---
5/12/2014	---	---	---	---	---	---	---	---
11/12/2014	---	---	---	---	---	---	---	---
5/7/2015	---	---	---	---	---	---	---	---
1/14/2016	---	---	---	---	---	---	---	---
3/17/2016	369.58	369.74	369.13	369.11	369.15	369.16	369.09	369.22

Table 2
Groundwater Elevation Summary
Bottom Ash Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well No.	MW-1604-I	MW-1604-D	MW-1605-S	MW-1605-I	MW-1605-D	MW-1606-S	MW-1606-I	MW-1606-D
Date Installed	1/28/2016	1/15/2016	3/1/2016	3/2/2016	2/3/2016	3/2/2016	3/1/2016	2/12/2016
MP Elevation (ft MSL)*	402.19	402.44	403.38	403.22	403.78	400.65	400.75	400.73
Depth to Well Bottom (ft BMP)	81.46	128.15	50.60	81.50	128.00	47.62	78.41	113.15
Well Bottom Elevation (ft MSL)	320.7	274.3	352.8	321.7	275.8	353.0	322.3	287.6
Depth to Water (ft BMP)								
5/17/2011	---	---	---	---	---	---	---	---
11/17/2011	---	---	---	---	---	---	---	---
11/15/2012	---	---	---	---	---	---	---	---
5/20/2013	---	---	---	---	---	---	---	---
11/13/2013	---	---	---	---	---	---	---	---
5/12/2014	---	---	---	---	---	---	---	---
11/12/2014	---	---	---	---	---	---	---	---
5/7/2015	---	---	---	---	---	---	---	---
1/14/2016	---	---	---	---	---	---	---	---
3/17/2016	33.01	33.24	33.90	34.0	35.0	31.03	31.05	31.02
Water Level Elevation (ft MSL)								
5/17/2011	---	---	---	---	---	---	---	---
11/17/2011	---	---	---	---	---	---	---	---
11/15/2012	---	---	---	---	---	---	---	---
5/20/2013	---	---	---	---	---	---	---	---
11/13/2013	---	---	---	---	---	---	---	---
5/12/2014	---	---	---	---	---	---	---	---
11/12/2014	---	---	---	---	---	---	---	---
5/7/2015	---	---	---	---	---	---	---	---
1/14/2016	---	---	---	---	---	---	---	---
3/17/2016	369.18	369.20	369.48	369.22	368.78	369.62	369.70	369.71

Prepared by: TMR 4/19/16
Checked by: SGW 4/21/16

Notes:
* Top of casing on new wells surveyed 3-4 March 2016.
--- = Data not available or not applicable
ft = feet
BMP = below measuring point (top of casing)
MSL = above Mean Sea Level, equivalent to the National Geodetic Vertical Datum of 1929 (NGVD29)

Table 3
Field Water Quality Data
Bottom Ash Pond Complex
AEP Rockport Plant, Rockport, Indiana

Well ID	Date	Time	Static DTW (ft BMP)	pH (S.U.)	Temp (°C)	SC (µS/cm)	DO (mg/L)	ORP (mV)	Turb (NTU)
MW-1600-S	3/22/2016	10:15	26.53	6.74	15.5	735	0.8	103	1.6
MW-1600-I	3/22/2016	12:00	26.51	6.97	15.5	703	4.22	-64.3	5.0*
MW-1600-D	3/22/2016	9:40	26.23	6.88	14.3	715	0.52	-104	1.8
MW-1601-S	3/10/2016	15:05	33.36	7.17	16.0	725	0.89	---	1.6
MW-1601-I	3/10/2016	13:45	33.35	6.78	15.9	788	6.61	-59.0	3.9
MW-1601-D	3/30/2016	9:05	33.1	6.97	15.6	759	1.91	-102.6	4.0
MW-1602-I	3/15/2016	16:40	33.21	7.18	18.8	738	0.6	---	4.8
MW-1602-D	3/15/2016	15:45	32.51	7.18	20.3	919	0.58	---	5.0
MW-1603-S	3/20/2016	15:40	34.70	7.15	17.0	792	0.42	-90.2	1.8
MW-1603-I	3/20/2016	16:25	34.99	7.04	14.4	835	2.48	-71.6	5.0
MW-1603-D	3/20/2016	15:00	34.76	6.95	14.4	739	0.75	-98.3	2.1
MW-1604-S	3/14/2016	14:25	33.21	7.33	18.9	876	0.39	---	2.3
MW-1604-I	3/12/2016	12:50	33.40	7.37	16.9	782	1.58	---	1.9
MW-1604-D	3/12/2016	11:30	33.59	7.23	16.2	553	0.57	---	0.69
MW-1605-S	3/17/2016	14:05	33.62	7.11	18.3	978	0.25	157	2.1
MW-1605-I	3/17/2016	13:15	33.51	7.16	16.3	790	0.39	-90.7	4.9
MW-1605-D	3/17/2016	10:45	33.73	7.12	17.1	1,365	0.45	-95.2	3.3
MW-1606-S	3/19/2016	13:10	31.03	7.00	14.0	788	2.75	219	5.8
MW-1606-I	3/19/2016	9:55	31.50	7.21	13.7	631	0.18	-93.2	1.5
MW-1606-D	3/19/2016	10:35	31.20	7.11	13.8	568	0.71	-126	3.1

Prepared By: TMR 4/25/16

Checked By: ALD 4/26/2016

Notes:

* = Final turbidity measurement collected at 14:00 after an additional 2 hours of pumping.
--- = Data not available or not applicable
ft = feet
S.U. = Standard Units
°C = degrees Celcius
µS/cm = microSiemens per centimeter
mg/L = milligrams per liter
mV = milliVolts
NTU = Nephelometric Turbidity Units
DTW = Depth to Water
BMP = Below Measuring Point (top of casing)
Temp = Temperature
SC = Specific Conductance
DO = Dissolved Oxygen
ORP = Oxidation-Reduction Potential
Turb = Turbidity

ATTACHMENTS

ATTACHMENT 1

WELL CONSTRUCTION AND LITHOLOGIC LOGS
2016 BA POND MONITORING WELLS

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,306.3 E 512,449.0**

GROUND ELEVATION **393.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1600D** DATE **4/27/16** SHEET **1** OF **4**

BORING START **2/17/16** BORING FINISH **2/17/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.52** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **84.99** BOTTOM **94.59**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	33-14-10	1.5					Gravel = 18 inches		
2	SS	1.5	3.0	3-5-6	1.5					Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff, FILL		
3	SS	3.0	4.5	2-3-4	1.5					@ 3' sl. stiff		
4	SS	4.5	6.0	4-4-6	1.5		5			@ 4.2' w/dusky brown 5YR 2/2 silt @ 4.5' stiff, some iron oxide particles, moist		
5	SS	6.0	7.5	3-6-9	1.5							
6	SS	7.5	9.0	2-5-6	1.5				MH	Clayey silt, moderate brown 5YR 4/4 and l. grey N7 fat clay mottled, moist, med. dense, trace oxide particles, likely fill		
7	SS	9.0	10.5	3-4-4	1.4				SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, dry to moist, med. dense @ 9' v. fine grained, loose		
8	SS	10.5	12.0	3-4-4	1.4		10					
9	SS	12.0	13.5	2-3-5	1.5							
10	SS	13.5	15.0	2-4-5	1.5				MH	Clayey silt, moderate brown 5YR 4/4, moist, loose		
11	SS	15.0	16.5	3-8-10	1.5				SP	Poorly graded sand, fine grained pale yellowish brown 10YR 6/2, moist, loose		
12	SS	16.5	18.0	4-6-8	1.5		15		MH	Clayey silt, moderate brown 5YR 4/4, moist, loose		
13	SS	18.0	19.5	5-6-5	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, moist, med. dense @ 16' 3" layer - clayey silt (prev. material) @ 19' 4" layer - poorly graded sand (l. brown, v. fine grained) prev. material @ 21' loose @ 21.3' w/black silt		
14	SS	19.5	21.0	3-5-4	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600D** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/17/16** BORING FINISH **2/17/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-3-5	1.5							
16	SS	22.5	24.0	2-3-3	1.5				SP	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist, loose @ 22.8' 3" layer - PG sand, fine, pale yellowish br. prev. material @ 23.2' w/black silt @ 23.5' no black silt		
17	SS	24.0	25.5	4-6-6	1.5				SP	@ 24' moderate red 5R 4/6		
18	SS	25.5	27.0	2-2-4	1.0		25		SP	Poorly graded sand, med. grained, d. yellowish brown 10YR 4/2, moist, med. dense, some black silt		
19	SS	27.0	28.5	2-2-2	1.2				SP	Poorly graded sand, v. fine grained, pale yellowish brown 10YR 6/2, wet, loose, trace clay (l. brown 5YR 6/4), trace coarse gravel, water in spoon		
20	SS	28.5	30.0	4-8-11	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, v. loose, w/lean clay (mod. brown 5YR 4/4)		
21	SS	30.0	31.5	6-6-8	1.0		30			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 30.5' w/black silt @ 30.7' no black silt		
22	SS	31.5	33.0	4-6-9	1.5				SW	Well graded sand, coarse grained, dark reddish brown 10R 3/4, wet, med. dense, w/fine gravel @ 32' 5" layer pg sand, fine, mod. yellowish brown, prev. material		
23	SS	33.0	34.5	8-9-12	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, trace black silt		
24	SS	34.5	36.0	13-16-12	1.5				SP			
25	SS	36.0	37.5	6-7-7	1.5		35		SP	Poorly graded sand, fine to med. grained, dusky red 5R 3/4, wet, med. dense, w/fine gravel, trace coarse gravel		
26	SS	37.5	39.0	5-8-12	1.5					Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 36' trace coarse gavel @ 37.5' well graded SW @ 40' poorly graded SP @ 41' trace fine gravel, no coarse gravel @ 42' dense @ 43.1' 1" seam black silt and fine gravel - possible coal		
27	SS	39.0	40.5	6-12-17	1.5		40					
28	SS	40.5	42.0	6-11-19	1.5							
29	SS	42.0	43.5	7-15-24	1.5							
30	SS	43.5	45.0	3-10-16	1.4				SW	Well graded sand, fine to med. grained, pale yellowish brown 10YR 6/2 wet, med. dense, w/fine gravel		
31	SS	45.0	46.5	10-13-16	1.5		45		SW	@ 44' trace lean clay mod. brown 5YR 4/4 @ 44.4' no clay		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600D** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/17/16** BORING FINISH **2/17/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-9-14	1.4					Well graded sand, coarse grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, trace coarse gravel @ 46.5' med. to coarse grained		
33	SS	48.0	49.5	9-16-20	1.5							
34	SS	49.5	51.0	12-11-15	1.4				SP	Poorly graded sand, fine grained, pale brown 5YR 5/4, wet, dense, trace coarse gravel		
35	SS	51.0	52.5	7-12-12	1.5		50		SW	Well graded sand, fine to med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, some fine gravel, some black silt @ 51' trace coarse gravel @ 52.5' fine grained, no coarse gravel @ 54' no fine gravel @ 55.5' brownish grey 5YR 4/1 w/fine gravel		
36	SS	52.5	54.0	4-9-12	1.5							
37	SS	54.0	55.5	9-10-14	1.4							
38	SS	55.5	57.0	6-12-16	1.5		55					
39	SS	57.0	58.5	7-9-11	1.4				SP	Poorly graded sand, fine grained, brownish grey 5YR 4/1, wet, med. dense, w/black silt @ 60' dense @ 60.6' 1.5" shale fragment @ 62.1' w/fine gravel @ 63' v. dense @ 64.2' 3" layer shale, l. grey N7 @ 64.5' some coarse gravel @ 65' 2" layer shale, l. grey N7		
40	SS	58.5	60.0	7-10-16	1.2							
41	SS	60.0	61.5	13-16-16	1.5		60					
42	SS	61.5	63.0	6-14-25	1.4							
43	SS	63.0	64.5	11-20-38	1.5							
44	SS	64.5	66.0	22-24-29	1.4		65					
45	SS	66.0	67.5	50/3						Shale, l. grey, dry, hard		
46	SS	67.5	69.0	13-13-14	1.5				SP	Indeterminate layer transition due to 3" recovery (spoon refusal) in prev. sample		
47	SS	69.0	70.5	12-16-16	1.4				SW	Poorly graded sand, v. fine grained, brownish grey 5YR 4/1, wet, med. dense, w/fine gravel Well graded sand, med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, some coarse gravel @ 69' dense, fine to med. grained @ 70.5' med. grained @ 71' 3" layer fat clay, l. grey N7 (w/shale),		
48	SS	70.5	72.0	6-13-21	1.3		70					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600D** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/17/16** BORING FINISH **2/17/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-13-24	1.1					w/coarse gravel @ 72' no coarse gravel @ 73.5' mod. dense, sample washed out @76' 2.5" layer coal fragments @ 79' 1" seam fat clay, l. grey N7 @ 79.5' trace black silt		
50	SS	73.5	75.0	10-9-17	0							
51	SS	75.0	76.5	5-13-14	1.4		75					
52	SS	76.5	78.0	9-12-18	1.1							
53	SS	78.0	79.5	6-6-15	1.4							
54	SS	79.5	81.0	6-7-13	1.2		80					
55	SS	81.0	82.5	6-6-8	1.1							
56	SS	82.5	84.0	7-8-9	1.3							
57	SS	84.0	85.5	10-12-21	1.5				SP	Poorly graded sand, v. fine grained, pale yellowish brown 10YR 6/2, wet, med. dense, trace black silt		
58	SS	85.5	87.0	14-11-10	1.5		85		SW	Well graded sand, med. grained, d. yellowish brown 10YR 4/2, wet, dense, w/fine gravel, trace coarse gravel, trace black silt @ 84.6' 2.5" layer coal w/~30% above material SW @ 85.5' med. dense, no coarse gravel, no black silt		
59	SS	87.0	88.5	6-7-8	1.4				GW	Well graded gravel, brownish grey 5YR 4/1, wet, med. dense, fine rounded, w/med. grained sand (l. yellowish brown 10YR 4.2, prev. material) @ 88.5' dense, sample washed out/blocket, cobble fragment in spoon tip		
60	SS	88.5	90.0	15-19-24	.08							
61	SS	90.0	91.5	11-25-21	1.5		90		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, dense, some fine gravel, trace coarse gravel		
62	SS	91.5	93.0	16-13-12	1.5				GW SP	Well graded gravel, brownish grey 5YR 4/1, wet, dense, fine to coarse, rounded, w/fine grained sand (mod. yellowish brown 10YR 5/4)		
63	SS	93.0	94.5	10-11-12	1.0				GW	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, some coarse gravel		
64	SS	94.5	96.0	9-26-50/5	1.4					Well graded gravel, brownish grey 5YR 4/1, wet, med. dense, fine to coarse, rounded, w/fine grained sand @ 94.5' hard		
65	SS	96.0	97.5	35-50/4			95		MH	Clayey silt, l. grey moist, hard non-durable shale Spoon refusal @ 96.8' Auger refusal @ 96.8' BT @ 96.8'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,306.0 E 512,454.0**

GROUND ELEVATION **393.7** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1600I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **2/29/16** BORING FINISH **2/29/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.93** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **61.7** BOTTOM **71.22**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	33-14-10	1.5					Gravel = 18 inches		
2	SS	1.5	3.0	3-5-6	1.5					Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff, FILL		
3	SS	3.0	4.5	2-3-4	1.5					@ 3' sl. stiff @ 4.2' w/dusky brown 5YR 2/2 silt		
4	SS	4.5	6.0	4-4-6	1.5		5			@ 4.5' stiff, some iron oxide particles, moist		
5	SS	6.0	7.5	3-6-9	1.5							
6	SS	7.5	9.0	2-5-6	1.5				MH	Clayey silt, moderate brown 5YR 4/4 and l. grey N7 fat clay mottled, moist, med. dense, trace oxide particles, likely fill		
7	SS	9.0	10.5	3-4-4	1.4				SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, dry to moist, med. dense @ 9' v. fine grained, loose		
8	SS	10.5	12.0	3-4-4	1.4		10					
9	SS	12.0	13.5	2-3-5	1.5							
10	SS	13.5	15.0	2-4-5	1.5				MH	Clayey silt, moderate brown 5YR 4/4, moist, loose		
11	SS	15.0	16.5	3-8-10	1.5				SP	Poorly graded sand, fine grained pale yellowish brown 10YR 6/2, moist, loose		
12	SS	16.5	18.0	4-6-8	1.5		15		MH	Clayey silt, moderate brown 5YR 4/4, moist, loose		
13	SS	18.0	19.5	5-6-5	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, moist, med. dense @ 16' 3" layer - clayey silt (prev. material) @ 19' 4" layer - poorly graded sand (l. brown, v. fine grained) prev. material @ 21' loose @ 21.3' w/black silt		
14	SS	19.5	21.0	3-5-4	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/29/16** BORING FINISH **2/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-3-5	1.5							
16	SS	22.5	24.0	2-3-3	1.5				SP	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist, loose @ 22.8' 3" layer - PG sand, fine, pale yellowish br. prev. material @ 23.2' w/black silt @ 23.5' no black silt		
17	SS	24.0	25.5	4-6-6	1.5				SP	@ 24' moderate red 5R 4/6		
18	SS	25.5	27.0	2-2-4	1.0		25		SP	Poorly graded sand, med. grained, d. yellowish brown 10YR 4/2, moist, med. dense, some black silt		Water @ 25.5'
19	SS	27.0	28.5	2-2-2	1.2				SP	Poorly graded sand, v. fine grained, pale yellowish brown 10YR 6/2, wet, loose, trace clay (l. brown 5YR 6/4), trace coarse gravel, water in spoon		
20	SS	28.5	30.0	4-8-11	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, v. loose, w/lean clay (mod. brown 5YR 4/4)		Began Mud Rotary @ 28.5'
21	SS	30.0	31.5	6-6-8	1.0		30			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 30.5' w/black silt @ 30.7' no black silt		
22	SS	31.5	33.0	4-6-9	1.5				SW	Well graded sand, coarse grained, dark reddish brown 10R 3/4, wet, med. dense, w/fine gravel @ 32' 5" layer pg sand, fine, mod. yellowish brown, prev. material		
23	SS	33.0	34.5	8-9-12	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, trace black silt		
24	SS	34.5	36.0	13-16-12	1.5				SP			
25	SS	36.0	37.5	6-7-7	1.5		35		SP	Poorly graded sand, fine to med. grained, dusky red 5R 3/4, wet, med. dense, w/fine gravel, trace coarse gravel		
26	SS	37.5	39.0	5-8-12	1.5					Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 36' trace coarse gavel @ 37.5' well graded SW @ 40' poorly graded SP @ 41' trace fine gravel, no coarse gravel @ 42' dense @ 43.1' 1" seam black silt and fine gravel - possible coal		
27	SS	39.0	40.5	6-12-17	1.5		40					
28	SS	40.5	42.0	6-11-19	1.5							
29	SS	42.0	43.5	7-15-24	1.5							
30	SS	43.5	45.0	3-10-16	1.4				SW	Well graded sand, fine to med. grained, pale yellowish brown 10YR 6/2 wet, med. dense, w/fine gravel		
31	SS	45.0	46.5	10-13-16	1.5		45		SW	@ 44' trace lean clay mod. brown 5YR 4/4 @ 44.4' no clay		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/29/16** BORING FINISH **2/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-9-14	1.4					Well graded sand, coarse grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, trace coarse gravel @ 46.5' med. to coarse grained		
33	SS	48.0	49.5	9-16-20	1.5							
34	SS	49.5	51.0	12-11-15	1.4				SP	Poorly graded sand, fine grained, pale brown 5YR 5/4, wet, dense, trace coarse gravel		
35	SS	51.0	52.5	7-12-12	1.5		50		SW	Well graded sand, fine to med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, some fine gravel, some black silt @ 51' trace coarse gravel @ 52.5' fine grained, no coarse gravel @ 54' no fine gravel @ 55.5' brownish grey 5YR 4/1 w/fine gravel		
36	SS	52.5	54.0	4-9-12	1.5							
37	SS	54.0	55.5	9-10-14	1.4							
38	SS	55.5	57.0	6-12-16	1.5		55					
39	SS	57.0	58.5	7-9-11	1.4				SP	Poorly graded sand, fine grained, brownish grey 5YR 4/1, wet, med. dense, w/black silt @ 60' dense @ 60.6' 1.5" shale fragment @ 62.1' w/fine gravel @ 63' v. dense @ 64.2' 3" layer shale, l. grey N7 @ 64.5' some coarse gravel @ 65' 2" layer shale, l. grey N7		
40	SS	58.5	60.0	7-10-16	1.2							
41	SS	60.0	61.5	13-16-16	1.5		60					
42	SS	61.5	63.0	6-14-25	1.4							
43	SS	63.0	64.5	11-20-38	1.5							
44	SS	64.5	66.0	22-24-29	1.4		65					
45	SS	66.0	67.5	50/3						Shale, l. grey, dry, hard		
46	SS	67.5	69.0	13-13-14	1.5				SP	Indeterminate layer transition due to 3" recovery (spoon refusal) in prev. sample		
47	SS	69.0	70.5	12-16-16	1.4				SW	Poorly graded sand, v. fine grained, brownish grey 5YR 4/1, wet, med. dense, w/fine gravel Well graded sand, med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, some coarse gravel @ 69' dense, fine to med. grained @ 70.5' med. grained @ 71' 3" layer fat clay, l. grey N7 (w/shale),		
48	SS	70.5	72.0	6-13-21	1.3		70					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/29/16** BORING FINISH **2/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-13-24	1.1					w/coarse gravel @ 72' no coarse gravel @ 73.5' mod. dense, sample washed out @76' 2.5" layer coal fragments @ 79' 1" seam fat clay, l. grey N7 @ 79.5' trace black silt		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,305.9 E 512,458.0**

GROUND ELEVATION **393.7** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1600S** DATE **4/27/16** SHEET **1** OF **2**

BORING START **2/29/16** BORING FINISH **2/29/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.04** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **30.6** BOTTOM **40.19**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	33-14-10	1.5					Gravel = 18 inches		
2	SS	1.5	3.0	3-5-6	1.5					Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff, FILL		
3	SS	3.0	4.5	2-3-4	1.5					@ 3' sl. stiff @ 4.2' w/dusky brown 5YR 2/2 silt		
4	SS	4.5	6.0	4-4-6	1.5		5			@ 4.5' stiff, some iron oxide particles, moist		
5	SS	6.0	7.5	3-6-9	1.5							
6	SS	7.5	9.0	2-5-6	1.5				MH	Clayey silt, moderate brown 5YR 4/4 and l. grey N7 fat clay mottled, moist, med. dense, trace oxide particles, likely fill		
7	SS	9.0	10.5	3-4-4	1.4				SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, dry to moist, med. dense @ 9' v. fine grained, loose		
8	SS	10.5	12.0	3-4-4	1.4		10					
9	SS	12.0	13.5	2-3-5	1.5							
10	SS	13.5	15.0	2-4-5	1.5				MH	Clayey silt, moderate brown 5YR 4/4, moist, loose		
11	SS	15.0	16.5	3-8-10	1.5				SP MH	Poorly graded sand, fine grained pale yellowish brown 10YR 6/2, moist, loose		
12	SS	16.5	18.0	4-6-8	1.5		15			Clayey silt, moderate brown 5YR 4/4, moist, loose		
13	SS	18.0	19.5	5-6-5	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, moist, med. dense @ 16' 3" layer - clayey silt (prev. material) @ 19' 4" layer - poorly graded sand (l. brown, v. fine grained) prev. material @ 21' loose @ 21.3' w/black silt		
14	SS	19.5	21.0	3-5-4	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1600S** DATE **4/27/16** SHEET **2** OF **2**

PROJECT **ROCKPORT PLANT** BORING START **2/29/16** BORING FINISH **2/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-3-5	1.5							
16	SS	22.5	24.0	2-3-3	1.5				SP	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist, loose @ 22.8' 3" layer - PG sand, fine, pale yellowish br. prev. material @ 23.2' w/black silt @ 23.5' no black silt		
17	SS	24.0	25.5	4-6-6	1.5				SP	@ 24' moderate red 5R 4/6		
							25					
18	SS	25.5	27.0	2-2-4	1.0				SP	Poorly graded sand, med. grained, d. yellowish brown 10YR 4/2, moist, med. dense, some black silt		Water @ 25.5'
19	SS	27.0	28.5	2-2-2	1.2				SP	Poorly graded sand, v. fine grained, pale yellowish brown 10YR 6/2, wet, loose, trace clay (l. brown 5YR 6/4), trace coarse gravel, water in spoon		
20	SS	28.5	30.0	4-8-11	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, v. loose, w/lean clay (mod. brown 5YR 4/4)		Began Mud Rotary @ 28.5'
							30			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 30.5' w/black silt @ 30.7' no black silt		
21	SS	30.0	31.5	6-6-8	1.0							
22	SS	31.5	33.0	4-6-9	1.5				SW	Well graded sand, coarse grained, dark reddish brown 10R 3/4, wet, med. dense, w/fine gravel @ 32' 5" layer pg sand, fine, mod. yellowish brown, prev. material		
23	SS	33.0	34.5	8-9-12	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel, trace black silt		
24	SS	34.5	36.0	13-16-12	1.5				SP			
							35					
25	SS	36.0	37.5	6-7-7	1.5				SP	Poorly graded sand, fine to med. grained, dusky red 5R 3/4, wet, med. dense, w/fine gravel, trace coarse gravel		
26	SS	37.5	39.0	5-8-12	1.5					Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel @ 36' trace coarse gavel @ 37.5' well graded SW @ 40' poorly graded SP @ 41' trace fine gravel, no coarse gravel @ 42' dense @ 43.1' 1" seam black silt and fine gravel - possible coal		
27	SS	39.0	40.5	6-12-17	1.5							
							40					
28	SS	40.5	42.0	6-11-19	1.5							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

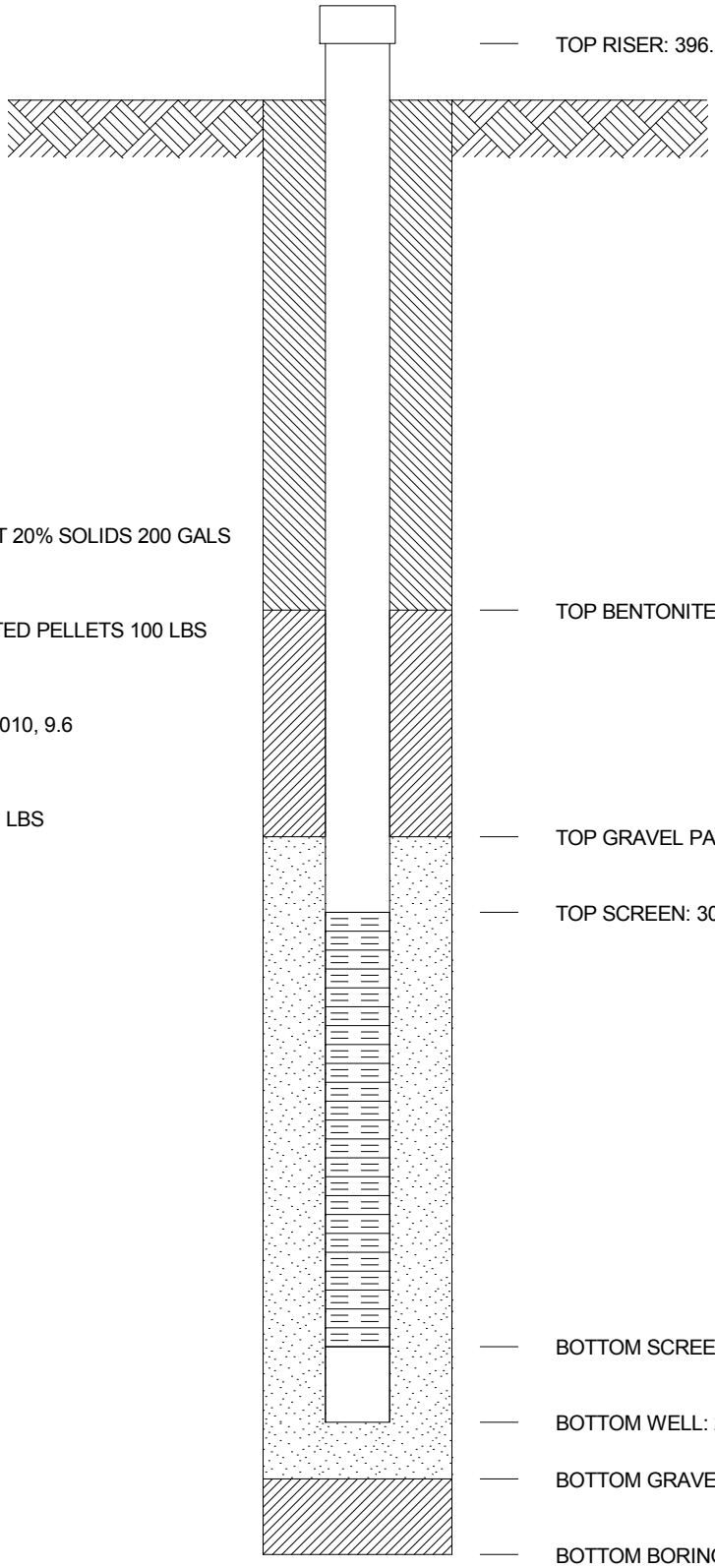
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1600D** BORING No. **MW-1600D** INSTALLED **2/17/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,306.3 E 512,449.0**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 393.79 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 200 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 300 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

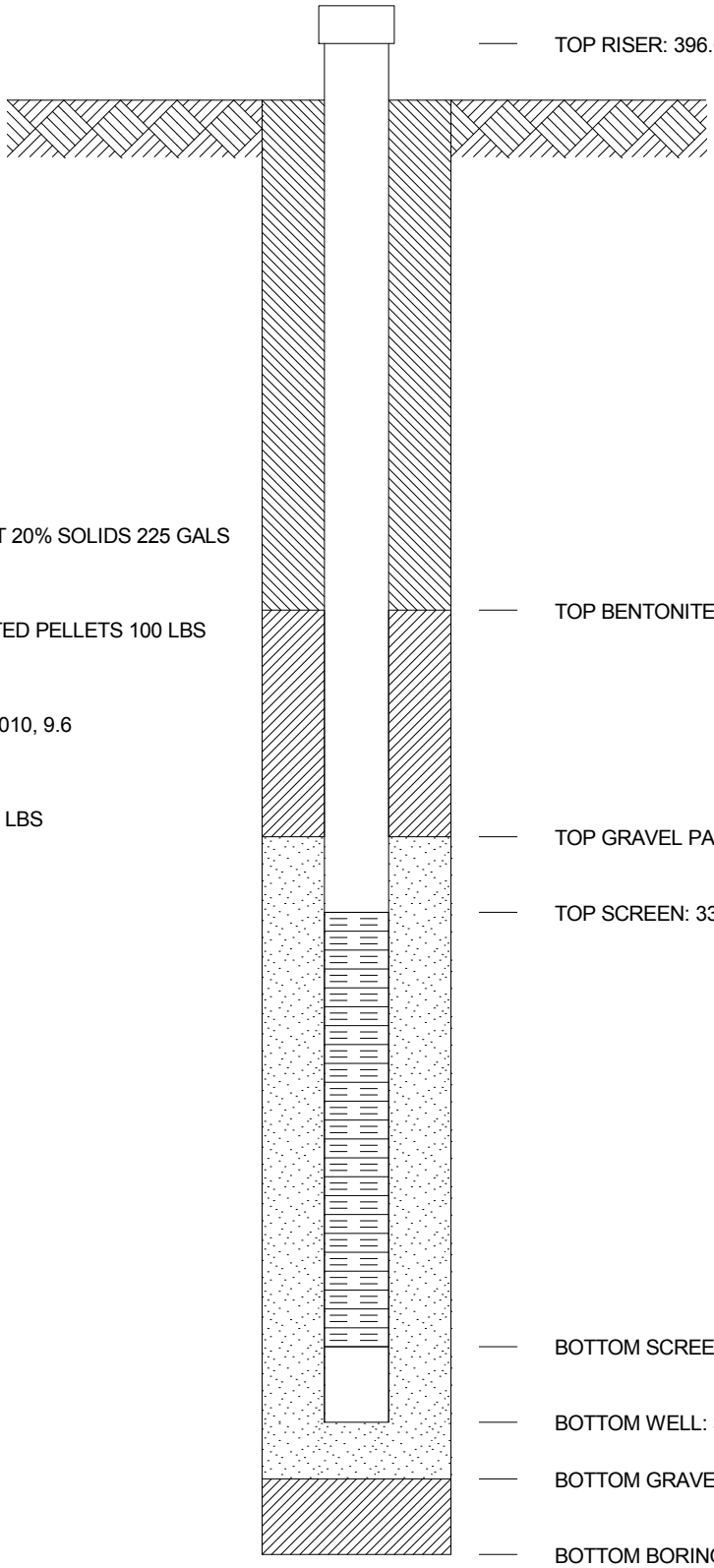
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1600I** BORING No. **MW-1600I** INSTALLED **2/29/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,306.0 E 512,454.0**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 393.72 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 225 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

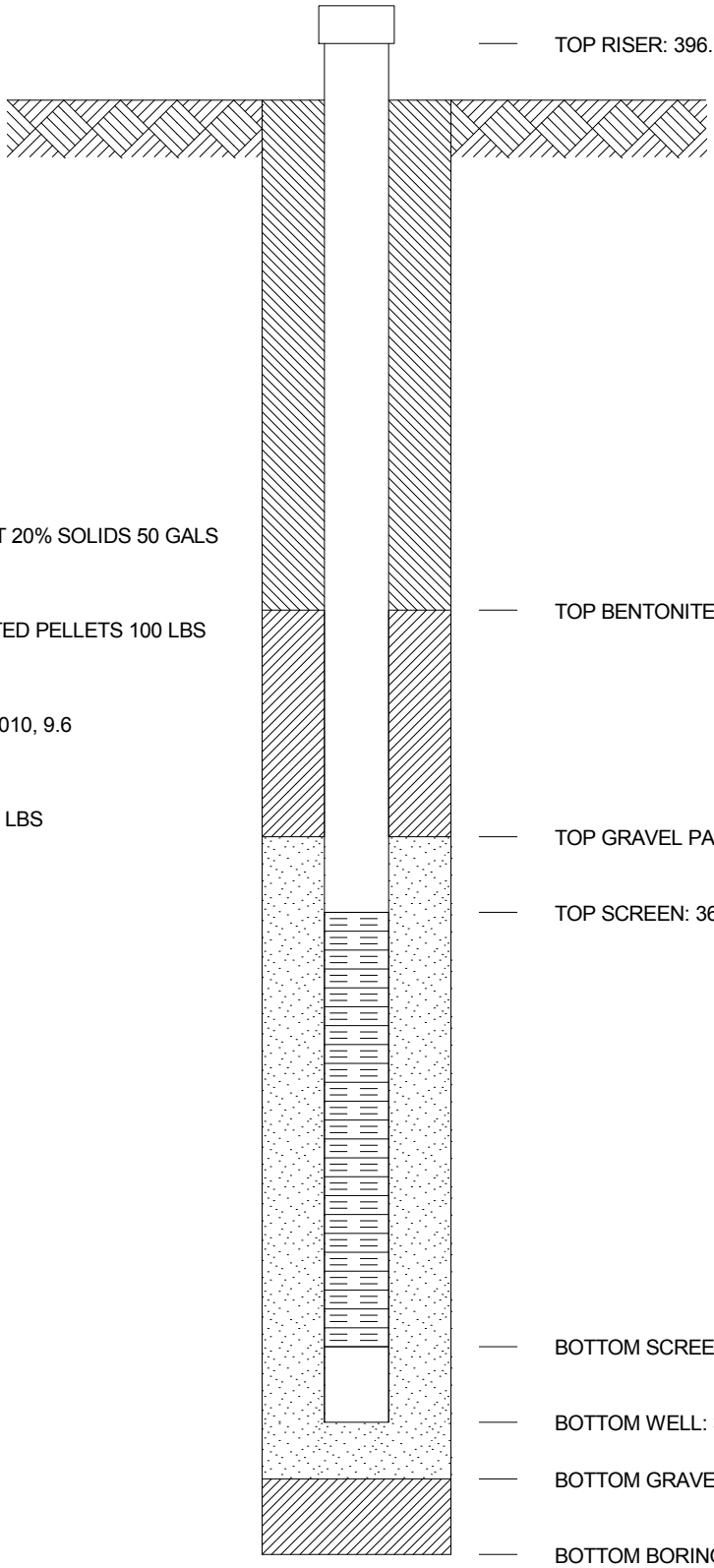
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1600S** BORING No. **MW-1600S** INSTALLED **2/29/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,305.9 E 512,458.0**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 393.69 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 50 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 225 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,323.2 E 513,487.5**

GROUND ELEVATION **400.1** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1601D** DATE **4/27/16** SHEET **1** OF **5**

BORING START **2/26/16** BORING FINISH **2/26/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.75** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **100.0** BOTTOM **109.59**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	4-5-8	1.5					Topsoil = 3 inches Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff *FILL		
2	SS	1.5	3.0	3-8-15	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, dry, med. dense @ 2' 2" layer - silty clay (prev. material)		
3	SS	3.0	4.5	3-13-16	1.4					@ 4' some black silt		
4	SS	4.5	6.0	4-8-8	1.5		5		SP	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, med. dense, trace fine gravel @ 6' water in spoon, loose		
5	SS	6.0	7.5	2-3-4	1.5							
6	SS	7.5	9.0	2-3-5	1.5				SC SP	Clayey sand, fine grained, med. bluish gray 5B 5/1, moist, loose		
7	SS	9.0	10.5	4-7-10	1.5				SC CH	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, loose		
8	SS	10.5	12.0	4-6-5	1.5		10		CH	Clayey sand, fine grained, med. bluish grey SB 5/1, moist, loose Fat clay, l. grey N7, moist, firm		
9	SS	12.0	13.5	3-5-5	1.5				MH	Fat clay, l. grey N7 and poorly graded sand, fine grained d. yellowish brown 10YR 4/2, moist, med. dense, 50/50 mix		
10	SS	13.5	15.0	3-4-6	1.5					Clayey silt, pale yellowish brown 10YR 6/2 and l. grey N7, moist, med. dense, mottled @ 12' loose @ 18.5' pale yellowish brown 10YR 6/2		
11	SS	15.0	16.5	3-4-4	1.5		15					
12	SS	16.5	18.0	3-5-5	1.5				SP	Poorly graded sand, v. fine grained greyish orange 10YR 7/4, moist, loose @ 20.7' trace black silt		
13	SS	18.0	19.5	4-4-5	1.5							
14	SS	19.5	21.0	3-4-4	1.5							

