HYDROGEOLOGIC ASSESSMENT REPORT
FLY ASH POND AND BOTTOM ASH POND
MEREDOSIA POWER STATION
800 SOUTH WASHINGTON STREET
MEREDOSIA, ILLINOIS

Prepared for:

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1.0 INTRODUCTION

AmerenEnergy Median Valley Cogen, LLC (Ameren) has retained Geotechnology, Inc. (Geotechnology) to provide design services for the closures of a fly ash pond and a bottom ash pond at their Meredosia, Illinois power station. We understand that the closure rules for the Meredosia ash ponds are similar to those defined for ash pond closures at Ameren's Hutsonville Power Station - Hutsonville, Illinois in January 2011 under Illinois Administrative Code (IAC) Title 35, Part 840, Subpart A: *Closure of Ash Pond D, Hutsonville Power Station*. These rules address the hydrogeologic site investigation, groundwater monitoring, groundwater collection and discharge, final slopes and stabilization, final cover system, closure plan, and post-closure maintenance and care.

The Meredosia Power Station in Morgan County, Illinois is owned by AmerenEnergy Medina Valley Cogen, LLC and operated by the Ameren Energy Generating Company from 1948 to 2011, when the power station was closed. The Meredosia Power Station has three coal combustion product impoundments including: the Bottom Ash Pond, the Fly Ash Pond and the Old Ash Pond. The Old Ash Pond was previously closed.

This document comprises the Hydrogeologic Assessment and includes a review and update of previous hydrogeologic assessment documents prepared by others for the Meredosia Power Station. Additionally, subsurface data collected from the October 2015 subsurface investigation and monitoring well installation activities are incorporated into this assessment. Hydrogeologic assessment data was compiled from previously presented information including the March 2013 Phase I Hydrogeological Assessment Report prepared by Natural Resource Technology Environmental Consultants (NRT)[1] and the November 2009 Site Characterization and Groundwater Monitoring Plan for CCP Impoundments prepared by Rapps Engineering and Applied Science (Rapps)[2].

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[1] *Phase I Hydrogeological Assessment Report, Coal Combustion Product Impoundments, Meredosia Power Station, Morgan County, Illinois;* prepared by Natural Resource Technology, Inc. for Ameren Energy Generating Company; Project No. 2124, dated March 19, 2013.

[2] *Site Characterization and Groundwater Monitoring Plan For CCP Impoundments, Ameren Energy Generating Company, Meredosia Power Station, Morgan County, Illinois;* prepared by Rapps Engineering and Applied Science for Ameren Services; dated November 2009.

2.0 PHYSICAL SETTING

The Meredosia Power Station is located at 800 South Washington Street, Meredosia, Illinois. The Fly Ash and Bottom Ash Ponds are located southwest of the former coal pile and plant facilities. The site location and topography are shown on Plate 1. An aerial photograph site plan showing existing structures, ash ponds, and monitoring well/boring locations is included as Plate 2. The Meredosia Power Station is located in the floodplain of the Illinois River which borders the site to the west.

The Meredosia Power Station ash ponds are located in the south half of Section 21 and the north half of Section 28, T.16N, R.13W. The Bottom Ash Pond was constructed in 1972 with a design surface area of 11 acres, a height of 24 feet, and a volume of approximately 90 acre-feet. The Fly Ash Pond was constructed in 1968 and has a design surface area of 44.8 acres, a height of 24 feet, and a volume of approximately 500 acre-feet.

3.0 REGIONAL GEOLOGY

The Meredosia Power Station is located near the western edge of the Springfield Plain Subsection of the Till Plains Section, Central Lowland Province, Interior Plains Physiographic Region. The Interior Plains Physiographic Region extends across the Laurentian craton of central North America. It is comprised of the Great Plains and Central Lowland Provinces. The Central Lowlands Province to the east formed from eroded sediments from the topographically-higher Great Plains Province to the west (Fenneman, 1922).

The Till Plains Section of the Central Lowland Province is subdivided into seven areas in Illinois. Four of the subdivisions are in Illinoian-aged drift (Willman et al., 1975). The Springfield Plain comprises the western half of the Illinoian-aged till plain. It is level to undulatory and exhibits relatively shallow drainages. The southern boundary is observed where the drift thins and the underlying bedrock control becomes prominent. It is characterized by smoothed features and glacial landforms. The Illinois River forms the northwestern border of the Springfield Plain.

3.1 Bedrock Stratigraphy. The Meredosia Power Station and surrounding areas within the Illinois River valley are underlain by Mississippian System bedrock of the Lower Valmeyeran Series which consists of the Meppen Limestone, Fern Glen formation, and the Burlington-Keokuk Limestone (Kolata, 2005). A bedrock geology map of the site and surrounding areas is included as Plate 3.

Willman et al. (1975) describe the Meppen Limestone as a tan or buff, very fine-grained dolomitic limestone or calcareous dolomite. The formation is slightly crinoidal and contains calcite geodes up to 2-inches in diameter. The maximum thickness of this formation is

approximately 22 feet. The Fern Glen formation consists of calcareous shale, limestone, and dolomite. Dolomitic portions of the formation are partially argillaceous. The limestone portions of the formation contain nodules of greenish-gray chert. The thickness of the formation can range from approximately 50 to 100 feet. The Burlington formation of the Burlington-Keokuk Limestone is described as a "very pure, coarsely crystalline, crinoidal, light gray limestone in medium to thick beds." The Burlington formation also contains beds of fine-grained, brownish-gray, dolomitic limestone. The formation is approximately 100 to 150 feet thick in Illinois. The Keokuk formation of the Burlington-Keokuk Limestone is composed of beds of fossiliferous, crinoidal limestone interbedded with fine-grained limestone, argillaceous dolomite, and calcareous gray shale. The Keokuk formation is approximately 60 to 80 feet thick in Illinois.

3.2 Surficial Geology. The Meredosia Power Station is situated within the Illinois River valley. The overburden soils consist of channel and floodplain deposits of the Cahokia formation underlain by glacial outwash deposits belonging to the Henry formation. Fine-grained lacustrine deposits of the Equality formation are present in the subsurface, but are discontinuous. These formations occur throughout Illinois in valley bottoms and floodplains as channel deposits in present-day rivers and streams.

The Cahokia Alluvium consists mainly of poorly-sorted silt, clay, and silty sand, but locally contains lenses of sand and gravel. The upper part consists of overbank silt and clays. The lower portion consists of coarse-textured sand and lateral accretion deposits. The Cahokia formation may be up to 20 feet thick in the area of the Meredosia Power Station (Berg and Kempton, 1987).

The Henry formation consists of glacial sand and gravel outwash. The Henry formation is subdivided into three members that differ in lithology: the Batavia Member (outwash plains), the Mackinaw Member (valley trains), and the Wasco Member (ice-contact deposits) (Willman and Frye, 1970; Willman et al., 1975). Based on information from well logs, the thickness of the Henry formation ranges from 60 to 84 feet in the area of the Meredosia Power Station.

The Equality formation consists of bedded silt and clay deposits in glacial and post-glacial lakes. Gravel, sand, and organic deposits occur in lenses that intertongue with the Henry formation. In the area of the Meredosia Power Station, the Equality formation overlies the Henry formation and generally occurs as lenses or patches not exceeding 20 feet thick.

Geotechnology has conducted subsurface explorations of the overburden soils at the Meredosia Power Station. The subsurface exploration and laboratory testing efforts are discussed further in Section 4.0.

3.3 Surface Water. The major surface water body in the vicinity of the Meredosia Power Station is the Illinois River, which flows from the north-northeast to the south-southwest, and borders the west side of the site. The normal pool elevation of the Illinois River is approximately

421.0 feet[3]. Information from the U.S. Army Corps of Engineers indicates the Illinois River flood stage is 435.0 feet above mean sea level (MSL). The record high stage was 446.69 feet above MSL on May 26, 1943, and the record low stage was 418.40 feet above MSL on January 11, 1940.

Meredosia Lake is a backwater lake located north of the Village of Meredosia within the Illinois River valley and within the Meredosia National Wildlife Refuge. Meredosia Lake is approximately 1.5 miles north of the Meredosia Power Station. Smith Lake is located approximately 1-mile south of the Meredosia Power Station and is connected to Seaman's Pond. Westerly-flowing streams drain the uplands to the east of the Meredosia Power Station. Easterly-flowing streams and drainage channels drain the floodplain across the Illinois River to the west of the Meredosia Power Station.

3.4 Groundwater. Groundwater within and near the Illinois River valley is obtained from the sand and gravel deposits of the Henry formation and to a lesser extent from wells drilled into the Mississippian-age Burlington-Keokuk Limestone and Salem Limestone. A summary of the water supply wells identified within 1-mile of the Meredosia Power Station is presented in Table 1 below. The water supply well information is included as Appendix A. The approximate locations of the water supply wells are depicted on Plate 4.