TYPE OF CASING USED

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

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601D** DATE **4/27/16** SHEET **2** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-6-6	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist, med. dense		
16	SS	22.5	24.0	4-5-8	1.5				SP	Poorly graded sand, v. fine grained, greyish orange 10YR 7/4, moist, med. dense		
17	SS	24.0	25.5	3-7-10	1.5		25		SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist to wet, med. dense @ 23.8' fine to med. grained, trace black silt @ 24' fine grained, no black, silt, trace fine gravel @ 26' coal fragment (2") (bl. silt) @ 29.1' 1" layer - lean clay, d. yellowish brown 10YR 4/2 @ 31' trace black silt		
18	SS	25.5	27.0	4-6-7	1.5							
19	SS	27.0	28.5	3-5-10	1.5							
20	SS	28.5	30.0	3-6-8	1.5		30					
21	SS	30.0	31.5	4-4-9	1.5							
22	SS	31.5	33.0	4-5-6	1.5							
23	SS	33.0	34.5	3-3-4	1.3				SW	Well graded sand, fine to med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, trace fine gravel @ 33' loose @ 34.5' med. dense, w/fine gravel		
24	SS	34.5	36.0	6-6-7	1.3		35					
25	SS	36.0	37.5	4-4-5	1.2				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, loose, w/fine gravel @ 37.5' med. dense @ 39' trace coarse gravel		
26	SS	37.5	39.0	5-6-12	1.4							
27	SS	39.0	40.5	11-10-12	1.5							
28	SS	40.5	42.0	6-11-15	1.5		40		SP	Poorly graded sand, fine gained, l. brown 5YR 5/6, wet, med. dense, trace fine gravel @ 40.5' w/fine gravel, trace coarse gravel @ 42' some fine gravel, no coarse gravel		
29	SS	42.0	43.5	6-10-10	1.3							
30	SS	43.5	45.0	6-11-12	1.5				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, med. dense, w/fine gravel, trace coarse gravel (rounded) @ 46.5' coarse gravel, plug in spoon @ 48' some coarse gravel, dense		
31	SS	45.0	46.5	9-8-8	1.4		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601D** DATE **4/27/16** SHEET **3** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	10-9-16	.2							
33	SS	48.0	49.5	11-15-21	1.4							
34	SS	49.5	51.0	11-15-15	1.4		50		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel		
									SW	@ 50' 1" layer - coal (angular fragments)		
35	SS	51.0	52.5	9-15-19	1.5					Well graded sand, med. to coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, trace coarse gravel		
36	SS	52.5	54.0	8-13-16	1.4					@ 51' dense		
									SP	@ 51.5' 1" layer - coal (angular fragments)		
37	SS	54.0	55.5	8-9-11	1.3					Poorly graded sand, fine grained, olive grey 5Y 4/1, wet, med. dense, w/fine gravel		
									SW	@ 53.3' 1.5" layer - coal (angular fragments)		
38	SS	55.5	57.0	9-14-16	1.4		55			Well graded sand, med. to coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		
39	SS	57.0	58.5	7-10-10	1.3					@ 55.5' trace coarse gravel		
										@ 57' no coarse gravel		
40	SS	58.5	60.0	6-7-13	1.5					@ 59.7' w/coal fragments, angular		
										@ 60.3' no coal fragments, some fine gravel		
41	SS	60.0	61.5	9-13-14	1.5		60					
42	SS	61.5	63.0	6-8-11	1.5				SP	Poorly graded sand, med. grained, pale yellowish brown 10YR 6/2, wet, med. dense, trace fine gravel		
43	SS	63.0	64.5	5-9-12	1.4					@ 64.5' fine to med. grained		
										@ 67.5' dense		
44	SS	64.5	66.0	8-9-12	1.4					@ 69' med. dense		
										@ 70.5' dense		
45	SS	66.0	67.5	5-9-17	1.5		65			@ 71' some coarse gravel		
46	SS	67.5	69.0	7-15-23	1.4					@ 72' w/coarse gravel		
47	SS	69.0	70.5	6-9-14	1.3							
48	SS	70.5	72.0	8-19-21	1.4		70					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601D** DATE **4/27/16** SHEET **4** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	14-22-19	1.4							
50	SS	73.5	75.0	10-13-19	1.5		75					
51	SS	75.0	76.5	9-15-36	1.5				SP	Poorly graded sand, fine grained, yellowish brown 10YR 5/4, wet, med. dense, some fine gravel, trace coarse gravel		
52	SS	76.5	78.0	17-13-14	1.4				SW	@ 75' v. dense, trace fine gravel, no coarse gravel		
53	SS	78.0	79.5	9-18-18	1.2					Well graded sand, coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, some coarse gravel		
54	SS	79.5	81.0	13-11-12	1.4		80			@ 78' dense @ 80' 4" layer - coarse gravel @ 81' 3" layer - poorly graded sand, fine grained, mod. yellowish brown (prev. material) @ 81.9' w/coal fragments		
55	SS	81.0	82.5	6-8-14	1.5				CH	Fat clay, l. grey N7, wet, v. stiff (shale)		
56	SS	82.5	84.0	7-6-16	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense		
57	SS	84.0	85.5	9-12-14	1.5				CH	Fat clay, l. grey N7, wet, v. stiff		
58	SS	85.5	87.0	4-9-9	1.5		85		SP	Poorly graded sand, fine grained, l. grey N7, wet, med. dense		
59	SS	87.0	88.5	7-14-18	1.5				CH	Fat clay, l. grey N7, wet, v. stiff (shale)		
60	SS	88.5	90.0	10-11-17	1.5				SP	Poorly graded sand, fine grained, olive grey 5Y 4/1, wet, med. dense, some fat clay (l. grey, prev. material)		
61	SS	90.0	91.5	7-10-13	1.5		90		CH	@ 85.5' l. grey N7		
62	SS	91.5	93.0	9-13-16	1.4					Fat clay, l. grey N7, wet, v. stiff		
63	SS	93.0	94.5	8-8-9	1.4				SW	Well graded sand, med. grained, med. l. grey N6, wet, dense, trace fine gravel @ 88.5' 3.5" layer - fat clay N7, prev. material @ 89' some fat clay N7, prev. material @ 90' 3.5" layer - fat clay N7, prev. material		
64	SS	94.5	96.0	10-15-17	1.4				SP	Poorly graded sand, fine to med. gained, med. d. grey N4, wet, med. dense @ 91.5' 1.5" layer - fat clay N7, prev. material @ 92' some fine gravel, trace black silt, trace fat clay (N7, prev. material) @ 93' w/fine gravel, trace coarse gravel, med. grained		
65	SS	96.0	97.5	10-11-12	1.2		95		SW	Well graded sand, med. grained, med. d. grey N4, wet, dense, w/fine gravel @ 96' med. to coarse gained, mod. dense @ 99' dense, trace coarse gravel @ 100.5' med. dense		
66	SS	97.5	99.0	9-13-14	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601D** DATE **4/27/16** SHEET **5** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	10-15-19	1.5		100					
68	SS	100.5	102.0	10-12-10	1.4				SP	Poorly graded sand, v. fine grained, brownish grey 5YR 4/1, wet, med. dense, some fine gravel		
69	SS	102.0	103.5	7-2-6	1.5					@ 102' loose, no fine gravel, water in spoon		
70	SS	103.5	105.0	5-5-9	1.5					@ 103.5 med. dense		
71	SS	105.0	106.5	5-6-13	1.5		105		MH	Clayey silt MH, l. grey N7, moist to wet, med. dense		
72	SS	106.5	108.0	10-11-14	1.4				SP	Poorly graded sand v. fine grained, med. l. grey N6, wet, med. dense		
73	SS	108.0	109.5	7-8-9	1.5					Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, trace fine gravel		
74	SS	109.5	111.0	4-4-10	1.5		110		SP	Poorly graded sand, v. fine grained, med. l. grey N6, wet, med. dense, trace fat clay (CH - l. grey, prev. material)		
75	SS	111.0	112.5	7-9-20	1.5				CH	Fat clay, l. grey N7, wet, stiff		
76	SS	112.5	114.0	50/3	0				SP	Poorly graded sand, v. fine grained, med. l. grey N6, wet, mod. dense		
77	SS	114.0	115.5	12-13-20	1.1				CH	Fat clay, l. grey N7, wet, v. stiff		
78	SS	115.5	117.0	50/5	.3		115		SP	Poorly graded sand, v. fine grained, med. l. grey N6, wet, med. dense, w/fat clay (l. grey, prev. material)		
79	SS	117.0	118.5	46-50/3	.5					@ 112.5' no recovery - possible cobble or rock fragment		
										@ 114' dense		
										@ 114.5' 2" layer - fat clay (N7), prev. material		
										@ 115' w/coarse gravel, shale fragments		
										@ 115.2' 1" layer - coal fragments		
										Shale, l. grey N7, dry, hard, some siltstone (olive grey - 5Y 4/1)		
										@117' no siltstone		
										Spoon refusal @ 117.7'		
										Auger refusal @ 117.7		
										BT @ 117.7'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,325.3 E 513,483.5**

GROUND ELEVATION **400.0** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1601I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **2/26/16** BORING FINISH **2/26/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.87** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **68.1** BOTTOM **77.6**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	4-5-8	1.5					Topsoil = 3 inches		
										Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff *FILL		
2	SS	1.5	3.0	3-8-15	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, dry, med. dense		
										@ 2' 2" layer - silty clay (prev. material)		
3	SS	3.0	4.5	3-13-16	1.4					@ 4' some black silt		
4	SS	4.5	6.0	4-8-8	1.5				SP	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, med. dense, trace fine gravel		
							5			@ 6' water in spoon, loose		
5	SS	6.0	7.5	2-3-4	1.5							
6	SS	7.5	9.0	2-3-5	1.5				SC	Clayey sand, fine grained, med. bluish gray 5B 5/1, moist, loose		
									SP			
									SC	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, loose		
7	SS	9.0	10.5	4-7-10	1.5				CH	Clayey sand, fine grained, med. bluish grey SB 5/1, moist, loose		
							10			Fat clay, l. grey N7, moist, firm		
8	SS	10.5	12.0	4-6-5	1.5				MH	Fat clay, l. grey N7 and poorly graded sand, fine grained d. yellowish brown 10YR 4/2, moist, med. dense, 50/50 mix		
9	SS	12.0	13.5	3-5-5	1.5					Clayey silt, pale yellowish brown 10YR 6/2 and l. grey N7, moist, med. dense, mottled		
										@ 12' loose		
10	SS	13.5	15.0	3-4-6	1.5					@ 18.5' pale yellowish brown 10YR 6/2		
							15					
11	SS	15.0	16.5	3-4-4	1.5							
12	SS	16.5	18.0	3-5-5	1.5				SP	Poorly graded sand, v. fine grained greyish orange 10YR 7/4, moist, loose		
										@ 20.7' trace black silt		
13	SS	18.0	19.5	4-4-5	1.5							
14	SS	19.5	21.0	3-4-4	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-6-6	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist, med. dense		
16	SS	22.5	24.0	4-5-8	1.5				SP	Poorly graded sand, v. fine grained, greyish orange 10YR 7/4, moist, med. dense		
17	SS	24.0	25.5	3-7-10	1.5		25		SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist to wet, med. dense @ 23.8' fine to med. grained, trace black silt @ 24' fine grained, no black, silt, trace fine gravel @ 26' coal fragment (2") (bl. silt) @ 29.1' 1" layer - lean clay, d. yellowish brown 10YR 4/2 @ 31' trace black silt		
18	SS	25.5	27.0	4-6-7	1.5							
19	SS	27.0	28.5	3-5-10	1.5							
20	SS	28.5	30.0	3-6-8	1.5		30					
21	SS	30.0	31.5	4-4-9	1.5							
22	SS	31.5	33.0	4-5-6	1.5							
23	SS	33.0	34.5	3-3-4	1.3				SW	Well graded sand, fine to med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, trace fine gravel @ 33' loose @ 34.5' med. dense, w/fine gravel		
24	SS	34.5	36.0	6-6-7	1.3		35					
25	SS	36.0	37.5	4-4-5	1.2				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, loose, w/fine gravel @ 37.5' med. dense @ 39' trace coarse gravel		
26	SS	37.5	39.0	5-6-12	1.4							
27	SS	39.0	40.5	11-10-12	1.5							
28	SS	40.5	42.0	6-11-15	1.5		40		SP	Poorly graded sand, fine gained, l. brown 5YR 5/6, wet, med. dense, trace fine gravel @ 40.5' w/fine gravel, trace coarse gravel @ 42' some fine gravel, no coarse gravel		
29	SS	42.0	43.5	6-10-10	1.3							
30	SS	43.5	45.0	6-11-12	1.5				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, med. dense, w/fine gravel, trace coarse gravel (rounded) @ 46.5' coarse gravel, plug in spoon @ 48' some coarse gravel, dense		
31	SS	45.0	46.5	9-8-8	1.4		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	10-9-16	.2							
33	SS	48.0	49.5	11-15-21	1.4							
34	SS	49.5	51.0	11-15-15	1.4		50		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, wet, med. dense, w/fine gravel		
									SW	@ 50' 1" layer - coal (angular fragments)		
35	SS	51.0	52.5	9-15-19	1.5					Well graded sand, med. to coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, trace coarse gravel		
36	SS	52.5	54.0	8-13-16	1.4					@ 51' dense		
									SP	@ 51.5' 1" layer - coal (angular fragments)		
37	SS	54.0	55.5	8-9-11	1.3					Poorly graded sand, fine grained, olive grey 5Y 4/1, wet, med. dense, w/fine gravel		
									SW	@ 53.3' 1.5" layer - coal (angular fragments)		
38	SS	55.5	57.0	9-14-16	1.4		55			Well graded sand, med. to coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		
39	SS	57.0	58.5	7-10-10	1.3					@ 55.5' trace coarse gravel		
40	SS	58.5	60.0	6-7-13	1.5					@ 57' no coarse gravel		
										@ 59.7' w/coal fragments, angular		
41	SS	60.0	61.5	9-13-14	1.5		60			@ 60.3' no coal fragments, some fine gravel		
42	SS	61.5	63.0	6-8-11	1.5				SP	Poorly graded sand, med. grained, pale yellowish brown 10YR 6/2, wet, med. dense, trace fine gravel		
43	SS	63.0	64.5	5-9-12	1.4					@ 64.5' fine to med. grained		
44	SS	64.5	66.0	8-9-12	1.4					@ 67.5' dense		
										@ 69' med. dense		
45	SS	66.0	67.5	5-9-17	1.5		65			@ 70.5' dense		
46	SS	67.5	69.0	7-15-23	1.4					@ 71' some coarse gravel		
47	SS	69.0	70.5	6-9-14	1.3					@ 72' w/coarse gravel		
48	SS	70.5	72.0	8-19-21	1.4		70					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/26/16** BORING FINISH **2/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	14-22-19	1.4							
50	SS	73.5	75.0	10-13-19	1.5							
51	SS	75.0	76.5	9-15-36	1.5		75					
52	SS	76.5	78.0	17-13-14	1.4				SP SW	Poorly graded sand, fine grained, yellowish brown 10YR 5/4, wet, med. dense, some fine gravel, trace coarse gravel @ 75' v. dense, trace fine gravel, no coarse gravel		
53	SS	78.0	79.5	9-18-18	1.2					Well graded sand, coarse grained, d. yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel, some coarse gravel @ 78' dense @ 80' 4" layer - coarse gravel @ 81' 3" layer - poorly graded sand, fine grained, mod. yellowish brown (prev. material) @ 81.9' w/coal fragments		
54	SS	79.5	81.0	13-11-12	1.4							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,327.6 E 513,479.7**

GROUND ELEVATION **399.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1601S** DATE **4/27/16** SHEET **1** OF **3**

BORING START **2/27/16** BORING FINISH **2/27/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.88** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **36.9** BOTTOM **46.47**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	4-5-8	1.5					Topsoil = 3 inches Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry, stiff *FILL		
2	SS	1.5	3.0	3-8-15	1.5				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, dry, med. dense @ 2' 2" layer - silty clay (prev. material)		
3	SS	3.0	4.5	3-13-16	1.4					@ 4' some black silt		
4	SS	4.5	6.0	4-8-8	1.5		5		SP	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, med. dense, trace fine gravel @ 6' water in spoon, loose		
5	SS	6.0	7.5	2-3-4	1.5							
6	SS	7.5	9.0	2-3-5	1.5				SC SP	Clayey sand, fine grained, med. bluish gray 5B 5/1, moist, loose		
7	SS	9.0	10.5	4-7-10	1.5				SC CH	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, loose		
8	SS	10.5	12.0	4-6-5	1.5		10		CH	Clayey sand, fine grained, med. bluish grey SB 5/1, moist, loose Fat clay, l. grey N7, moist, firm		
9	SS	12.0	13.5	3-5-5	1.5				MH	Fat clay, l. grey N7 and poorly graded sand, fine grained d. yellowish brown 10YR 4/2, moist, med. dense, 50/50 mix		
10	SS	13.5	15.0	3-4-6	1.5					Clayey silt, pale yellowish brown 10YR 6/2 and l. grey N7, moist, med. dense, mottled @ 12' loose @ 18.5' pale yellowish brown 10YR 6/2		
11	SS	15.0	16.5	3-4-4	1.5		15					
12	SS	16.5	18.0	3-5-5	1.5				SP	Poorly graded sand, v. fine grained greyish orange 10YR 7/4, moist, loose @ 20.7' trace black silt		
13	SS	18.0	19.5	4-4-5	1.5							
14	SS	19.5	21.0	3-4-4	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601S** DATE **4/27/16** SHEET **2** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **2/27/16** BORING FINISH **2/27/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-6-6	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist, med. dense		
16	SS	22.5	24.0	4-5-8	1.5				SP	Poorly graded sand, v. fine grained, greyish orange 10YR 7/4, moist, med. dense		
17	SS	24.0	25.5	3-7-10	1.5		25		SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2 moist to wet, med. dense @ 23.8' fine to med. grained, trace black silt @ 24' fine grained, no black, silt, trace fine gravel @ 26' coal fragment (2") (bl. silt) @ 29.1' 1" layer - lean clay, d. yellowish brown 10YR 4/2 @ 31' trace black silt		
18	SS	25.5	27.0	4-6-7	1.5							
19	SS	27.0	28.5	3-5-10	1.5							
20	SS	28.5	30.0	3-6-8	1.5		30					
21	SS	30.0	31.5	4-4-9	1.5							
22	SS	31.5	33.0	4-5-6	1.5							
23	SS	33.0	34.5	3-3-4	1.3				SW	Well graded sand, fine to med. grained, d. yellowish brown 10YR 4/2, wet, med. dense, trace fine gravel @ 33' loose @ 34.5' med. dense, w/fine gravel		
24	SS	34.5	36.0	6-6-7	1.3		35					
25	SS	36.0	37.5	4-4-5	1.2				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, loose, w/fine gravel @ 37.5' med. dense @ 39' trace coarse gravel		
26	SS	37.5	39.0	5-6-12	1.4							
27	SS	39.0	40.5	11-10-12	1.5							
28	SS	40.5	42.0	6-11-15	1.5		40		SP	Poorly graded sand, fine gained, l. brown 5YR 5/6, wet, med. dense, trace fine gravel @ 40.5' w/fine gravel, trace coarse gravel @ 42' some fine gravel, no coarse gravel		
29	SS	42.0	43.5	6-10-10	1.3							
30	SS	43.5	45.0	6-11-12	1.5				SW	Well graded sand, coarse grained, dusky brown 5YR 2/2, wet, med. dense, w/fine gravel, trace coarse gravel (rounded) @ 46.5' coarse gravel, plug in spoon @ 48' some coarse gravel, dense		
31	SS	45.0	46.5	9-8-8	1.4		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1601S** DATE **4/27/16** SHEET **3** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **2/27/16** BORING FINISH **2/27/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	10-9-16	.2							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

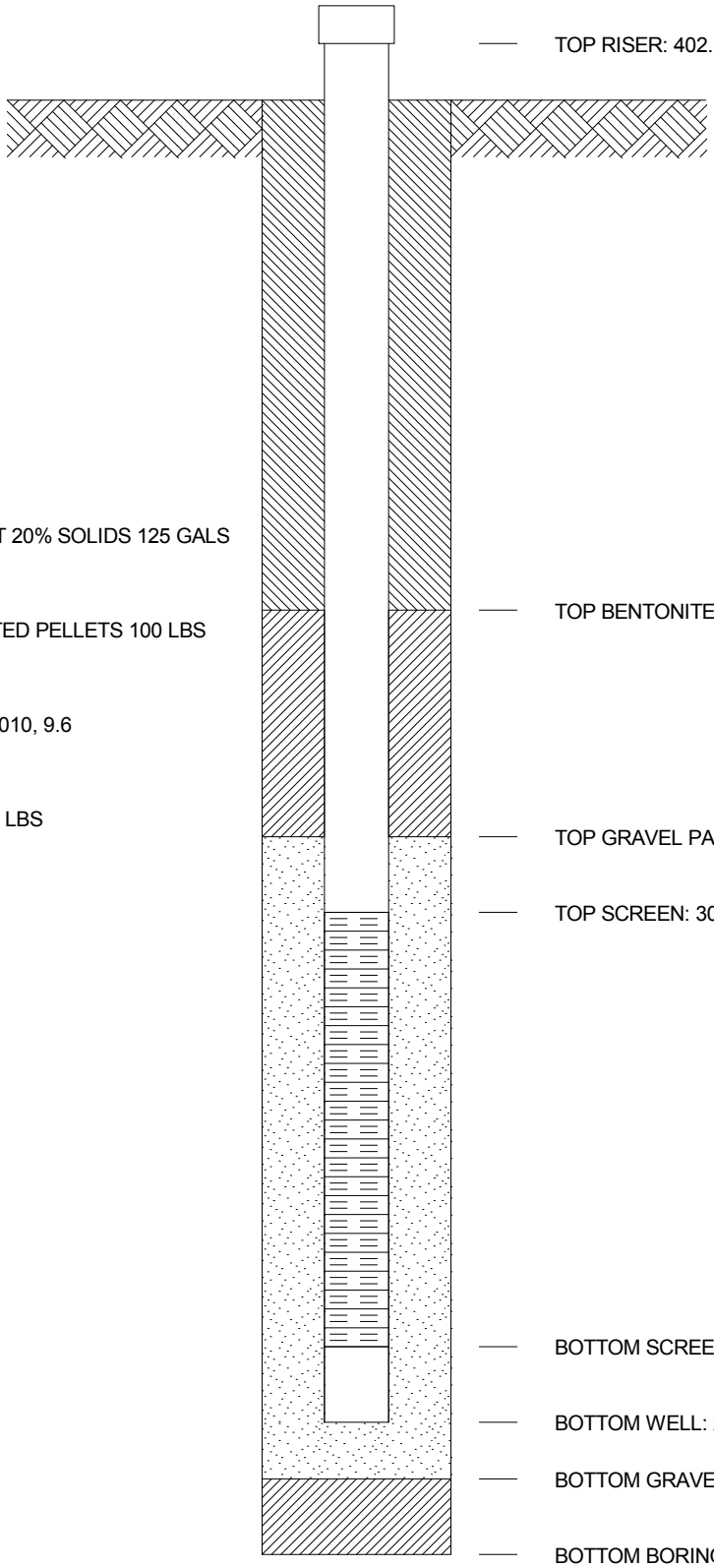
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1601D** BORING No. **MW-1601D** INSTALLED **2/26/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,323.2 E 513,487.5**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 400.09 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 125 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 475 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

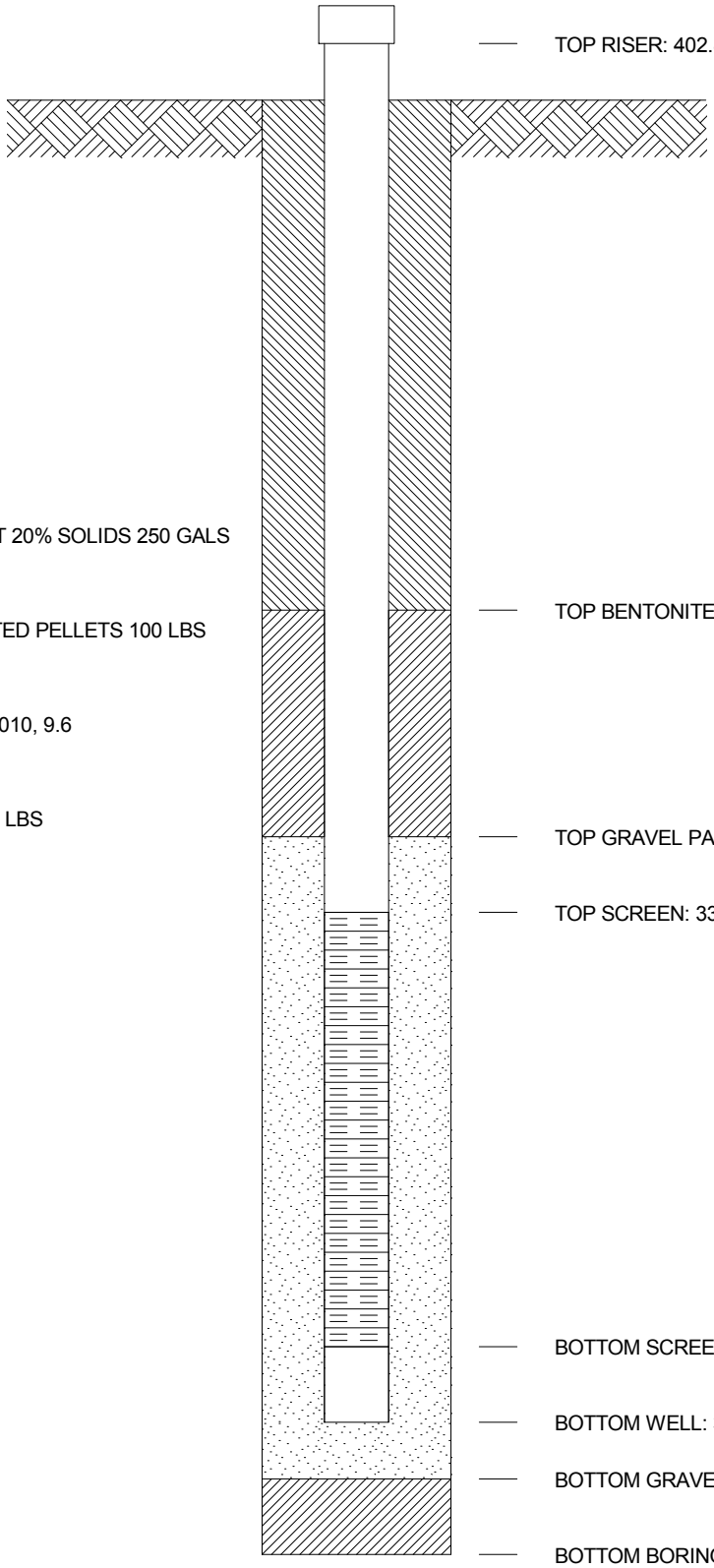
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1601I** BORING No. **MW-1601I** INSTALLED **2/26/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,325.3 E 513,483.5**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.96 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 250 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 175 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

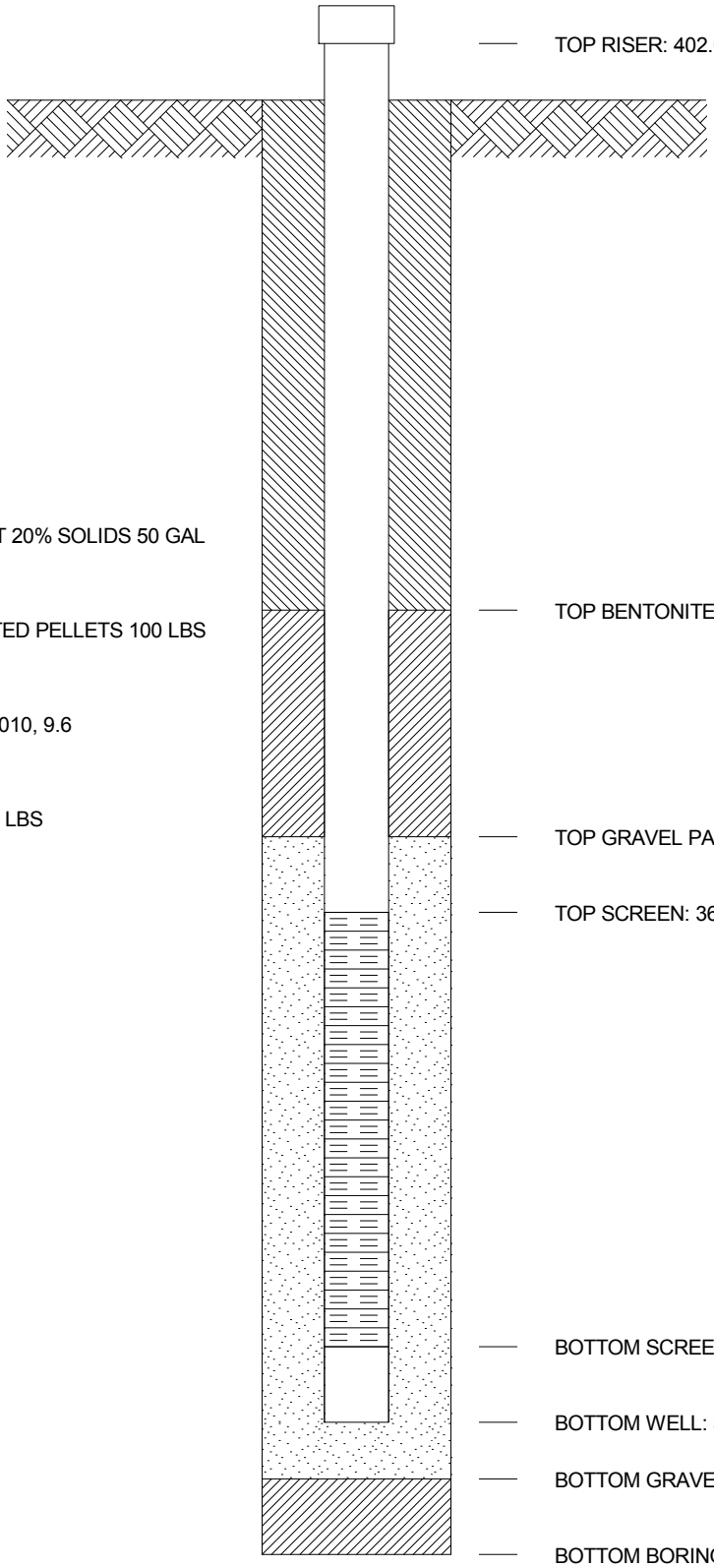
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1601S** BORING No. **MW-1601S** INSTALLED **2/27/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 154,327.6 E 513,479.7**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.77 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 50 GAL

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,300.2 E 514,229.4**

GROUND ELEVATION **399.3** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1602D** DATE **4/27/16** SHEET **1** OF **6**

BORING START **1/26/16** BORING FINISH **1/26/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.63** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **114.3** BOTTOM **123.88**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-2-5	1.5					Topsoil = 20 inches		
2	SS	1.5	3.0	6-9-9	1.25				CL	Silty lean clay, light brown 5YR 5/6 moderate brown 5YR 4/4 & medium light gray N5 fat clay seam, mottled, moist, v. stiff, trace organic *possible mud/grout/fill from nearby (~10') MW =>*FILL*		
3	SS	3.0	4.5	4-6-7	1.25					@ 3' stiff no organic, some moderate yellowish brown 10YR 5/4 silt		
4	SS	4.5	6.0	3-3-4	1.16		5					
5	SS	6.0	7.5	3-3-4	1.5				CH	Fat clay, medium light gray N6, moist to moist, firm *FILL*		
6	SS	7.5	9.0	2-2-3	1.5				CL	@ 6' w/lean clay, dark yellowish brown 10YR 4/2 mottled		
7	SS	9.0	10.5	4-5-6	1.5				CH	Silty lean clay, dark yellowish brown 10YR 4/2, moist, firm, some water in spoon *FILL*		
8	SS	10.5	12.0	5-6-9	1.5		10		CL	Fat clay, olive gray 5Y 4/1, dry to moist, firm *FILL*		
9	SS	12.0	13.5	2-5-8	1.41				CH	Silty lean clay, dark yellowish brown 10YR 4/2 with olive gray 5Y 4/1 fat clay mottled, moist, stiff, some moderate yellowish brown 10YR 5/4 silt, trace organic (wood, roots) *FILL*		
10	SS	13.5	15.0	2-5-8	1.33				CL	Fat clay, olive gray 5Y 4/1, dry to moist, stiff, trace organic *FILL*		
11	SS	15.0	16.5	4-5-7	1.5		15			Silty lean clay, dark yellowish brown 10YR 4/2 with olive gray 5Y 4/1 fat clay heavily mottled, moist, stiff, some moderate yellowish brown 10YR 5/4 and dark reddish brown 10R 3/4 silty *FILL* @ 12' trace sandstone to 1/4" @ 13.5' no sandstone, trace black oxide		
12	SS	16.5	18.0	3-3-5	1.5				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, trace moderate yellowish brown 10YR 5/4 silt, trace medium light gray N6 fat clay		
13	SS	18.0	19.5	4-3-5	1.5				ML	Clayey silt, dark yellowish brown 10YR 4/2, moist, loose @ 18.5' .5" sand seam		
14	SS	19.5	21.0	3-3-4	1.5				SP	Very fine grained sand, moderate yellowish brown		

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602D** DATE **4/27/16** SHEET **2** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/26/16** BORING FINISH **1/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-2-3	1.5					10YR 5/4 to dark yellowish brown 10YR 4/2, moist, loose, poorly graded @ 19.8' clay, silt seam (prev. material) 4.5" @ 21.2' clayey silt seam (prev. material) 3" @ 22' fat clay seam, medium light gray N6 and dark yellowish orange 10YR 6/6 mottled, 2" @ 22.8' clay silt seam (prev. material) 8"		
16	SS	22.5	24.0	2-3-3	1.41							
17	SS	24.0	25.5	4-6-11	.91				SP	Med. grained sand, dark yellowish brown 10YR 4/2 to moderate yellowish brown 10YR 5/4, moist, med. dense @ 25.1' 25.3' fine grained sand seam (prev. material) .5" @ 27' loose @ 28.9' clayey silt seam (prev. material) 2.5" @ 29.7' coarse sand seam dark reddish brown 10R 3/4 w/black oxide, 2"		
18	SS	25.5	27.0	5-5-8	.83		25					
19	SS	27.0	28.5	3-5-5	1.0							
20	SS	28.5	30.0	2-4-5	1.25							
21	SS	30.0	31.5	4-5-7	1.08		30		SP	Coarse sand, dark reddish brown 10R 3/4, moist, med. dense		
									SP			
22	SS	31.5	33.0	2-2-3	1.33				SP	Med. grain to coarse sand, dark yellowish brown 10YR 4/2, moist, med. dense, w/gravel to 1/4"		
23	SS	33.0	34.5	1-2-3	1.33					Fine to med. grained sand, grayish brown 5YR 3/2, moist, med. dense, poorly graded @ 31.5' loose @ 33' moist to wet, water in spoon @ 34.5' v. loose @ 35.5' 6" silty clay seam ~50% medium light gray N6 @ 36' loose @ 37.5' trace gravel to 1/4"		
24	SS	34.5	36.0	3-1-3	.83		35					
25	SS	36.0	37.5	2-4-5	.91							
26	SS	37.5	39.0	7-4-4	.41							
27	SS	39.0	40.5	3-5-11	.83							
28	SS	40.5	42.0	6-7-9	.91		40		SP	Very fine grain to fine grained sand, dark yellowish brown 10YR 4/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4", some black, @ 42' fine to med. grained		
29	SS	42.0	43.5	3-6-9	.75							
30	SS	43.5	45.0	3-6-8	.66				SW	Coarse sand, dark yellowish brown 10YR 4/2, moist to wet, med. dense, well graded, with gravel to 1/4", trace black silt @ 4' moderate brown 5YR 3/4 to grayish brown 5YR 3/2		
31	SS	45.0	46.5	11-9-13	1.08		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602D** DATE **4/27/16** SHEET **3** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/26/16** BORING FINISH **1/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	5-11-13	1.0					@ 47.6' coal fragments (2")		
33	SS	48.0	49.5	11-12-13	1.0				SP	Fine to med. grain sand, grayish brown 5YR 3/2, moist to wet, med. dense, some gravel to 1/4"		
34	SS	49.5	51.0	5-5-8	1.16		50		SW	Coarse sand, grayish brown 5YR 3/2, moist to wet, med. dense, well graded with gravel to 1/4" @ 51.3' 2" coal seam @ 51.8' 3" med. grain sand seam, moderate brown 5YR 4/4, w/gravel to 1/4"		
35	SS	51.0	52.5	5-5-7	1.16							
36	SS	52.5	54.0	5-7-11	.75				SP SW	Fine to med. grain sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4"		
37	SS	54.0	55.5	9-8-11	.50		55			Coarse sand, grayish brown 5YR 3/2, moist to wet, well graded, with gravel med. dense to 1/4" @ 54.5' 2" sandstone plug		
38	SS	55.5	57.0	5-12-16	1.41				SP	Fine grained sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded @ 56' 1.5" coal seam @ 57' med. grained, with gravel (riverstone) to 1/4", well graded		
39	SS	57.0	58.5	10-14-14	1.08							
40	SS	58.5	60.0	6-10-17	1.25							
41	SS	60.0	61.5	10-13-16	1.16		60		SW	Coarse sand, grayish brown 5YR 3/2, wet, med. dense, well graded w/well rounded, fine to coarse gravel to 1"		
42	SS	61.5	63.0	7-11-20	1.25							
43	SS	63.0	64.5	7-13-15	1.25				SP	Med. grained sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4" @ 64.5' fine grained @ 67.1' 1/5" coal fragments @ 67.5' dense, w/well rounded fine gravel @ 69' med. dense, well rounded fine gravel @ 70.5' dense @ 72' med. dense @ 73.5' dense @ 74.5' w/well rounded fine gravel @ 75' w/well rounded fine gravel @ 76.5 w/well rounded fine to coarse gravel @ 79.3' 2" shale fragment		
44	SS	64.5	66.0	6-10-14	1.33		65					
45	SS	66.0	67.5	8-10-13	1.16							
46	SS	67.5	69.0	10-19-22	1.25							
47	SS	69.0	70.5	9-10-12	1.08		70					
48	SS	70.5	72.0	10-15-18	1.16							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602D** DATE **4/27/16** SHEET **4** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/26/16** BORING FINISH **1/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-10-12	1.16							
50	SS	73.5	75.0	7-15-19	1.1							
51	SS	75.0	76.5	12-18-21	1.33		75					
52	SS	76.5	78.0	8-16-29	1.41							
53	SS	78.0	79.5	27-18-15	1..5							
54	SS	79.5	81.0	11-16-26	1.5				CL	Silty clay, olive gray 5Y 3/2, wet, stiff (N values from shale)		
55	SS	81.0	82.5	9-18-23	1.41		80		SP	Fine grained sand, olive gray 5Y 3/2, wet, dense, poorly graded @ 81' silty clay seam (prev. material)		
56	SS	82.5	84.0	8-14-14	1.16							
57	SS	84.0	85.5	10-13-18	1.5				CH	Silty fat clay, brownish gray 5YR 4/1, wet, stiff		
58	SS	85.5	87.0	15-14-20	1.5		85		SP CH SW	Med. grained sand, moderate yellowish brown 10YR 5/4, wet, dense, trace well rounded fine gravel @ 85.2' 1" coal fragments		
59	SS	87.0	88.5	10-12-12	1.08					Silty fat clay, moderate yellowish brown 10YR 5/4, wet, v. stiff		
60	SS	88.5	90.0	15-13-24	1.33					Coarse sand, moderate yellowish brown 10YR 5/4, moist, dense, well graded, w/well rounded fine to coarse gravel to 1" @ 87' med. dense @ 88.5' clay plug (prev. material), 3"		
61	SS	90.0	91.5	15-17-21	1.75		90		SP SW	Med. grained sand, moderate yellowish brown 10YR 5/4, moist, dense, well rounded fine gravel		
62	SS	91.5	93.0	11-17-20	1.08					Coarse sand, moderate yellowish brown 10YR 5/4, moist to wet, dense, well graded, w/gravel to 1.25'		
63	SS	93.0	94.5	8-11-16	1.33				SP	Med. grained sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, trace fine gravel @ 95.5' mostly brown @ 96.3' .5" coal seam		
64	SS	94.5	96.0	1-11-17	1.41		95					
65	SS	96.0	97.5	7-10-18	1.41							
66	SS	97.5	99.0	6-11-13	1.16				SW	Coarse sand, moderate yellowish brown 10YR 5/4 to moderate brown 5YR 4/4, moist, med. dense,		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602D** DATE **4/27/16** SHEET **5** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/26/16** BORING FINISH **1/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	8-13-21	1.25		100			well graded, w/fine to coarse gravel @ 100.3' shale fragment 2"		
68	SS	100.5	102.0	6-6-13	1.5				SP	V. fine to fine sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded @ 102.2' 3" coarse sand seam (prev. material)		
69	SS	102.0	103.5	6-8-17	1.5							
70	SS	103.5	105.0	10-12-15	1.25		105		SP	Fine to med. grained sand, grayish brown 5YR 3/2, moist to wet, med. dense, trace fine gravel @ 105' no gravel @ 106.5' dense @ 107.7' 1" shale fragment @ 109' 3" shale fragment @110.8' trace shale @ 111' no shale		
71	SS	105.0	106.5	8-11-19	1.41							
72	SS	106.5	108.0	8-12-20	1.33							
73	SS	108.0	109.5	13-21-17	1.33							
74	SS	109.5	111.0	8-16-31	1.5		110					
75	SS	111.0	112.5	12-20-31	1.41							
76	SS	112.5	114.0	17-27-28	1.41				SW	Coarse sand, grayish brown 5YR 3/2, moist to wet, v. dense, w/fine to coarse gravel (~50%), well graded @ 114.1' 1.5" clay seam (prev. material, gray fat)		
77	SS	114.0	115.5	12-26-22	1.5							
78	SS	115.5	117.0	8-7-7	1.41		115		SW	Fine grained sand, grayish brown 5YR 3/2, wet, dense, well graded, w/gravel to 1.75"		
79	SS	117.0	118.5	13-12-15	1.25				SW	Coarse sand, grayish brown 5YR 3/2, moist, med. dense, well graded w/fine gravel (~50%), some black silt		
80	SS	118.5	120.0	8-9-14	1.25							
81	SS	120.0	121.5	11-11-21	1.33		120					
82	SS	121.5	123.0	12-21-43	1.25				SP	Med. grained sand, grayish brown 5YR 3/2, moist to wet, dense, some gravel to 1/4" @ 122.8' gravel plug, 1.5" v. dense @ 123' w/gravel to 1.75" (~50%)		
83	SS	123.0	124.5	32-50/5	.91							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602D** DATE **4/27/16** SHEET **6** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/26/16** BORING FINISH **1/26/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
84	SS	124.5	126.0	50/5	.41		125			Shale, olive gray 5Y 4/1, moist, hard Spoon refusal @ 125' Auger refusal @ 125' TOR 124.6' Boring terminated @ 125'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,295.0 E 514,229.2**