TABLE 1 – WATER SUPPLY WELL SUMMARY

Owner	Wells	On/Off Site	Type	Status
CIPS*	42	On Site	Water Supply	Abandoned (except 4)
National Starch	15	Off Site	Water Supply	Unknown
Village of Meredosia	6	Off Site	Public Supply	In Use
IDOT	4	Off Site	Test Borings	Not Wells
W.R. Grace	2	Off Site	Water Supply	Unknown
T.A. Terminal	2	Off Site	Water Supply	Unknown
Illinois Road Contractors	1	Off Site	Water Supply	Unknown

*Central Illinois Public Service Company

The water supply wells were located using the Illinois State Geological Survey (ISGS) *Illinois Water Well* (ILWATER) *Internet Map Service,* the Illinois State Water Survey's *Domestic Wells Database*, the Illinois Environmental Protection Agency (IEPA) web-based Geographic Information System (GIS) files, Illinois Department of Health (IDPH) records, and Morgan County Health Department records.

[3] Elevations herein refer to the mean sea level datum in feet (msl-ft).

3.4.1 Private Water Supply Wells. Approximately 62 private water supply wells and 4 non-well test borings were identified within 1-mile of the Meredosia Power Station. Twenty of the private water supply wells are off-site. The status of the wells are unknown at this time, but are assumed to be in-use. The twenty off-site private water supply wells are up-gradient or cross-gradient from the site and are not anticipated to be impacted from the site. Groundwater sampling and testing results further support that the twenty off-site water supply wells are not expected to be impacted.

The other 42 private water supply wells are located at the Meredosia Power Station. According to site records, personnel interviews, and field reconnaissance, 38 of the on-site water supply wells have been abandoned. Two wells are no longer used, but have not been abandoned. One well is shut down and one currently supplies water to the restrooms/showers on the site. Once the former power plant is demolished and the ash pond closure activities are complete, these four supply wells will be abandoned in accordance with 77 Illinois Administrative Code 920.120. Additional water needs at the Meredosia Power Station are provided by the Village of Meredosia public water supply.

3.4.2 Public Water Supply Wells. According to the mapping sources referenced in Section 3.4.1, public water supply wells are not located within 1-mile of the Meredosia Power Station. The closest public water supply wells to the Meredosia Power Station belong to the Village of Meredosia. The six public water supply wells are situated approximately 1.2 miles to the north-northeast. Although the wells are beyond 1-mile from the facility, the locations are depicted on Plate 4 and the water supply well information is included in Appendix A for reference.

Per the IEPA database, two of the Village of Meredosia public water supply wells have a minimum setback of 400 feet and a second setback of 1,000 feet due to the Phase I Wellhead Protection Area (WHPA). A third Village of Meredosia public water supply well has a Phase II WHPA, which has an extended area of protection that includes the recharge area or geographic area surrounding the well that supplies potable water to a community.

3.4.3 Oil and Gas Wells. Oil and gas wells within a 1-mile radius of the Meredosia Power Station were identified using the Illinois State Geological Survey *Illinois Oil and Gas Resources* (ILOIL) *Internet Map Service*. ILOIL contained records for three wells within the search radius, but the status of the three wells was listed as dry, abandoned and plugged.

4.0 SUBSURFACE INVESTIGATION

4.1 Subsurface Investigations. From October 19 through October 26, 2010, Geotechnology advanced 15 borings at the Meredosia Power Station. Ten of the borings (B-1 through B-10) were drilled in support of a global stability evaluation, while the remaining five borings were completed as Monitoring Wells APW-1 through APW-5 in support of groundwater monitoring activities. The borings were drilled using a truck-mounted CME 550 rotary drill rig equipped with 4-1/4-inch hollow stem augers. The borings were drilled to depths ranging from 25 to 60 feet below land surface (bls). Standard Penetration Tests (SPT) were performed using an automatic hammer and split spoon sampler. The locations of the borings and monitoring wells are included on Plate 2.

From September 28 through October 1, 2015, Geotechnology advanced four additional borings at the site using a truck-mounted CME 550 rotary drill rig equipped with 4-1/4-inch hollow stem augers. The borings were drilled to depths ranging from 17 to 40 feet bls. SPTs were performed using an automatic hammer and split spoon sampler. Monitoring Wells APW-6 through APW-9 were installed in the borings in support of ongoing groundwater monitoring activities. Copies of the boring logs are included as Appendix B. The locations of the monitoring wells are included on Plate 2.

Monitoring Wells APW-6 through APW-9 were constructed using 10 feet of 2-inch-diameter 0.010-inch slotted PVC screen and riser to the surface. The monitoring wells were completed at the surface with above-ground steel covers set in a concrete pad. The monitoring wells were developed in accordance with industry practice and registered with the IDPH and the IEPA.

An engineer from Geotechnology provided technical direction during field exploration, observed drilling and sampling, assisted in obtaining samples and prepared descriptive logs of the material encountered. The boring logs represent conditions observed at the time of exploration.

Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials may be gradual or may occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

4.2 Subsurface Conditions. Native soils consisting of brown and gray, very soft to medium stiff, silt and clay were encountered below the fill in Boring B-1 and Monitoring Well APW-9, and at the ground surface in Boring B-5. Native soils consisting of black, clayey sand with trace gravel were encountered below the fill in Boring B-2.

A stratum of very soft to medium stiff, brown, black, and gray clay with traces of sand and wood was encountered below the fill in Borings B-3 and B-8, below the native soils in Borings B-1, B-2, and B-5, and at the ground surface in Borings B-4, B-9, APW-2, APW-3, APW-4, and APW-7. This soil stratum ranged in thickness from approximately 8 to 17 feet bls.

The clay layer described above was underlain by a stratum of granular and cohesive alluvial soils (except for Boring APW-4). The granular alluvium generally consisted of loose, gray, clayey sand with gravel. The cohesive alluvium generally consisted of very soft to medium stiff, gray and brown, clayey silt, silty clay, and sandy clay. This soil stratum ranges in thickness from approximately 5 to 11 feet bls in borings where it is encountered.

Alluvium was encountered below the fill soils in Borings B-6 and B-7, and at the ground surface in Boring B-10 and Monitoring Wells APW-6 and APW-8. This stratum is interpreted as alluvium placed in a buried valley that had been cut down through the soil stratum described above. The granular portions of this alluvium infill generally consisted of very loose, gray, silty sand. The cohesive portions generally consisted of very soft to very stiff, gray, silty clay with sand and silt seams. This soil stratum was at least 28 feet thick where encountered.

The native soils described above are interpreted as belonging to the Cahokia Alluvium, and were underlain by sand deposits interpreted as belonging to the Henry formation. Generalized east-west and north-south subsurface profiles based on the soil boring data at the Meredosia Power Station are included on Plates 6 and 7, respectively. The plan-view of the subsurface profile orientations is included on Plate 5.

During the subsurface exploration activities, groundwater was observed in Borings B-3, B-4, B-5 and B-6 at depths ranging from approximately 18 to 39 feet bls. Groundwater was observed in Monitoring Wells APW-1 through APW-9 at depths ranging from 6 to 32 feet bls at the time of construction. Groundwater levels might not have stabilized before backfilling or well construction activities. Consequently, the indicated groundwater levels might not represent present or future levels. Groundwater levels could vary over time due to the effects of the Illinois River, seasonal variation in precipitation, or other factors not evident at the time of exploration.

5.0 SITE HYDROGEOLOGY

5.1 Groundwater Classification. The Illinois Class I groundwater standards are applicable to the Meredosia Power Station. The Illinois Class I groundwater is generally defined and groundwater that is capable of being potable.

5.2 Groundwater Monitoring. The groundwater monitoring network at the Meredosia Power Station consists of one up-gradient monitoring well (APW-1) and eight down-gradient monitoring wells (APW-2 through APW-9). The approximate locations of the monitoring wells are included on Plate 2. The monitoring wells are screened in the uppermost aquifer which generally consists of saturated, fine to coarse sand. The monitoring well depths range from 17 to 40 feet bls. Monitoring well construction diagrams from Monitoring Wells APW-1 through APW-9 are included in Appendix B. A total of 11 groundwater monitoring events have been conducted at the Meredosia Power Station since December 2010. The groundwater monitoring events have been conducted quarterly since the third quarter of 2015. Future groundwater monitoring events are anticipated to be conducted quarterly until trend analysis indicates less frequent monitoring is acceptable. A summary of the monitoring well gauging data is included as Table 2. A summary of the groundwater laboratory analytical results collected to date is included as Table 3.

5.3 Groundwater Flow. Based on the monitoring well gauging data in Table 2, the groundwater flow direction at the Meredosia Power Station is to the west-northwest toward the Illinois River. Groundwater flow direction may be influenced by the stage of the Illinois River. Groundwater elevation contour maps for the 10 groundwater monitoring events are included as Plates 8 through 16. These events include a range of climate conditions including flood and dry timeframes. *Note: Only gauging events with data from at least five monitoring wells are included.*

5.4 Groundwater Geochemistry. A total of 11 groundwater sampling events have been conducted at the Meredosia Power Station since December 2010. The parameters analyzed include those listed in Section 5.1 in addition to field parameters pH, specific conductivity, and temperature. The analytical testing data are summarized in Table 3. The historical groundwater data collected prior to 2015 consists of dissolved parameter concentrations only. During the time these data were collected, laboratory analysis for dissolved concentrations was the applicable standard of care. The use of dissolved parameter concentration results in the statistical analysis for this Hydrogeologic Assessment report was the only historical data available for the site and was based on the precedent set by the Hutsonville Ash Pond D Closure which was approved by the IEPA. The recent three quarterly sampling events (3Q15, 4Q15, and 1Q16) were analyzed for both total and dissolved parameter concentrations. The purpose of the dual analysis was to allow historical data to be compared to current data and to prepare for future statistical analysis using total parameter concentrations. *Note: The historical data provided by others did not*

contain practical quantitation limits (PQLs) or method detection limits (MDLs). The PQLs and MDLs from the February 2016 groundwater sampling event were substituted for the missing data during statistical analysis.

The analytical results were compared to the Illinois Class I groundwater standards. Historical concentrations of arsenic exceeded the Class I groundwater standard in Monitoring Wells APW-3 and APW-4. Currently, (as of February 2016) the arsenic concentration exceeded the Class I groundwater standard in APW-3 only. Concentrations of boron exceeded the Class I groundwater standard in Monitoring Wells APW-2, APW-3, APW-4, APW-6, APW-8, and APW-9. Currently, (as of February 2016) the boron concentration exceeded the Class I groundwater standard (2 ppm) in Monitoring Wells APW-2, APW-3, APW-8, and APW-9. Aerial photographs showing the boron concentration contours for September 2015, December 2015, and February 2016 are included as Plates 18 through 20, respectively. Concentrations of manganese exceeded the Class I groundwater standard in Monitoring Wells APW-2, APW-3, and APW-4. Historical concentrations of iron exceeded the Class I groundwater standards in Monitoring Wells APW-3 and APW-4, but the February 2016 results are below the Class I groundwater standard. A single event anomaly associated with flooding in February 2016 resulted in the concentration of sulfate in Monitoring Well APW-9 being above the Class I groundwater standard. The arsenic and manganese exceedances at each monitoring well for the February 2016 sampling event are included on Plate 21. Changes of oxidation/reduction (redox) potential in the subsurface due to fluctuations in pH make evaluation of manganese and iron concentrations unreliable at this facility. Comparison of manganese and iron to the respective Class I groundwater standard may be inappropriate for this site.

Box and whiskers plots of boron and arsenic are included as Appendix C. Statistical trend analysis plots for boron and arsenic are also included in Appendix C. Statistical trends are decreasing or not significant at a 98% confidence level. The analysis indicates that increasing trends may have been present while the Meredosia Power Station was in operation through 2011, but appear to be decreasing based on the three most recent quarterly monitoring data.

5.5 Contaminants of Concern. Boron and arsenic are the contaminants of concern for the Meredosia Power Station and are also the groundwater indicator parameters. Boron and arsenic are widespread across the site and are generally considered good indicator chemicals for ash pond facilities in Illinois. Due to the elevated levels of boron above background levels in the groundwater near the ash ponds on site, boron will be a primary indicator parameter for the site during remedial actions and ash pond closure activities. Boron and arsenic are relatively stable in the subsurface and are not prone to attenuation.

Other chemicals and water quality parameters such as iron, manganese, pH, and TDS can be affected by redox conditions in the subsurface and are therefore not reliable as indicator parameters at this site. The concentrations of other chemicals may naturally fluctuate through attenuation.

5.6 Groundwater Modeling.

Both a two-dimensional and three-dimensional transient groundwater flow and transport model were used to describe the site. The models were calibrated to match the groundwater elevation and concentration trends observed between 2009 and 2015. Prediction simulations were then performed for no action and for proposed ash pond closure activities. The existing conditions model was used to calibrate the hydrogeologic flow and transport conditions and to evaluate the need for the ponds to be closed. The proposed closure conditions model was created to evaluate the length of time for the boron and arsenic concentrations to decrease to below the IEPA Class I Groundwater standards. Boron and arsenic were chosen because they are indicator contaminants for coal ash leachate, are mobile in groundwater, and are widespread in groundwater across the site.

5.6.1 HELP Model

In order to assess the drainage capabilities of the proposed fly ash and bottom ash pond closures, Geotechnology utilized the USEPA Hydrologic Evaluation of Landfill Performance (HELP) model to simulate conditions at the site. The version of software used was HELP 3.07 (November 1997). A description of inputs and output data is attached in Appendix D of this report. For the purposes of this evaluation, the proposed ash pond cap, ash, and soil cross-section has been divided into six layers.

Model parameters for the layers were the default values for each selected layer type as provided by the HELP software module, or were input by the user (for synthetic materials) with known or manufacturer provided parameters. The model was run without groundwater influx parameters.

The model indicates that steady state conditions (<0.05 inches of head on the sand layer) will be achieved within approximately six months of closure activities at the two ash ponds on site. The data obtained from the HELP model was used as input parameters for MODFLOW and MT3DMS.

5.6.2 MODFLOW and MT3DMS

MODFLOW was developed by the United States Geological Survey (USGS) to solve three-dimensional transient head distributions using finite difference approximations. The model inputs include soil properties, multiple layers, heterogeneities, variable thicknesses, variable gradients, flow boundaries, wells, and can define confined or unconfined flow systems. Assumptions of the program include that groundwater is governed by Darcy's law; the formation behaves as a continuous porous medium; flow is not affected by chemical, temperature, or density gradients; and hydraulic properties are constant within a grid cell.

MT3DMS was developed by the USGS and calculates concentration distributions for a single chemical as a function of time and location using a finite difference solution. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. MT3DMS accounts for advection, diffusion, dispersion, sorption, and first order decay. Assumptions of the module include changes in the concentration field do not affect the flow field; concentrations of solutes do not interact with each other; chemical and hydraulic properties are constant within a cell; sorption is instantaneous and fully reversible; and decay is not reversible.

Flow and transport boundaries, soil properties, and river stage fluctuations were the same for the calibration and prediction scenarios. One prediction scenario was no action and the other included the proposed ash pond closures.

Boron and arsenic concentrations for the current configuration were modeled for 25 years into the future to represent a scenario where the ash ponds were not closed. After 25 years, monitoring well APW-3 (the well with historically highest boron concentrations) stabilized at 16.9 mg/L of boron and 0.208 mg/L of arsenic, which exceed the respective Class I Groundwater standards. APW-2, APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards for boron and arsenic at 25 years with no action.

According to the closure scenario model results, boron concentrations will be below the Class I Groundwater standards for each well on site within three years after dewatering and closure of the fly ash and bottom ash ponds, and arsenic concentrations will be below the Class I Groundwater standards for each well on site within six years.

Additional information on the MODFLOW and MT3DMS modeling and modeling results are provided in Appendix E.

5.6.3 Boron and Arsenic Loading to the Illinois River

Groundwater in the vicinity of the fly ash and bottom ash ponds discharges to the Illinois River. A mixing calculation was performed to conservatively estimate the boron and arsenic loading rates to the Illinois River. Calculations are provided in Appendix F.

The loading rate was calculated by multiplying the volume of groundwater flowing into the river by the concentration of boron and arsenic in groundwater.

Loading Rate (L) = Concentration (C) * Groundwater Discharge Volume (Q)

Where Q = Hydraulic Conductivity (K) * Hydraulic Gradient (I) * Area (A)

To be conservative, the highest single concentration in groundwater monitoring wells at the site was initially used in this calculation (Cmax). A second calculation was performed using the average of the four monitoring wells near the river (APW-2, APW-3, APW-4, and APW-9).

The monitoring wells were not tested for hydraulic conductivity; however, Gibb et al. (1979) published hydraulic conductivity values for wells along the Illinois waterway, which included a site-specific value of 1,200 gallons per day/square foot (gpd/ft^2). Both a maximum and an average hydraulic gradient were used. The average hydraulic gradient was based on the ten groundwater gauging events. Two groundwater gauging events were not used because of flooding and inaccessibility of the wells. Removing flooding events provides a more conservative value. The cross sectional area was assumed to be over the entire thickness of the aquifer, and along the entire length of the Fly Ash Pond parallel to the river, plus 50 feet north and south of the pond.

The calculated loading rate was divided by: 1) the 7-day 10-year low flow (Q7,10); and 2) the mean of the average annual flow data at the Meredosia gaging station. This calculation estimates the incremental concentration increase (dB) in the river due to discharge from the Fly Ash Pond. Due to the size of the Illinois River, it is unlikely that boron and arsenic concentrations would initially be distributed across the entire width of the river. Therefore, an additional calculation was performed to determine the incremental concentration increase assuming that mixing occurred within 50 feet of the shoreline. This calculation was performed by multiplying dB by 750 feet/50 feet (750 feet being total river width and 50 feet being the assumed mixing width).