GROUND ELEVATION **399.4** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1602I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **2/9/16** BORING FINISH **2/9/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.65** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **67.8** BOTTOM **77.38**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-2-5	1.5					Topsoil = 20 inches		
2	SS	1.5	3.0	6-9-9	1.25				CL	Silty lean clay, light brown 5YR 5/6 moderate brown 5YR 4/4 & medium light gray N5 fat clay seam, mottled, moist, v. stiff, trace organic *possible mud/grout/fill from nearby (~10') MW =>*FILL*		
3	SS	3.0	4.5	4-6-7	1.25					@ 3' stiff no organic, some moderate yellowish brown 10YR 5/4 silt		
4	SS	4.5	6.0	3-3-4	1.16		5					
5	SS	6.0	7.5	3-3-4	1.5				CH	Fat clay, medium light gray N6, moist to moist, firm *FILL*		
6	SS	7.5	9.0	2-2-3	1.5				CL	@ 6' w/lean clay, dark yellowish brown 10YR 4/2 mottled		
7	SS	9.0	10.5	4-5-6	1.5				CH	Silty lean clay, dark yellowish brown 10YR 4/2, moist, firm, some water in spoon *FILL*		
8	SS	10.5	12.0	5-6-9	1.5		10		CL	Fat clay, olive gray 5Y 4/1, dry to moist, firm *FILL*		
9	SS	12.0	13.5	2-5-8	1.41				CH	Silty lean clay, dark yellowish brown 10YR 4/2 with olive gray 5Y 4/1 fat clay mottled, moist, stiff, some moderate yellowish brown 10YR 5/4 silt, trace organic (wood, roots) *FILL*		
10	SS	13.5	15.0	2-5-8	1.33				CL	Fat clay, olive gray 5Y 4/1, dry to moist, stiff, trace organic *FILL*		
11	SS	15.0	16.5	4-5-7	1.5		15			Silty lean clay, dark yellowish brown 10YR 4/2 with olive gray 5Y 4/1 fat clay heavily mottled, moist, stiff, some moderate yellowish brown 10YR 5/4 and dark reddish brown 10R 3/4 silty *FILL* @ 12' trace sandstone to 1/4" @ 13.5' no sandstone, trace black oxide		
12	SS	16.5	18.0	3-3-5	1.5				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, trace moderate yellowish brown 10YR 5/4 silt, trace medium light gray N6 fat clay		
13	SS	18.0	19.5	4-3-5	1.5				ML	Clayey silt, dark yellowish brown 10YR 4/2, moist, loose @ 18.5' .5" sand seam		
14	SS	19.5	21.0	3-3-4	1.5				SP	Very fine grained sand, moderate yellowish brown		

TYPE OF CASING USED

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

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/9/16** BORING FINISH **2/9/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-2-3	1.5					10YR 5/4 to dark yellowish brown 10YR 4/2, moist, loose, poorly graded @ 19.8' clay, silt seam (prev. material) 4.5" @ 21.2' clayey silt seam (prev. material) 3" @ 22' fat clay seam, medium light gray N6 and dark yellowish orange 10YR 6/6 mottled, 2" @ 22.8' clay silt seam (prev. material) 8"		
16	SS	22.5	24.0	2-3-3	1.41							
17	SS	24.0	25.5	4-6-11	.91				SP	Med. grained sand, dark yellowish brown 10YR 4/2 to moderate yellowish brown 10YR 5/4, moist, med. dense @ 25.1' 25.3' fine grained sand seam (prev. material) .5" @ 27' loose @ 28.9' clayey silt seam (prev. material) 2.5" @ 29.7' coarse sand seam dark reddish brown 10R 3/4 w/black oxide, 2"		
18	SS	25.5	27.0	5-5-8	.83		25					
19	SS	27.0	28.5	3-5-5	1.0							
20	SS	28.5	30.0	2-4-5	1.25							
21	SS	30.0	31.5	4-5-7	1.08		30		SP	Coarse sand, dark reddish brown 10R 3/4, moist, med. dense		
									SP			
22	SS	31.5	33.0	2-2-3	1.33				SP	Med. grain to coarse sand, dark yellowish brown 10YR 4/2, moist, med. dense, w/gravel to 1/4"		
23	SS	33.0	34.5	1-2-3	1.33					Fine to med. grained sand, grayish brown 5YR 3/2, moist, med. dense, poorly graded @ 31.5' loose @ 33' moist to wet, water in spoon @ 34.5' v. loose @ 35.5' 6" silty clay seam ~50% medium light gray N6 @ 36' loose @ 37.5' trace gravel to 1/4"		
24	SS	34.5	36.0	3-1-3	.83		35					
25	SS	36.0	37.5	2-4-5	.91							
26	SS	37.5	39.0	7-4-4	.41							Began Mud Rotary @ 37.5'
27	SS	39.0	40.5	3-5-11	.83							
28	SS	40.5	42.0	6-7-9	.91		40		SP	Very fine grain to fine grained sand, dark yellowish brown 10YR 4/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4", some black, @ 42' fine to med. grained		
29	SS	42.0	43.5	3-6-9	.75							
30	SS	43.5	45.0	3-6-8	.66				SW	Coarse sand, dark yellowish brown 10YR 4/2, moist to wet, med. dense, well graded, with gravel to 1/4", trace black silt @ 4' moderate brown 5YR 3/4 to grayish brown 5YR 3/2		
31	SS	45.0	46.5	11-9-13	1.08		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/9/16** BORING FINISH **2/9/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	5-11-13	1.0					@ 47.6' coal fragments (2")		
33	SS	48.0	49.5	11-12-13	1.0				SP	Fine to med. grain sand, grayish brown 5YR 3/2, moist to wet, med. dense, some gravel to 1/4"		
34	SS	49.5	51.0	5-5-8	1.16		50		SW	Coarse sand, grayish brown 5YR 3/2, moist to wet, med. dense, well graded with gravel to 1/4" @ 51.3' 2" coal seam @ 51.8' 3" med. grain sand seam, moderate brown 5YR 4/4, w/gravel to 1/4"		
35	SS	51.0	52.5	5-5-7	1.16							
36	SS	52.5	54.0	5-7-11	.75				SP SW	Fine to med. grain sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4"		
37	SS	54.0	55.5	9-8-11	.50		55			Coarse sand, grayish brown 5YR 3/2, moist to wet, well graded, with gravel med. dense to 1/4" @ 54.5' 2" sandstone plug		
38	SS	55.5	57.0	5-12-16	1.41				SP	Fine grained sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded @ 56' 1.5" coal seam @ 57' med. grained, with gravel (riverstone) to 1/4", well graded		
39	SS	57.0	58.5	10-14-14	1.08							
40	SS	58.5	60.0	6-10-17	1.25							
41	SS	60.0	61.5	10-13-16	1.16		60		SW	Coarse sand, grayish brown 5YR 3/2, wet, med. dense, well graded w/well rounded, fine to coarse gravel to 1"		
42	SS	61.5	63.0	7-11-20	1.25							
43	SS	63.0	64.5	7-13-15	1.25				SP	Med. grained sand, grayish brown 5YR 3/2, moist to wet, med. dense, poorly graded, trace gravel to 1/4" @ 64.5' fine grained @ 67.1' 1/5" coal fragments @ 67.5' dense, w/well rounded fine gravel @ 69' med. dense, well rounded fine gravel @ 70.5' dense @ 72' med. dense @ 73.5' dense @ 74.5' w/well rounded fine gravel @ 75' w/well rounded fine gravel @ 76.5 w/well rounded fine to coarse gravel @ 79.3' 2" shale fragment		
44	SS	64.5	66.0	6-10-14	1.33		65					
45	SS	66.0	67.5	8-10-13	1.16							
46	SS	67.5	69.0	10-19-22	1.25							
47	SS	69.0	70.5	9-10-12	1.08		70					
48	SS	70.5	72.0	10-15-18	1.16							

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1602I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/9/16** BORING FINISH **2/9/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-10-12	1.16							
50	SS	73.5	75.0	7-15-19	1.1							
							75					
51	SS	75.0	76.5	12-18-21	1.33							
52	SS	76.5	78.0	8-16-29	1.41							
53	SS	78.0	79.5	27-18-15	1..5							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

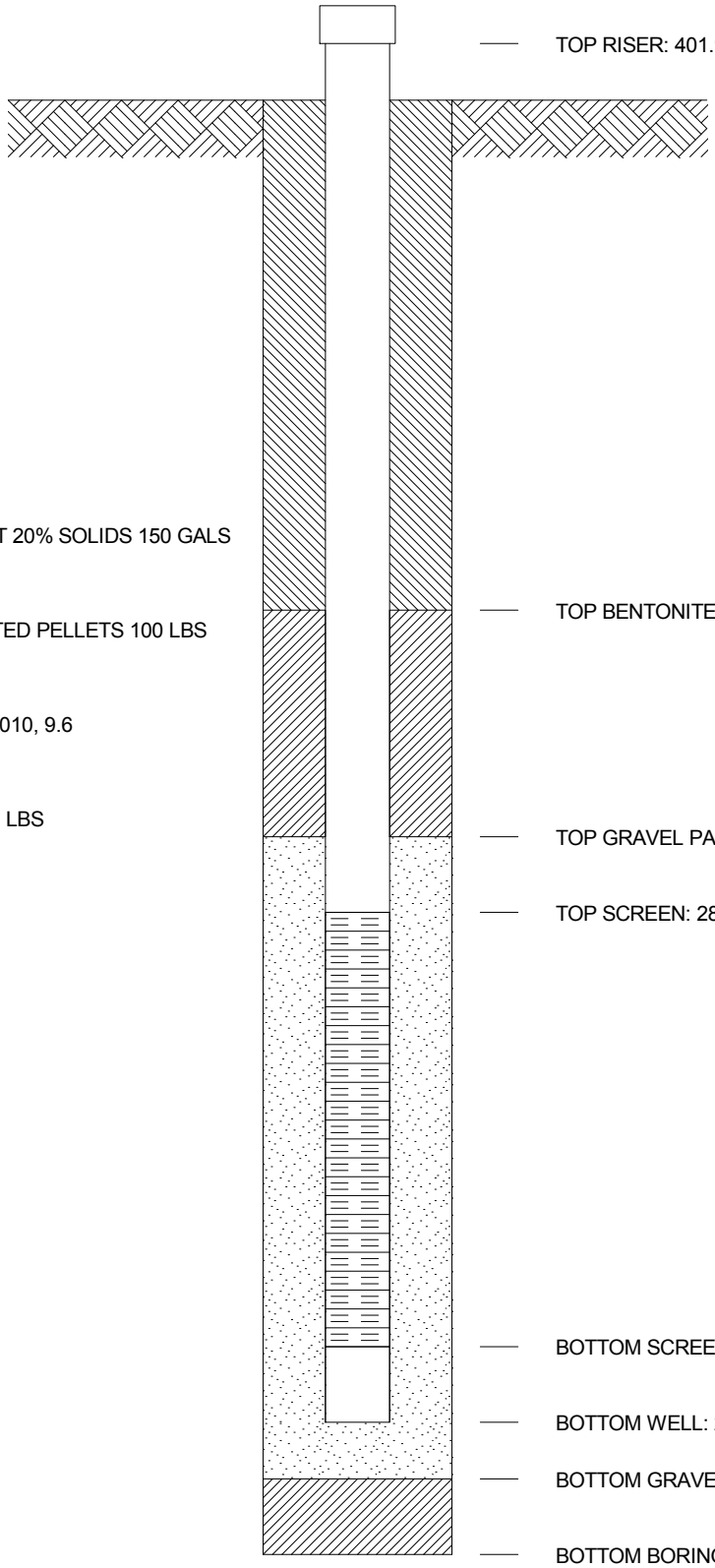
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1602D** BORING No. **MW-1602D** INSTALLED **1/26/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,300.2 E 514,229.4**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.28 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 150 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

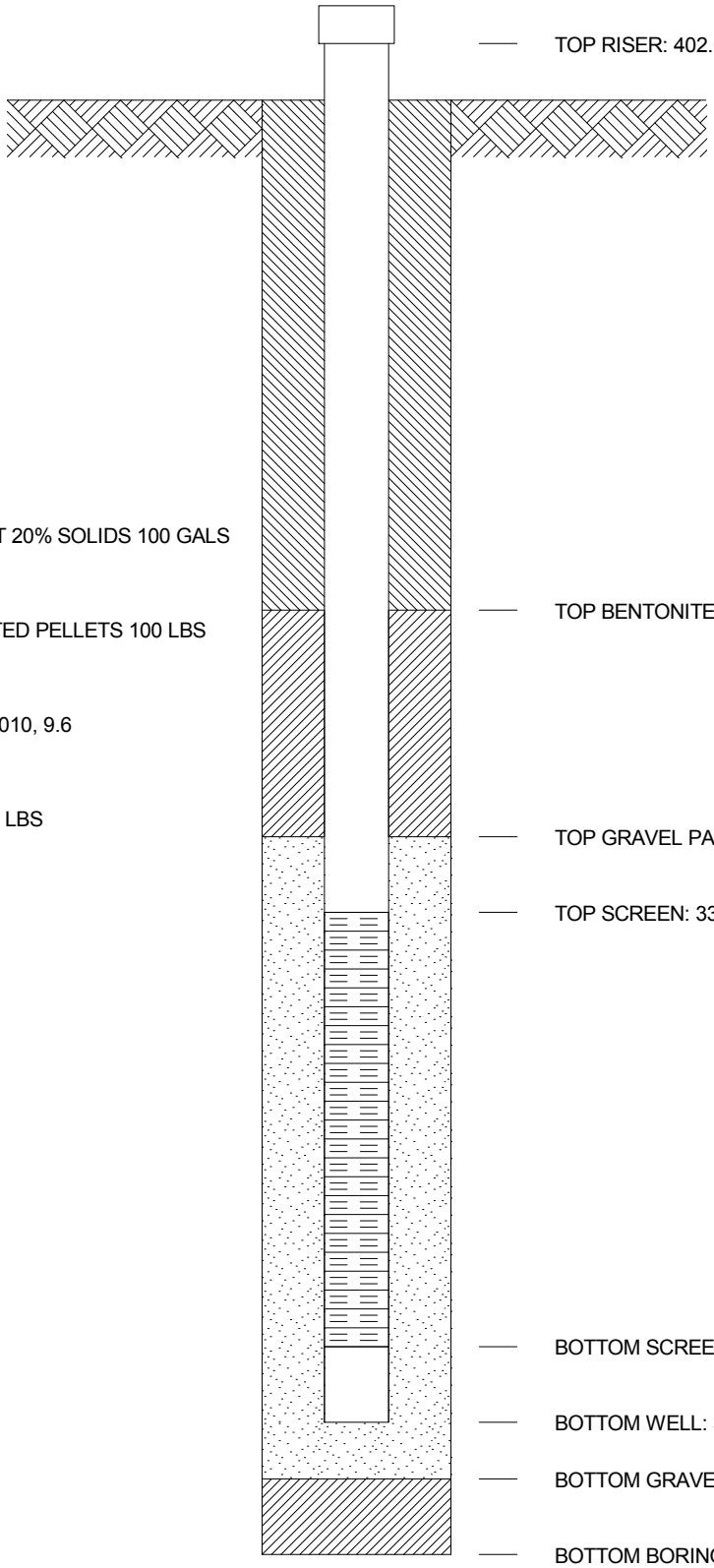
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1602I** BORING No. **MW-1602I** INSTALLED **2/9/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,295.0 E 514,229.2**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.38 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 100 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 150 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,811.9 E 514,207.5**

GROUND ELEVATION **401.6** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1603D** DATE **4/27/16** SHEET **1** OF **5**

BORING START **1/29/16** BORING FINISH **1/29/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.29** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **110.9** BOTTOM **120.46**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-3-6	.5					Gravel = 6 inches		
										Topsoil = 12 inches		
2	SS	1.5	3.0	4-11-14	.75				CL	Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry to moist, v. stiff @ 3' trace moderate red 5R 4/6 silt @ 6' stiff, geofabric in spoon @ 7.5' v. stiff, wood debris @ 9' w/pale yellowish brown 10YR 6/2 fat clay, stiff		
3	SS	3.0	4.5	5-9-12	1.0							
4	SS	4.5	6.0	7-10-13	.92		5					
5	SS	6.0	7.5	4-6-9	1.08							
6	SS	7.5	9.0	4-8-12	1.5							
7	SS	9.0	10.5	2-3-7	1.33							
8	SS	10.5	12.0	2-4-9	1.5		10					
9	SS	12.0	13.5	4-5-7	1.33				SC	Clayey sand, moderate brown 5YR 4/4, moist, med. dense, w/l. grey N7 clay, fine grained, trace black N1 silt		
10	SS	13.5	15.0	3-5-9	1.5				ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, med. dense, some l. grey N7 fat clay @ 15' trace l. grey N7 fat clay		
11	SS	15.0	16.5	3-4-7	1.5		15					
12	SS	16.5	18.0	3-4-6	1.16							
13	SS	18.0	19.5	3-4-4	1.5				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist, loose @ 18' v. fine to fine grained		
14	SS	19.5	21.0	4-6-8	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603D** DATE **4/27/16** SHEET **2** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-2-3	1.42				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace blacK N1 silt		
16	SS	22.5	24.0	1-3-4	1.5				SP	@ 21.5' 2" clay seam, moderate brown 5YR 4/4 Poorly graded sand, moderate yellowish brown 10YR 5/4, moist, v. fine grained, loose @ 22.8' 2.5" clayey silt seam (prev. material) @ 23.6' 2" grayish orange 10YR 7/4 sand seam (prev. material) @ 24' 3" shale fragment, med. l. grey N6 @ 25.5' 2" shale fragments		
17	SS	24.0	25.5	4-7-8	.33		25					
18	SS	25.5	27.0	3-6-9	1.5				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace black N1 silt @ 26.6' 1" coarse sand seam, dark yellowish brown 10YR 4/2, w/rounded fine gravel, well graded @ 27.9' 2" coarse sand seam (prev. material) @ 28.7' clay seam, 1.5" (prev. material @ 29.5' .5" coarse sand seam, moderate red 5R4/6, w/black N1 silt, poorly graded @ 31.1' 1/4" coal fragments and black N1 silt @ 31.3' 1/4" coal fragment and black, N1 silt		
19	SS	27.0	28.5	5-6-9	1.5							
20	SS	28.5	30.0	4-7-12	1.5		30					
21	SS	30.0	31.5	5-6-8	1.5							
22	SS	31.5	33.0	5-6-10	1.5				SW	Well graded sand, coarse grained, pale yellowish brown 10YR 6/2, moist, med. dense, trace black N1 silt @ 32.5' .5" coarse sand seam, moderate red (prev. material) @ 33' med. grained @ 35 1/4" coal fragments		
23	SS	33.0	34.5	3-5-8	1.25							
24	SS	34.5	36.0	5-7-9	1.41		35					
25	SS	36.0	37.5	6-5-7	1.25				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, fine grained, some fine gravel, water in spoon @ 36' fine to med. grained @ 38.6' 2" coarse sand seam dark yellowish brown 10YR 4/2 w/black N1 silt (50%)		
26	SS	37.5	39.0	2-3-7	1.33							
27	SS	39.0	40.5	6-8-8	1.41				SP	Poorly graded sand, pale reddish brown 10R 5/4, fine grained, moist to wet, med, dense @ 40' 1/4" coal fragments		
28	SS	40.5	42.0	3-6-9	1.16		40		SW	Well graded sand, moderate, yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 41' coarse sand seam, 3", d. yellowish brown 10YR 4/2, prev. material @ 42.5' coarse sand seam, 3.5", d. yellowish brown 10YR 4/2, w/black N1 silt and fine gravel		
29	SS	42.0	43.5	5-8-8	1.25							
30	SS	43.5	45.0	5-4-7	.83				SW	Well graded sand, d. yelllowish brown 10YR 4/2, coarse grained, moist to wet, med. dense, with fine gravel @ 43.8' trace coal fragments, angular @ 44' no coal fragments		
31	SS	45.0	46.5	6-8-14	1.16		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603D** DATE **4/27/16** SHEET **3** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	13-10-18	1.33				SW	@ 45.5' some coarse gravel, rounded @ 45.7' .5" coal fragments @ 46' 1.5" coal fragments		
33	SS	48.0	49.5	9-14-19	1.41					Well graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 46.9' 1.5" shale seam		
34	SS	49.5	51.0	11-15-18	1.33		50			@ 47.6' 1" coal fragment and black N1 silt, angular @ 47.8' 1.5" rounded fine gravel, clean, poorly graded		
35	SS	51.0	52.5	6-9-16	1.41					@ 48' 1" shale fragment @ 48.1' dense, poorly graded, trace fine gravel @ 49.5' w/fine gravel		
36	SS	52.5	54.0	7-14-21	1.41					@ 51' well graded, med. dense		
									SP	@ 52.5' trace shale fragments to 1.5"		
37	SS	54.0	55.5	10-12-12	1.5					Poorly graded sand, med. grained, pale yellowish brown 10YR 6/2, moist to wet, dense, trace fine gravel		
									SW			
38	SS	55.5	57.0	9-12-31	1.41		55			Well graded sand, pale yellowish brown 10YR 6/2, fine grained, moist to wet, med. dense, some fine gravel, trace coarse gravel @ 55.5' dense, no coarse gravel		
39	SS	57.0	58.5	10-10-15	1.16					@57' med. dense @ 58' 2.5" shale seam, med. l. grey N6		
40	SS	58.5	60.0	8-10-15	1.5				SW	Well graded sand, l. olive grey 5Y 6/1, fine to med. grained, moist to wet, med. dense, with fine gravel (rounded)		
41	SS	60.0	61.5	7-10-11	1.25		60			@ 61.5' fine grained @ 63' trace fine gravel		
42	SS	61.5	63.0	8-13-13	1.25					@ 64.5' d. yellowish brown 10YR 4/2 @ 66' fine to med. grained, some fine gravel (rounded)		
43	SS	63.0	64.5	7-9-17	1.16							
44	SS	64.5	66.0	6-9-10	1.33		65					
45	SS	66.0	67.5	10-11-15	1.16							
46	SS	67.5	69.0	10-11-15	1.33				SW	Well graded sand, d. yellowish brown 10YR 4/2, coarse grained, moist to wet, med. dense, with fine gravel		
47	SS	69.0	70.5	9-13-15	1.5							
48	SS	70.5	72.0	9-12-18	1.33		70					
									SP	Poorly graded sand, pale yellowish brown 10YR 6/2, fine grained, moist to wet, dense		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603D** DATE **4/27/16** SHEET **4** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	5-8-16	1.41					@ 72' med. dense @ 73' v. fine grained, moist @ 75.5' silty clay seam (~50%), moderate brown 5YR 3/4, moist, stiff to v. stiff @ 76.2' shale fragment, 3"		
50	SS	73.5	75.0	8-8-12	1.33							
51	SS	75.0	76.5	9-11-13	1.5		75					
52	SS	76.5	78.0	8-12-18	1.0				SW	Well graded sand, d. yellowish brown 10YR 4/2, coarse grained, moist to wet, dense, w/fine gavel, trace coarse gravel (rounded) @ 78' 3.5" shale fragment @ 78.4' coarse gravel seam 3" @ 78.6' 3" shale fragment		
53	SS	78.0	79.5	21-21-15	.75							
54	SS	79.5	81.0	3-6-6	1.41		80		CH	Fat clay, l. grey N7, wet, stiff		
55	SS	81.0	82.5	5-4-6	1.5				ML	Clayey silt, l. grey N7, moist to wet, loose @ 83' 2.5" fine grained sand seam, med. d. grey N4		
56	SS	82.5	84.0	5-6-11	1.5							
57	SS	84.0	85.5	5-6-15	1.5				SP	Poorly graded sand, med. d. grey N4, fine grained, moist to wet, med. dense @ 85' 4" clayey silt seam, prev. material @ 85.5' dense @ 86' 3.5" clayey silt seam, prev. material @ 88.5' v. dense @ 91.5' med. dense @ 92' some fine gravel @ 92.2' 1" coal fragments seam @ 93' d. yellowish brown 10YR 4/2, 4" clayey silt seam (prev. material) (50%) @ 94.4' 2" coal fragments seam @ 95' 6" coal fragments (75%) and above material (25%)		
58	SS	85.5	87.0	11-15-19	1.5		85					
59	SS	87.0	88.5	9-13-29	.41							
60	SS	88.5	90.0	15-21-34	1.5							
61	SS	90.0	91.5	12-22-30	1.5		90					
62	SS	91.5	93.0	7-12-17	1.33							
63	SS	93.0	94.5	8-11-12	1.5							
65	SS	94.0	95.5	12-22-17	1.5							
64	SS	94.5	96.0	7-14-19	1.5		95					
									SP	Poorly graded sand, coarse grained, moderate reddish brown 10R 4/6, moist to wet, dense, trace coal fragments @ 96' with coal fragements (~50%)		
66	SS	97.5	99.0	9-9-12	1.5				SP	Poorly graded sand, fine to med. grained, dusky		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603D** DATE **4/27/16** SHEET **5** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
										yellow 5Y 6/4, moist to wet, dense, some coarse gravel		
67	SS	99.0	100.5	8-9-15	1.5				SW	@ 97.5' med. dense @ 97.7' 1" clayey silt plug (prev. material)		
							100			Well graded sand, coarse grained, dusky yellowish brown 10YR 2/2, moist to wet, med. dense, with fine gravel, trace coarse gravel		
68	SS	100.5	102.0	16-20-12	.50					@ 100.5' dense @ 101.8' 2.5" shale fragment		
69	SS	102.0	103.5	6-5-8	1.16				SP	Poorly graded sand, very fine grained, dark yellowish orange 10YR 6/6, wet, med. dense, trace fine gravel		
70	SS	103.5	105.0	9-8-10	1.41					@ 105' grey 5Y 4/1 @ 108.5' moderate reddish brown 10R 4/6 @ 109' grey 5Y 4/1		
71	SS	105.0	106.5	7-10-12	1.41		105			@ 109.5' moist to wet		
72	SS	106.5	108.0	6-9-12	1.33							
73	SS	108.0	109.5	6-8-13	1.25							
74	SS	109.5	111.0	7-9-15	1.5		110					
75	SS	111.0	112.5	17-16-20	1.41				SW	Well graded sand, coarse grained, olive grey 5Y 3/2, moist to wet, dense, w/fine gravel, trace coarse gravel		
76	SS	112.5	114.0	8-10-17	1.33					@ 112.5' med. dense		
77	SS	114.0	115.5	14-22-26	1.41				SP	Poorly graded sand, fine grained, medium grey N5, moist to wet, dense, some fine gravel		
78	SS	115.5	117.0	12-20-31	1.33		115		SW	Well graded sand, coarse grained, light olive grey 5Y 6/1, moist to wet, v. dense, with fine gravel, some coarse gravel		
79	SS	117.0	118.5	15-13-16	1.25				SP	Poorly graded sand, fine grained, light olive grey 5Y 6/1, moist to wet, med. dense, some fine gravel		
80	SS	118.5	120.0	13-15-16	1.25					@ 118.5' dense, with fine gravel, some coarse gravel		
81	SS	120.0	121.5	10-16-20	1.25		120					
82	SS	121.5	123.0	25-50/4	1.33					Shale, med. l. grey N6, dry to moist, hard Spoon refusal @ 122' Auger refusal @ 122' Boring terminated @ 122'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,807.3 E 519,207.2**

GROUND ELEVATION **401.4** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1603I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **2/1/16** BORING FINISH **2/1/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.74** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **68.9** BOTTOM **78.51**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **MWJ / TAS** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-3-6	.5					Gravel = 6 inches		
										Topsoil = 12 inches		
2	SS	1.5	3.0	4-11-14	.75				CL	Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry to moist, v. stiff		
3	SS	3.0	4.5	5-9-12	1.0					@ 3' trace moderate red 5R 4/6 silt		
										@ 6' stiff, geofabric in spoon		
										@ 7.5' v. stiff, wood debris		
4	SS	4.5	6.0	7-10-13	.92		5			@ 9' w/pale yellowish brown 10YR 6/2 fat clay, stiff		
5	SS	6.0	7.5	4-6-9	1.08							
6	SS	7.5	9.0	4-8-12	1.5							
7	SS	9.0	10.5	2-3-7	1.33		10					
8	SS	10.5	12.0	2-4-9	1.5							
9	SS	12.0	13.5	4-5-7	1.33				SC	Clayey sand, moderate brown 5YR 4/4, moist, med. dense, w/l. grey N7 clay, fine grained, trace black N1 silt		
10	SS	13.5	15.0	3-5-9	1.5							
11	SS	15.0	16.5	3-4-7	1.5		15		ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, med. dense, some l. grey N7 fat clay		
12	SS	16.5	18.0	3-4-6	1.16					@ 15' trace l. grey N7 fat clay		
13	SS	18.0	19.5	3-4-4	1.5				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist, loose		
14	SS	19.5	21.0	4-6-8	1.5					@ 18' v. fine to fine grained		

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/1/16** BORING FINISH **2/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-2-3	1.42				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace blacK N1 silt		
16	SS	22.5	24.0	1-3-4	1.5				SP	@ 21.5' 2" clay seam, moderate brown 5YR 4/4 Poorly graded sand, moderate yellowish brown 10YR 5/4, moist, v. fine grained, loose @ 22.8' 2.5" clayey silt seam (prev. material) @ 23.6' 2" grayish orange 10YR 7/4 sand seam (prev. material)		
17	SS	24.0	25.5	4-7-8	.33		25			@ 24' 3" shale fragment, med. l. grey N6 @ 25.5' 2" shale fragments		
18	SS	25.5	27.0	3-6-9	1.5				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace black N1 silt @ 26.6' 1" coarse sand seam, dark yellowish brown 10YR 4/2, w/rounded fine gravel, well graded @ 27.9' 2" coarse sand seam (prev. material) @ 28.7' clay seam, 1.5" (prev. material @ 29.5' .5" coarse sand seam, moderate red 5R4/6, w/black N1 silt, poorly graded @ 31.1' 1/4" coal fragments and black N1 silt @ 31.3' 1/4" coal fragment and black, N1 silt		
19	SS	27.0	28.5	5-6-9	1.5							
20	SS	28.5	30.0	4-7-12	1.5		30					
21	SS	30.0	31.5	5-6-8	1.5				SW	Well graded sand, coarse grained, pale yellowish brown 10YR 6/2, moist, med. dense, trace black N1 silt @ 32.5' .5" coarse sand seam, moderate red (prev. material) @ 33' med. grained @ 35 1/4" coal fragments		
22	SS	31.5	33.0	5-6-10	1.5							
23	SS	33.0	34.5	3-5-8	1.25							
24	SS	34.5	36.0	5-7-9	1.41		35					
25	SS	36.0	37.5	6-5-7	1.25				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, fine grained, some fine gravel, water in spoon @ 36' fine to med. grained @ 38.6' 2" coarse sand seam dark yellowish brown 10YR 4/2 w/black N1 silt (50%)		
26	SS	37.5	39.0	2-3-7	1.33							
27	SS	39.0	40.5	6-8-8	1.41				SP	Poorly graded sand, pale reddish brown 10R 5/4, fine grained, moist to wet, med, dense @ 40' 1/4" coal fragments		
28	SS	40.5	42.0	3-6-9	1.16		40		SW	Well graded sand, moderate, yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 41' coarse sand seam, 3", d. yellowish brown 10YR 4/2, prev. material @ 42.5' coarse sand seam, 3.5", d. yellowish brown 10YR 4/2, w/black N1 silt and fine gravel		
29	SS	42.0	43.5	5-8-8	1.25							
30	SS	43.5	45.0	5-4-7	.83				SW	Well graded sand, d. yelllowish brown 10YR 4/2, coarse grained, moist to wet, med. dense, with fine gravel @ 43.8' trace coal fragments, angular @ 44' no coal fragments		
31	SS	45.0	46.5	6-8-14	1.16		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/1/16** BORING FINISH **2/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	13-10-18	1.33				SW	@ 45.5' some coarse gravel, rounded @ 45.7' .5" coal fragments @ 46' 1.5" coal fragments		
33	SS	48.0	49.5	9-14-19	1.41					Well graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 46.9' 1.5" shale seam		
34	SS	49.5	51.0	11-15-18	1.33		50			@ 47.6' 1" coal fragment and black N1 silt, angular @ 47.8' 1.5" rounded fine gravel, clean, poorly graded		
35	SS	51.0	52.5	6-9-16	1.41					@ 48' 1" shale fragment @ 48.1' dense, poorly graded, trace fine gravel @ 49.5' w/fine gravel		
36	SS	52.5	54.0	7-14-21	1.41					@ 51' well graded, med. dense		
									SP	@ 52.5' trace shale fragments to 1.5"		
37	SS	54.0	55.5	10-12-12	1.5					Poorly graded sand, med. grained, pale yellowish brown 10YR 6/2, moist to wet, dense, trace fine gravel		
									SW			
38	SS	55.5	57.0	9-12-31	1.41		55			Well graded sand, pale yellowish brown 10YR 6/2, fine grained, moist to wet, med. dense, some fine gravel, trace coarse gravel @ 55.5' dense, no coarse gravel		
39	SS	57.0	58.5	10-10-15	1.16					@57' med. dense @ 58' 2.5" shale seam, med. l. grey N6		
40	SS	58.5	60.0	8-10-15	1.5				SW	Well graded sand, l. olive grey 5Y 6/1, fine to med. grained, moist to wet, med. dense, with fine gravel (rounded)		
41	SS	60.0	61.5	7-10-11	1.25		60			@ 61.5' fine grained @ 63' trace fine gravel		
42	SS	61.5	63.0	8-13-13	1.25					@ 64.5' d. yellowish brown 10YR 4/2 @ 66' fine to med. grained, some fine gravel (rounded)		
43	SS	63.0	64.5	7-9-17	1.16							
44	SS	64.5	66.0	6-9-10	1.33		65					
45	SS	66.0	67.5	10-11-15	1.16							
46	SS	67.5	69.0	10-11-15	1.33				SW	Well graded sand, d. yellowish brown 10YR 4/2, coarse grained, moist to wet, med. dense, with fine gravel		
47	SS	69.0	70.5	9-13-15	1.5							
48	SS	70.5	72.0	9-12-18	1.33		70					
									SP	Poorly graded sand, pale yellowish brown 10YR 6/2, fine grained, moist to wet, dense		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **2/1/16** BORING FINISH **2/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	5-8-16	1.41					@ 72' med. dense @ 73' v. fine grained, moist @ 75.5' silty clay seam (~50%), moderate brown 5YR 3/4, moist, stiff to v. stiff @ 76.2' shale fragment, 3"		
50	SS	73.5	75.0	8-8-12	1.33							
51	SS	75.0	76.5	9-11-13	1.5		75					
52	SS	76.5	78.0	8-12-18	1.0				SW	Well graded sand, d. yellowish brown 10YR 4/2, coarse grained, moist to wet, dense, w/fine gavel, trace coarse gravel (rounded) @ 78' 3.5" shale fragment @ 78.4' coarse gravel seam 3" @ 78.6' 3" shale fragment		
53	SS	78.0	79.5	21-21-15	.75							
54	SS	79.5	81.0	3-6-6	1.41				CH	Fat clay, l. grey N7, wet, stiff		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,802.7 E 514,206.9**

GROUND ELEVATION **401.5** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1603S** DATE **4/27/16** SHEET **1** OF **3**