The result of the boron calculation is an incremental increase of 0.0061 mg/L calculated using average concentration, average hydraulic gradient, and mean annual river discharge. This is near the reporting limit for boron as listed by the USEPA in method SW-846, 6010c and below the Public and Food Processing Water Supply Standard of 1.0 mg/L. (35 IAC 302.304). The result of the boron calculation; based on maximum concentration, maximum hydraulic gradient, and the Q7,10; is a conservative estimate of the increase in boron loading to the Illinois River. This result (0.23 mg/L) suggests that a measurable boron increase could occur near shore for worst case conditions at low flow. This value is below the Public and Food Processing Water Supply Standard.

The boron concentrations were calculated at three years after dewatering and closure, which was the time period when boron concentrations were calculated to be below the Class I Groundwater Standards. The calculation indicated potential increases of 0.00014 mg/L and 0.0057 mg/L for the average and worst case conditions, respectively. Both values are below the Public and Food Processing Water Supply Standard of 1.0 mg/L.

The arsenic concentrations were calculated at six years after dewatering and closure, which was the time period when arsenic concentrations were calculated to be below the Class I Groundwater Standards. The calculation indicated potential increases of 0.0000010 mg/L and 0.000045 mg/L for the average and worst case conditions, respectively. Both values are below the Public and Food Processing Water Supply Standard of 1.0 mg/L.

The calculated impacts to the Illinois River for both boron and arsenic are below typical detection limits for analytical testing.

6.0 CONCLUSIONS

Although up to 11 groundwater monitoring events have been conducted at the Meredosia Power Station since December 2010, only three monitoring events have been conducted since the facility ceased operations in 2011. Therefore, statistical analysis of post-closure trends could not be performed. The groundwater analytical and statistical data indicates that the unlined ash ponds are a primary contributor to groundwater impacts based on the location of groundwater exceedances, the types of chemicals common to coals ash exceeding the applicable Class I groundwater standards, gradual reduction of groundwater impacts after plant closure, and contaminant transport modeling. The preliminary data suggests that a reduction in the concentrations of boron and arsenic has occurred since the facility ceased operations. The results of the groundwater modeling further support this preliminary assessment. When the ash ponds are capped the primary pathway (storm water infiltration) for contaminants to impact the groundwater at the site will not be complete. Groundwater modeling indicates that within six years of dewatering and closure, boron and arsenic levels in the residual plume will be below the Class I Groundwater standards.

Additional groundwater monitoring events are planned to further assess the extent of the impacts of ash pond capping activities. Future monitoring events will be sampled for the parameters in accordance with the Meredosia Power Station Groundwater Monitoring Plan (GMP, 2016).

7.0 REFERENCES

Natural Resource Technology Environmental Consultants, Phase I Hydrogeological Assessment Report, Coal Combustion product Impoundments, Meredosia Power Station, Morgan County, Illinois, March 19, 2013.

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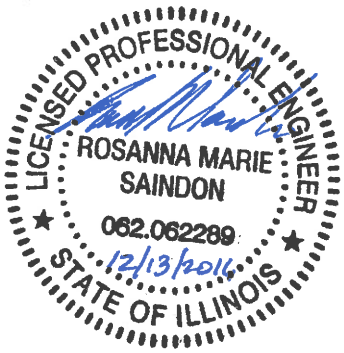
8.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

I hereby affirm that the information and design documents contained in this hydrogeologic assessment report are true and accurate to the best of my knowledge and professional opinion.



Rosanna M. Saindon, P.E., Ph.D.
Illinois Licensed Professional Engineer
Project Manager
Geotechnology, Inc.

TABLE 1

MONITORING WELL SURVEY DATA
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

Well ID (feet)	Northing (feet)	Easting (feet)	Elevation (feet)		
			Top Vault	Top Casing	Ground
APW-1	1147018.68	2185605.20	449.581	449.261	446.062
APW-2	1148489.69	2182485.19	437.528	436.869	433.966
APW-3	1148118.60	2181973.76	436.782	436.281	433.345
APW-4	1146935.94	2181602.97	435.198	434.859	431.897
APW-5	1146922.64	2183711.11	453.652	453.197	450.476

Coordinates are referenced to Illinois State Plane Coordinates, East Zone - NAD 1983
Elevations are referenced to NAVD 1988

TABLE 2

MONITORING WELL DATA SUMMARY
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

Well ID	Ground Surface Elevation	Bottom of Well Elevation	Screen Length (ft)	Top of Casing Elevation[1]	Groundwater Measurements		
					Date	Depth to Water (ft)	Groundwater Surface Elevation
APW-1	446.06	420.90	10.00	449.26	11/17/10	18.35	430.91
					12/13/10	19.15	430.11
					03/14/11	18.30	430.96
					06/24/11	10.80	438.46
					09/15/11	17.30	431.96
					10/28/11	19.60	429.66
					03/26/12	21.55	427.71
					06/18/12	21.34	427.92
					09/17/12	23.45	425.81
					08/25/15	12.10	437.16
					12/21/15	18.22	431.04
					02/18/16	13.54	435.72
APW-2	433.97	410.60	10.00	436.87	11/17/10	13.00	423.87
					12/13/10	13.14	423.73
					03/14/11	8.30	428.57
					09/15/11	12.65	424.22
					10/28/11	13.60	423.27
					03/26/12	13.27	423.60
					06/18/12	14.46	422.41
					09/17/12	15.59	421.28
					08/25/15	9.67	427.20
					12/21/15	9.05	427.82
					02/18/16	8.21	428.66
APW-3	433.35	410.30	10.00	436.28	11/17/10	13.52	422.76
					12/13/10	13.35	422.93
					03/14/11	5.70	430.58
					09/15/11	13.90	422.38
					10/28/11	14.60	421.68
					03/26/12	12.80	423.48
					06/18/12	13.95	422.33
					09/17/12	15.92	420.36
					08/25/15	11.10	425.18
					12/21/15	4.79	431.49
					02/18/16	8.74	427.54
APW-4	431.90	405.80	6.50	434.86	11/17/10	9.15	425.71
					12/13/10	9.25	425.61
					09/15/11	9.20	425.66
					10/28/11	10.00	424.86
					03/26/12	9.90	424.96
					06/18/12	10.95	423.91
					09/17/12	12.36	422.50
					08/25/15	6.13	428.73
					12/21/15	5.47	429.39
					02/18/16	4.92	429.94
APW-5	450.48	420.20	10.00	453.20	11/17/10	25.60	427.60
					12/13/10	25.40	427.80
					03/14/11	22.60	430.60
					06/24/11	14.70	438.50
					09/15/11	23.40	429.80
					10/28/11	24.50	428.70
					03/26/12	27.20	426.00
					06/18/12	27.30	425.90
					09/17/12	29.18	424.02
					08/25/15	18.55	434.65
					12/21/15	23.68	429.52
					02/18/16	19.42	433.78
APW-6	448.60	420.60	9.68	451.90	12/21/15	21.90	430.00
					02/18/16	18.35	433.55
APW-7	435.00	418.50	9.70	438.70	12/21/15	9.15	429.55
					02/18/16	6.95	431.75
APW-8	460.50	421.40	9.68	463.90	12/21/15	34.56	429.34
					02/18/16	31.60	432.30
APW-9	445.00	415.70	9.68	448.10	12/21/15	18.23	429.87
					02/18/16	17.76	430.34

[1]Elevations reported in feet above mean sea level.

TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	SAMPLE DATE	PARAMETER[1]													
		Antimony (d)	Antimony (t)	Arsenic (d)	Arsenic (t)	Barium (d)	Barium (t)	Beryllium (d)	Beryllium (t)	Boron (d)	Boron (t)	Cadmium (d)	Cadmium (t)	Chloride (d)	Chromium (d)
APW-1	12/13/2010	<0.006	NA	<0.004	NA	<0.05	NA	<0.004	NA	0.117	NA	<0.004	NA	1	<0.01
	3/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.13	NA	<0.001	NA	11	<0.004
	6/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.14	NA	<0.001	NA	5.6	<0.004
	9/15/2011	<0.003	NA	<0.001	NA	0.017	NA	<0.001	NA	0.1	NA	<0.001	NA	13	<0.004
	10/28/2011	<0.003	NA	<0.001	NA	0.019	NA	<0.001	NA	0.098	NA	<0.001	NA	6.8	<0.004
	3/26/2012	<0.003	NA	<0.001	NA	0.011	NA	<0.001	NA	0.11	NA	<0.001	NA	20	<0.004
	6/18/2012	<0.003	NA	<0.001	NA	0.02	NA	<0.001	NA	0.097	NA	<0.001	NA	45	<0.004
	9/17/2012	<0.003	NA	<0.001	NA	0.013	NA	<0.001	NA	0.055	NA	<0.001	NA	39	<0.004
	8/25/2015	<0.001	<0.001	<0.001	0.004	0.014	0.032	<0.0005	<0.0005	0.066	0.071	<0.002	<0.002	54	<0.005
	12/21/2015	<0.001	<0.001	<0.001	0.003	0.014	0.03	<0.0005	<0.0005	0.074	0.079	<0.002	<0.002	62	<0.005
	2/18/2016	<0.0010	0.0004	<0.0010	0.0012	0.0207	0.0276	<0.0005	<0.0005	0.0712	0.0705	<0.0020	<0.0020	80	<0.0050
APW-2	12/13/2010	<0.006	NA	0.004	NA	<0.05	NA	<0.004	NA	2.11	NA	<0.004	NA	33	<0.01
	3/24/2011	<0.003	NA	0.004	NA	0.055	NA	<0.001	NA	3.1	NA	<0.001	NA	50	<0.004
	9/15/2011	<0.003	NA	0.003	NA	0.042	NA	<0.001	NA	2.8	NA	<0.001	NA	41	<0.004
	10/28/2011	<0.003	NA	0.004	NA	0.045	NA	<0.001	NA	3.3	NA	<0.001	NA	42	<0.004
	3/26/2012	<0.003	NA	0.004	NA	0.046	NA	<0.001	NA	3.6	NA	<0.001	NA	47	<0.004
	6/18/2012	<0.003	NA	0.004	NA	0.051	NA	<0.001	NA	3.5	NA	<0.001	NA	50	<0.004
	9/17/2012	<0.003	NA	0.004	NA	0.048	NA	<0.001	NA	3.9	NA	<0.001	NA	44	<0.004
	8/25/2015	<0.001	<0.001	0.001	0.003	0.06	0.073	<0.0005	<0.0005	2.65	2.8	<0.002	<0.002	40	<0.005
	12/21/2015	<0.001	<0.001	0.002	0.003	0.074	0.092	<0.0005	<0.0005	2.61	2.61	<0.002	<0.002	26	<0.005
	2/18/2016	<0.0010	0.0007	0.0011	0.0014	0.0597	0.0654	<0.0005	<0.0005	2.66	2.88	<0.0020	<0.0020	30	<0.0050
APW-3	12/13/2010	<0.006	NA	0.148	NA	<0.05	NA	<0.004	NA	30.2	NA	<0.004	NA	54.5	<0.01
	3/24/2011	<0.003	NA	0.17	NA	0.05	NA	<0.001	NA	28	NA	0.001	NA	54	<0.004
	9/15/2011	<0.003	NA	0.21	NA	0.042	NA	<0.001	NA	32	NA	<0.001	NA	44	<0.004
	10/28/2011	<0.003	NA	0.22	NA	0.045	NA	0.001	NA	35	NA	<0.001	NA	47	<0.004
	3/26/2012	<0.003	NA	0.19	NA	0.048	NA	<0.001	NA	31	NA	0.001	NA	54	<0.004
	6/18/2012	<0.003	NA	0.31	NA	0.081	NA	<0.001	NA	46	NA	0.002	NA	49	<0.004
	9/17/2012	<0.003	NA	0.17	NA	0.11	NA	<0.001	NA	26	NA	0.001	NA	58	<0.004
	8/25/2015	<0.001	<0.001	0.216	0.225	0.072	0.082	<0.0005	<0.0005	25.3	27	<0.002	<0.002	27	<0.005
	12/21/2015	<0.001	<0.001	0.19	0.207	0.066	0.074	<0.0005	<0.0005	24.2	24.9	<0.002	<0.002	26	<0.005
	2/18/2016	<0.0010	0.0004	0.143	0.158	0.0605	0.0690	<0.0005	<0.0005	23.1	23.7	<0.0020	<0.0020	25	<0.0050
APW-4	12/13/2010	<0.006	NA	0.053	NA	0.067	NA	<0.004	NA	2.55	NA	<0.004	NA	41	<0.01
	9/15/2011	<0.003	NA	0.15	NA	0.085	NA	0.002	NA	4.5	NA	<0.001	NA	50	0.007
	10/28/2011	<0.003	NA	0.18	NA	0.095	NA	0.002	NA	6.3	NA	<0.001	NA	63	<0.004
	3/26/2012	<0.003	NA	0.029	NA	0.048	NA	<0.001	NA	3.9	NA	<0.001	NA	58	<0.004
	6/18/2012	<0.003	NA	0.033	NA	0.063	NA	<0.001	NA	4.8	NA	<0.001	NA	53	<0.004
	9/17/2012	<0.003	NA	0.036	NA	0.064	NA	<0.001	NA	4.9	NA	<0.001	NA	49	<0.004
	8/25/2015	<0.001	<0.001	0.03	0.032	0.053	0.063	<0.0005	<0.0005	1.81	1.89	<0.002	<0.002	33	<0.005
	12/21/2015	<0.001	<0.001	0.018	0.02	0.057	0.077	<0.0005	<0.0005	1.96	2.22	<0.002	<0.002	24	<0.005
	2/18/2016	<0.0010	0.0008	0.0086	0.0151	0.0706	0.176	<0.0005	0.0007	1.33	1.62	<0.0020	<0.0020	26	<0.0050
APW-5	12/13/2010	<0.006	NA	<0.004	NA	<0.05	NA	<0.004	NA	0.118	NA	<0.004	NA	3	<0.01
	3/24/2011	<0.003	NA	<0.001	NA	0.009	NA	<0.001	NA	0.17	NA	<0.001	NA	2.8	<0.004
	6/24/2011	<0.003	NA	<0.001	NA	0.01	NA	<0.001	NA	0.2	NA	<0.001	NA	2.6	<0.004
	9/15/2011	<0.003	NA	<0.001	NA	0.006	NA	<0.001	NA	0.35	NA	<0.001	NA	<1	<0.004
	10/28/2011	<0.003	NA	<0.001	NA	0.006	NA	<0.001	NA	0.31	NA	<0.001	NA	1	<0.004
	3/26/2012	<0.003	NA	0.001	NA	0.009	NA	<0.001	NA	0.3	NA	<0.001	NA	2.5	<0.004
	6/18/2012	<0.003	NA	0.001	NA	0.01	NA	<0.001	NA	0.41	NA	<0.001	NA	4.6	<0.004
	9/17/2012	<0.003	NA	<0.001	NA	0.009	NA	<0.001	NA	0.32	NA	<0.001	NA	2.9	<0.004
	8/25/2015	<0.001	0.001	<0.001	0.008	0.011	0.042	<0.0005	<0.0005	0.109	0.119	<0.002	<0.002	9	<0.005
	12/21/2015	<0.001	<0.001	<0.001	0.001	0.012	0.018	<0.0005	<0.0005	0.092	0.116	<0.002	<0.002	6	<0.005
	2/18/2016	0.0003	0.0006	0.0003	0.0010	0.0113	0.0151	<0.0005	<0.0005	0.118	0.165	<0.0020	<0.0020	9	<0.0050
APW-6	12/21/2015	<0.001	<0.001	<0.001	<0.001	0.015	0.018	<0.0005	<0.0005	0.246	0.271	<0.002	<0.002	6	<0.005
	2/18/2016	<0.0010	0.0005	0.0006	0.0008	0.0150	0.0167	<0.0005	<0.0005	0.412	0.444	<0.0020	<0.0020	6	<0.0050
APW-7	12/21/2015	<0.001	<0.001	<0.001	0.002	0.028	0.042	<0.0005	<0.0005	0.245	0.26	<0.002	<0.002	28	<0.005
	2/18/2016	<0.0010	0.0005	0.0003	0.0010	0.0202	0.0284	<0.0005	<0.0005	0.109	0.0986	<0.0020	<0.0020	30	<0.0050
APW-8	12/21/2015	<0.001	<0.001	0.001	0.002	0.083	0.09	<0.0005	<0.0005	10.8	11	<0.002	<0.002	13	0.01
	2/18/2016	0.0003	0.0006	0.0012	0.0013	0.0729	0.0788	<0.0005	<0.0005	10.3	11.1	<0.0020	<0.0020	12	0.0070
APW-9	12/21/2015	<0.001	0.001	<0.001	0.002	0.017	0.028	<0.0005	<0.0005	0.5	0.531	<0.002	<0.002	16	<0.005
	2/18/2016	0.0008	0.0013	0.0007	0.0012	0.0363	0.0425	<0.0005	<0.0005	4.42	5.12	<0.0020	<0.0020	19	<0.0050
Class I GW Standards		**0.006**	**NE**	**0.010**	**NE**	**2**	**NE**	**0.004**	**NE**	**2**	**NE**	**0.005**	**NE**	**200**	**0.1**

Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration

TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	PARAMETER[1]													
	Chromium (t)	Cobalt (d)	Cobalt (t)	Copper (d)	Copper (t)	Cyanide	Fluoride (d)	Iron (t)	Iron (d)	Lead (d)	Lead (t)	Manganese (t)	Manganese (d)	Mercury (d)	Mercury (t)
APW-1	NA	<0.05	NA	<0.025	NA	<0.01	<0.1	NA	0.162	<0.005	NA	NA	<0.015	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	0.03	<0.001	NA	NA	0.008	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.26	NA	<0.01	<0.001	NA	NA	0.003	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.32	NA	<0.01	<0.001	NA	NA	0.005	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.009	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	<0.005	<0.005	0.012	<0.005	0.008	<0.007	<0.1	5.67	0.1	<0.001	0.007	0.593	<0.003	<0.0002	<0.0002
	<0.005	<0.005	0.009	<0.005	0.006	<0.007	0.11	4.18	<0.02	<0.001	0.005	0.418	<0.003	<0.0002	<0.0002
	0.0022	<0.0050	0.0028	<0.0050	0.0016	<0.007	0.10	1.53	<0.0200	<0.0010	0.0020	0.170	<0.0030	<0.00020	<0.00020
APW-2	NA	<0.05	NA	<0.025	NA	<0.01	0.3	NA	<0.1	<0.005	NA	NA	0.931	<0.0002	NA
	NA	0.004	NA	<0.003	NA	<0.005	<0.25	NA	1.1	<0.001	NA	NA	0.48	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.44	NA	0.37	<0.001	NA	NA	0.82	<0.0002	NA
	NA	0.002	NA	<0.003	NA	<0.005	0.46	NA	0.46	<0.001	NA	NA	0.79	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.32	NA	0.15	<0.001	NA	NA	0.91	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.27	NA	0.34	0.001	NA	NA	0.83	<0.0002	NA
	NA	0.003	NA	<0.003	NA	<0.005	0.3	NA	0.3	<0.001	NA	NA	0.96	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.28	2.16	0.104	<0.001	0.001	1.09	0.989	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.29	1.9	0.024	<0.001	0.001	0.686	0.63	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	0.0015	<0.007	0.31	0.297	0.018	<0.0010	0.0004	0.925	0.906	<0.00020	<0.00020
APW-3	NA	<0.05	NA	<0.025	NA	<0.01	0.25	NA	<0.1	<0.005	NA	NA	0.169	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.36	NA	0.65	<0.001	NA	NA	0.45	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.49	NA	0.41	<0.001	NA	NA	0.28	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.54	NA	0.33	<0.001	NA	NA	0.25	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.32	NA	0.48	<0.001	NA	NA	0.3	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.29	NA	0.39	0.001	NA	NA	0.46	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.29	NA	5.4	<0.001	NA	NA	1.2	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.2	2.38	0.475	<0.001	0.001	0.492	0.432	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.23	1.93	1.38	<0.001	<0.001	0.635	0.586	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.22	2.26	1.36	<0.0010	0.0006	0.669	0.632	<0.00020	<0.00020
APW-4	NA	<0.05	NA	<0.025	NA	<0.01	0.39	NA	<0.1	<0.005	NA	NA	3.1	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.73	NA	5.9	<0.001	NA	NA	3.4	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.79	NA	6.6	<0.001	NA	NA	5.4	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.47	NA	14	<0.001	NA	NA	2.8	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.45	NA	16	<0.001	NA	NA	3.3	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.45	NA	16	<0.001	NA	NA	2.9	<0.0002	NA
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.37	13.8	11.8	<0.001	<0.001	2.14	2.05	<0.0002	<0.0002
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.41	18.4	14.1	<0.001	0.001	2.3	2.18	<0.0002	<0.0002
	0.0228	<0.0050	0.0079	<0.0050	0.0203	<0.007	0.30	27.5	2.16	<0.0010	0.0136	2.39	1.72	<0.00020	<0.00020
APW-5	NA	<0.05	NA	<0.025	NA	<0.01	0.13	NA	<0.1	<0.005	NA	NA	<0.015	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.012	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	0.012	<0.001	NA	NA	0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.31	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	0.36	NA	<0.01	<0.001	NA	NA	<0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.001	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.04	<0.0002	NA
	NA	<0.002	NA	<0.003	NA	<0.005	<0.25	NA	<0.01	<0.001	NA	NA	0.002	<0.0002	NA
	0.009	<0.005	0.05	<0.005	0.023	<0.007	<0.1	11.2	<0.02	<0.001	0.018	2.13	0.004	<0.0002	<0.0002
	<0.005	<0.005	0.007	<0.005	<0.005	<0.007	<0.1	1.4	<0.02	<0.001	0.002	0.292	<0.003	<0.0002	<0.0002
	<0.0050	<0.0050	0.0035	<0.0050	0.0015	<0.007	0.08	0.886	<0.0200	<0.0010	0.0016	0.181	0.0009	<0.00020	<0.00020
APW-6	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.11	0.402	<0.02	<0.001	<0.001	0.04	0.01	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.15	0.198	<0.0200	<0.0010	0.0003	0.0129	<0.0030	<0.00020	<0.00020
APW-7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.22	2.57	<0.02	<0.001	0.002	0.177	0.018	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.21	1.32	<0.0200	<0.0010	0.0010	0.0549	0.0008	<0.00020	<0.00020
APW-8	0.013	<0.005	<0.005	<0.005	<0.005	<0.007	<0.1	0.809	<0.02	<0.001	0.001	0.116	<0.003	<0.0002	<0.0002
	0.0078	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.23	0.0531	<0.0200	<0.0010	<0.0010	0.0052	<0.0030	<0.00020	<0.00020
APW-9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.007	0.59	1.26	<0.02	<0.001	0.002	0.175	0.008	<0.0002	<0.0002
	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.007	0.10	0.505	<0.0200	<0.0010	0.0007	0.0579	<0.0030	<0.00020	<0.00020
Class I GW Standards	**NE**	**1**	**NE**	**0.65**	**NE**	**0.2**	**4**	**NE**	**5**	**0.0075**	**NE**	**NE**	**0.15**	**0.002**	**NE**

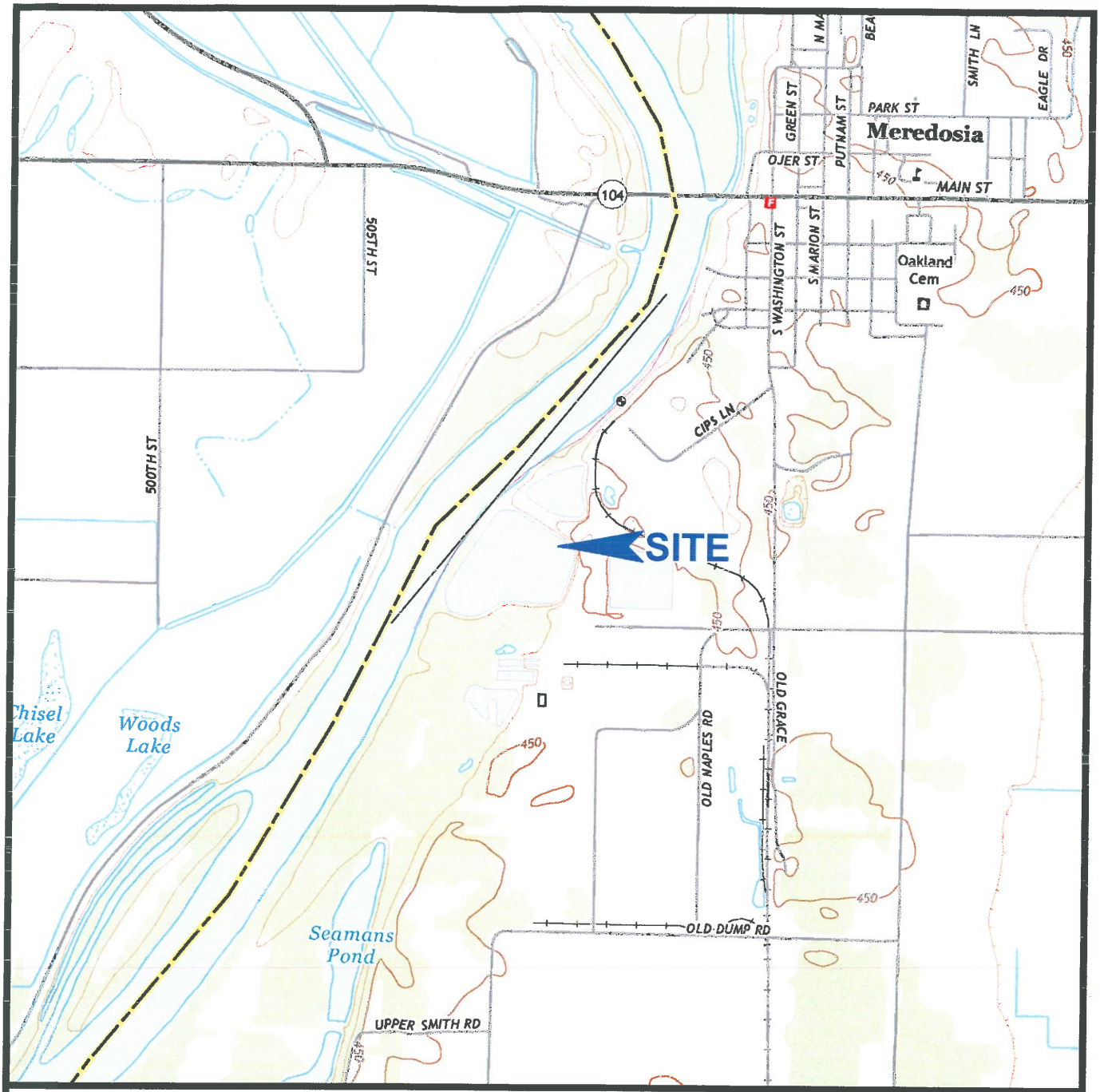
Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration

TABLE 3

GROUNDWATER ANALYTICAL DATA SUMMARY
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS

WELL ID	PARAMETER[1]														
	Nickel (d)	Nickel (t)	Nitrate	Selenium (d)	Selenium (t)	Silver (d)	Silver (t)	Sulfate	TDS	Thallium (d)	Thallium (t)	Vanadium (d)	Vanadium (t)	Zinc (d)	Zinc (t)
APW-1	<0.04	NA	3.8	<0.01	NA	<0.005	NA	26.4	132	<0.002	NA	NA	NA	<0.02	NA
	<0.005	NA	3.9	0.002	NA	<0.005	NA	23	190	<0.001	NA	NA	NA	<0.006	NA
	0.014	NA	4.7	0.002	NA	<0.005	NA	33	140	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.7	0.002	NA	<0.005	NA	20	190	<0.001	NA	NA	NA	<0.006	NA
	0.005	NA	2.8	0.002	NA	<0.005	NA	24	150	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	5.7	0.001	NA	<0.005	NA	15	180	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2.1	<0.001	NA	<0.005	NA	13	270	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.6	0.002	NA	<0.005	NA	12	280	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.021	3.94	<0.04	<0.04	<0.005	<0.005	12	226	<0.001	<0.001	<0.01	<0.01	<0.01	0.02
	<0.005	0.015	3.43	<0.04	<0.04	<0.005	<0.005	11	280	<0.001	<0.001	<0.01	<0.01	<0.01	0.015
	0.0030	0.0090	3.59	<0.0400	<0.0400	<0.0050	<0.0050	20	298	<0.0010	<0.0010	<0.0100	0.0025	<0.0100	0.0068
APW-2	<0.04	NA	0.4	<0.01	NA	<0.005	NA	28.2	368	<0.002	NA	NA	NA	<0.02	NA
	0.012	NA	<0.02	<0.001	NA	<0.005	NA	41	630	<0.001	NA	NA	NA	<0.006	NA
	0.007	NA	<0.02	<0.001	NA	<0.005	NA	<25	430	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	0.04	0.003	NA	<0.005	NA	14	440	<0.001	NA	NA	NA	<0.006	NA
	0.009	NA	0.07	0.001	NA	<0.005	NA	13	460	<0.001	NA	NA	NA	<0.006	NA
	0.011	NA	<0.02	0.004	NA	<0.005	NA	18	510	<0.001	NA	NA	NA	0.006	NA
	0.011	NA	<0.02	0.002	NA	<0.005	NA	15	520	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.007	<0.05	<0.04	<0.04	<0.005	<0.005	<10	488	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	0.005	<0.05	<0.04	<0.04	<0.005	<0.005	22	572	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	0.0058	0.0062	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	19	494	<0.0010	<0.0010	0.0015	0.0017	<0.0100	0.0036
APW-3	<0.04	NA	0.49	<0.01	NA	<0.005	NA	284	660	<0.002	NA	NA	NA	<0.02	NA
	0.01	NA	<0.02	0.001	NA	<0.005	NA	310	750	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	<0.02	<0.001	NA	<0.005	NA	260	680	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	0.002	NA	<0.005	NA	290	650	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	<0.001	NA	<0.005	NA	270	710	<0.001	NA	NA	NA	<0.006	NA
	0.011	NA	<0.02	0.002	NA	<0.005	NA	300	770	0.001	NA	NA	NA	0.012	NA
	0.012	NA	<0.02	0.003	NA	<0.005	NA	300	970	<0.001	NA	NA	NA	<0.006	NA
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	177	670	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	235	738	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	<0.0050	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	192	736	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	0.0028
APW-4	<0.04	NA	0.31	<0.01	NA	<0.005	NA	49.3	418	<0.002	NA	NA	NA	<0.02	NA
	0.019	NA	0.04	0.012	NA	<0.005	NA	53	470	<0.001	NA	NA	NA	<0.006	NA
	0.01	NA	0.29	0.013	NA	<0.005	NA	17	520	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	<0.02	0.015	NA	<0.005	NA	23	300	<0.001	NA	NA	NA	<0.006	NA
	0.009	NA	<0.02	0.021	NA	<0.005	NA	14	690	<0.001	NA	NA	NA	0.007	NA
	0.01	NA	<0.02	0.03	NA	<0.005	NA	24	360	<0.001	NA	NA	NA	<0.006	NA
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	<10	504	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.005	<0.005	<0.05	<0.04	<0.04	<0.005	<0.005	28	578	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	0.0033	0.0232	<0.050	<0.0400	<0.0400	<0.0050	<0.0050	66	462	<0.0010	<0.0010	<0.0100	0.0331	0.0024	0.0677
APW-5	<0.04	NA	1.7	<0.01	NA	<0.005	NA	6.1	138	<0.002	NA	NA	NA	<0.02	NA
	0.007	NA	1.9	<0.001	NA	<0.005	NA	17	230	<0.001	NA	NA	NA	<0.006	NA
	0.01	NA	1.4	0.002	NA	<0.005	NA	15	290	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2	0.001	NA	<0.005	NA	9.5	180	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	1.9	0.004	NA	<0.005	NA	6.7	160	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	2	0.002	NA	<0.005	NA	14	250	<0.001	NA	NA	NA	<0.006	NA
	<0.005	NA	4.1	0.003	NA	<0.005	NA	15	280	<0.001	NA	NA	NA	<0.006	NA
	0.006	NA	2.6	0.002	NA	<0.005	NA	33	290	<0.001	NA	NA	NA	<0.006	NA
	<0.005	0.07	2.03	<0.04	<0.04	<0.005	<0.005	19	338	<0.001	<0.001	<0.01	0.017	<0.01	0.037
	<0.005	0.009	2.1	<0.04	<0.04	<0.005	<0.005	66	400	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0077	1.85	<0.0400	<0.0400	<0.0050	<0.0050	36	340	<0.0010	<0.0010	<0.0100	0.0025	<0.0100	0.0048
APW-6	<0.005	<0.005	0.172	<0.04	<0.04	<0.005	<0.005	<10	354	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.002	0.730	<0.0400	<0.0400	<0.0050	<0.0050	12	296	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	0.0025
APW-7	<0.005	<0.005	1.09	<0.04	<0.04	<0.005	<0.005	17	384	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0033	4.82	<0.0400	<0.0400	<0.0050	<0.0050	35	248	<0.0010	<0.0010	<0.0100	0.0033	<0.0100	0.0054
APW-8	<0.005	<0.005	5.73	0.126	0.135	<0.005	<0.005	473	994	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	<0.0050	5.29	0.102	0.118	<0.0050	<0.0050	338	786	<0.0010	<0.0010	<0.0100	<0.0100	<0.0100	<0.0100
APW-9	<0.005	0.005	3.25	<0.04	<0.04	<0.005	<0.005	265	716	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
	<0.0050	0.0035	3.88	<0.0400	<0.0400	<0.0050	<0.0050	466	1,070	<0.0010	<0.0010	0.0028	0.0033	<0.0100	0.0030
Class I GW Standards	**0.1**	**NE**	**10**	**0.05**	**NE**	**0.05**	**NE**	**400**	**1,200**	**NE**	**NE**	**0.049**	**NE**	**5**	**NE**

Results are reported as mg/L or parts per million (ppm)
Contents of table obtained from data provided by Ameren.
Concentration above Illinois Class I Groundwater Standards
NA = Not Analyzed
NE = Not Established
TDS = Total Dissolved Solids
(d) = dissolved concentration
(t) = total concentration