BORING START **2/3/16** BORING FINISH **2/3/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.39** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **38.2** BOTTOM **47.86**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **MJW / TAS** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-3-6	.5					Gravel = 6 inches		
										Topsoil = 12 inches		
2	SS	1.5	3.0	4-11-14	.75				CL	Silty clay, l. brown 5YR 6/4 and l. grey N7 mottled, dry to moist, v. stiff @ 3' trace moderate red 5R 4/6 silt @ 6' stiff, geofabric in spoon @ 7.5' v. stiff, wood debris @ 9' w/pale yellowish brown 10YR 6/2 fat clay, stiff		
3	SS	3.0	4.5	5-9-12	1.0							
4	SS	4.5	6.0	7-10-13	.92		5					
5	SS	6.0	7.5	4-6-9	1.08							
6	SS	7.5	9.0	4-8-12	1.5							
7	SS	9.0	10.5	2-3-7	1.33							
8	SS	10.5	12.0	2-4-9	1.5		10					
9	SS	12.0	13.5	4-5-7	1.33				SC	Clayey sand, moderate brown 5YR 4/4, moist, med. dense, w/l. grey N7 clay, fine grained, trace black N1 silt		
10	SS	13.5	15.0	3-5-9	1.5				ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, med. dense, some l. grey N7 fat clay @ 15' trace l. grey N7 fat clay		
11	SS	15.0	16.5	3-4-7	1.5		15					
12	SS	16.5	18.0	3-4-6	1.16							
13	SS	18.0	19.5	3-4-4	1.5				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist, loose @ 18' v. fine to fine grained		
14	SS	19.5	21.0	4-6-8	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603S** DATE **4/27/16** SHEET **2** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	2-2-3	1.42				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace blacK N1 silt		
16	SS	22.5	24.0	1-3-4	1.5				SP	@ 21.5' 2" clay seam, moderate brown 5YR 4/4 Poorly graded sand, moderate yellowish brown 10YR 5/4, moist, v. fine grained, loose @ 22.8' 2.5" clayey silt seam (prev. material) @ 23.6' 2" grayish orange 10YR 7/4 sand seam (prev. material)		
17	SS	24.0	25.5	4-7-8	.33		25			@ 24' 3" shale fragment, med. l. grey N6 @ 25.5' 2" shale fragments		
18	SS	25.5	27.0	3-6-9	1.5				SP	Poorly graded sand, grayish orange 10YR 7/4, moist, med. dense, fine grained, trace black N1 silt @ 26.6' 1" coarse sand seam, dark yellowish brown 10YR 4/2, w/rounded fine gravel, well graded @ 27.9' 2" coarse sand seam (prev. material) @ 28.7' clay seam, 1.5" (prev. material @ 29.5' .5" coarse sand seam, moderate red 5R4/6, w/black N1 silt, poorly graded @ 31.1' 1/4" coal fragments and black N1 silt @ 31.3' 1/4" coal fragment and black, N1 silt		
19	SS	27.0	28.5	5-6-9	1.5							
20	SS	28.5	30.0	4-7-12	1.5		30					
21	SS	30.0	31.5	5-6-8	1.5				SW	Well graded sand, coarse grained, pale yellowish brown 10YR 6/2, moist, med. dense, trace black N1 silt @ 32.5' .5" coarse sand seam, moderate red (prev. material) @ 33' med. grained @ 35 1/4" coal fragments		
22	SS	31.5	33.0	5-6-10	1.5							
23	SS	33.0	34.5	3-5-8	1.25							
24	SS	34.5	36.0	5-7-9	1.41		35					
25	SS	36.0	37.5	6-5-7	1.25				SP	Poorly graded sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, fine grained, some fine gravel, water in spoon @ 36' fine to med. grained @ 38.6' 2" coarse sand seam dark yellowish brown 10YR 4/2 w/black N1 silt (50%)		
26	SS	37.5	39.0	2-3-7	1.33							
27	SS	39.0	40.5	6-8-8	1.41				SP	Poorly graded sand, pale reddish brown 10R 5/4, fine grained, moist to wet, med, dense @ 40' 1/4" coal fragments		
28	SS	40.5	42.0	3-6-9	1.16		40		SW	Well graded sand, moderate, yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 41' coarse sand seam, 3", d. yellowish brown 10YR 4/2, prev. material @ 42.5' coarse sand seam, 3.5", d. yellowish brown 10YR 4/2, w/black N1 silt and fine gravel		
29	SS	42.0	43.5	5-8-8	1.25							
30	SS	43.5	45.0	5-4-7	.83				SW	Well graded sand, d. yelllowish brown 10YR 4/2, coarse grained, moist to wet, med. dense, with fine gravel @ 43.8' trace coal fragments, angular @ 44' no coal fragments		
31	SS	45.0	46.5	6-8-14	1.16		45					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1603S** DATE **4/27/16** SHEET **3** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	13-10-18	1.33				SW	@ 45.5' some coarse gravel, rounded @ 45.7' .5" coal fragments @ 46' 1.5" coal fragments		
33	SS	48.0	49.5	9-14-19	1.41					Well graded sand, moderate yellowish brown 10YR 5/4, fine grained, moist to wet, med. dense, some fine gravel @ 46.9' 1.5" shale seam @ 47.6' 1" coal fragment and black N1 silt, angular @ 47.8' 1.5" rounded fine gravel, clean, poorly graded @ 48' 1" shale fragment @ 48.1' dense, poorly graded, trace fine gravel @ 49.5' w/fine gravel @ 51' well graded, med. dense @ 52.5' trace shale fragments to 1.5"		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

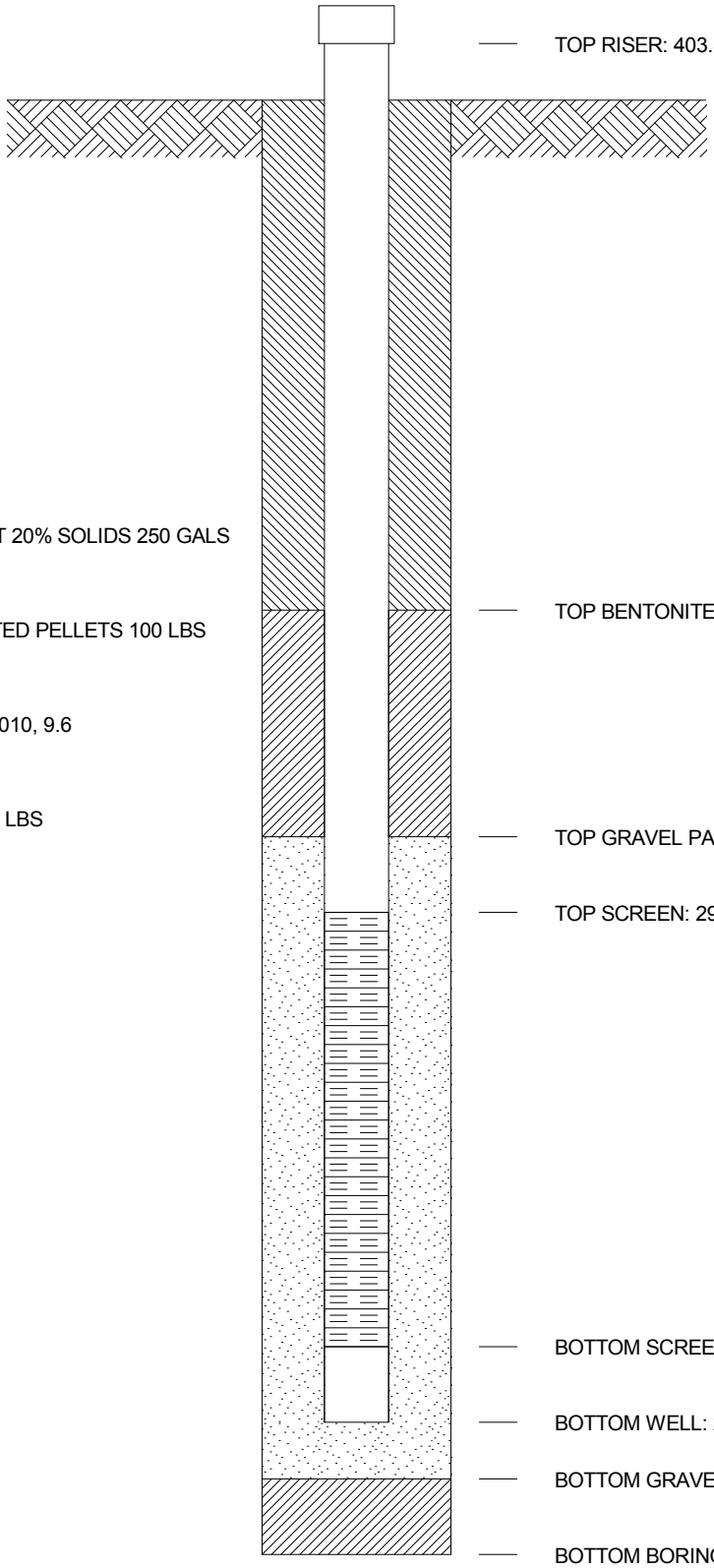
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1603D** BORING No. **MW-1603D** INSTALLED **1/29/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,811.9 E 514,207.5**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 401.56 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 250 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 325 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

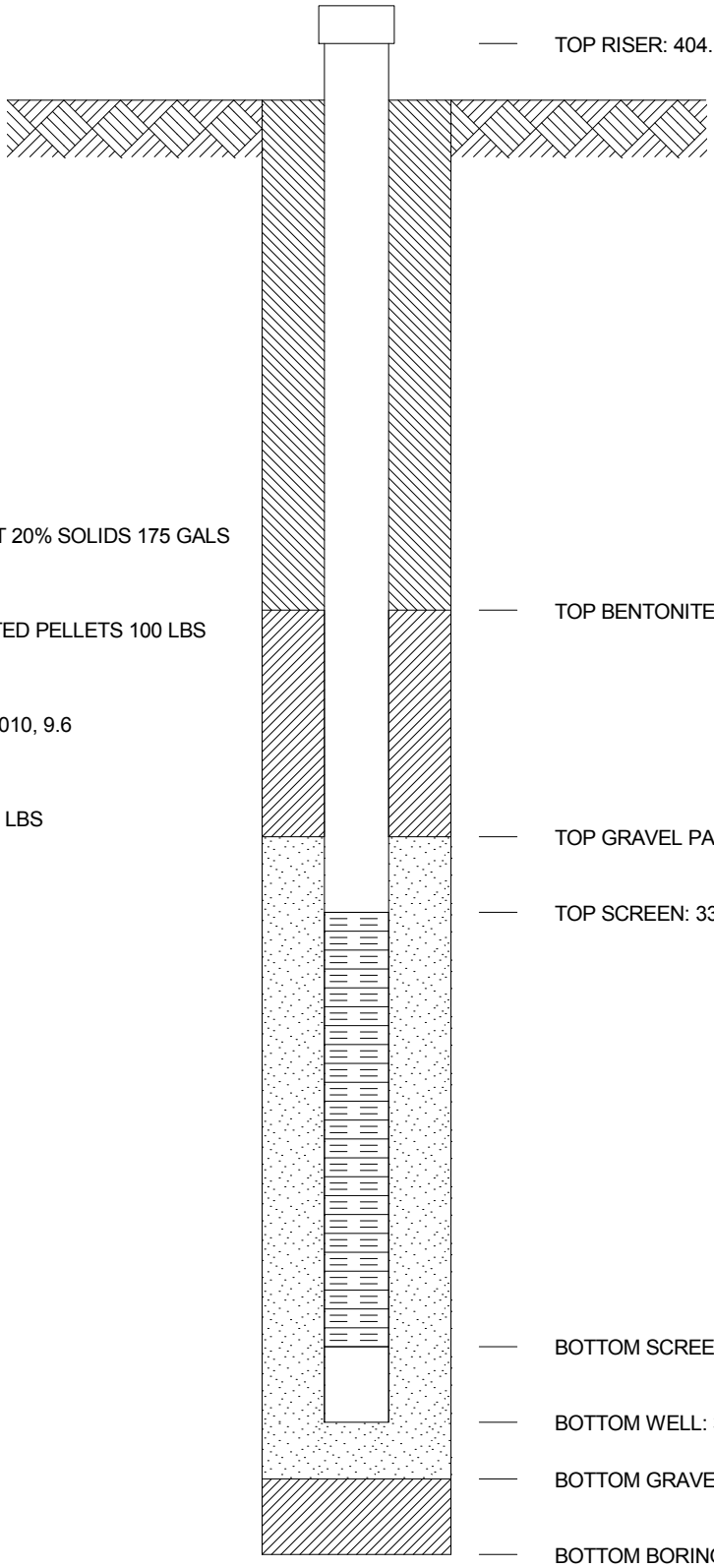
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1603I** BORING No. **MW-1603I** INSTALLED **2/1/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,807.3 E 519,207.2**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 401.41 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 175 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 175 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

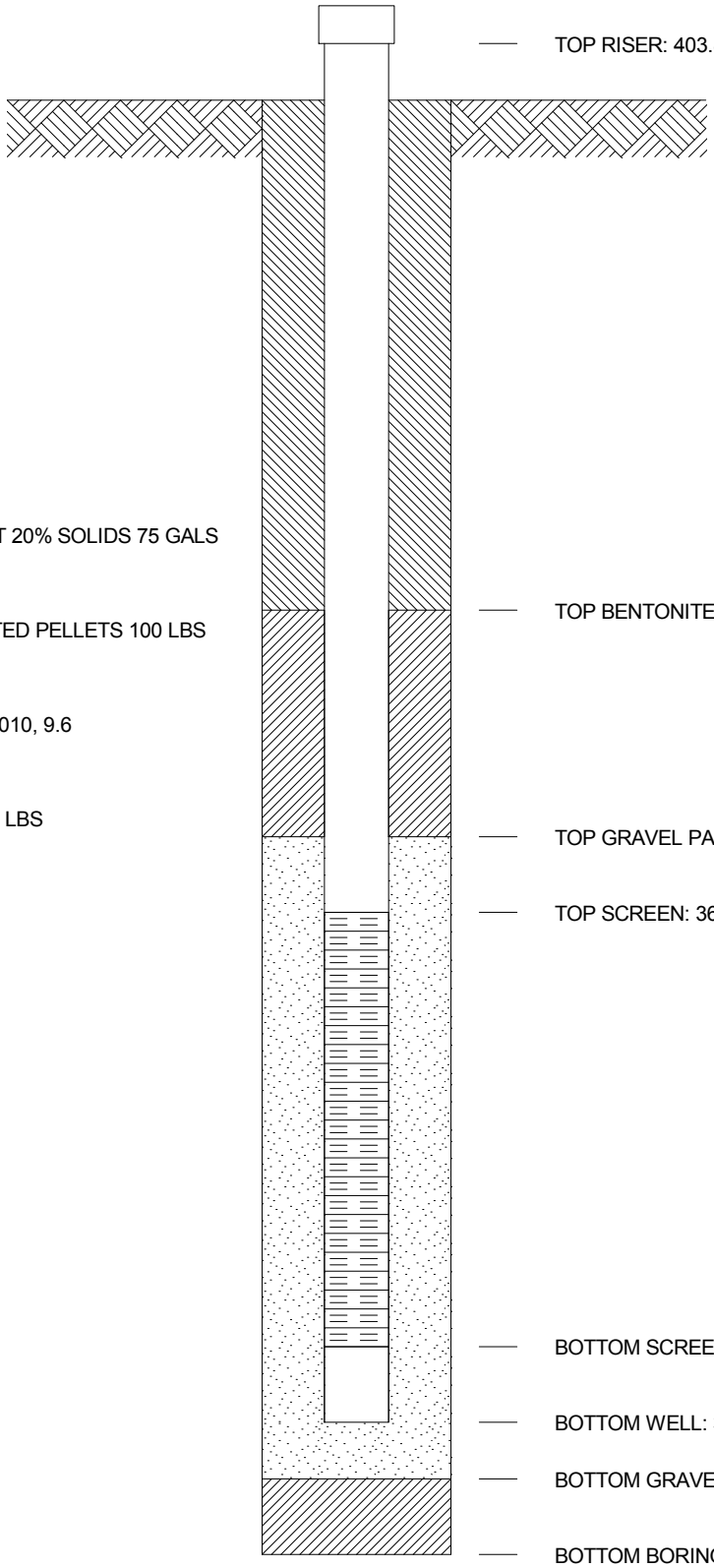
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1603S** BORING No. **MW-1603S** INSTALLED **2/3/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 152,802.7 E 514,206.9**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 401.46 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 75 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 250 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,510.2 E 514,204.9**

GROUND ELEVATION **399.9** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1604D** DATE **4/27/16** SHEET **1** OF **6**

BORING START **1/15/16** BORING FINISH **1/15/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.59** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **115.6** BOTTOM **125.15**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	17-29-28	.6					Surface gravel		
2	SS	1.5	3.0	8-10-10	1.0				CL	Lean silty clay, dark yellowish brown 10YR 4/2, dry to moist, v. stiff @ 3' trace black oxide nodules, some l. brown silt seams, hard		
3	SS	3.0	4.5	10-19-30	1.0							
4	SS	4.5	6.0	5-15-15	1.2							
5	SS	5.0	6.5	5-5-9	1.1		5					
6	SS	7.5	9.0	7-6-9	1.2				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, some medium dark gray N4 silt seams @ 9' wood (~1")		
7	SS	9.0	10.5	6-5-9	1.2							
8	SS	10.0	11.5	4-2-3	1.3		10					
9	SS	12.0	13.5	5-5-7	1.5				CH	Fat clay, olive gray 5Y 4/1, moist, firm, trace black oxide nodules @ 12' stiff @ 13' some moderate yellowish brown 10YR 5/4 silty clay mottled		
10	SS	13.5	15.0	4-5-9	1.5				CH	Fat clay, medium dark gray N4, and silty lean clay, dark yellowish brown 10YR 4/2, mottled, moist, stiff @ 15' tools sunk / 1" spoon driven / material same, pp same, N value inferred @ 15.5' trace black oxide		
11	SS	15.0	16.5	5-6-5	1.0		15					
12	SS	16.5	18.0	2-3-5	1.5				CL ML	Lean silty clay, moderate yellowish brown 10YR 5/4, moist, firm to stiff, w/medium dark gray N4 fat clay seams (~15%)		
13	SS	18.0	19.5	3-4-7	1.5							
14	SS	19.5	21.0	2-3-4	1.4							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **2** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	4-4-4	1.5				ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, loose		
16	SS	22.5	24.0	2-3-3	1.5				SP	Fine grained sand, moderate yellowish brown 10YR 5/4, moist, loose, poorly graded @ 22.2' ~3" seam clayey silt, moderate yellowish brown 10YR 5/4, moist, loose @ 23.8' ~ 2" silt seam		
17	SS	24.0	25.5	1-1-2	1.0				ML	Sandy silt to silty sand, light brown 5YR 5/6, moist, v. loose		
18	SS	25.5	27.0	1-1-2	1.0		25					
19	SS	27.0	28.5	1-1-5	.83							
20	SS	28.5	30.0	1-5-7	.6				SP	Fine sand, dark yellowish orange 10YR 6/6, moist, loose, poorly graded @ 29' transitioning to moderate yellowish brown 10YR 5/4, moist, sample SS20 spilled		
21	SS	30.0	31.5	5-11-12	.8		30		SP	Fine sand, moderate yellowish brown 10YR 5/4, moist, med. dense, poorly graded @ 31.5' moist, dark yellowish brown 10YR 4/2, loose @ 33' v. loose, water in spoon, wet		
22	SS	31.5	33.0	2-4-3	1.1							
23	SS	33.0	34.5	4-1-3	.8							
24	SS	34.5	36.0	4-3-5	.7		35					
25	SS	36.0	37.5	10-6-9	1.5				SW	Coarse grained sand, dark yellowish brown 10YR 4/2, wet loose, well rounded fine gravel, well graded @ 36.5' v. stiff lean clay moderate yellowish brown 10YR 5/4 seam, higher N value likely due to clay, ~30% clay over last 12" longitudinally @ 38' clay seam @ 40' sand sample mostly washed out clay seam (lean clay, moderate yellowish brown 10YR 5/4, wet, v. stiff) ~50%		
26	SS	37.5	39.0	12-10-12	1.5							
27	SS	39.0	40.5	14-14-16	.6		40					
28	SS	40.5	42.0	5-12-19	1.5				SP	Medium grained sand, moderate yellowish brown 10YR 5/4, wet, dense, poorly graded, well rounded fine gravel @ 42' med dense, well rounded fine gravel		
29	SS	42.0	43.5	8-10-10	1.5							
30	SS	43.5	45.0	14-16-11	1.5							
31	SS	45.0	46.5	3-9-12	1.5		45		SW	Coarse grained sand, moderate yellowish brown 10YR 5/4, wet med. dense, w/well rounded fine gravel (to 1/2"), well graded		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **3** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	17-8-9	1.1							
33	SS	48.0	49.5	5-10-11	1.5							
34	SS	49.5	51.0	10-11-12	1.5		50		SP	Fine to med. grained sand, moderate yellowish brown 10YR 5/4, wet, med. dense, poorly graded, w/well rounded fine gravel @ 49.5' trace well rounded fine gravel @ 51' dense, moist @ 55.5' med. dense, transitioning to med. grain @ 57' w/well rounded fine to coarse gravel and rounded sandstone to ~1" @ 60' fully med. grained @ 61.5' w/well rounded fine to coarse gravel and rounded sandstone to 2" @ 63' fine to med. grain, well rounded fine gravel @ 67.5' trace black silt @ 70.5' mostly fine grained, no stone, wet @ 74.8' 1" seam, potential coal or slate, black N1, wet, coarse black N1 silt @ 75' back to fine to med. grain, trace small gravel (~1/4")		
35	SS	51.0	52.5	8-17-18	1.2							
36	SS	52.5	54.0	15-16-16	1.3							
37	SS	54.0	55.5	5-11-19	1.5		55					
38	SS	55.5	57.0	8-10-12	1.0							
39	SS	57.0	58.5	8-12-13	1.1							
40	SS	58.5	60.0	13-9-9	1.1							
41	SS	60.0	61.5	12-9-14	.8		60					
42	SS	61.5	63.0	10-10-11	.8							
43	SS	63.0	64.5	6-10-11	.8							
44	SS	64.5	66.0	7-9-13	1.0		65					
45	SS	66.0	67.5	7-10-16	.7							
46	SS	67.5	69.0	9-10-13	.8							
47	SS	69.0	70.5	8-12-14	.8		70					
48	SS	70.5	72.0	9-9-12	1.0							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **4** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-13	1.0							
50	SS	73.5	75.0	6-10-20	1.3		75					
51	SS	75.0	76.5	11-13-17	1.2							
52	SS	76.5	78.0	8-29-47	.8				SP	Coarse sand with gravel (~50%) to 15", moderate yellowish brown 10YR 5/4, moist, v. dense, well graded @ 78' fine gravel, dense		
53	SS	78.0	79.5	16-23-19	1.0							
54	SS	79.5	81.0	10-13-19	1.5		80					
55	SS	81.0	82.5	7-13-18	1.0				SP	Fine grained sand, moderate yellowish brown 10YR 5/4 to dark yellowish brown 10YR 4/2, moist, dense, trace fine gravel, poorly graded @ 81' moist to wet, no gravel @ 82.5' med. dense, trace gravel @ 84' dense, no gravel @ 85.5' med. dense		
56	SS	82.5	84.0	6-12-17	.9							
57	SS	84.0	85.5	10-16-20	.8		85					
58	SS	85.5	87.0	11-11-17	1.2							
59	SS	87.0	88.5	12-15-13	1.3				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2 to medium dark gray N4, moist to wet, v. stiff, w/sand @ 87.2' fine grained sand, moist med. dense, poorly graded		
60	SS	88.5	90.0	11-8-10	1.3				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2 to medium dark gray N4, moist to wet, v. stiff, w/sand		
61	SS	90.0	91.5	7-6-14	1.2		90		SP	Fine grained sand, dark yellowish brown 10YR 4/2, wet, med. dense, poorly graded		
62	SS	91.5	93.0	6-12-9	1.5				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2, moist to wet, v. stiff, w/sand @ 92.3' 5" sand seam (prev material) @ 93.5' 4" sand seam (prev material)		
63	SS	93.0	94.5	7-6-16	1.3							
64	SS	94.5	96.0	9-11-12	1.5		95		SP	Fine grained sand, dark yellowish brown 10YR 4/2, wet, med. dense, poorly graded, trace pea gravel		
65	SS	96.0	97.5	9-8-9	.8				SW	Coarse sand and gravel, dark yellowish brown 10YR 4/2, moist to wet, med. dense, well graded, gravel to 1.5"		
66	SS	97.5	99.0	13-13-14	.8							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **5** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	13-21-15	1.0		100					
68	SS	100.5	102.0	5-8-12	1.3				SP	Shale, medium dark gray N4, moist, v. stiff to hard, dark yellowish brown 10YR 4/2 w/sand		
69	SS	102.0	103.5	9-13-13	1.1					Fine grained sand, dark yellowish brown 10YR 4/2, v. moist med. dense		
70	SS	103.5	105.0	5-3-8	1.4				SC	Clayey sand, fine grained, dark yellowish brown 10YR 4/2, wet, loose		
71	SS	105.0	106.5	7-11-17	1.4		105					
72	SS	106.5	108.0	10-15-15	1.3				SP	Very fine grain sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, poorly graded		
73	SS	108.0	109.5	6-11-18	1.3				SP	Fine to med. grained sand, moderate yellowish brown 10YR 5/4 to medium dark gray N4, moist to wet, med. dense, poorly graded @ 100' dense @ 111' trace rock to 1.5" @ 112.5' no stone @ 114' med. dense @ 115.5' loose, moist to wet @ 117' med. dense @ 118.5' d. grey, w/black silt @ 120' trace gravel to 1/4", dense @ 121.5' med. dense @ 123' wet, dense		
74	SS	109.5	111.0	9-17-18	1.2		110					
75	SS	111.0	112.5	8-17-24	1.2							
76	SS	112.5	114.0	14-23-23	1.3							
77	SS	114.0	115.5	6-7-10	1.3		115					
78	SS	115.5	117.0	5-5-5	1.3							
79	SS	117.0	118.5	5-5-6	1.4							
80	SS	118.5	120.0	6-9-15	1.3							
81	SS	120.0	121.5	8-15-20	1.5		120					
82	SS	121.5	123.0	8-10-17	1.5							
83	SS	123.0	124.5	7-12-38	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **6** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
84	SS	124.5	126.0	10-13-35	1.4		125					
									SW	Coarse sand, medium dark gray N4, moist to wet, dense, with gravel moist to wet graded		
85	SS	126.0	127.5	37-50/2	.5					@ 125.3' 2" coal seam (black, dry, coarse)		
										Shale, medium dark gray N4, dry, hard TOR @ 125.8' Spoon refusal @ 126.6' BT @ 126.6'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,506.5 E 514,201.0**

GROUND ELEVATION **399.7** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1604I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **1/28/16** BORING FINISH **1/28/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.45** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **69** BOTTOM **78.64**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **MWJ / TAS** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	17-29-28	.6					Surface gravel		
2	SS	1.5	3.0	8-10-10	1.0				CL	Lean silty clay, dark yellowish brown 10YR 4/2, dry to moist, v. stiff @ 3' trace black oxide nodules, some l. brown silt seams, hard		
3	SS	3.0	4.5	10-19-30	1.0							
4	SS	4.5	6.0	5-15-15	1.2		5					
5	SS	5.0	6.5	5-5-9	1.1				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, some medium dark gray N4 silt seams @ 9' wood (~1")		
6	SS	7.5	9.0	7-6-9	1.2							
7	SS	9.0	10.5	6-5-9	1.2		10					
8	SS	10.0	11.5	4-2-3	1.3				CH	Fat clay, olive gray 5Y 4/1, moist, firm, trace black oxide nodules @ 12' stiff @ 13' some moderate yellowish brown 10YR 5/4 silty clay mottled		
9	SS	12.0	13.5	5-5-7	1.5							
10	SS	13.5	15.0	4-5-9	1.5				CH	Fat clay, medium dark gray N4, and silty lean clay, dark yellowish brown 10YR 4/2, mottled, moist, stiff @ 15' tools sunk / 1" spoon driven / material same, pp same, N value inferred @ 15.5' trace black oxide		
11	SS	15.0	16.5	5-6-5	1.0		15					
12	SS	16.5	18.0	2-3-5	1.5				CL ML	Lean silty clay, moderate yellowish brown 10YR 5/4, moist, firm to stiff, w/medium dark gray N4 fat clay seams (~15%)		
13	SS	18.0	19.5	3-4-7	1.5							
14	SS	19.5	21.0	2-3-4	1.4							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **1/28/16** BORING FINISH **1/28/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	4-4-4	1.5				ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, loose		
16	SS	22.5	24.0	2-3-3	1.5				SP	Fine grained sand, moderate yellowish brown 10YR 5/4, moist, loose, poorly graded @ 22.2' ~3" seam clayey silt, moderate yellowish brown 10YR 5/4, moist, loose @ 23.8' ~ 2" silt seam		
17	SS	24.0	25.5	1-1-2	1.0				ML	Sandy silt to silty sand, light brown 5YR 5/6, moist, v. loose		
18	SS	25.5	27.0	1-1-2	1.0		25					
19	SS	27.0	28.5	1-1-5	.83							
20	SS	28.5	30.0	1-5-7	.6				SP	Fine sand, dark yellowish orange 10YR 6/6, moist, loose, poorly graded @ 29' transitioning to moderate yellowish brown 10YR 5/4, moist, sample SS20 spilled		
21	SS	30.0	31.5	5-11-12	.8		30		SP	Fine sand, moderate yellowish brown 10YR 5/4, moist, med. dense, poorly graded @ 31.5' moist, dark yellowish brown 10YR 4/2, loose @ 33' v. loose, water in spoon, wet		
22	SS	31.5	33.0	2-4-3	1.1							
23	SS	33.0	34.5	4-1-3	.8							
24	SS	34.5	36.0	4-3-5	.7		35					
25	SS	36.0	37.5	10-6-9	1.5				SW	Coarse grained sand, dark yellowish brown 10YR 4/2, wet loose, well rounded fine gravel, well graded @ 36.5' v. stiff lean clay moderate yellowish brown 10YR 5/4 seam, higher N value likely due to clay, ~30% clay over last 12" longitudinally @ 38' clay seam @ 40' sand sample mostly washed out clay seam (lean clay, moderate yellowish brown 10YR 5/4, wet, v. stiff) ~50%		
26	SS	37.5	39.0	12-10-12	1.5							
27	SS	39.0	40.5	14-14-16	.6		40					
28	SS	40.5	42.0	5-12-19	1.5				SP	Medium grained sand, moderate yellowish brown 10YR 5/4, wet, dense, poorly graded, well rounded fine gravel @ 42' med dense, well rounded fine gravel		
29	SS	42.0	43.5	8-10-10	1.5							
30	SS	43.5	45.0	14-16-11	1.5							
31	SS	45.0	46.5	3-9-12	1.5		45		SW	Coarse grained sand, moderate yellowish brown 10YR 5/4, wet med. dense, w/well rounded fine gravel (to 1/2"), well graded		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **1/28/16** BORING FINISH **1/28/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	17-8-9	1.1							
33	SS	48.0	49.5	5-10-11	1.5							
34	SS	49.5	51.0	10-11-12	1.5		50		SP	Fine to med. grained sand, moderate yellowish brown 10YR 5/4, wet, med. dense, poorly graded, w/well rounded fine gravel @ 49.5' trace well rounded fine gravel @ 51' dense, moist @ 55.5' med. dense, transitioning to med. grain @ 57' w/well rounded fine to coarse gravel and rounded sandstone to ~1" @ 60' fully med. grained @ 61.5' w/well rounded fine to coarse gravel and rounded sandstone to 2" @ 63' fine to med. grain, well rounded fine gravel @ 67.5' trace black silt @ 70.5' mostly fine grained, no stone, wet @ 74.8' 1" seam, potential coal or slate, black N1, wet, coarse black N1 silt @ 75' back to fine to med. grain, trace small gravel (~1/4")		
35	SS	51.0	52.5	8-17-18	1.2							
36	SS	52.5	54.0	15-16-16	1.3							
37	SS	54.0	55.5	5-11-19	1.5		55					
38	SS	55.5	57.0	8-10-12	1.0							
39	SS	57.0	58.5	8-12-13	1.1							
40	SS	58.5	60.0	13-9-9	1.1							
41	SS	60.0	61.5	12-9-14	.8		60					
42	SS	61.5	63.0	10-10-11	.8							
43	SS	63.0	64.5	6-10-11	.8							
44	SS	64.5	66.0	7-9-13	1.0		65					
45	SS	66.0	67.5	7-10-16	.7							
46	SS	67.5	69.0	9-10-13	.8							
47	SS	69.0	70.5	8-12-14	.8		70					
48	SS	70.5	72.0	9-9-12	1.0							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **1/28/16** BORING FINISH **1/28/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-13	1.0							
50	SS	73.5	75.0	6-10-20	1.3							
51	SS	75.0	76.5	11-13-17	1.2		75					
52	SS	76.5	78.0	8-29-47	.8							
53	SS	78.0	79.5	16-23-19	1.0				SP	Coarse sand with gravel (~50%) to 15", moderate yellowish brown 10YR 5/4, moist, v. dense, well graded @ 78' fine gravel, dense		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,503.1 E 514,197.3**

GROUND ELEVATION **399.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1604S** DATE **4/27/16** SHEET **1** OF **3**

BORING START **1/29/16** BORING FINISH **1/29/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.70** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **36.7** BOTTOM **46.26**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **MWJ / TAS** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	17-29-28	.6					Surface gravel		
2	SS	1.5	3.0	8-10-10	1.0				CL	Lean silty clay, dark yellowish brown 10YR 4/2, dry to moist, v. stiff @ 3' trace black oxide nodules, some l. brown silt seams, hard		
3	SS	3.0	4.5	10-19-30	1.0							
4	SS	4.5	6.0	5-15-15	1.2							
5	SS	5.0	6.5	5-5-9	1.1		5					
6	SS	7.5	9.0	7-6-9	1.2				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, some medium dark gray N4 silt seams @ 9' wood (~1")		
7	SS	9.0	10.5	6-5-9	1.2							
8	SS	10.0	11.5	4-2-3	1.3		10					
9	SS	12.0	13.5	5-5-7	1.5				CH	Fat clay, olive gray 5Y 4/1, moist, firm, trace black oxide nodules @ 12' stiff @ 13' some moderate yellowish brown 10YR 5/4 silty clay mottled		
10	SS	13.5	15.0	4-5-9	1.5				CH	Fat clay, medium dark gray N4, and silty lean clay, dark yellowish brown 10YR 4/2, mottled, moist, stiff @ 15' tools sunk / 1" spoon driven / material same, pp same, N value inferred @ 15.5' trace black oxide		
11	SS	15.0	16.5	5-6-5	1.0		15					
12	SS	16.5	18.0	2-3-5	1.5				CL ML	Lean silty clay, moderate yellowish brown 10YR 5/4, moist, firm to stiff, w/medium dark gray N4 fat clay seams (~15%)		
13	SS	18.0	19.5	3-4-7	1.5							
14	SS	19.5	21.0	2-3-4	1.4							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604S** DATE **4/27/16** SHEET **2** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
									ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, loose		
15	SS	21.0	22.5	4-4-4	1.5				SP	Fine grained sand, moderate yellowish brown 10YR 5/4, moist, loose, poorly graded		
16	SS	22.5	24.0	2-3-3	1.5					@ 22.2' ~3" seam clayey silt, moderate yellowish brown 10YR 5/4, moist, loose		
17	SS	24.0	25.5	1-1-2	1.0					@ 23.8' ~ 2" silt seam		
									ML	Sandy silt to silty sand, light brown 5YR 5/6, moist, v. loose		
18	SS	25.5	27.0	1-1-2	1.0		25					
19	SS	27.0	28.5	1-1-5	.83							
20	SS	28.5	30.0	1-5-7	.6				SP	Fine sand, dark yellowish orange 10YR 6/6, moist, loose, poorly graded		
21	SS	30.0	31.5	5-11-12	.8					@ 29' transitioning to moderate yellowish brown 10YR 5/4, moist, sample SS20 spilled		
22	SS	31.5	33.0	2-4-3	1.1		30		SP	Fine sand, moderate yellowish brown 10YR 5/4, moist, med. dense, poorly graded		
23	SS	33.0	34.5	4-1-3	.8					@ 31.5' moist, dark yellowish brown 10YR 4/2, loose		
24	SS	34.5	36.0	4-3-5	.7					@ 33' v. loose, water in spoon, wet		
25	SS	36.0	37.5	10-6-9	1.5		35		SW	Coarse grained sand, dark yellowish brown 10YR 4/2, wet loose, well rounded fine gravel, well graded		
26	SS	37.5	39.0	12-10-12	1.5					@ 36.5' v. stiff lean clay moderate yellowish brown 10YR 5/4 seam, higher N value likely due to clay, ~30% clay over last 12" longitudinally		
27	SS	39.0	40.5	14-14-16	.6					@ 38' clay seam		
28	SS	40.5	42.0	5-12-19	1.5		40			@ 40' sand sample mostly washed out clay seam (lean clay, moderate yellowish brown 10YR 5/4, wet, v. stiff) ~50%		
29	SS	42.0	43.5	8-10-10	1.5				SP	Medium grained sand, moderate yellowish brown 10YR 5/4, wet, dense, poorly graded, well rounded fine gravel		
30	SS	43.5	45.0	14-16-11	1.5					@ 42' med dense, well rounded fine gravel		
31	SS	45.0	46.5	3-9-12	1.5		45		SW	Coarse grained sand, moderate yellowish brown 10YR 5/4, wet med. dense, w/well rounded fine gravel (to 1/2"), well graded		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604S** DATE **4/27/16** SHEET **3** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **1/29/16** BORING FINISH **1/29/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	17-8-9	1.1							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

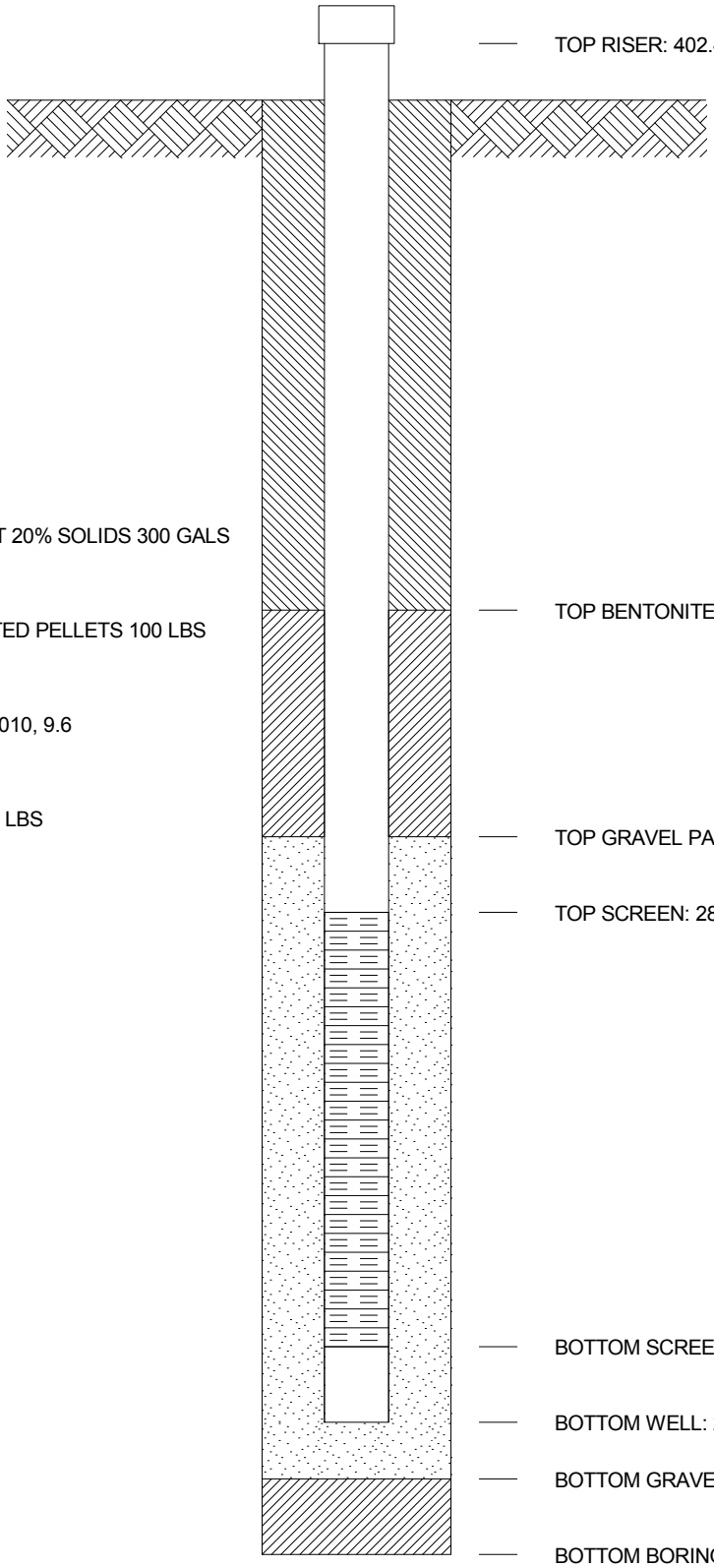
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1604D** BORING No. **MW-1604D** INSTALLED **1/15/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,510.2 E 514,204.9**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.85 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 300 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

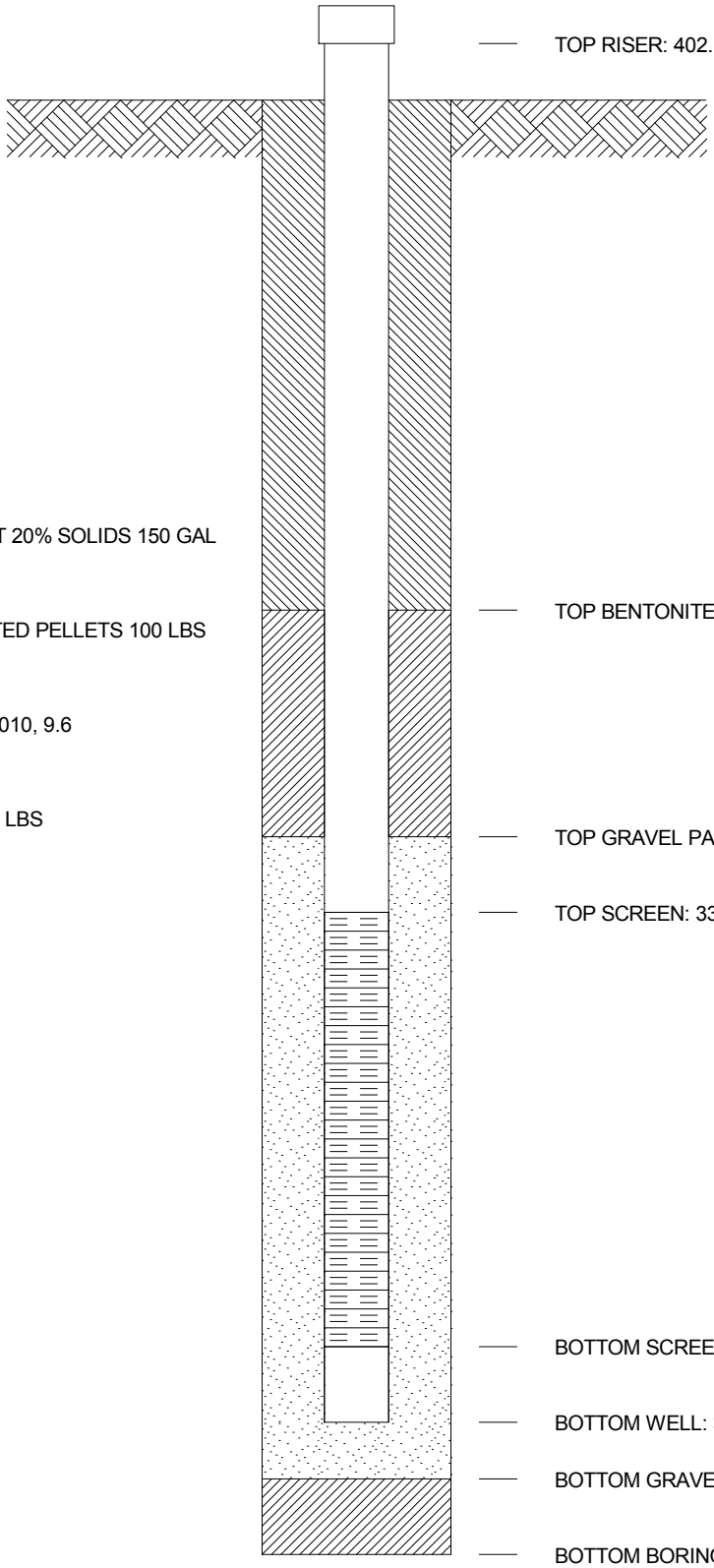
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1604I** BORING No. **MW-1604I** INSTALLED **1/28/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,506.5 E 514,201.0**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.74 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 150 GAL

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 100 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

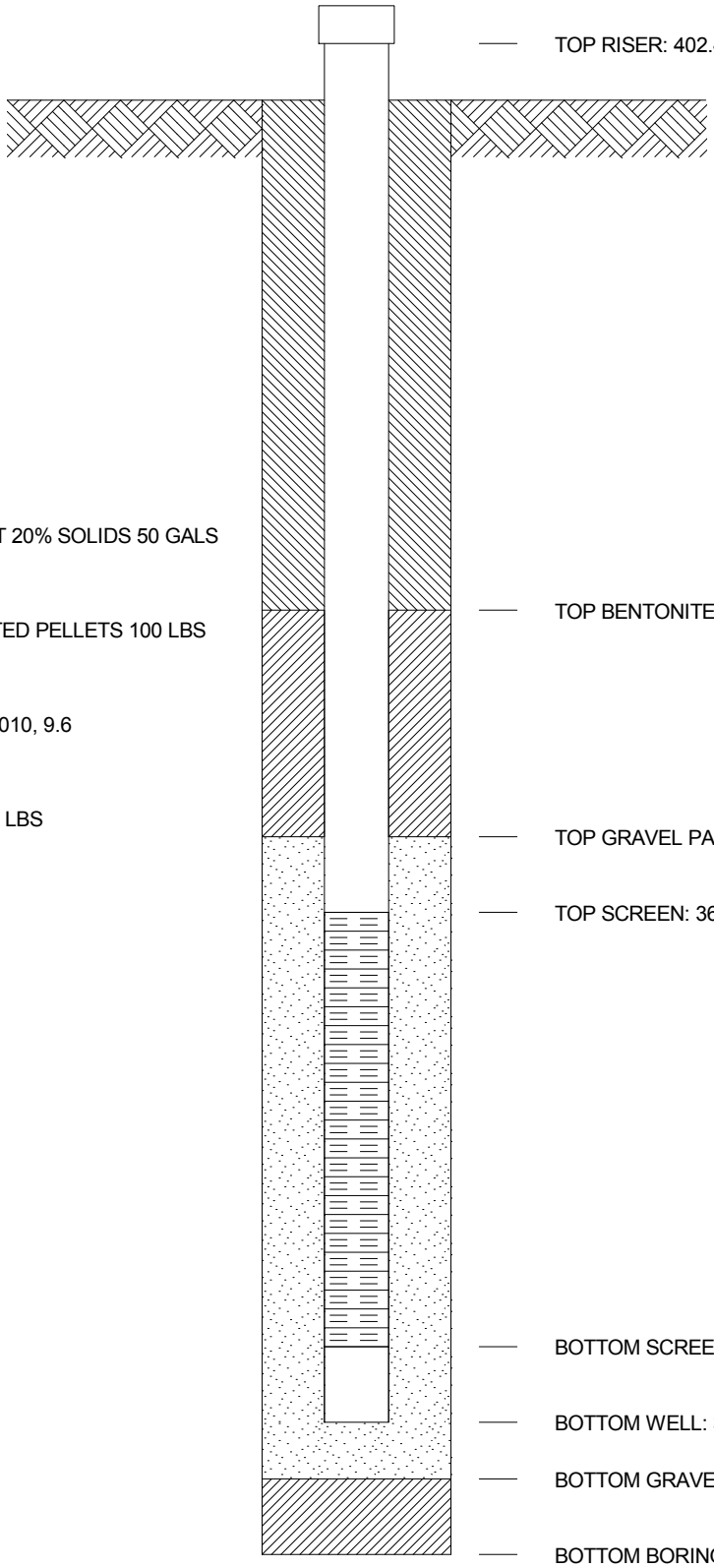
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1604S** BORING No. **MW-1604S** INSTALLED **1/29/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,503.1 E 514,197.3**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 399.76 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 50 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 275 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.9 E 513,537.1**

GROUND ELEVATION **400.4** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1605D** DATE **4/27/16** SHEET **1** OF **6**

BORING START **2/3/16** BORING FINISH **2/3/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.36** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **114.6** BOTTOM **124.22**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	20-13-10	1.25					Gravel = 6 inches		
2	SS	1.5	3.0	5-15-18	1.25				CL	Silty clay, moderate yellowish brown 10R 5/4 and med l. grey N6 mottled, moist, v. stiff @ 1.5' hard @ 3' v. stiff		
3	SS	3.0	4.5	7-9-15	1.41							
4	SS	4.5	6.0	11-12-14	1.5		5					
5	SS	6.0	7.5	4-8-11	1.41				ML	Clayey silt, medium grey N5, moist, med. dense, w/mod. yellowish brown 10R 5/4 silty clay mottled		
6	SS	7.5	9.0	3-6-11	1.33							
7	SS	9.0	10.5	3-4-7	1.41				CL	Silty clay, mod. yellowish brown 10R 5/4, moist, stiff, w/med. grey N5 clayey silt mottled		
8	SS	10.5	12.0	3-4-6	1.5		10					
9	SS	12.0	13.5	2-2-4	1.5				CH	Fat to lean clay, med. l. grey N6, moist, firm		
10	SS	13.5	15.0	2-2-5	1.41							
11	SS	15.0	16.5	2-4-5	1.5		15		CL ML	Silty clay, mod. reddish brown 10R 4/6 w/med. l. grey N6 fat clay heavily mottled, moist, firm @ 15' stiff @ 15.5' l" shale fragment, angular @ 18' very silty @ 20' trace to some pale yellowish brown 10YR 6/2 silt		
12	SS	16.5	18.0	3-5-9	1.5							
13	SS	18.0	19.5	3-6-8	1.41							
14	SS	19.5	21.0	3-5-7	1.41							

TYPE OF CASING USED

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

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **2** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-7	1.5				ML	Clayey silt, pale yellowish brown 10YR 6/2, moist, med. dense, w/silty clay (prev. material), trace sand		
16	SS	22.5	24.0	4-4-5	1.5				SP	Poorly graded sand, v. fine to fine grained, l. brown 5YR 5/6, moist, loose		
17	SS	24.0	25.5	1-1-3	1.5					@ 23.2' 2" clayey silt seam (prev. material)		
18	SS	25.5	27.0	1-1-1	1.5		25		ML	Clayey silt, pale yellowish brown 10YR 6/2, moist to wet, v. loose @ 25' 2" l. brown sand seam (prev. material) @ 26' 2" l. brown sand seam @ 26.4' 15" l. brown sand seam @ 26.8' l" l. brown sand seam @ 27' loose @ 28' 2" l. brown sand seam		
19	SS	27.0	28.5	2-1-4	1.5							
20	SS	28.5	30.0	5-6-7	1.33							
21	SS	30.0	31.5	3-5-7	1.25		30		SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, moist, med. dense @ 30' d. yellowish orange 10YR 6/6 @ 31' 3" clayey silt seam (prev. material) @ 32.3' trace fine gravel and black silt @ 32.5' no fine gravel or silt @ 33' moist, loose @ 34.1' 2" clayey silt seam (prev. material) @ 34.5' moist to wet, water in spoon @ 34.9' 2.5' clayey silt seam (prev. material)		
22	SS	31.5	33.0	5-7-8	1.5							
23	SS	33.0	34.5	3-3-6	1.41							
24	SS	34.5	36.0	2-4-5	1.5		35					
25	SS	36.0	37.5	2-4-6	1.33							
26	SS	37.5	39.0	4-3-8	1.5				SW	Well graded sand, fine grained, l. brown 5YR 5/6, moist to wet, med. dense, w/fine gravel		
27	SS	39.0	40.5	3-3-5	1.5				SW			
28	SS	40.5	42.0	11-8-10	1.25		40		SP	Well graded sand, coarse grained, grayish black N2, moist to wet, med. dense, trace fine gravel		
29	SS	42.0	43.5	4-5-11	1.5				SW	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist to wet, med. dense		
30	SS	43.5	45.0	8-9-9	1.16				SP	Well graded sand, fine to med. grained, moderate yellowish brown 10YR 5/4, moist to wet, loose @ 40.5' med. dense @ 41' 1.5" shale seam w/clay		
31	SS	45.0	46.5	6-9-14	1.5		45		SW	Poorly graded sand, v. fine to fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense		
										Well graded sand, med. grained, mod. reddish brown 10R 4/6, moist to wet, med. dense		
									SP	@ 44' med. to coarse grained		
										Poorly graded sand, fine grained, mod. yellowish		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **3** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-8-11	1.5				SW	brown 10YR 5/4, moist to wet, mod. dense, some fine gravel		
33	SS	48.0	49.5	6-10-14	1.5				SP	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, med. dense, trace fine gravel		
34	SS	49.5	51.0	8-12-18	1.33		50			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense, trace fine gravel @ 48' w/fine gravel, trace coarse gravel @ 49.5' no coarse gravel		
35	SS	51.0	52.5	8-11-18	1.41							
36	SS	52.5	54.0	8-9-13	.91				SW	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, mod. dense, trace fine gravel		
37	SS	54.0	55.5	11-20-26	1.25		55		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace fine gravel @ 54' no fine gravel, dense @ 57' wet, mod. dense @ 60' dense @ 63' mod. dense		
38	SS	55.5	57.0	10-15-16	1.5							
39	SS	57.0	58.5	6-12-16	1.33							
40	SS	58.5	60.0	7-10-18	1.33		60					
41	SS	60.0	61.5	8-9-12	1.33							
42	SS	61.5	63.0	10-13-19	1.25							
43	SS	63.0	64.5	9-11-18	1.33							
44	SS	64.5	66.0	9-11-15	1.08		65		SW	Well graded sand, med. to coarse grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace black silt		
45	SS	66.0	67.5	7-8-13	1.41				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense @ 68.5' trace fine gravel, trace coal fragments @ 70' no fine gravel, no coal fragments @ 70.9' trace fine gravel @ 71.6' no fine gravel, wet		
46	SS	67.5	69.0	5-5-8	1.5							
47	SS	69.0	70.5	6-8-12	1.5		70					
48	SS	70.5	72.0	0-12-16	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **4** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-8-10	1.25				SW	Well graded sand, fine grained d. yellowish brown 10YR 4/2, moist to wet, mod. dense, trace fine gravel		
50	SS	73.5	75.0	9-12-17	1.41					@ 73.5' w/fine gravel, trace coarse gravel		
51	SS	75.0	76.5	8-7-9	1.5		75		SW	Well graded sand, coarse grained, brownish grey 5YR 4/1, moist to wet, mod. dense, w/fine gravel, trace coarse gravel		
52	SS	76.5	78.0	10-15-25	1.5							
53	SS	78.0	79.5	7-13-12	1.33				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, dense, trace fine gravel		
54	SS	79.5	81.0	5-7-12	1.5		80			@ 78' mod. dense @ 81' v. fine to fine grained @ 82.5' no fine gravel @ 84' dense @ 85' 2" shale fragment @ 85.2' v. fine grained @ 85.5' 3.5" shale fragment @ 87' fine grained, d. yellowish brown 10YR 4/2 @ 88.5' v. fine grained, mod. dense		
55	SS	81.0	82.5	6-12-13	1.5							
56	SS	82.5	84.0	8-10-16	1.41							
57	SS	84.0	85.5	10-21-22	1.41		85					
58	SS	85.5	87.0	14-21-14	.5							
59	SS	87.0	88.5	6-13-25	1.41							
60	SS	88.5	90.0	8-9-9	1.16				ML	Clayey silt, med. l. grey N6, moist to wet, mod. dense		
61	SS	90.0	91.5	15-24-7	1.41		90		SP	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, dense		
62	SS	91.5	93.0	7-21-28	1.5				ML	Clayey silt, med. l. grey N6, moist to wet, dense		
63	SS	93.0	94.5	14-18-21	1.5				SW	Well graded sand, coarse grained, med. grey N5, w/fine gravel, some coarse gravel		
64	SS	94.5	96.0	12-17-25	1.5		95		ML	Clayey silt, med. l. grey N6, moist to wet, dense		
65	SS	96.0	97.5	20-21-19	1.33				SW	Well graded sand, fine grained, med. grey N5, moist to wet, dense, w/fine gravel		
66	SS	97.5	99.0	13-11-18	1.41					Clayey silt, med. l. grey N6, moist to wet, dense Well graded sand, coarse grained, med. grey N5, moist to wet, dense, w/fine gravel @ 98.7' coal fragments		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **5** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	15-22-28	1.5		100		SP	Poorly graded sand, v. fine to fine grained, pale yellowish brown 10YR 6/2, moist to wet, dense, w/fine gravel @ 100.5' no fine gravel, mod. dense @ 102' v. fine, dense @ 105' mod. dense @ 106' trace coal fragments @ 106.3' no coal fragments @ 109.5' moist @ 111' v. moist to wet @ 112.5' moist to wet, dense @ 113' trace fine gravel, trace coarse gravel @ 113.5' no fine gravel, no coarse gravel		
68	SS	100.5	102.0	8-8-9	1.5							
69	SS	102.0	103.5	10-16-18	1.5							
70	SS	103.5	105.0	9-13-18	1.41		105					
71	SS	105.0	106.5	8-12-16	1.5							
72	SS	106.5	108.0	6-9-13	1.5							
73	SS	108.0	109.5	7-8-12	1.25							
74	SS	109.5	111.0	6-8-10	1.41		110					
75	SS	111.0	112.5	5-10-12	1.25							
76	SS	112.5	114.0	6-11-27	1.33							
77	SS	114.0	115.5	13-21-13	1.25				SW	Well graded sand, med. to coarse grained, med. grey N5, moist to wet, dense, w/fine gravel, some coarse gavel @ 115.5' coarse grained, mod. dense, trace coarse gravel @ 118.5' v. dense		
78	SS	115.5	117.0	7-7-9	1.33		115					
79	SS	117.0	118.5	9-9-8	1.16							
80	SS	118.5	120.0	12-36-22	1.5							
81	SS	120.0	121.5	10-11-19	1.41		120		SP	Poorly graded sand, v. fine grained, med. l. grey N6, moist to wet, v. dense @ 120' med. dense, sl. moist @ 122' fine grained, w/fine gravel, dense @ 124.5' trace coarse gravel		
82	SS	121.5	123.0	12-20-29	1.5							
83	SS	123.0	124.5	14-16-19	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **6** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
84	SS	124.5	126.0	18-12-25	1.5		125					
85	SS	126.0	127.5	17-28-50/5	1.5				ML	Clayey silt, l. grey N7, moist, hard, non-durable shale @ 126' flaky, dry to moist Spoon refusal @ 127.4' Auger refusal @127.5' (shale)		
86	SS	127.5	129.0	27-50/2	.66							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.9 E 513,532.6**

GROUND ELEVATION **400.6** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1605I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **3/2/16** BORING FINISH **3/2/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.62** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **68.9** BOTTOM **78.5**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	20-13-10	1.25					Gravel = 6 inches		
2	SS	1.5	3.0	5-15-18	1.25				CL	Silty clay, moderate yellowish brown 10R 5/4 and med l. grey N6 mottled, moist, v. stiff @ 1.5' hard @ 3' v. stiff		
3	SS	3.0	4.5	7-9-15	1.41							
4	SS	4.5	6.0	11-12-14	1.5		5					
5	SS	6.0	7.5	4-8-11	1.41				ML	Clayey silt, medium grey N5, moist, med. dense, w/mod. yellowish brown 10R 5/4 silty clay mottled		
6	SS	7.5	9.0	3-6-11	1.33							
7	SS	9.0	10.5	3-4-7	1.41				CL	Silty clay, mod. yellowish brown 10R 5/4, moist, stiff, w/med. grey N5 clayey silt mottled		
8	SS	10.5	12.0	3-4-6	1.5		10					
9	SS	12.0	13.5	2-2-4	1.5				CH	Fat to lean clay, med. l. grey N6, moist, firm		
10	SS	13.5	15.0	2-2-5	1.41							
11	SS	15.0	16.5	2-4-5	1.5		15		CL ML	Silty clay, mod. reddish brown 10R 4/6 w/med. l. grey N6 fat clay heavily mottled, moist, firm @ 15' stiff @ 15.5' l" shale fragment, angular @ 18' very silty @ 20' trace to some pale yellowish brown 10YR 6/2 silt		
12	SS	16.5	18.0	3-5-9	1.5							
13	SS	18.0	19.5	3-6-8	1.41							
14	SS	19.5	21.0	3-5-7	1.41							

TYPE OF CASING USED

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

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/2/16** BORING FINISH **3/2/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-7	1.5				ML	Clayey silt, pale yellowish brown 10YR 6/2, moist, med. dense, w/silty clay (prev. material), trace sand		
16	SS	22.5	24.0	4-4-5	1.5				SP	Poorly graded sand, v. fine to fine grained, l. brown 5YR 5/6, moist, loose		
17	SS	24.0	25.5	1-1-3	1.5					@ 23.2' 2" clayey silt seam (prev. material)		
18	SS	25.5	27.0	1-1-1	1.5		25		ML	Clayey silt, pale yellowish brown 10YR 6/2, moist to wet, v. loose @ 25' 2" l. brown sand seam (prev. material) @ 26' 2" l. brown sand seam @ 26.4' 15" l. brown sand seam @ 26.8' l" l. brown sand seam @ 27' loose @ 28' 2" l. brown sand seam		
19	SS	27.0	28.5	2-1-4	1.5							
20	SS	28.5	30.0	5-6-7	1.33							
21	SS	30.0	31.5	3-5-7	1.25		30		SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, moist, med. dense @ 30' d. yellowish orange 10YR 6/6 @ 31' 3" clayey silt seam (prev. material) @ 32.3' trace fine gravel and black silt @ 32.5' no fine gravel or silt @ 33' moist, loose @ 34.1' 2" clayey silt seam (prev. material) @ 34.5' moist to wet, water in spoon @ 34.9' 2.5' clayey silt seam (prev. material)		
22	SS	31.5	33.0	5-7-8	1.5							
23	SS	33.0	34.5	3-3-6	1.41							
24	SS	34.5	36.0	2-4-5	1.5		35					
25	SS	36.0	37.5	2-4-6	1.33				SW	Well graded sand, fine grained, l. brown 5YR 5/6, moist to wet, med. dense, w/fine gravel		
26	SS	37.5	39.0	4-3-8	1.5				SW			
27	SS	39.0	40.5	3-3-5	1.5				SP	Well graded sand, coarse grained, grayish black N2, moist to wet, med. dense, trace fine gravel		
28	SS	40.5	42.0	11-8-10	1.25		40		SW	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist to wet, med. dense		Begin Mud Rotary @ 40.5'
29	SS	42.0	43.5	4-5-11	1.5				SP	Well graded sand, fine to med. grained, moderate yellowish brown 10YR 5/4, moist to wet, loose @ 40.5' med. dense @ 41' 1.5" shale seam w/clay		
30	SS	43.5	45.0	8-9-9	1.16				SW	Poorly graded sand, v. fine to fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense		
31	SS	45.0	46.5	6-9-14	1.5		45		SP	Well graded sand, med. grained, mod. reddish brown 10R 4/6, moist to wet, med. dense @ 44' med. to coarse grained		
										Poorly graded sand, fine grained, mod. yellowish		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/2/16** BORING FINISH **3/2/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-8-11	1.5				SW	brown 10YR 5/4, moist to wet, mod. dense, some fine gravel		
33	SS	48.0	49.5	6-10-14	1.5				SP	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, med. dense, trace fine gravel		
34	SS	49.5	51.0	8-12-18	1.33		50			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense, trace fine gravel @ 48' w/fine gravel, trace coarse gravel @ 49.5' no coarse gravel		
35	SS	51.0	52.5	8-11-18	1.41							
36	SS	52.5	54.0	8-9-13	.91				SW	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, mod. dense, trace fine gravel		
37	SS	54.0	55.5	11-20-26	1.25		55		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace fine gravel @ 54' no fine gravel, dense @ 57' wet, mod. dense @ 60' dense @ 63' mod. dense		
38	SS	55.5	57.0	10-15-16	1.5							
39	SS	57.0	58.5	6-12-16	1.33							
40	SS	58.5	60.0	7-10-18	1.33		60					
41	SS	60.0	61.5	8-9-12	1.33							
42	SS	61.5	63.0	10-13-19	1.25							
43	SS	63.0	64.5	9-11-18	1.33							
44	SS	64.5	66.0	9-11-15	1.08		65		SW	Well graded sand, med. to coarse grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace black silt		
45	SS	66.0	67.5	7-8-13	1.41				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense @ 68.5' trace fine gravel, trace coal fragments @ 70' no fine gravel, no coal fragments @ 70.9' trace fine gravel @ 71.6' no fine gravel, wet		
46	SS	67.5	69.0	5-5-8	1.5							
47	SS	69.0	70.5	6-8-12	1.5		70					
48	SS	70.5	72.0	0-12-16	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/2/16** BORING FINISH **3/2/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-8-10	1.25				SW	Well graded sand, fine grained d. yellowish brown 10YR 4/2, moist to wet, mod. dense, trace fine gravel		
50	SS	73.5	75.0	9-12-17	1.41					@ 73.5' w/fine gravel, trace coarse gravel		
51	SS	75.0	76.5	8-7-9	1.5		75		SW	Well graded sand, coarse grained, brownish grey 5YR 4/1, moist to wet, mod. dense, w/fine gravel, trace coarse gravel		
52	SS	76.5	78.0	10-15-25	1.5				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, dense, trace fine gravel		
53	SS	78.0	79.5	7-13-12	1.33					@ 78' mod. dense		
54	SS	79.5	81.0	5-7-12	1.5		80			@ 81' v. fine to fine grained @ 82.5' no fine gravel @ 84' dense @ 85' 2" shale fragment @ 85.2' v. fine grained @ 85.5' 3.5" shale fragment @ 87' fine grained, d. yellowish brown 10YR 4/2 @ 88.5' v. fine grained, mod. dense		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.8 E 513,528.4**

GROUND ELEVATION **400.3** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1605S** DATE **4/27/16** SHEET **1** OF **3**

BORING START **3/1/16** BORING FINISH **3/1/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.05** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **37.6** BOTTOM **47.13**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	20-13-10	1.25					Gravel = 6 inches		
2	SS	1.5	3.0	5-15-18	1.25				CL	Silty clay, moderate yellowish brown 10R 5/4 and med l. grey N6 mottled, moist, v. stiff @ 1.5' hard @ 3' v. stiff		
3	SS	3.0	4.5	7-9-15	1.41							
4	SS	4.5	6.0	11-12-14	1.5		5					
5	SS	6.0	7.5	4-8-11	1.41				ML	Clayey silt, medium grey N5, moist, med. dense, w/mod. yellowish brown 10R 5/4 silty clay mottled		
6	SS	7.5	9.0	3-6-11	1.33							
7	SS	9.0	10.5	3-4-7	1.41				CL	Silty clay, mod. yellowish brown 10R 5/4, moist, stiff, w/med. grey N5 clayey silt mottled		
8	SS	10.5	12.0	3-4-6	1.5		10					
9	SS	12.0	13.5	2-2-4	1.5				CH	Fat to lean clay, med. l. grey N6, moist, firm		
10	SS	13.5	15.0	2-2-5	1.41							
11	SS	15.0	16.5	2-4-5	1.5		15		CL ML	Silty clay, mod. reddish brown 10R 4/6 w/med. l. grey N6 fat clay heavily mottled, moist, firm @ 15' stiff @ 15.5' l" shale fragment, angular @ 18' very silty @ 20' trace to some pale yellowish brown 10YR 6/2 silt		
12	SS	16.5	18.0	3-5-9	1.5							
13	SS	18.0	19.5	3-6-8	1.41							
14	SS	19.5	21.0	3-5-7	1.41							

TYPE OF CASING USED

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

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605S** DATE **4/27/16** SHEET **2** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **3/1/16** BORING FINISH **3/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-7	1.5				ML	Clayey silt, pale yellowish brown 10YR 6/2, moist, med. dense, w/silty clay (prev. material), trace sand		
16	SS	22.5	24.0	4-4-5	1.5				SP	Poorly graded sand, v. fine to fine grained, l. brown 5YR 5/6, moist, loose		
17	SS	24.0	25.5	1-1-3	1.5					@ 23.2' 2" clayey silt seam (prev. material)		
18	SS	25.5	27.0	1-1-1	1.5		25		ML	Clayey silt, pale yellowish brown 10YR 6/2, moist to wet, v. loose @ 25' 2" l. brown sand seam (prev. material) @ 26' 2" l. brown sand seam @ 26.4' 15" l. brown sand seam @ 26.8' l" l. brown sand seam @ 27' loose @ 28' 2" l. brown sand seam		
19	SS	27.0	28.5	2-1-4	1.5							
20	SS	28.5	30.0	5-6-7	1.33							
21	SS	30.0	31.5	3-5-7	1.25		30		SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, moist, med. dense @ 30' d. yellowish orange 10YR 6/6 @ 31' 3" clayey silt seam (prev. material) @ 32.3' trace fine gravel and black silt @ 32.5' no fine gravel or silt @ 33' moist, loose @ 34.1' 2" clayey silt seam (prev. material) @ 34.5' moist to wet, water in spoon @ 34.9' 2.5' clayey silt seam (prev. material)		
22	SS	31.5	33.0	5-7-8	1.5							
23	SS	33.0	34.5	3-3-6	1.41							
24	SS	34.5	36.0	2-4-5	1.5		35					
25	SS	36.0	37.5	2-4-6	1.33				SW	Well graded sand, fine grained, l. brown 5YR 5/6, moist to wet, med. dense, w/fine gravel		
26	SS	37.5	39.0	4-3-8	1.5				SW			
27	SS	39.0	40.5	3-3-5	1.5				SP	Well graded sand, coarse grained, grayish black N2, moist to wet, med. dense, trace fine gravel		
28	SS	40.5	42.0	11-8-10	1.25		40		SW	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist to wet, med. dense		Begin Mud Rotary @ 40.5'
29	SS	42.0	43.5	4-5-11	1.5				SP	Well graded sand, fine to med. grained, moderate yellowish brown 10YR 5/4, moist to wet, loose @ 40.5' med. dense @ 41' 1.5" shale seam w/clay		
30	SS	43.5	45.0	8-9-9	1.16				SW	Poorly graded sand, v. fine to fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense		
31	SS	45.0	46.5	6-9-14	1.5		45		SP	Well graded sand, med. grained, mod. reddish brown 10R 4/6, moist to wet, med. dense @ 44' med. to coarse grained		
										Poorly graded sand, fine grained, mod. yellowish		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605S** DATE **4/27/16** SHEET **3** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **3/1/16** BORING FINISH **3/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-8-11	1.5				SW	brown 10YR 5/4, moist to wet, mod. dense, some fine gravel		
									SP	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, med. dense, trace fine gravel		
33	SS	48.0	49.5	6-10-14	1.5					Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense, trace fine gravel @ 48' w/fine gravel, trace coarse gravel @ 49.5' no coarse gravel		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

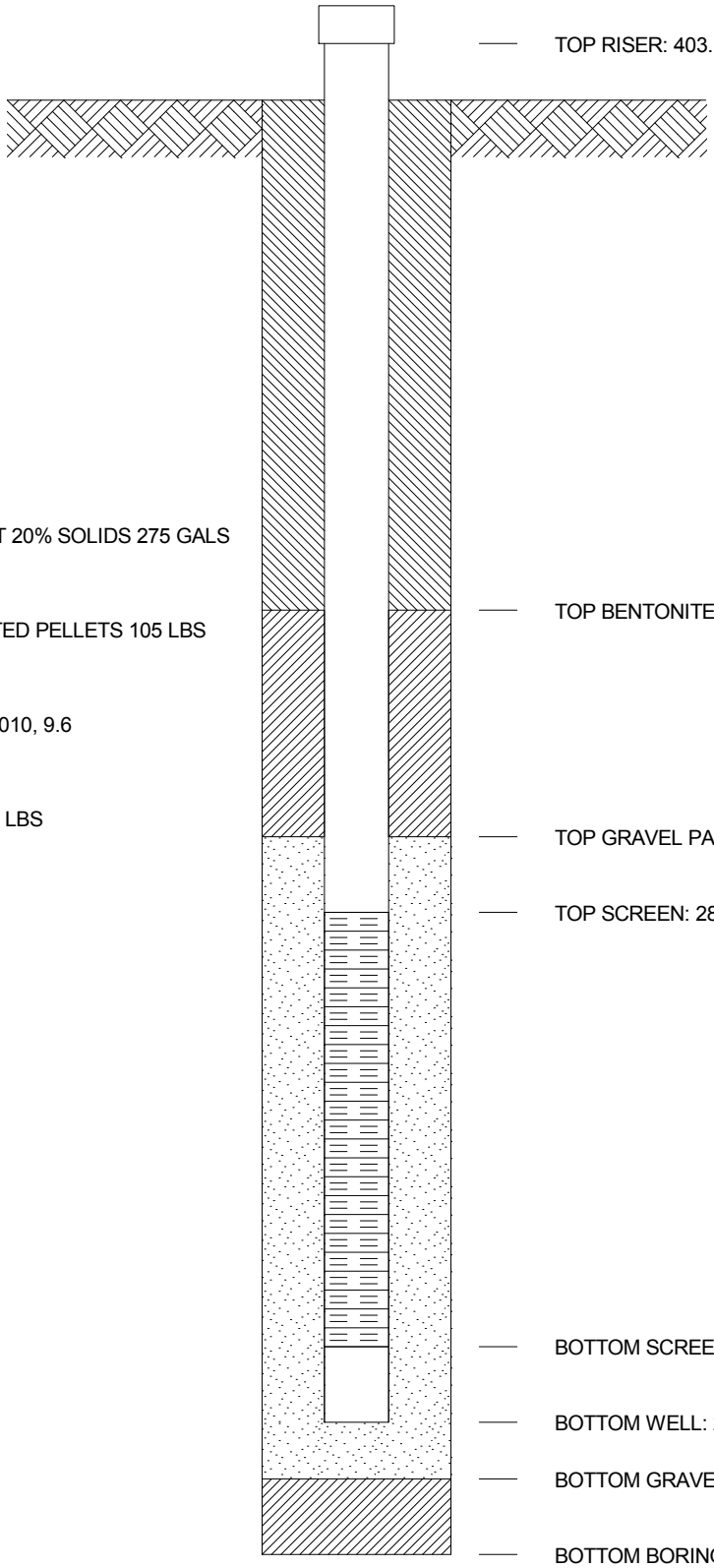
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1605D** BORING No. **MW-1605D** INSTALLED **2/3/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.9 E 513,537.1**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 400.42 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 275 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 105 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 375 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

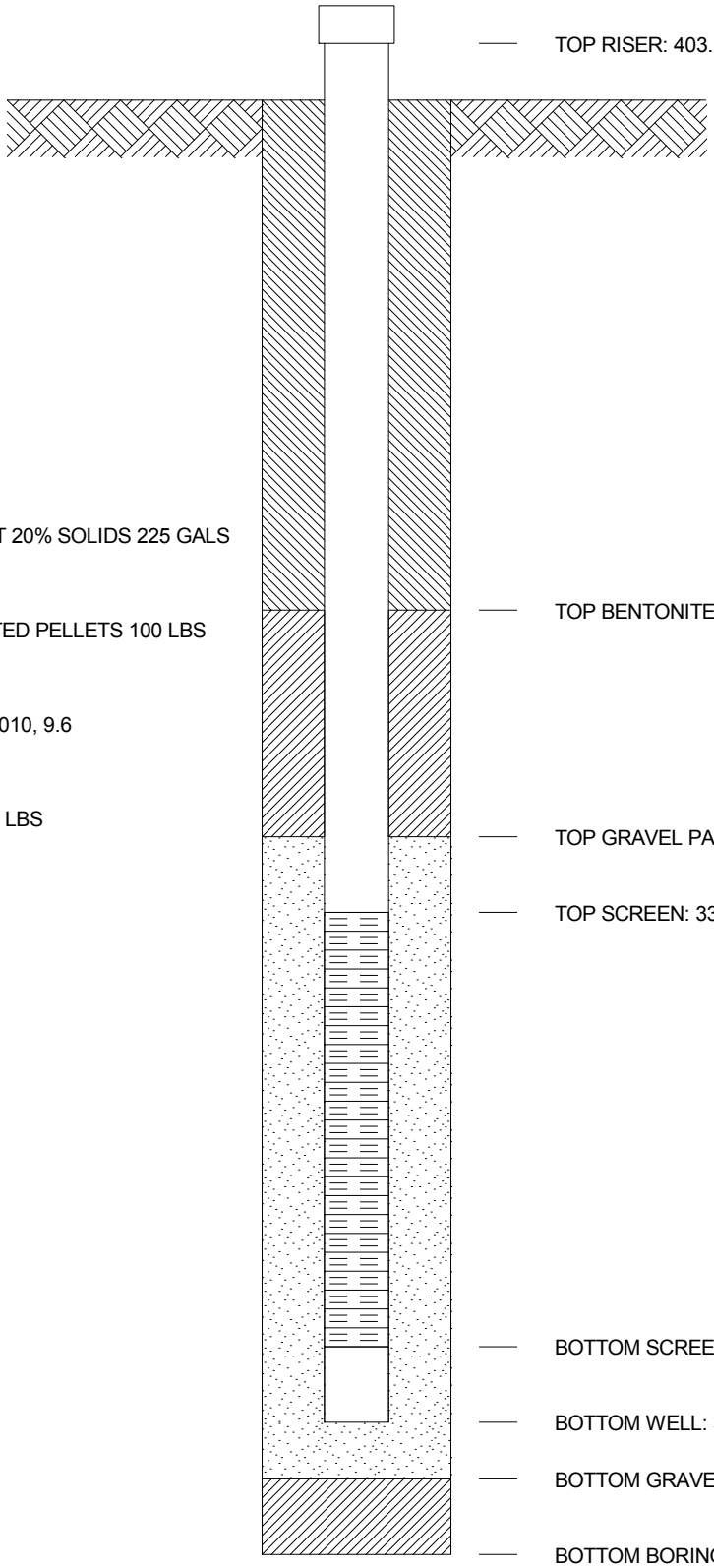
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1605I** BORING No. **MW-1605I** INSTALLED **3/2/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.9 E 513,532.6**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 400.60 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 225 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

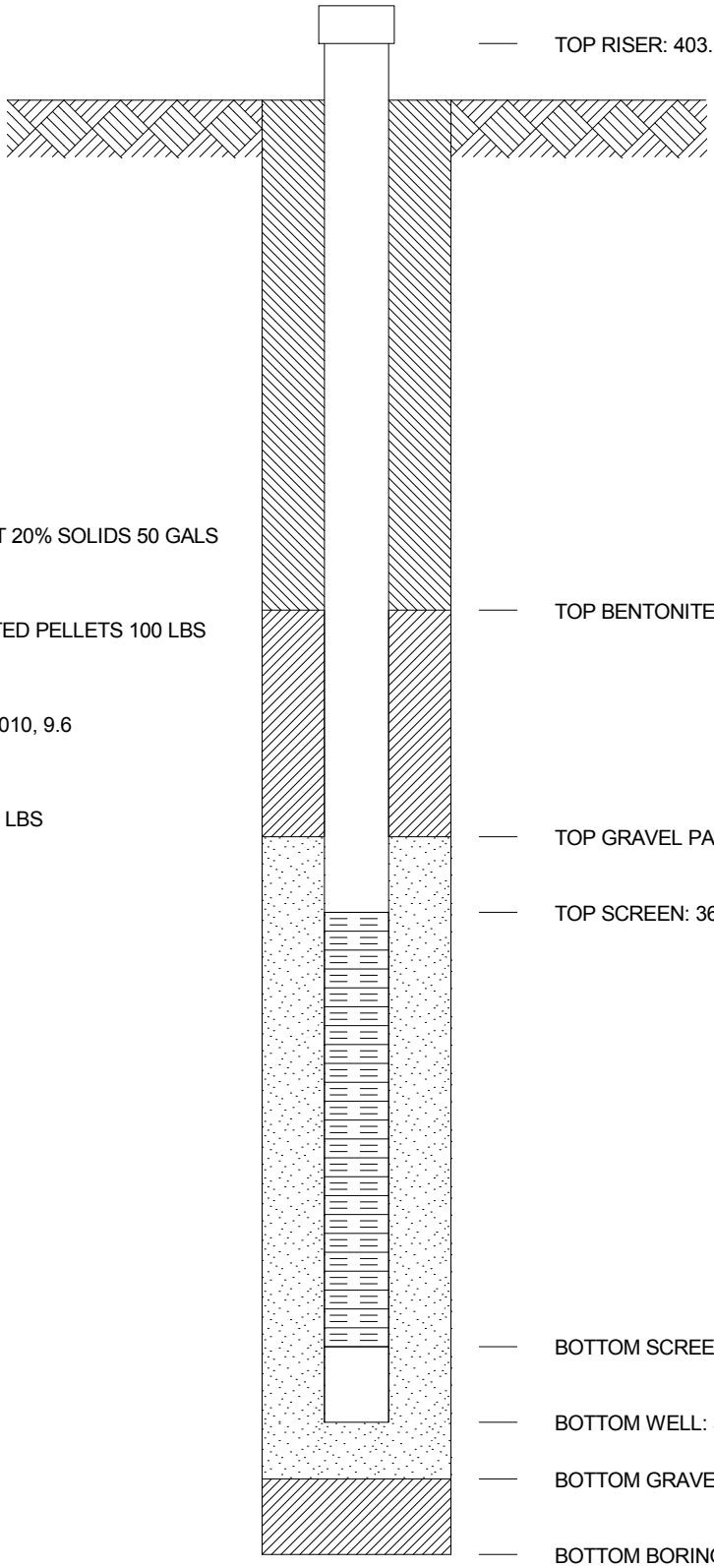
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1605S** BORING No. **MW-1605S** INSTALLED **3/1/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.8 E 513,528.4**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 400.33 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 50 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 245 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,502.1 E 512,881.5**

GROUND ELEVATION **397.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1606D** DATE **4/27/16** SHEET **1** OF **5**

BORING START **2/12/16** BORING FINISH **2/12/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.91** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **100.2** BOTTOM **109.82**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-5-9	1.5					Crushed stone gravel (limestone)		
									CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, trace fine grained sand, stiff		
2	SS	1.5	3.0	4-7-9	1.5					@ 1.5' as above, trace coarse grain sand and black decomposed organic staining		
3	SS	3.0	4.5	3-4-6	1.3					@ 3' trace fine gravel		
4	SS	4.5	6.0	1-2-8	1.3		5					
									CL	Lean clay, pale yellow brown 10YR 6/2, moist, some light brown oxide staining		
5	SS	6.0	7.5	5-9-10	1.5					@ 6.0' yellow brown and brown 10YR 5/4		
										@ 7.5' pale yellow brown 10YR 6/2, trace fine roots, trace fine grained sand		
6	SS	7.5	9.0	3-6-9	1.5				CL	Lean clay w/sand, dark yellow brown 10YR 4/2, moist, little fine grained sand		
7	SS	9.0	10.5	2-4-5	1.5				CL	Lean clay, light bluish gray 5B 7/1, moist, some brown oxide staining, trace coarse grained sand		
							10			@ 12.5' as above, becomes moderate brown in color 5YR 4/4		
8	SS	10.5	12.0	3-4-6	1.5					@ 13.5' moderate yellow brown 10YR 5/4 and pale yellow brown 10YR 6/2) mottled		
9	SS	12.0	13.5	3-5-9	1.5					@ 13.5' - 15' trace fine grained sand, trace fine gravel		
10	SS	13.5	15.0	4-5-7	1.5					@ 19.5' mostly 10YR 6/2 in color		
							15					
11	SS	15.0	16.5	3-5-6	1.5							
12	SS	16.5	18.0	3-4-6	1.5							
13	SS	18.0	19.5	2-5-7	1.5							
14	SS	19.5	21.0	3-3-6	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **2** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-5	1.5							
									CL ML	Silty clay, pale yellow brown 10YR 6/2, moist, trace to little fine grained sand		
16	SS	22.5	24.0	2-4-6	1.5							
									SP SM	Poorly graded sand w/silt, pale yellow brown 10YR 6/2, moist, fine to medium grained sand		
17	SS	24.0	25.5	1-2-5	1.2					@ 24.9' 3" silt layer		
							25					
18	SS	25.5	27.0	2-4-6	1.5				CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, few sandy layers <1" thick		
19	SS	27.0	28.5	1-5-9	1.3					@ 28.3' SP-SM layer (~3" thick)		
20	SS	28.5	30.0	4-4-5	1.3				SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, little coarse grained sand		
21	SS	30.0	31.5	5-7-8	1.5		30			@ 31.5' trace fine gravel		
22	SS	31.5	33.0	3-3-4	1.1					@ 34.5' trace fine gravel		
23	SS	33.0	34.5	1-2-5	0							
24	SS	34.5	36.0	3-4-8	.8							
							35					
25	SS	36.0	37.5	3-5-7	1.0							
26	SS	37.5	39.0	5-6-7	.9				SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace to little coarse grained sand		
27	SS	39.0	40.5	4-7-20	1.2					@ 37.5' trace gravel		
									SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand		
							40					
28	SS	40.5	42.0	7-7-8	1.1				SC	Clayey sand, moderate brown 5YR 3/4, wet, fine to medium grained sand		
									SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand & fine gravel		
29	SS	42.0	43.5	4-6-10	1.0					@ 42.0' - 43.5' increase in coarse grained sand		
30	SS	43.5	45.0	4-5-7	1.0					@ 45.2' - 45.5' color change to moderate brown 5YR 4/4		
										@ 46.5' increase in coarse grained sand, trace wood fragments (tree bark)		
							45					
31	SS	45.0	46.5	4-6-10	1.2					@ 48' color change to pale yellowish brown 10YR		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **3** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	8-9-11	1.1					6/2, few black decomposed organic layers		
33	SS	48.0	49.5	6-10-13	1.1							
34	SS	49.5	51.0	18-13-13	.9		50		SW SM	Well graded sand w/silt & gravel, wet, pale yellowish brown 10YR 6/2, fine to coarse grained sand, little to some fine gravel, trace coarse gravel		
35	SS	51.0	52.5	7-14-16	1.1				SP SM	Poorly graded sand w/silt, moderate yellowish brown 10YR 5/4, wet, fine to medium grained sand, trace coarse grained sand, few layers of decomposed organics (from 51' - 52.5')		
36	SS	52.5	54.0	7-9-15	1.0					@ 54' trace coarse gravel, fines between 5 - 10%		
37	SS	54.0	55.5	10-10-14	1.2		55			@ 55.5' trace fine gravel		
38	SS	55.5	57.0	8-10-13	1.2							
39	SS	57.0	58.5	7-9-9	1.3				SW	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2), wet, med. dense, trace fine gravel		
40	SS	58.5	60.0	4-5-9	1.2					@ 59' trace coarse gravel		
41	SS	60.0	61.5	6-6-9	1.5		60		SP	Poorly graded sand, fine grained, dusky yellowish brown 10YR 2/2, wet, med. dense, w/fine gravel		
42	SS	61.5	63.0	6-13-21	1.5					@ 60.5' 2" shale fragment		
43	SS	63.0	64.5	10-17-31	1.3					@ 61.5' dark yellowish brown 10YR 4/2, dense		
44	SS	64.5	66.0	13-13-17	1.4					@ 61.8' 2" shale fragment		
45	SS	66.0	67.5	6-14-18	1.5		65			@ 62' some lean clay, pale yellowish brown (prev. material)		
46	SS	67.5	69.0	9-14-17	1.5					@ 62.5' no clay, trace fine gravel		
47	SS	69.0	70.5	10-20-20	1.1					@ 63' no fine gravel		
48	SS	70.5	72.0	10-19-26	1.4					@ 64.5' med. dense		
										@ 65.8' 15" coarse sand seam (prev. material)		
										@ 66' dense		
										@ 67.2' 3" shale seam, med. l. grey N6		
										@ 67.7' med. grained		
							70		SP	Poorly graded sand, fine gravel, pale yellowish brown 10YR 6.2, wet, dense		
										@ 69' moist to v. moist		
										@ 72' med. dense, fine grained		
										@ 75' dense, d. yellowish brown 10YR 4.2		
										@ 76.5' med. dense, trace black silt		
										@ 80.6 3" shale plug (responsible for increase in N value (same material))		
										@ 81.3' 1.5" shale plug, dense		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **4** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-17	1.3					@ 81.5' no recovery, potential cobble blocking during sampling		
50	SS	73.5	75.0	8-9-13	1.2							
51	SS	75.0	76.5	10-16-25	1.4		75					
52	SS	76.5	78.0	9-10-14	1.4							
53	SS	78.0	79.5	6-9-18	1.5							
54	SS	79.5	81.0	10-17-34	1.5		80					
55	SS	81.0	82.5	31-19-14	1.3							
56	SS	82.5	84.0	10-16-21	1.5				CH	Fat clay, med. l. grey N6, moist, firm		
57	SS	84.0	85.5	9-19-21	1.5		85		SW	Well graded sand, med. grained, dark yellowish brown 10YR 4/2, wet, dense, w/fine gravel @ 83' coal fragment (2" diam., 1" thick) @ 83.6' coal fragment (2" diam, 1" thick)		
58	SS	85.5	87.0	7-15-24	1.3				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, dense @ 88.5' trace fine gravel @ 91.5' with fine gravel		
59	SS	87.0	88.5	10-13-20	1.2							
60	SS	88.5	90.0	8-14-23	1.4							
61	SS	90.0	91.5	8-13-27	1.3		90					
62	SS	91.5	93.0	8-7-16	1.5							
63	SS	93.0	94.5	7-9-15	1.5							
64	SS	94.5	96.0	12-12-14	1.5				SW	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		
65	SS	96.0	97.5	3-5-5	1.5		95		SP SW SP	Poorly graded sand, coarse grained, greyish red 5R 4/2, wet, med. dense, trace fine gravel Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		
66	SS	97.5	99.0	5-5-6	1.4				SP			

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **5** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	4-5-7	1.5					Poorly graded sand, coarse grained, greyish red 5R 4/2, wet, med. dense to loose, trace fine gravel		
										Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, loose		
							100			@ 97.5' med. dense, fine grained		
68	SS	100.5	102.0	7-7-10	1.4				SP	Poorly graded sand, fine to fine grained, dusky red 5R 3/4, wet, med. dense		
69	SS	102.0	103.5	4-4-6	1.5					@ 102' loose, fine grained, moist		
										@ 103.5' med. dense		
70	SS	103.5	105.0	5-6-10	1.3					@ 105' fine grained		
										@ 106.5' dense		
										@ 108' med. dense, trace fine gravel		
										@ 109' no fine gravel		
							105			@110.6' siltstone fragments to 2.5", moderate brown 5YR 4/4, shiny, angular		
71	SS	105.0	106.5	4-6-9	1.5							
72	SS	106.5	108.0	7-11-20	1.4							
73	SS	108.0	109.5	8-13-15	1.5							
74	SS	109.5	111.0	10-18-11	1.3							
							110					
75	SS	111.0	112.5	14-50/3					ML	Silt, l. grey N7, moist, med. dense, non-durable shale		
										@ 111' clayey silt, hard		
76	SS	112.5	114.0	50/4						Spoon refusal @ 111.7'		
										Auger refusal @ 112.9		
										BT @ 112.9'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,500.4 E 512,885.5**

GROUND ELEVATION **397.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1606I** DATE **4/27/16** SHEET **1** OF **4**

BORING START **3/1/16** BORING FINISH **3/1/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.00** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **65.4** BOTTOM **75.05**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-5-9	1.5					Crushed stone gravel (limestone)		
									CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, trace fine grained sand, stiff		
2	SS	1.5	3.0	4-7-9	1.5					@ 1.5' as above, trace coarse grain sand and black decomposed organic staining		
3	SS	3.0	4.5	3-4-6	1.3					@ 3' trace fine gravel		
4	SS	4.5	6.0	1-2-8	1.3		5					
									CL	Lean clay, pale yellow brown 10YR 6/2, moist, some light brown oxide staining		
5	SS	6.0	7.5	5-9-10	1.5					@ 6.0' yellow brown and brown 10YR 5/4		
										@ 7.5' pale yellow brown 10YR 6/2, trace fine roots, trace fine grained sand		
6	SS	7.5	9.0	3-6-9	1.5				CL	Lean clay w/sand, dark yellow brown 10YR 4/2, moist, little fine grained sand		
7	SS	9.0	10.5	2-4-5	1.5				CL	Lean clay, light bluish gray 5B 7/1, moist, some brown oxide staining, trace coarse grained sand		
							10			@ 12.5' as above, becomes moderate brown in color 5YR 4/4		
8	SS	10.5	12.0	3-4-6	1.5					@ 13.5' moderate yellow brown 10YR 5/4 and pale yellow brown 10YR 6/2) mottled		
9	SS	12.0	13.5	3-5-9	1.5					@ 13.5' - 15' trace fine grained sand, trace fine gravel		
10	SS	13.5	15.0	4-5-7	1.5					@ 19.5' mostly 10YR 6/2 in color		
							15					
11	SS	15.0	16.5	3-5-6	1.5							
12	SS	16.5	18.0	3-4-6	1.5							
13	SS	18.0	19.5	2-5-7	1.5							
14	SS	19.5	21.0	3-3-6	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606I** DATE **4/27/16** SHEET **2** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/1/16** BORING FINISH **3/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-5	1.5							
									CL ML	Silty clay, pale yellow brown 10YR 6/2, moist, trace to little fine grained sand		
16	SS	22.5	24.0	2-4-6	1.5							
									SP SM	Poorly graded sand w/silt, pale yellow brown 10YR 6/2, moist, fine to medium grained sand		
17	SS	24.0	25.5	1-2-5	1.2					@ 24.9' 3" silt layer		
							25					
18	SS	25.5	27.0	2-4-6	1.5				CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, few sandy layers <1" thick		
19	SS	27.0	28.5	1-5-9	1.3					@ 28.3' SP-SM layer (~3" thick)		
20	SS	28.5	30.0	4-4-5	1.3				SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, little coarse grained sand		
21	SS	30.0	31.5	5-7-8	1.5		30			@ 31.5' trace fine gravel		
22	SS	31.5	33.0	3-3-4	1.1					@ 34.5' trace fine gravel		
23	SS	33.0	34.5	1-2-5	0							
24	SS	34.5	36.0	3-4-8	.8							
							35					
25	SS	36.0	37.5	3-5-7	1.0							
26	SS	37.5	39.0	5-6-7	.9				SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace to little coarse grained sand		
27	SS	39.0	40.5	4-7-20	1.2					@ 37.5' trace gravel		
									SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand		
							40					
28	SS	40.5	42.0	7-7-8	1.1				SC	Clayey sand, moderate brown 5YR 3/4, wet, fine to medium grained sand		
									SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand & fine gravel		
29	SS	42.0	43.5	4-6-10	1.0					@ 42.0' - 43.5' increase in coarse grained sand		
30	SS	43.5	45.0	4-5-7	1.0					@ 45.2' - 45.5' color change to moderate brown 5YR 4/4		
										@ 46.5' increase in coarse grained sand, trace wood fragments (tree bark)		
							45					
31	SS	45.0	46.5	4-6-10	1.2					@ 48' color change to pale yellowish brown 10YR		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606I** DATE **4/27/16** SHEET **3** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/1/16** BORING FINISH **3/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	8-9-11	1.1					6/2, few black decomposed organic layers		
33	SS	48.0	49.5	6-10-13	1.1							
34	SS	49.5	51.0	18-13-13	.9		50		SW SM	Well graded sand w/silt & gravel, wet, pale yellowish brown 10YR 6/2, fine to coarse grained sand, little to some fine gravel, trace coarse gravel		
35	SS	51.0	52.5	7-14-16	1.1				SP SM	Poorly graded sand w/silt, moderate yellowish brown 10YR 5/4, wet, fine to medium grained sand, trace coarse grained sand, few layers of decomposed organics (from 51' - 52.5')		
36	SS	52.5	54.0	7-9-15	1.0					@ 54' trace coarse gravel, fines between 5 - 10%		
37	SS	54.0	55.5	10-10-14	1.2		55			@ 55.5' trace fine gravel		
38	SS	55.5	57.0	8-10-13	1.2							
39	SS	57.0	58.5	7-9-9	1.3				SW	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2), wet, med. dense, trace fine gravel		
40	SS	58.5	60.0	4-5-9	1.2					@ 59' trace coarse gravel		
41	SS	60.0	61.5	6-6-9	1.5		60		SP	Poorly graded sand, fine grained, dusky yellowish brown 10YR 2/2, wet, med. dense, w/fine gravel		
42	SS	61.5	63.0	6-13-21	1.5					@ 60.5' 2" shale fragment		
43	SS	63.0	64.5	10-17-31	1.3					@ 61.5' dark yellowish brown 10YR 4/2, dense		
44	SS	64.5	66.0	13-13-17	1.4					@ 61.8' 2" shale fragment		
45	SS	66.0	67.5	6-14-18	1.5		65			@ 62' some lean clay, pale yellowish brown (prev. material)		
46	SS	67.5	69.0	9-14-17	1.5					@ 62.5' no clay, trace fine gravel		
47	SS	69.0	70.5	10-20-20	1.1					@ 63' no fine gravel		
48	SS	70.5	72.0	10-19-26	1.4					@ 64.5' med. dense		
										@ 65.8' 15" coarse sand seam (prev. material)		
										@ 66' dense		
										@ 67.2' 3" shale seam, med. l. grey N6		
										@ 67.7' med. grained		
							70		SP	Poorly graded sand, fine gravel, pale yellowish brown 10YR 6.2, wet, dense		
										@ 69' moist to v. moist		
										@ 72' med. dense, fine grained		
										@ 75' dense, d. yellowish brown 10YR 4.2		
										@ 76.5' med. dense, trace black silt		
										@ 80.6 3" shale plug (responsible for increase in N value (same material))		
										@ 81.3' 1.5" shale plug, dense		

Continued Next Page

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606I** DATE **4/27/16** SHEET **4** OF **4**

PROJECT **ROCKPORT PLANT** BORING START **3/1/16** BORING FINISH **3/1/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-17	1.3					@ 81.5' no recovery, potential cobble blocking during sampling		
50	SS	73.5	75.0	8-9-13	1.2							
51	SS	75.0	76.5	10-16-25	1.4		75					
52	SS	76.5	78.0	9-10-14	1.4							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,498.9 E 512,889.4**

GROUND ELEVATION **397.6** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1606S** DATE **4/27/16** SHEET **1** OF **3**

BORING START **3/2/16** BORING FINISH **3/2/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.03** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **34.6** BOTTOM **44.22**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-5-9	1.5					Crushed stone gravel (limestone)		
									CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, trace fine grained sand, stiff		
2	SS	1.5	3.0	4-7-9	1.5					@ 1.5' as above, trace coarse grain sand and black decomposed organic staining		
3	SS	3.0	4.5	3-4-6	1.3					@ 3' trace fine gravel		
4	SS	4.5	6.0	1-2-8	1.3		5					
									CL	Lean clay, pale yellow brown 10YR 6/2, moist, some light brown oxide staining		
5	SS	6.0	7.5	5-9-10	1.5					@ 6.0' yellow brown and brown 10YR 5/4		
6	SS	7.5	9.0	3-6-9	1.5					@ 7.5' pale yellow brown 10YR 6/2, trace fine roots, trace fine grained sand		
									CL	Lean clay w/sand, dark yellow brown 10YR 4/2, moist, little fine grained sand		
7	SS	9.0	10.5	2-4-5	1.5							
									CL	Lean clay, light bluish gray 5B 7/1, moist, some brown oxide staining, trace coarse grained sand		
8	SS	10.5	12.0	3-4-6	1.5		10			@ 12.5' as above, becomes moderate brown in color 5YR 4/4		
9	SS	12.0	13.5	3-5-9	1.5					@ 13.5' moderate yellow brown 10YR 5/4 and pale yellow brown 10YR 6/2) mottled		
10	SS	13.5	15.0	4-5-7	1.5					@ 13.5' - 15' trace fine grained sand, trace fine gravel		
										@ 19.5' mostly 10YR 6/2 in color		
11	SS	15.0	16.5	3-5-6	1.5		15					
12	SS	16.5	18.0	3-4-6	1.5							
13	SS	18.0	19.5	2-5-7	1.5							
14	SS	19.5	21.0	3-3-6	1.5							

TYPE OF CASING USED

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

Continued Next Page

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

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

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606S** DATE **4/27/16** SHEET **2** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **3/2/16** BORING FINISH **3/2/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-5	1.5							
									CL ML	Silty clay, pale yellow brown 10YR 6/2, moist, trace to little fine grained sand		
16	SS	22.5	24.0	2-4-6	1.5							
									SP SM	Poorly graded sand w/silt, pale yellow brown 10YR 6/2, moist, fine to medium grained sand		
17	SS	24.0	25.5	1-2-5	1.2					@ 24.9' 3" silt layer		
							25					
18	SS	25.5	27.0	2-4-6	1.5				CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, few sandy layers <1" thick		
19	SS	27.0	28.5	1-5-9	1.3					@ 28.3' SP-SM layer (~3" thick)		
20	SS	28.5	30.0	4-4-5	1.3				SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, little coarse grained sand		
21	SS	30.0	31.5	5-7-8	1.5		30			@ 31.5' trace fine gravel		
22	SS	31.5	33.0	3-3-4	1.1					@ 34.5' trace fine gravel		
23	SS	33.0	34.5	1-2-5	0							
24	SS	34.5	36.0	3-4-8	.8							
							35					
25	SS	36.0	37.5	3-5-7	1.0							
26	SS	37.5	39.0	5-6-7	.9				SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace to little coarse grained sand		
27	SS	39.0	40.5	4-7-20	1.2					@ 37.5' trace gravel		
									SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand		
							40					
28	SS	40.5	42.0	7-7-8	1.1				SC	Clayey sand, moderate brown 5YR 3/4, wet, fine to medium grained sand		
									SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand & fine gravel		
29	SS	42.0	43.5	4-6-10	1.0					@ 42.0' - 43.5' increase in coarse grained sand		
30	SS	43.5	45.0	4-5-7	1.0					@ 45.2' - 45.5' color change to moderate brown 5YR 4/4		
										@ 46.5' increase in coarse grained sand, trace wood fragments (tree bark)		
							45					
31	SS	45.0	46.5	4-6-10	1.2					@ 48' color change to pale yellowish brown 10YR		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606S** DATE **4/27/16** SHEET **3** OF **3**

PROJECT **ROCKPORT PLANT** BORING START **3/2/16** BORING FINISH **3/2/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
										6/2, few black decomposed organic layers		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

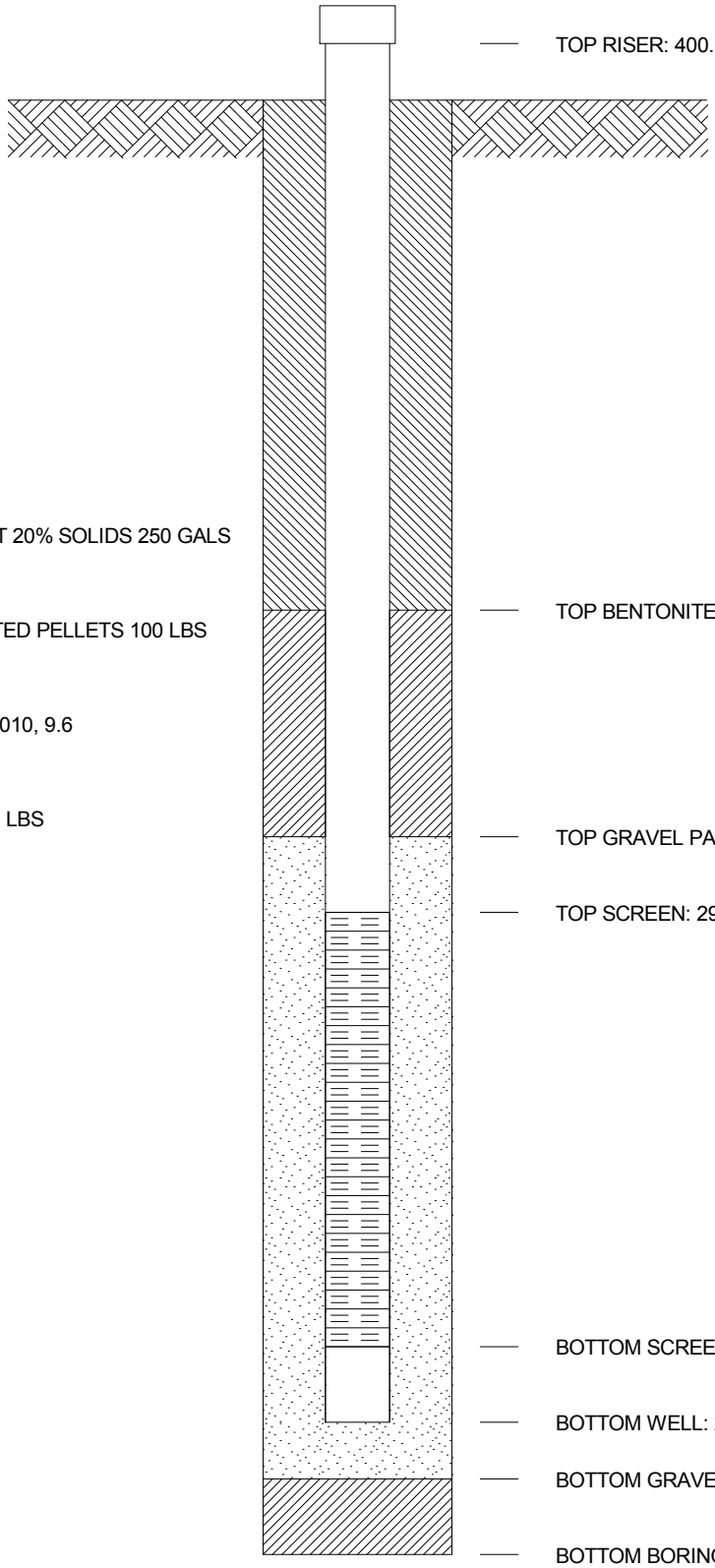
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1606D** BORING No. **MW-1606D** INSTALLED **2/12/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,502.1 E 512,881.5**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 397.82 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 250 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 350 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

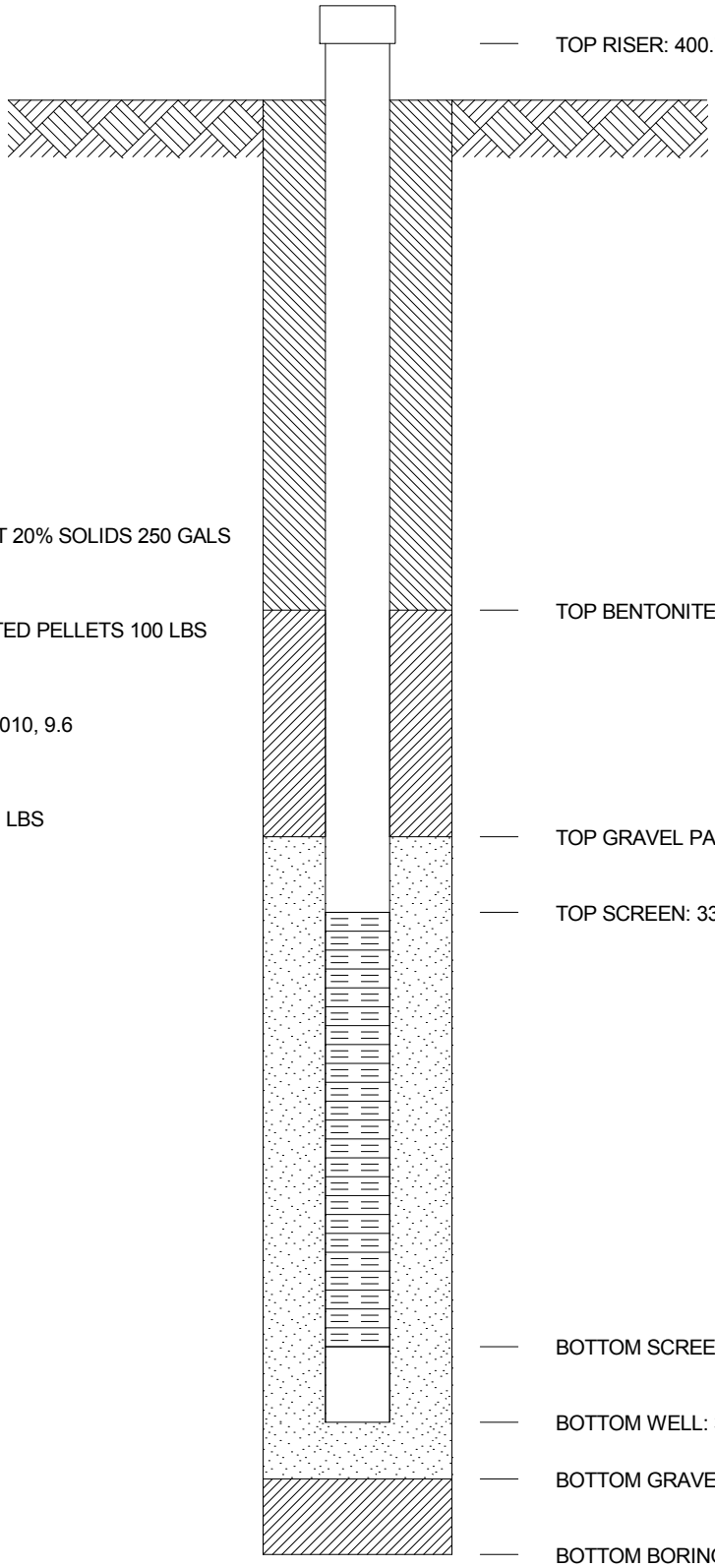
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1606I** BORING No. **MW-1606I** INSTALLED **3/1/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,500.4 E 512,885.5**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 397.75 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 250 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 200 LBS

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER **42393125-01**

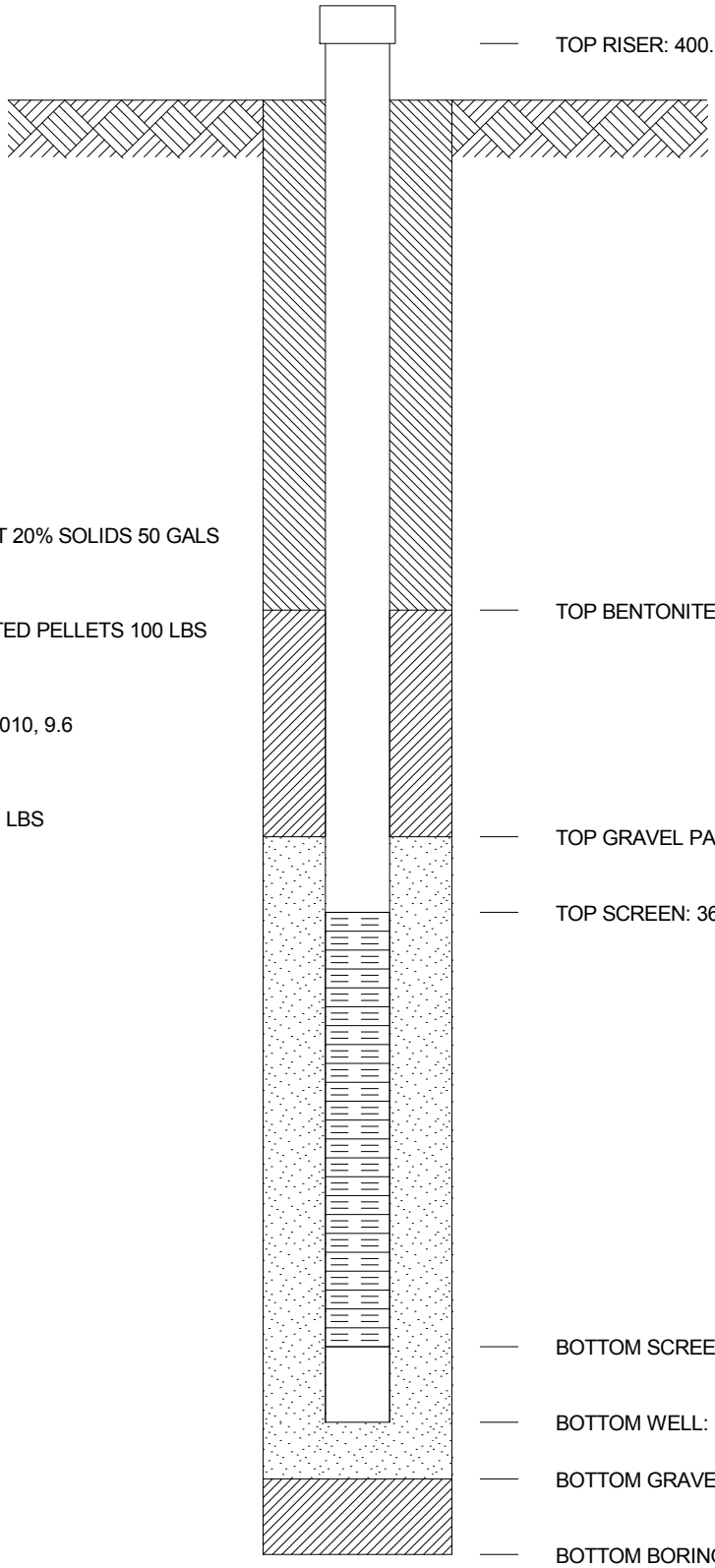
COMPANY **INDIANA MICHIGAN POWER COMPANY** WELL No. **MW-1606S** BORING No. **MW-1606S** INSTALLED **3/2/16**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,498.9 E 512,889.4**

SYSTEM **State Plane using NAD27/29**

GROUND ELEVATION 397.62 FT.



GROUT SEAL: QUICK GROUT 20% SOLIDS 50 GALS

BENTONITE SEAL: 3/8" COATED PELLETS 100 LBS

SCREEN: 2.0 dia., SLOTTED .010, 9.6

GRAVEL PACK: #5 SAND 225 LBS

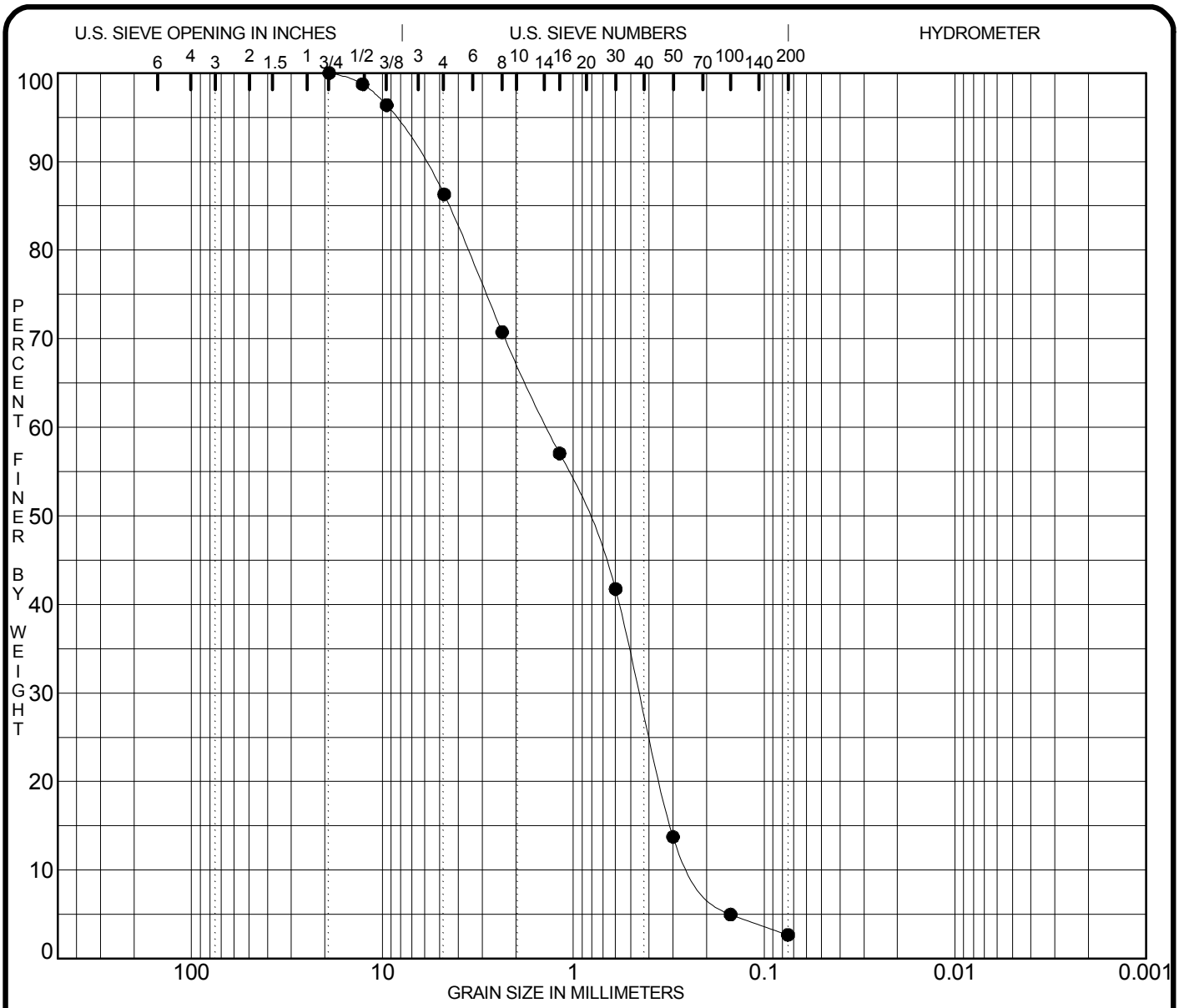
RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH:

GEOMCNST RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

ATTACHMENT 2

GRADATION CURVES FOR SCREENED INTERVALS
2016 BA POND MONITORING WELLS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1600D 84.5-94.1ft**		**13.5**				
	POORLY GRADED SAND SP					
	SS-57,58,59,60,61 (Composite)					
	N 154,306.3 E 512,449.0					
	ELEVATION 393.8					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1600D 84.5-94.1ft**	**19.000**	**1.370**	**0.449**	**0.223**	**13.7**	**83.6**	**2.7**	

PROJECT **ROCKPORT PLANT -**

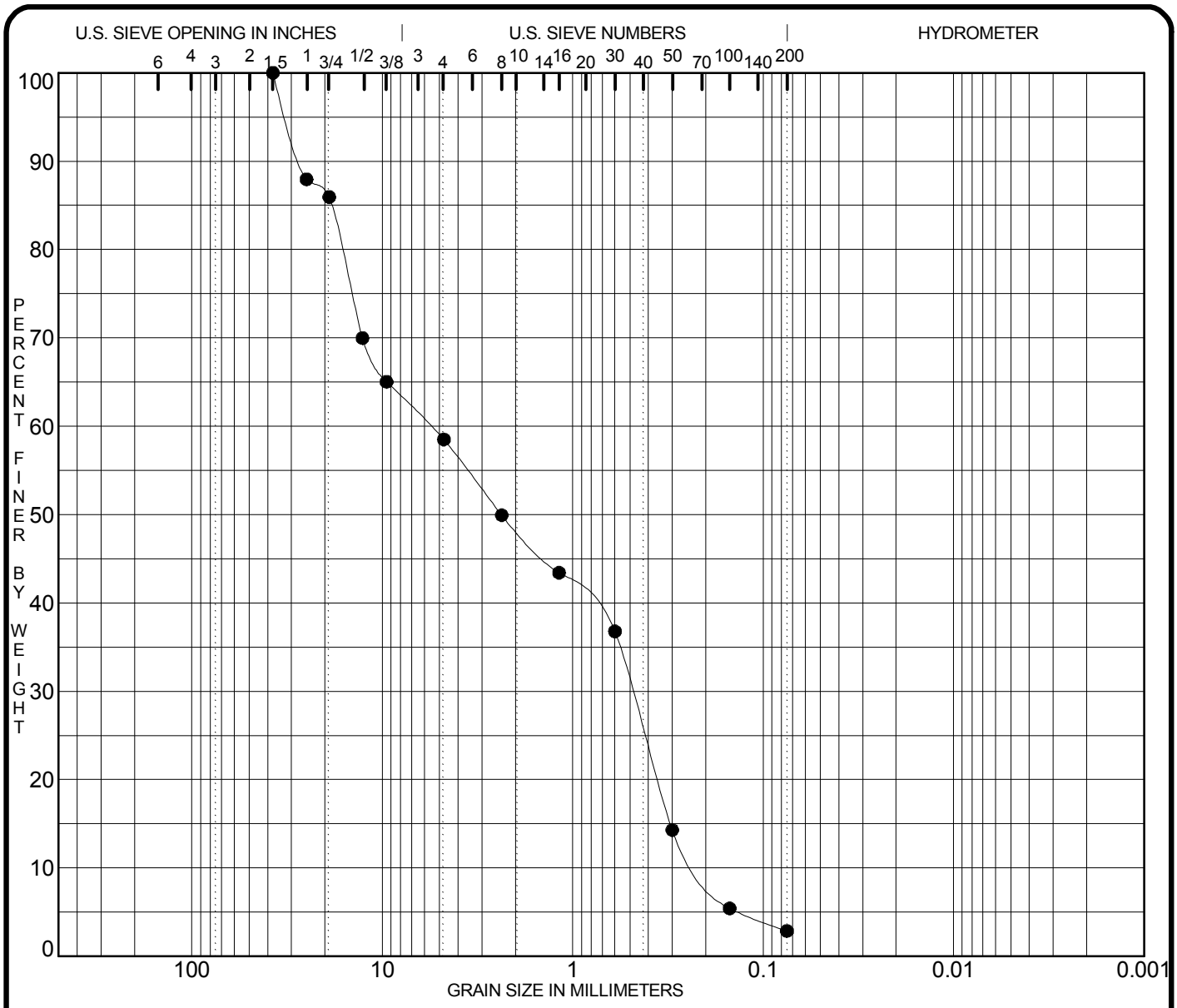
JOB NO. **42393125-01**

DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

AEP



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1600I 61.6-71.2ft**		**12.6**				
	POORLY GRADED SAND with GRAVEL SP					
	SS-42,43,44,45,46,47,48 (Composite)					
	N 154,306.0 E 512,454.0					
	ELEVATION 393.7					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1600I 61.6-71.2ft**	**37.500**	**5.568**	**0.487**	**0.214**	**41.5**	**55.6**	**2.9**	

PROJECT **ROCKPORT PLANT -**

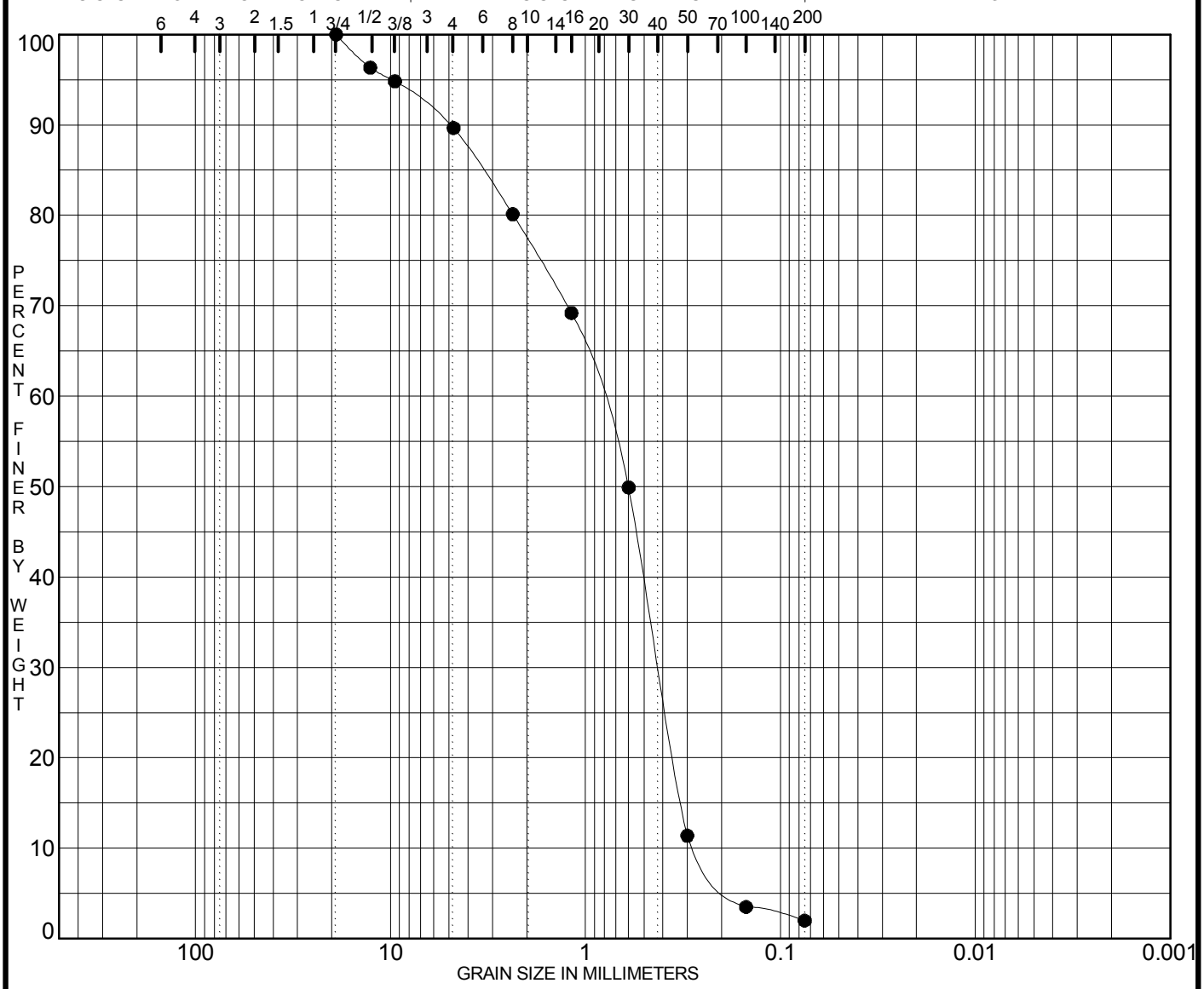
JOB NO. **42393125-01**

DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

AEP



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1600S 30.6-40.2ft**		**15.4**				
	POORLY GRADED SAND SP					
	SS-21,22,23,24,25,26,27,28 (Composite)					
	N 154,305.9 E 512,458.0					
	ELEVATION 393.7					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1600S 30.6-40.2ft**	**19.000**	**0.855**	**0.419**	**0.266**	**10.3**	**87.7**	**2.0**	

PROJECT **ROCKPORT PLANT -**

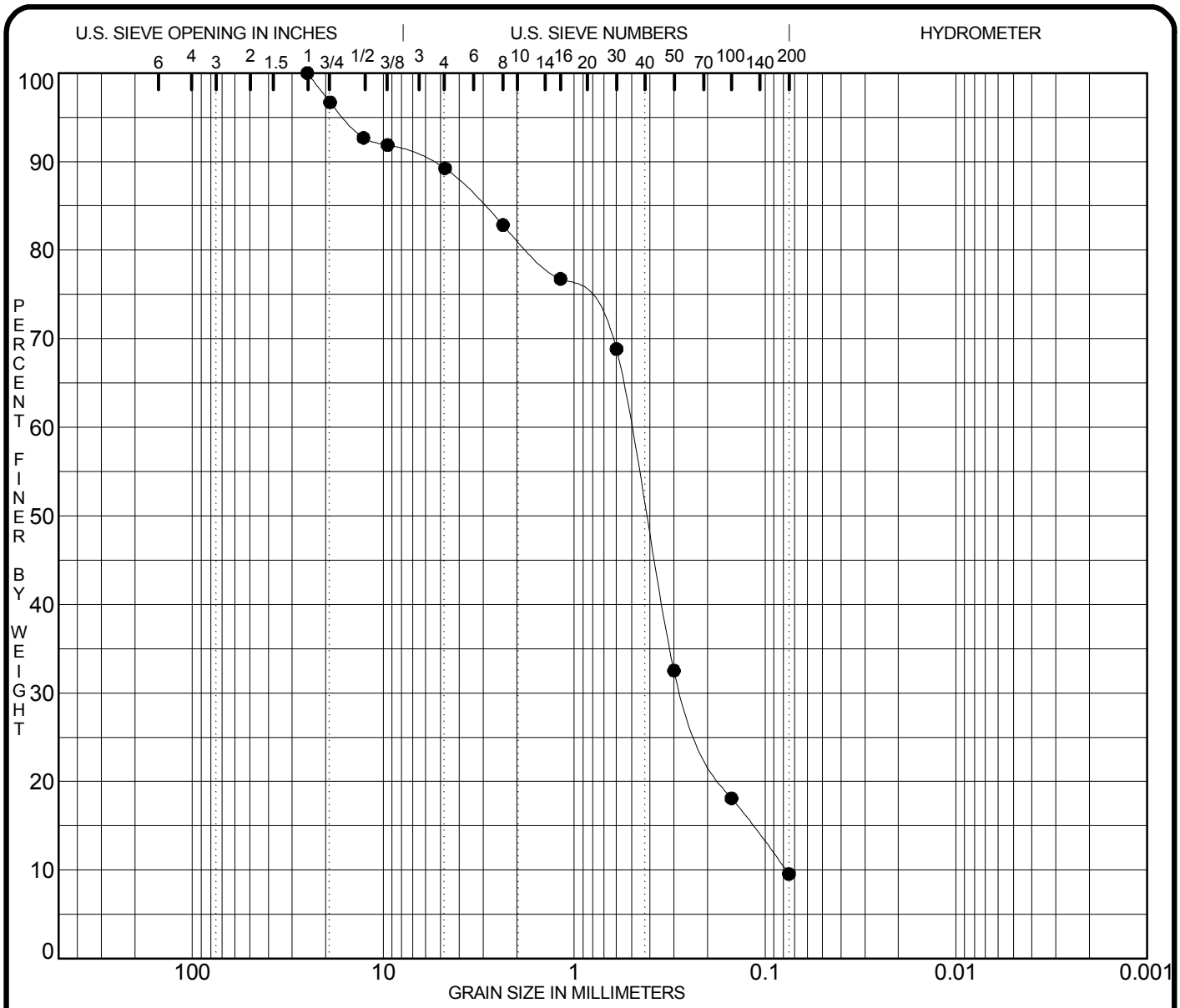
JOB NO. **42393125-01**

DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

AEP



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1601D 99.8-109.4ft**		**23.9**				
	SS-68,69,70,71,72,73 (Composite)					
	N 154,323.2 E 513,487.5					
	ELEVATION 400.1					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1601D 99.8-109.4ft**	**25.000**	**0.507**	**0.266**	**0.078**	**10.8**	**79.7**	**9.6**	

PROJECT **ROCKPORT PLANT -**

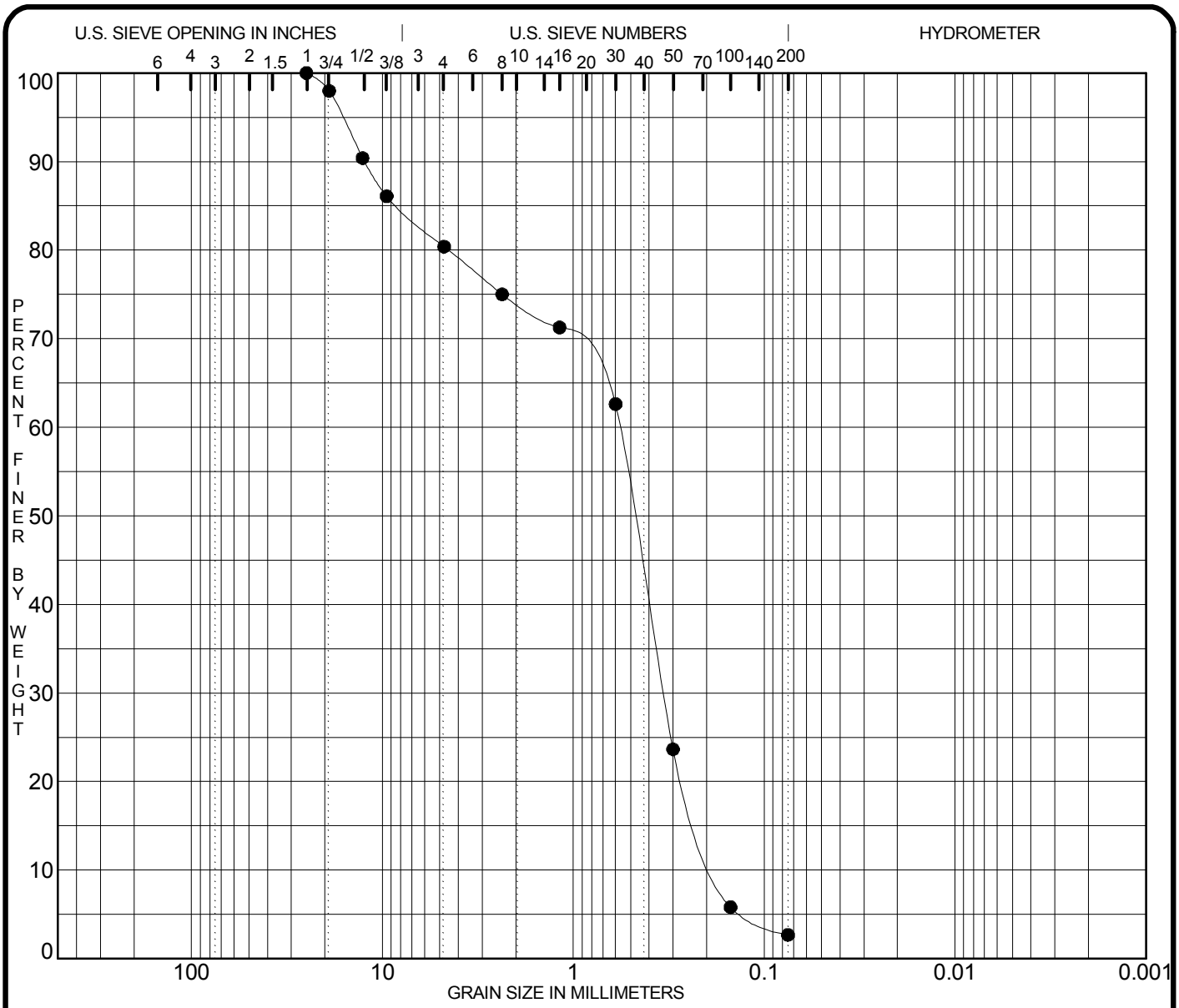
JOB NO. **42393125-01**

DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

AEP



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1601I 67.8-77.4ft**		**15.7**				
	POORLY GRADED SAND with GRAVEL SP					
	SS-48,48,49,50,51 (Composite)					
	N 154,325.3 E 513,483.5					
	ELEVATION 400.0					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1601I 67.8-77.4ft**	**25.000**	**0.573**	**0.336**	**0.177**	**19.6**	**77.7**	**2.7**	

PROJECT **ROCKPORT PLANT -**

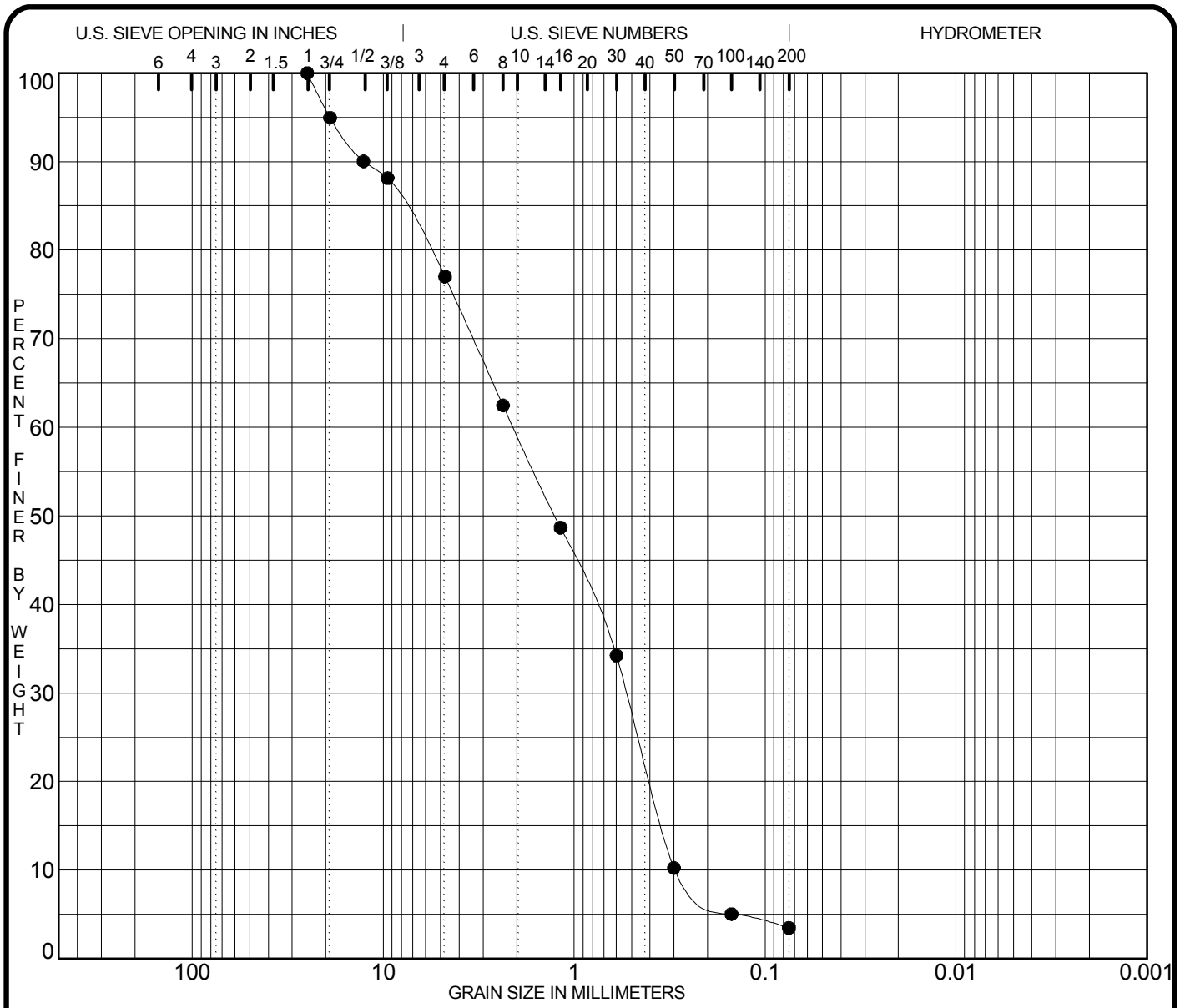
JOB NO. **42393125-01**

DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

AEP



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1601S 36.8-46.4ft**		**25.2**				
	POORLY GRADED SAND with GRAVEL SP					
	SS-26,27,28,29,30,31 (Composite)					
	N 154,327.6 E 513,479.7					
	ELEVATION 399.8					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1601S 36.8-46.4ft**	**25.000**	**2.084**	**0.531**	**0.290**	**23.0**	**73.5**	**3.5**	

PROJECT **ROCKPORT PLANT -**

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DATE **3/22/16**

GRADATION CURVES

American Electric Power Service Corp.

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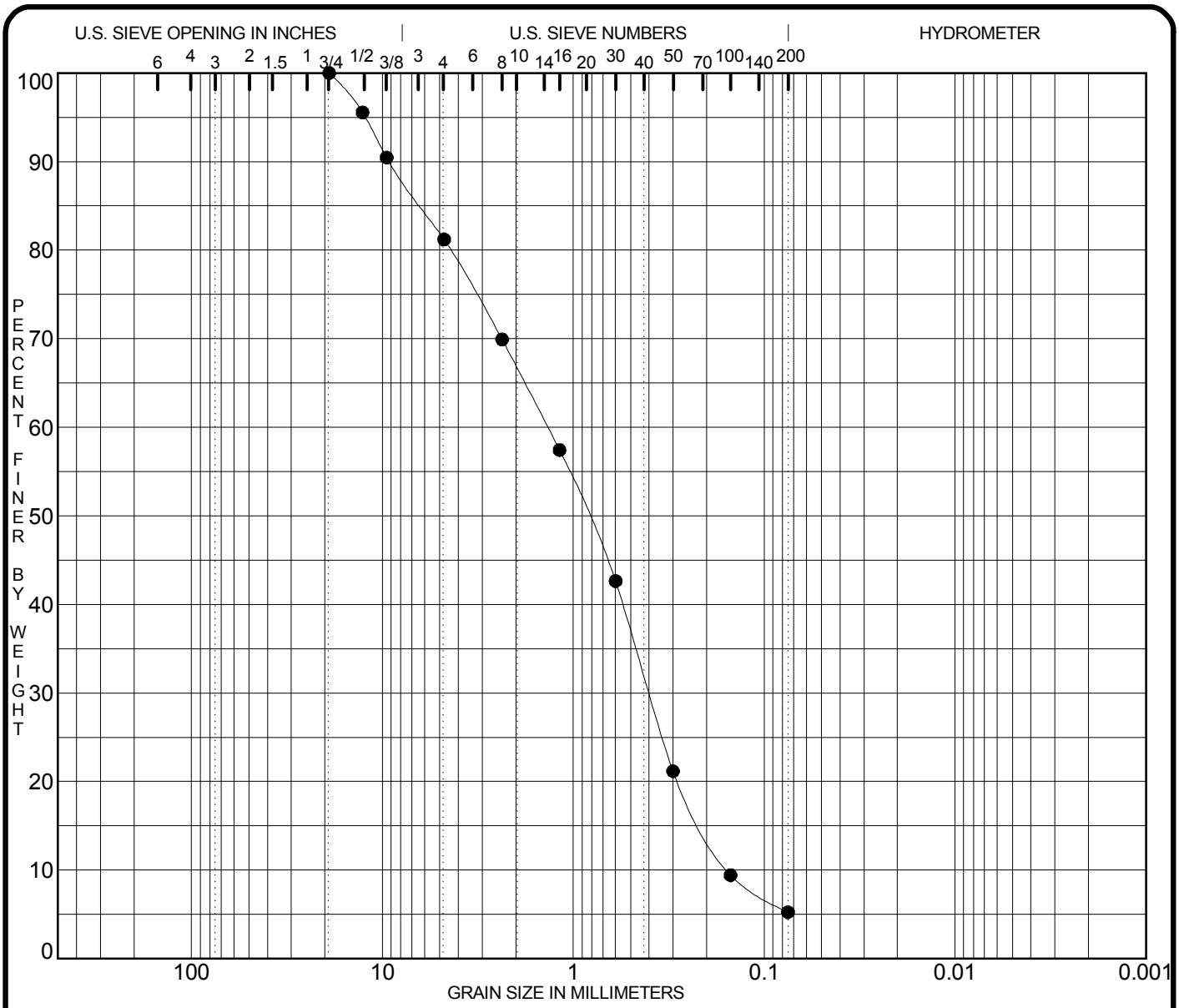

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1602DI 14.0-123.6ft**		**14.1**				
	N 152,300.2 E 514,229.4					
	ELEVATION 399.3					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1602DI 14.0-123.6ft**	**19.000**	**1.361**	**0.399**	**0.155**	**18.8**	**76.0**	**5.3**	

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GRADATION CURVES

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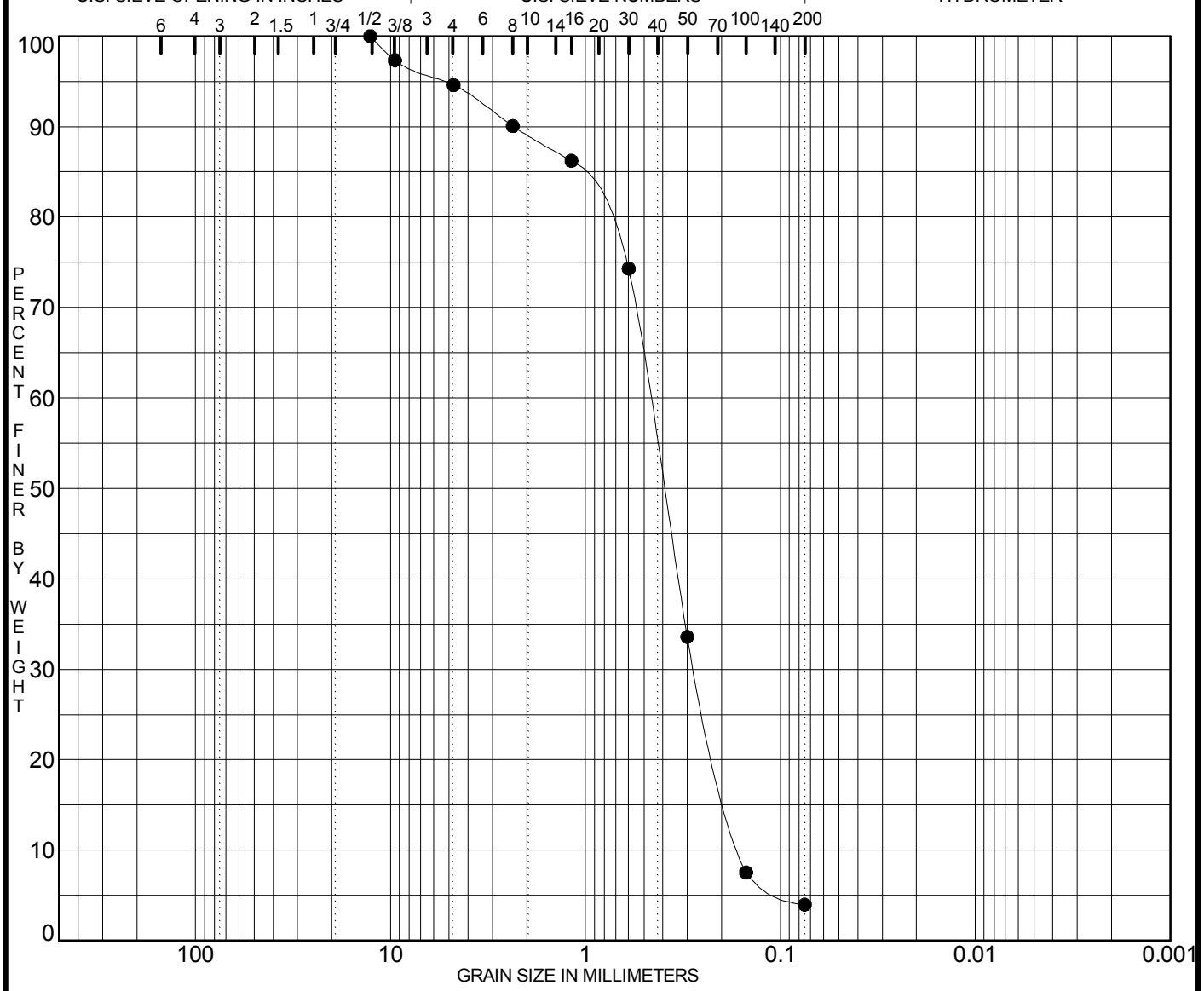

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1602I 67.5-77.1ft**		**17.9**				
	POORLY GRADED SAND SP					
	N 152,295.0 E 514,229.2					
	ELEVATION 399.4					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1602I 67.5-77.1ft**	**12.700**	**0.470**	**0.273**	**0.160**	**5.4**	**90.6**	**4.0**	

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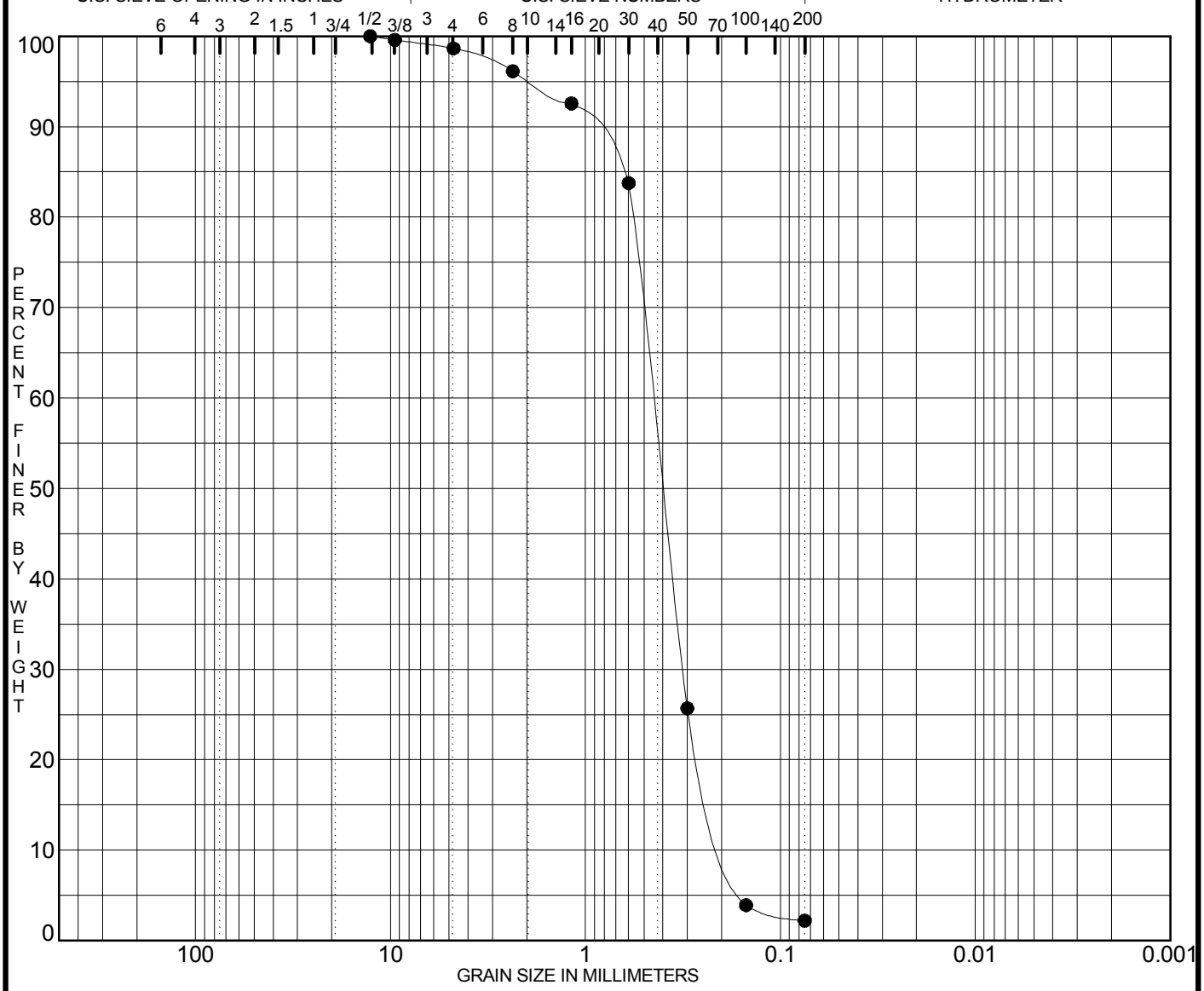

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1602S 35.5-45.5ft**		**21.8**				
	POORLY GRADED SAND SP					
	SS-24,25,26,27,28 (Composite Sample)					
	ELEVATION					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1602S 35.5-45.5ft**	**12.700**	**0.452**	**0.316**	**0.182**	**1.3**	**96.4**	**2.2**	

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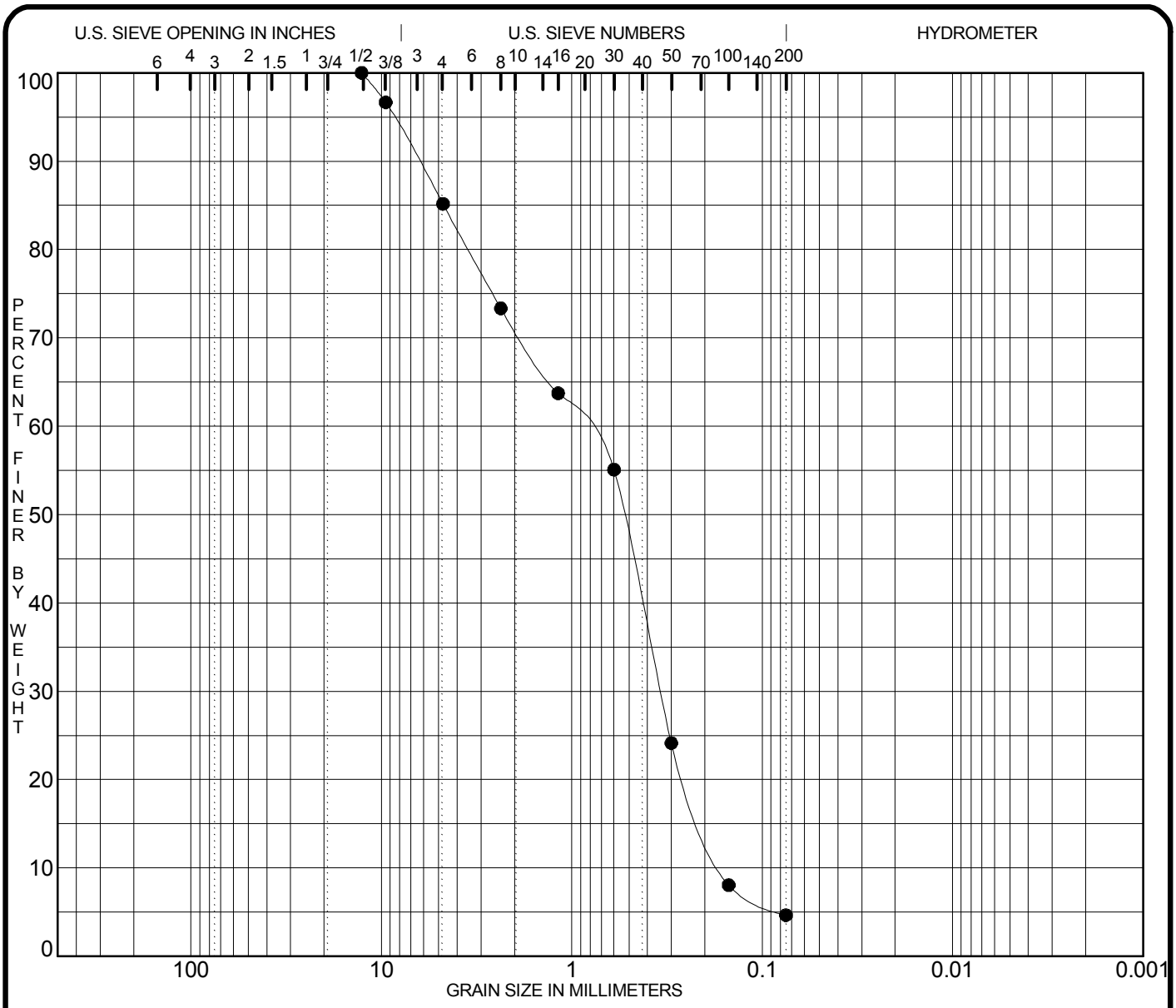

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1603DI 10.0-119.6ft**		**10.7**				
	POORLY GRADED SAND SP					
	SS-75,76,77,78,79 (Composite Sample)					
	N 152,811.9 E 514,207.5					
	ELEVATION 401.6					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1603DI 10.0-119.6ft**	**12.700**	**0.881**	**0.342**	**0.163**	**14.8**	**80.5**	**4.7**	

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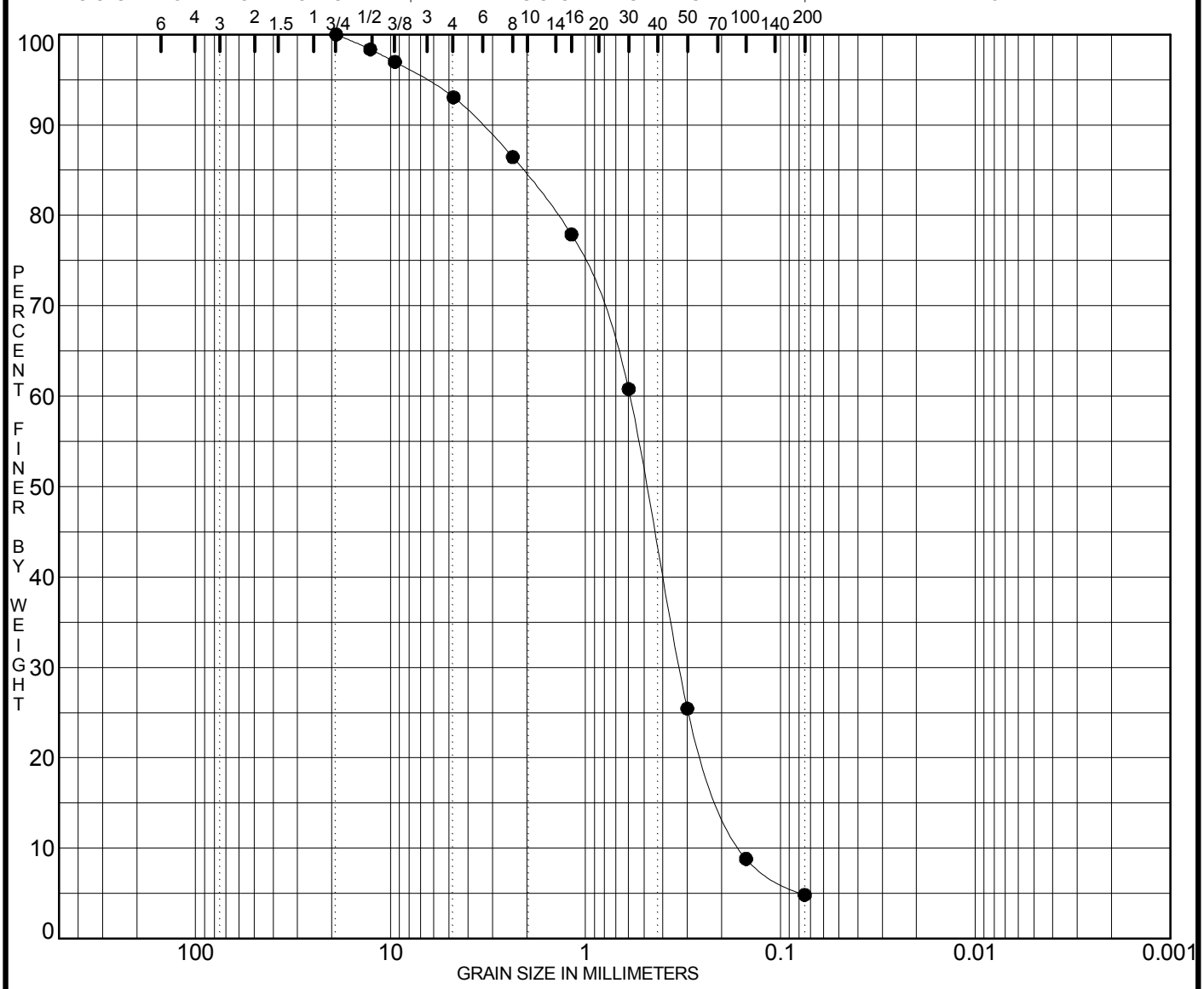

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1603I 68.6-78.2ft**		**15.4**				
	POORLY GRADED SAND SP					
	SS-47,48,49,50,51,52 (Composite					
	N 152,803.3, E 719,207.2					
	ELEVATION 401.4					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1603I 68.6-78.2ft**	**19.000**	**0.591**	**0.328**	**0.158**	**6.9**	**88.2**	**4.8**	

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GRADATION CURVES

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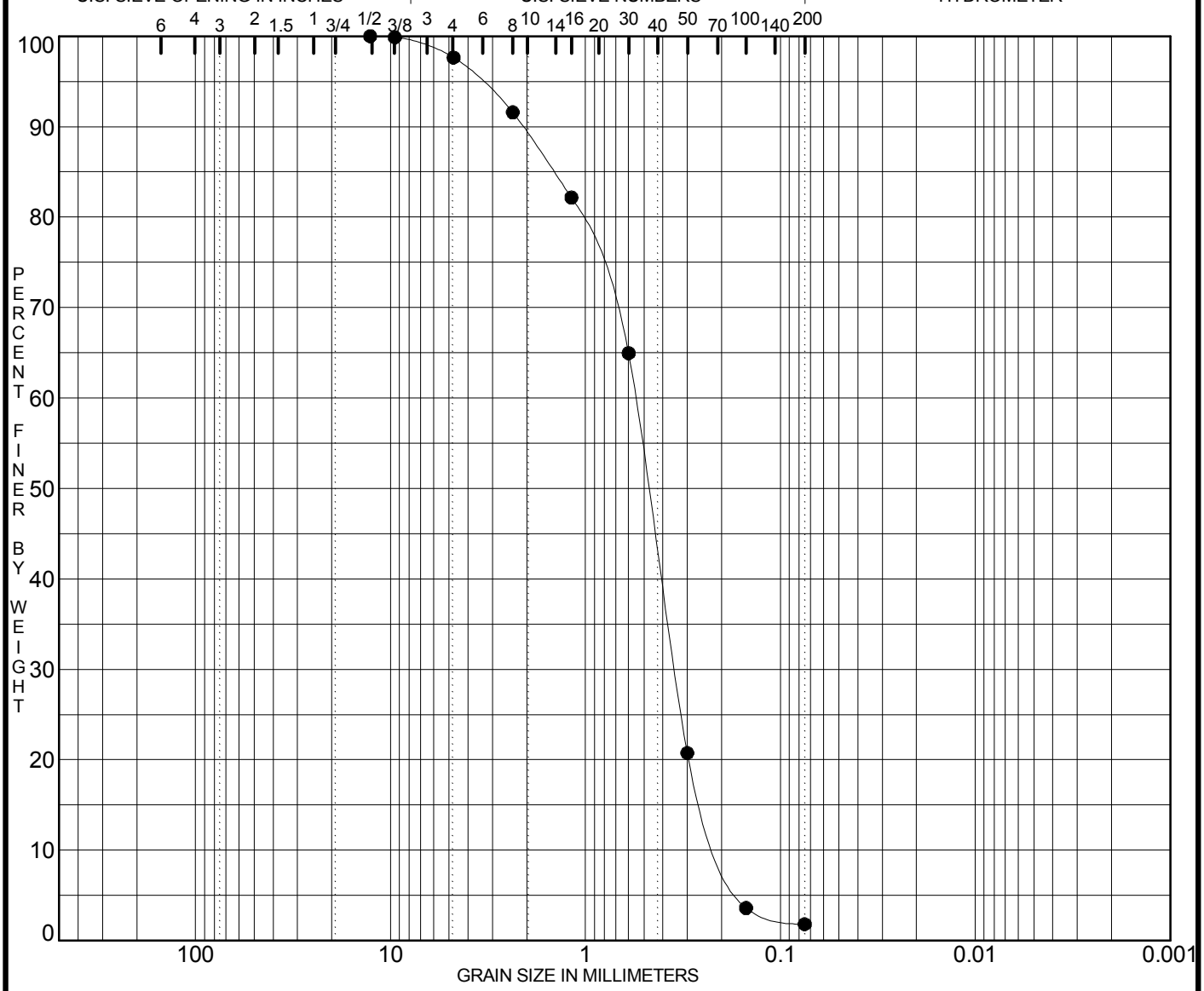

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1603S 37.6-47.2ft**		**16.3**				
	POORLY GRADED SAND SP					
	SS-27,28,29,30 (Composite Sample)					
	N 152,802.7 E 514,206.9					
	ELEVATION 401.5					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1603S 37.6-47.2ft**	**12.700**	**0.555**	**0.347**	**0.194**	**2.4**	**95.8**	**1.8**	

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GRADATION CURVES

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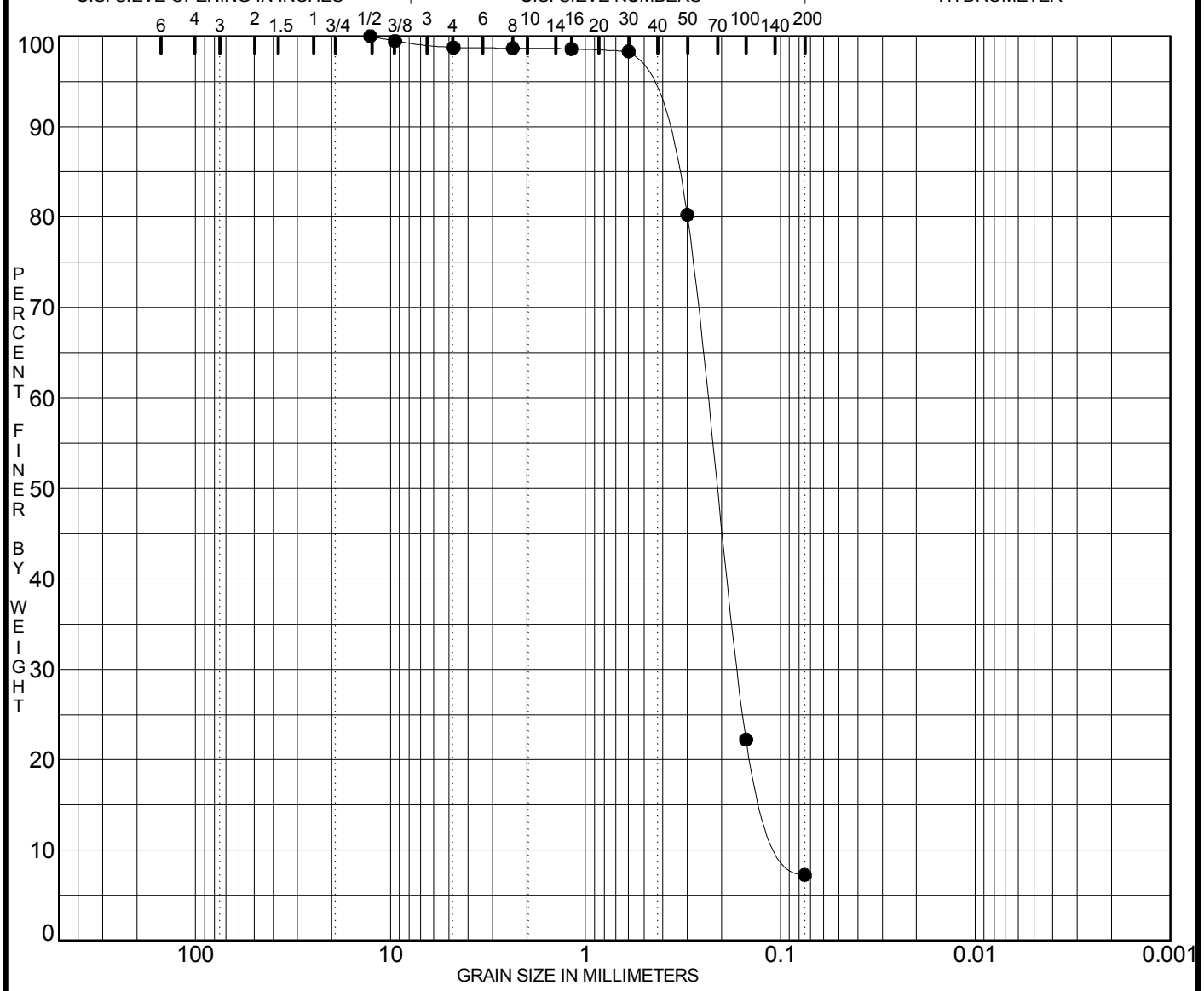

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1604DI 15.0-124.6ft**		**24.9**				
	SS-78,79,80,81,82,83 (Composite					
	N 151,518.2 E 14,204.9 Sample)					
	ELEVATION 399.9					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1604DI 15.0-124.6ft**	**12.700**	**0.236**	**0.165**	**0.085**	**1.3**	**91.5**	**7.3**	

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GRADATION CURVES

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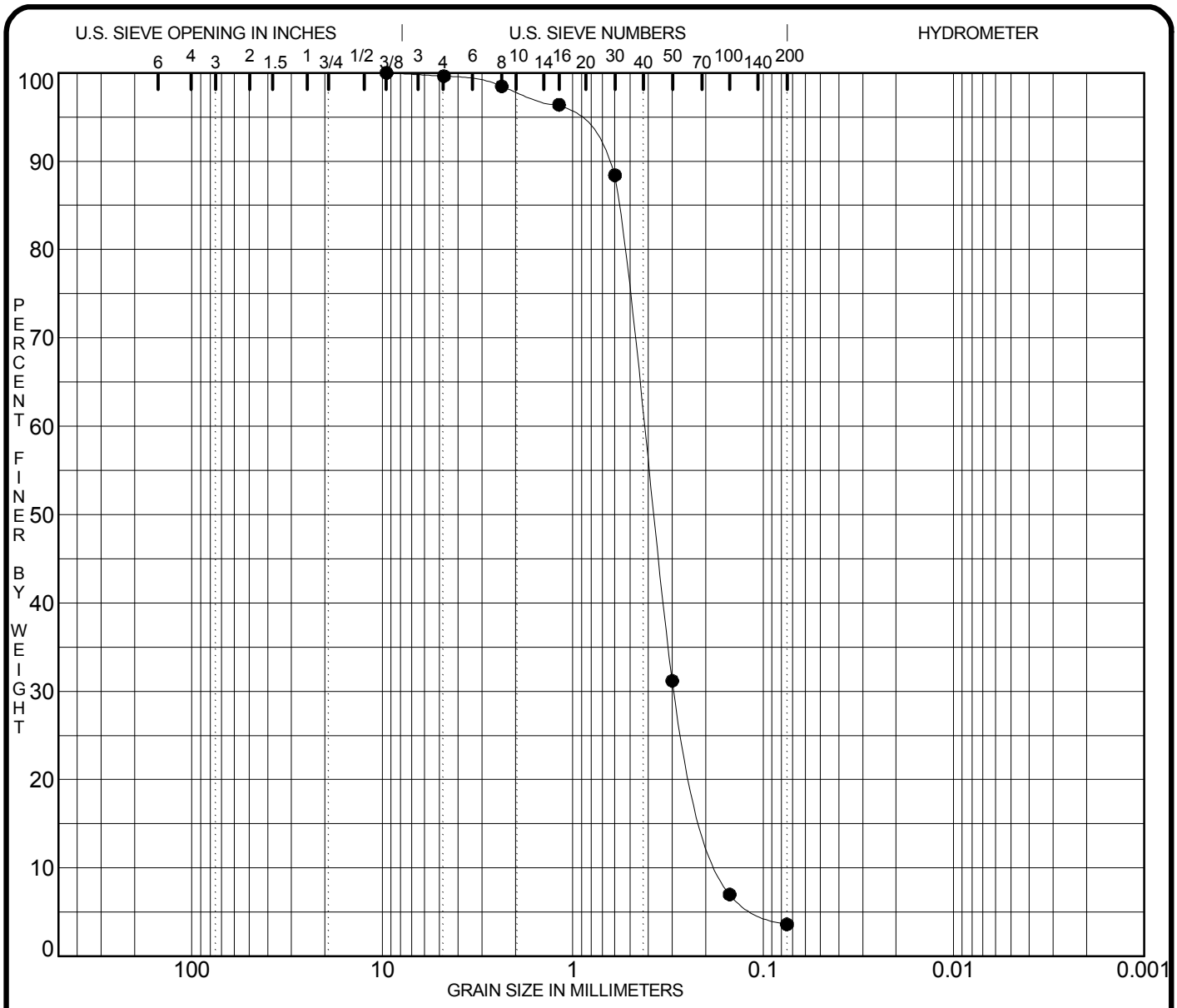

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1604I 68.0-77.6ft**		**19.4**				
	POORLY GRADED SAND SP					
	SS-47,48,49,50,51 (Composite Sample)					
	N 151,506.5 E 514,201.0					
	ELEVATION 399.7					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1604I 68.0-77.6ft**	**9.500**	**0.425**	**0.290**	**0.163**	**0.4**	**96.0**	**3.6**	

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GRADATION CURVES

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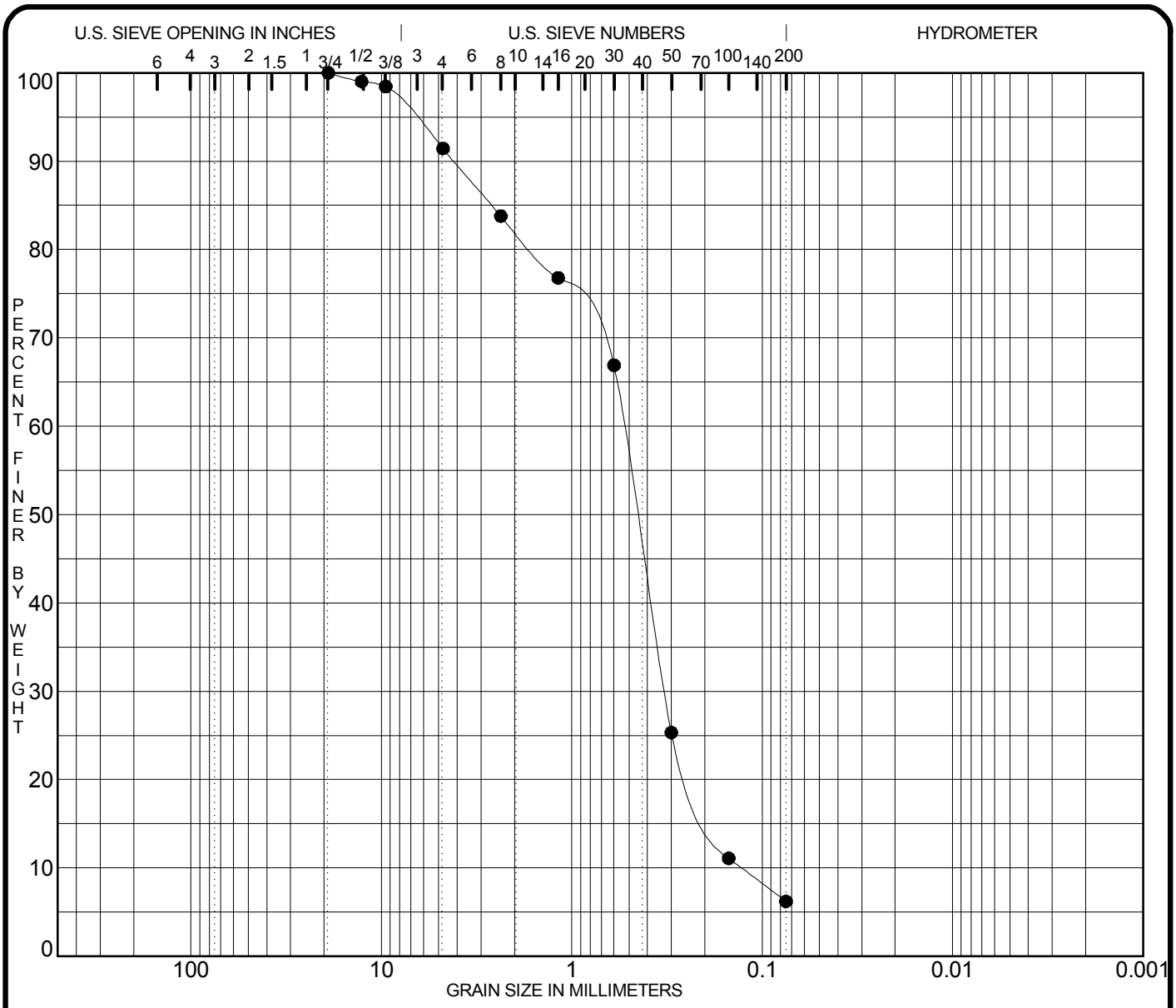

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1604S 37.0-46.6ft**		**15.5**				
	SS-26,27,28,29,30,31 (Composite					
	N 151,503.4 E 14,197.3 Sample)					
	ELEVATION 399.8					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1604S 37.0-46.6ft**	**19.000**	**0.535**	**0.324**	**0.128**	**8.6**	**85.2**	**6.2**	

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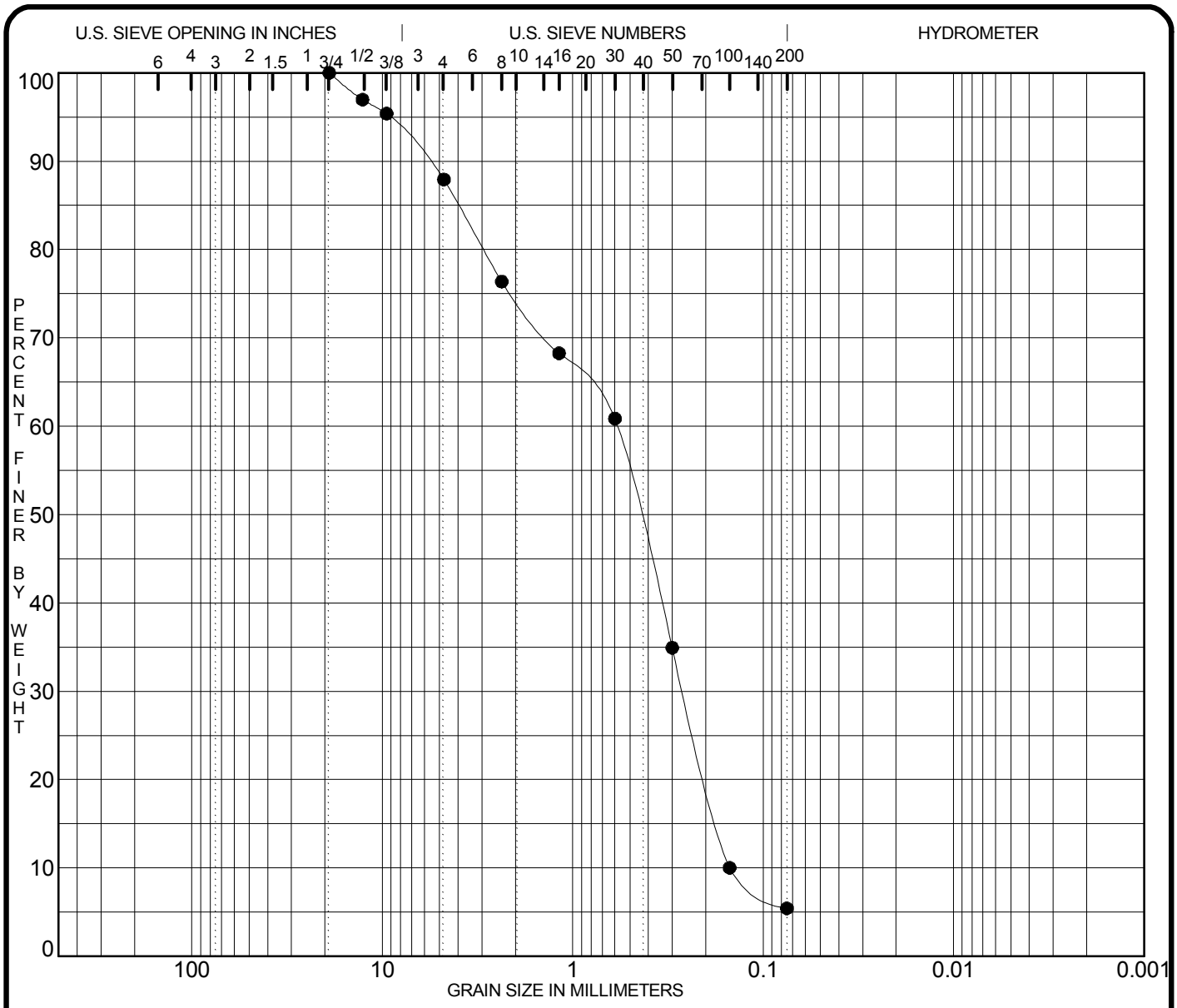

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1605DI 115.0-124.6ft**		**14.5**				
	SS-78,79,80,81,82,83 (Composite					
	N 151,478.2 E 13,537.1 Sample)					
	ELEVATION 400.4					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1605DI 115.0-124.6ft**	**19.000**	**0.586**	**0.262**	**0.150**	**12.1**	**82.5**	**5.4**	

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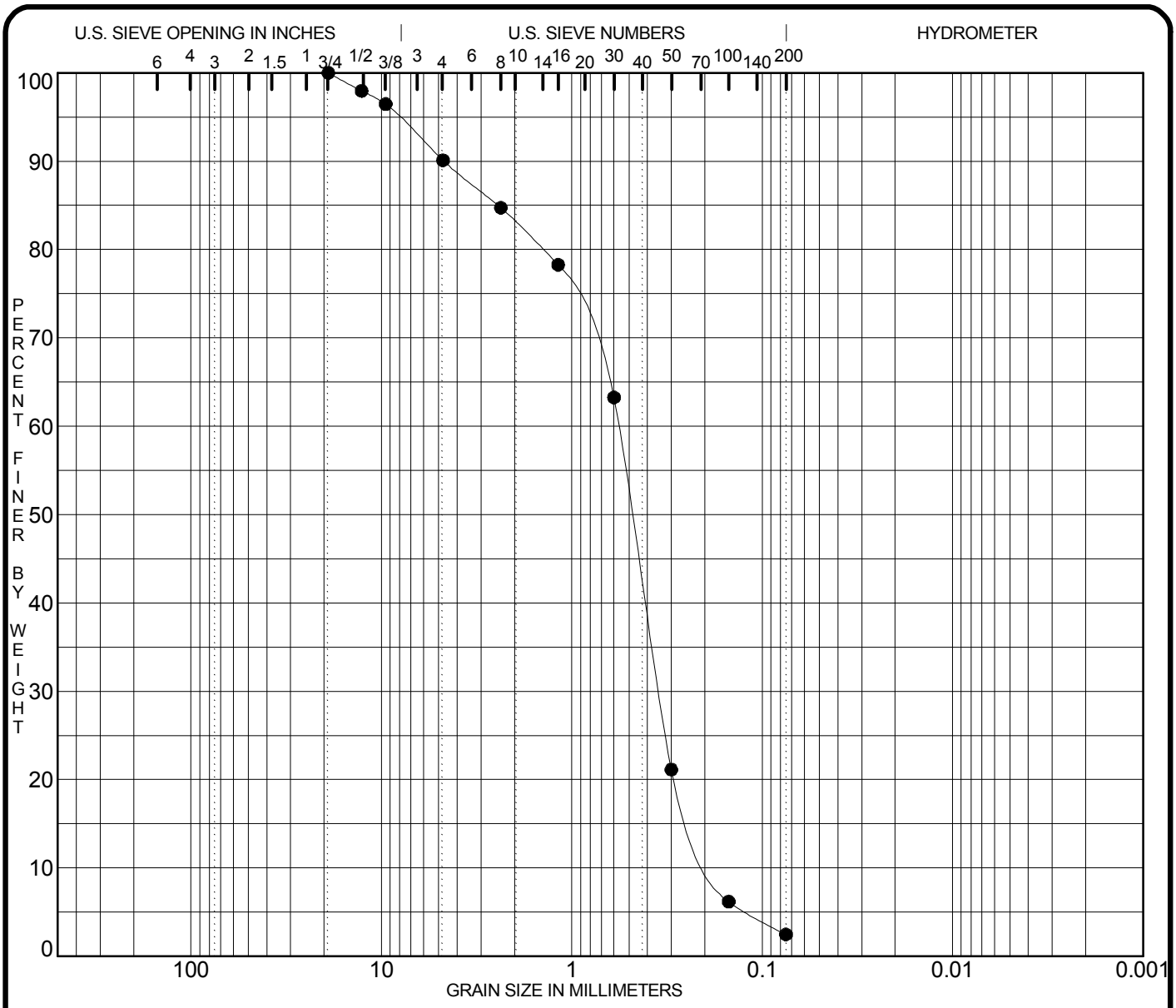

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1605I 68.6-78.2ft**		**19.7**				
	POORLY GRADED SAND SP					
	SS-48,49,50,51,52 (Composite Sample)					
	N 151,478.9 E 513,532.6					
	ELEVATION 400.6					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1605I 68.6-78.2ft**	**19.000**	**0.569**	**0.347**	**0.179**	**9.9**	**87.6**	**2.5**	

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GRADATION CURVES

American Electric Power Service Corp.

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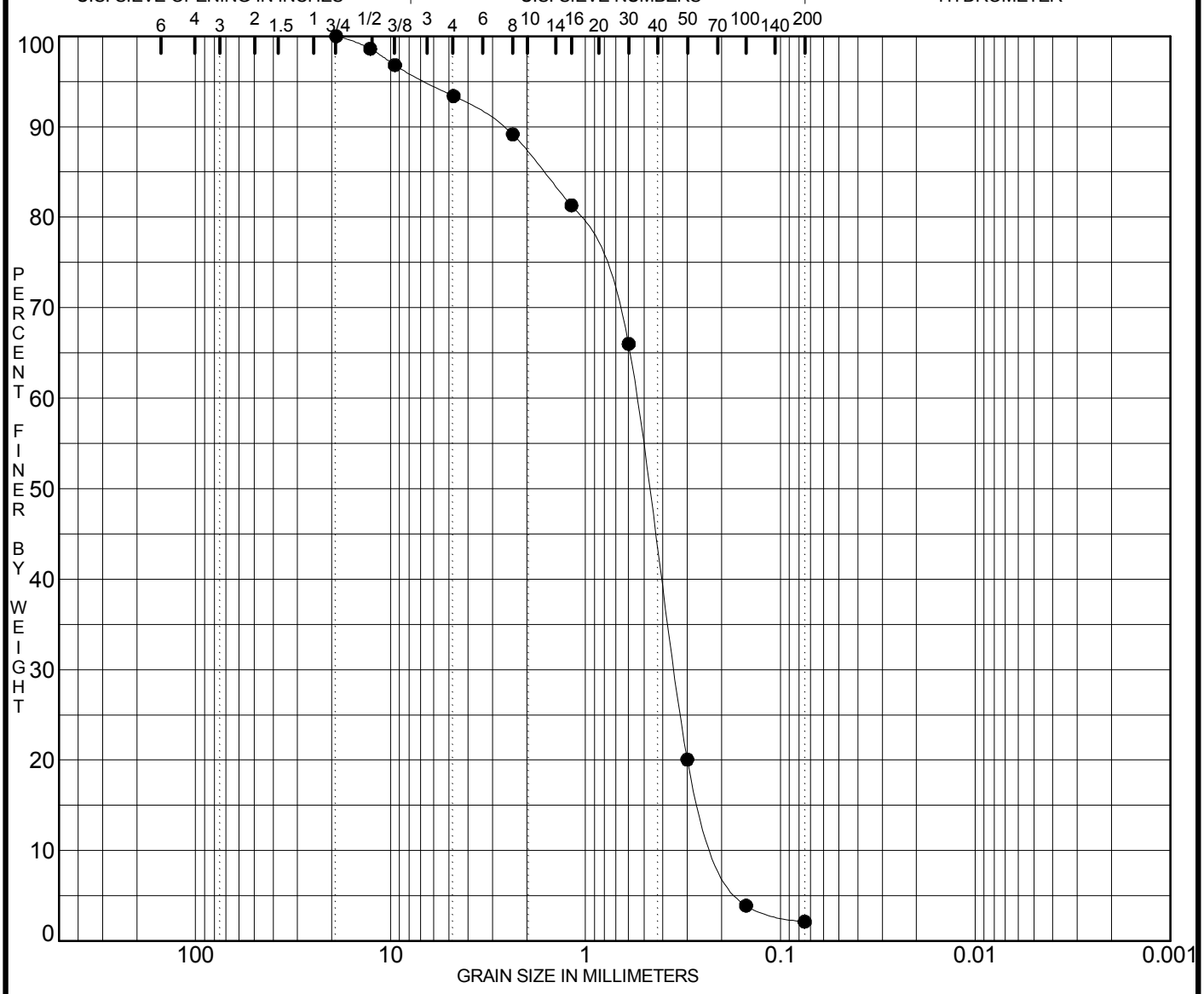

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1605S 37.6-47.2ft**		**16.0**				
	POORLY GRADED SAND SP					
	SS-27,28,29,30,31 (Composite Sample)					
	N 151,478.8 E 513,528.4					
	ELEVATION 400.3					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1605S 37.6-47.2ft**	**19.000**	**0.548**	**0.349**	**0.195**	**6.6**	**91.3**	**2.1**	

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GRADATION CURVES

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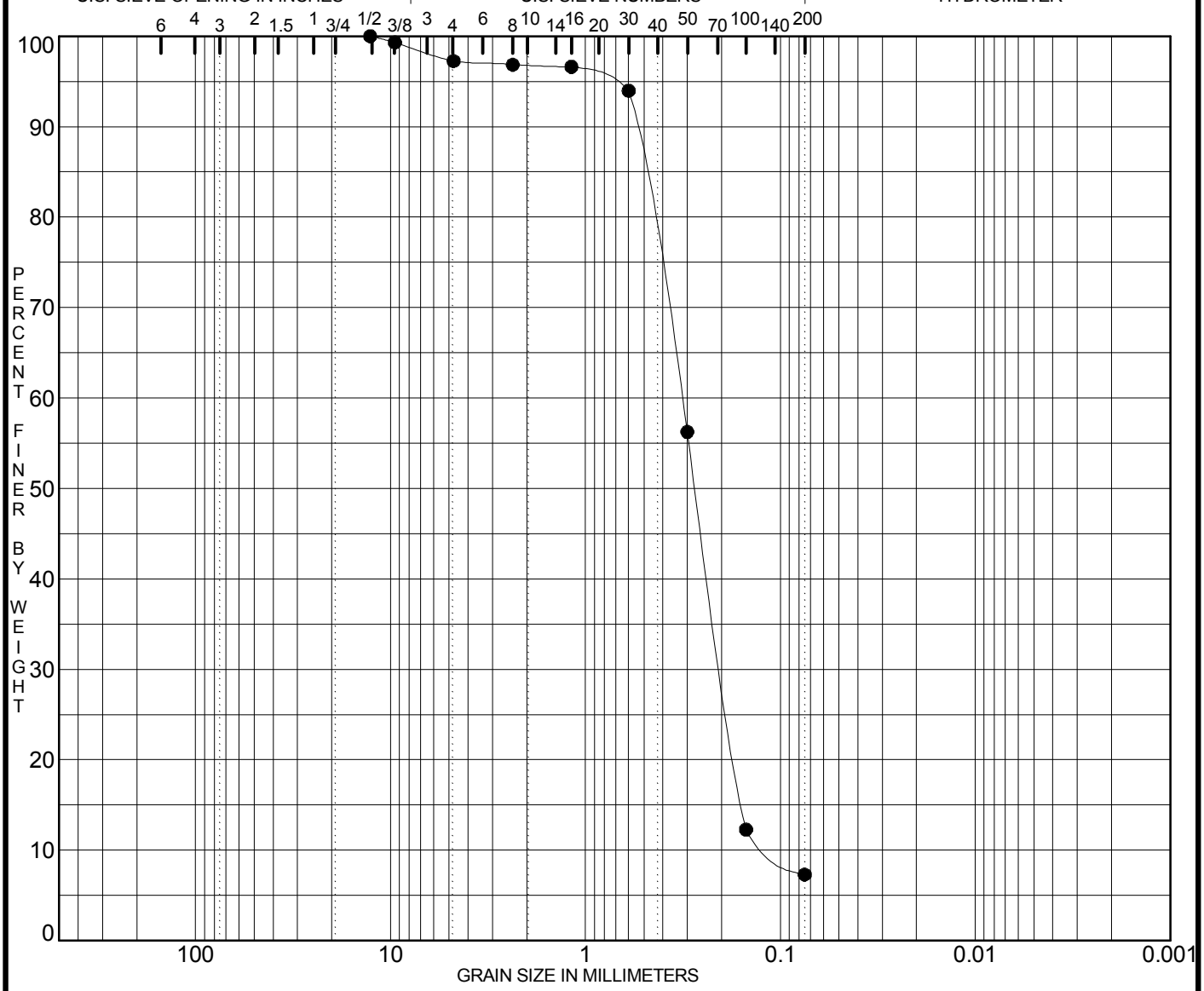

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1606DI 100.0-109.6ft**		**28.6**				
	SS-68,69,70,71,72,73 (Composite					
	N 151,502.4 E 12,881.5 Sample)					
	ELEVATION 397.8					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1606DI 100.0-109.6ft**	**12.700**	**0.321**	**0.198**	**0.109**	**2.7**	**90.0**	**7.3**	

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GRADATION CURVES

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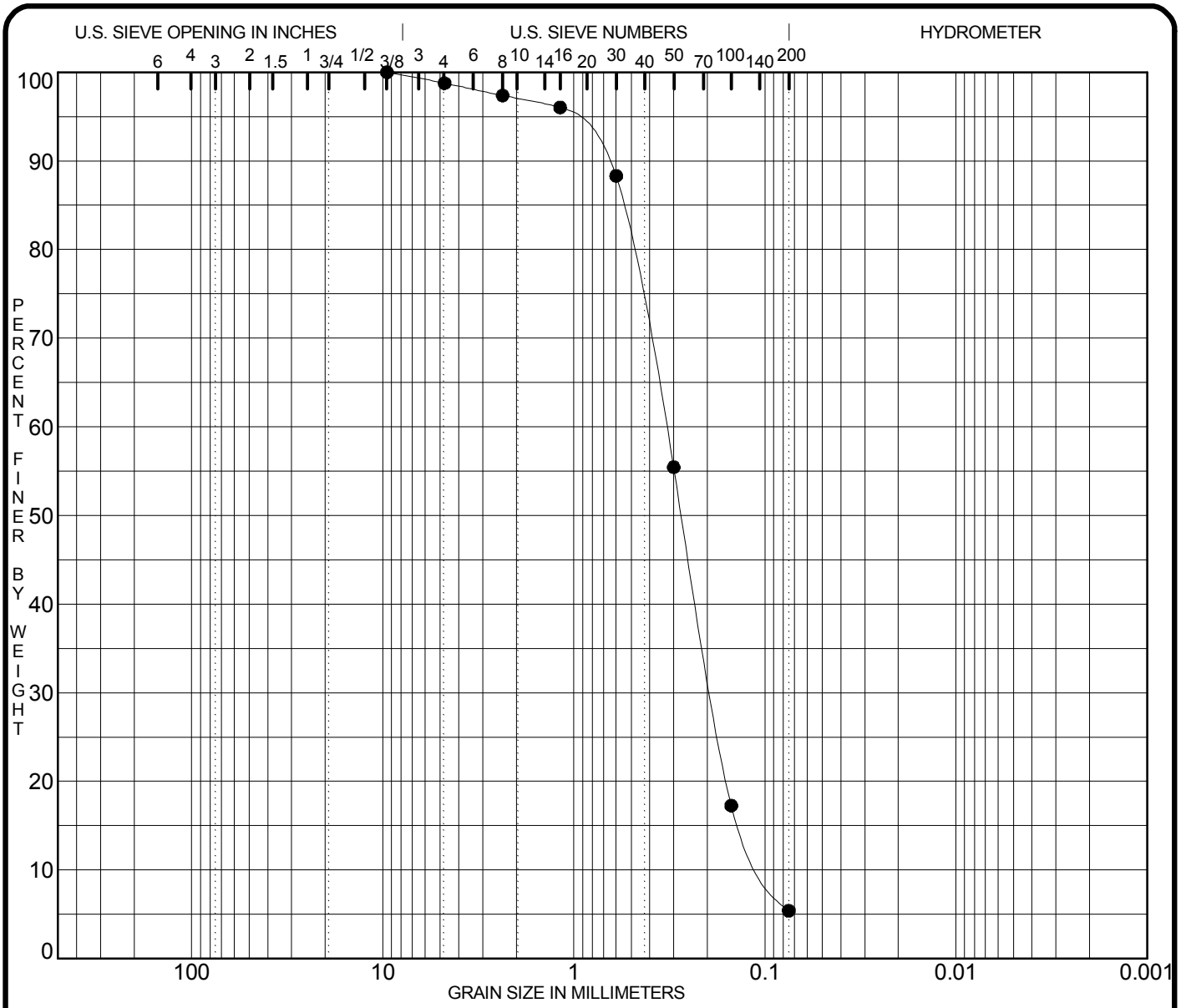

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1606I 65.7-75.3ft**		**18.9**				
	SS-45,46,47,48,49,50 (Composite					
	N 151,508.4 E 12,885.5 Sample)					
	ELEVATION 397.8					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1606I 65.7-75.3ft**	**9.500**	**0.330**	**0.189**	**0.098**	**1.2**	**93.4**	**5.4**	

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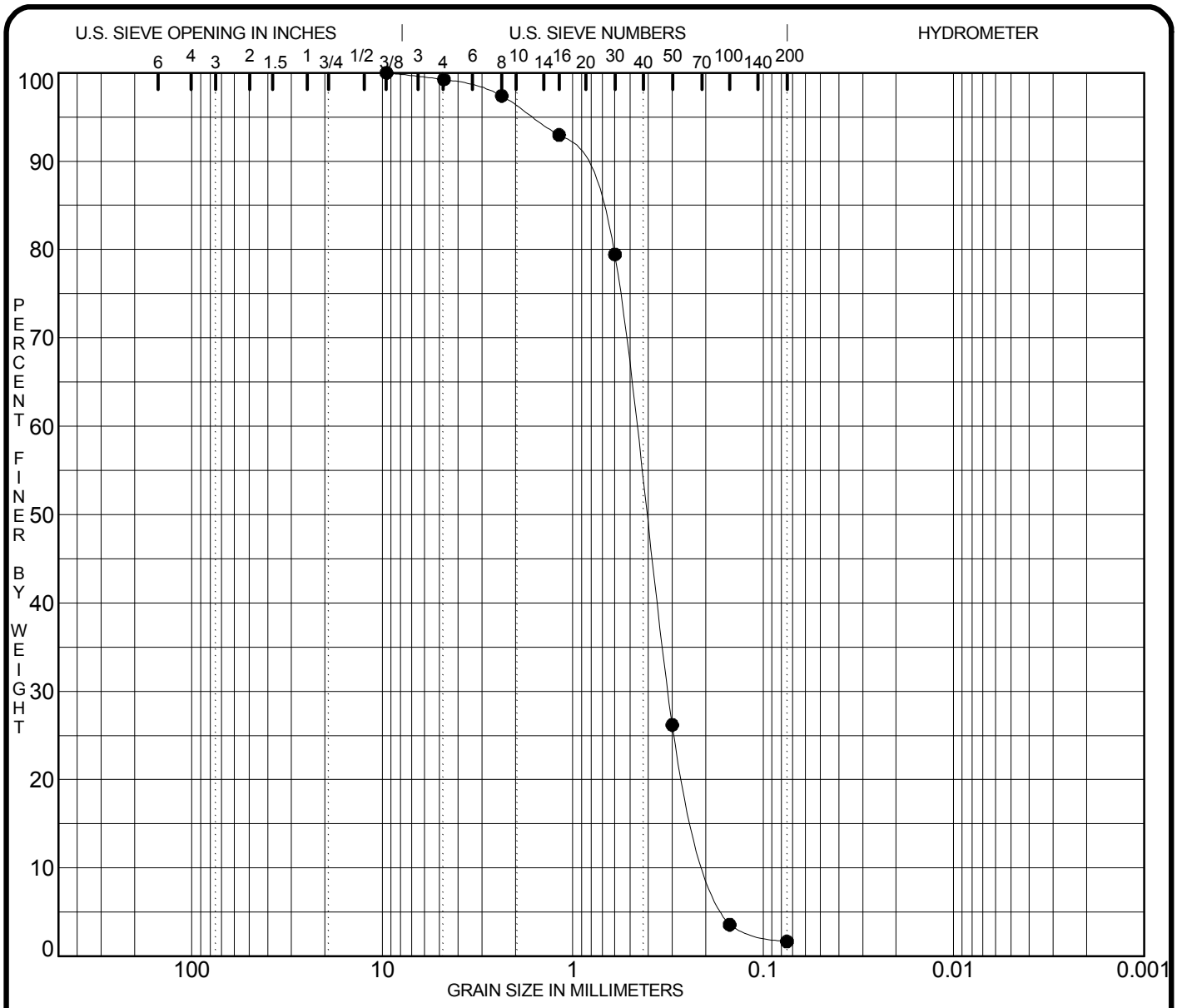

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Sp.Gr.
● **MW-1606S 34.7-44.3ft**		**20.9**				
	POORLY GRADED SAND SP					
	SS-25,26,27,28,29 (Composite Sample)					
	N 151,498.9 E 512,889.4					
	ELEVATION 397.6					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **MW-1606S 34.7-44.3ft**	**9.500**	**0.466**	**0.315**	**0.183**	**0.8**	**97.6**	**1.7**	

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ATTACHMENT 3

MONITORING WELL HYDROGRAPHS
2010 BA POND MONITORING WELLS

AEP Rockport Plant

Wastewater Pond Complex - Monitoring Well Hydrographs