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

N

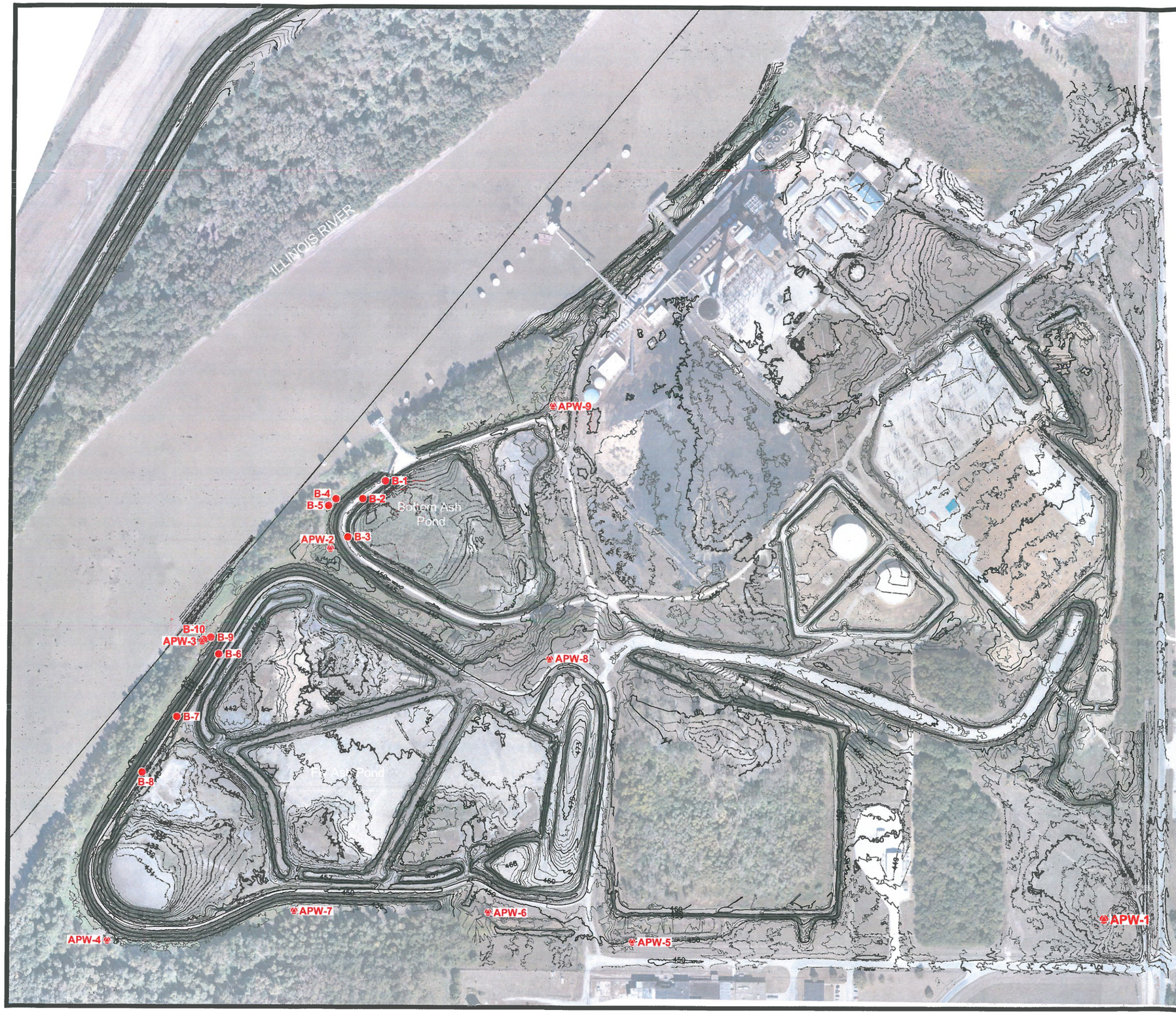
Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.

LEGEND

- Monitoring Well Location
- Soil Boring Location

N

0 200 400 800

SCALE IN FEET

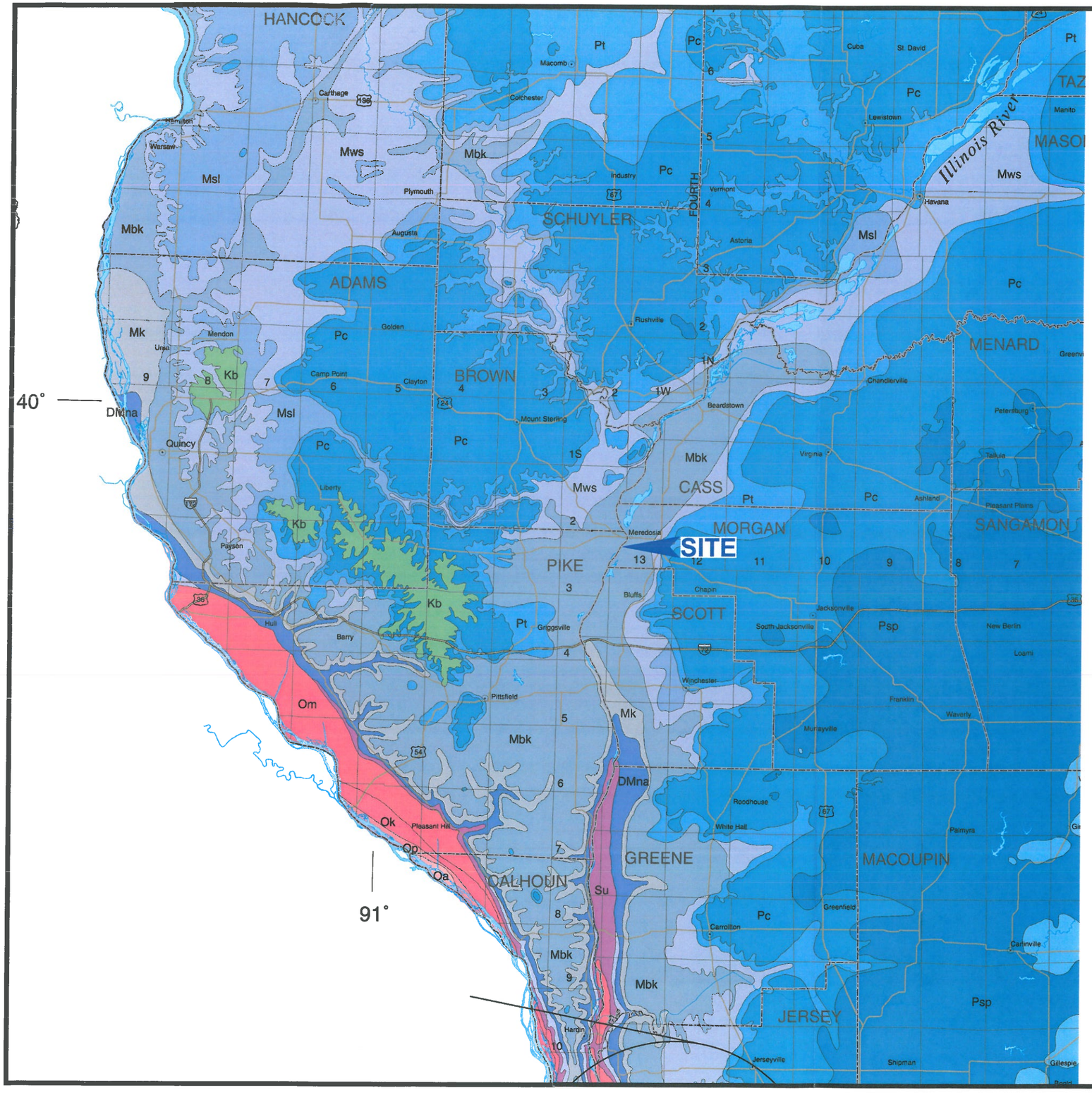
Drawn By: WAH	Ck'd By: AE	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE PLAN AND MONITORING WELL LOCATIONS

Project Number J024917.01	PLATE 2



Kb	Baylis Formation (western Illinois)
Psp	Shelburn-Patoka Formations undivided
Pc	Carbondale Formation
Pt	Tradewater Formation
Msg	Ste. Genevieve Limestone
Msl	St. Louis Limestone
Mbk	Meppen Limestone, Fern Glen Formation, and Burlington-Keokuk Limestone
Mk	Glen Park Formation, Hannibal Shale, Chouteau Limestone, McCraney Limestone, Prospect Hill Siltstone, and Starrs Cave Limestone
DMna	New Albany Shale, Blocher Shale, Sylamore Sandstone, Selmier Shale, Sweetland Creek Shale, Grassy Creek Shale, Saverton Shale, and Louisiana Limestone
Su	Silurian System undivided, includes Sexton Creek Limestone, St. Clair Limestone, and Moccasin Springs Formation in southern Illinois; includes Wilhelmi Formation, Elwood Dolomite, Kankakee Dolomite, Joliet Dolomite, Sugar Run Dolomite, and Racine Dolomite in northeastern Illinois; includes Mosalem, Tete des Morts, Blanding, Sweeney, Marcus, and Racine Dolomites in northwestern Illinois
Om	Maquoketa Formation or Group, includes Cape Limestone, Cape La Croix Shale, Thebes Sandstone, Orchard Creek Shale, Girardeau Limestone, and Leemon Formation in southern Illinois; includes Scales Shale, Fort Atkinson Limestone, Brainard Shale, and Neda Formation in northern Illinois; includes Noix Oolite in western Illinois
Ok	Kimmswick (Trenton) Limestone and Decorah Formation in southern and western Illinois
Op	Platteville Group, includes Pecatonica, Mifflin, Grand Detour, Nachusa, and Quimbys Mill Formations; includes Plattin Limestone in southwestern Illinois
Oa	Ancell Group, includes St. Peter Sandstone, Dutchtown Limestone, Joachim Dolomite, and Glenwood Formation; includes Prairie du Chien Group in Jo Daviess County of northwestern Illinois

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 2-26-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BEDROCK GEOLOGY MAP

Project Number J024917.01	PLATE 3

NOTES

1. Plan adapted from a July 22, 2012 aerial photograph courtesy of Google Earth.
2. Water well locations from Illinois State Geological Survey Prairie Research Institute.
3. See Appendix A for water well records.
4. Abandoned on-site water supply wells are not shown.

LEGEND

- Water Supply Wells
- On-Site Water Supply Wells to be Abandoned

N

0 600 1200 2400

SCALE IN FEET

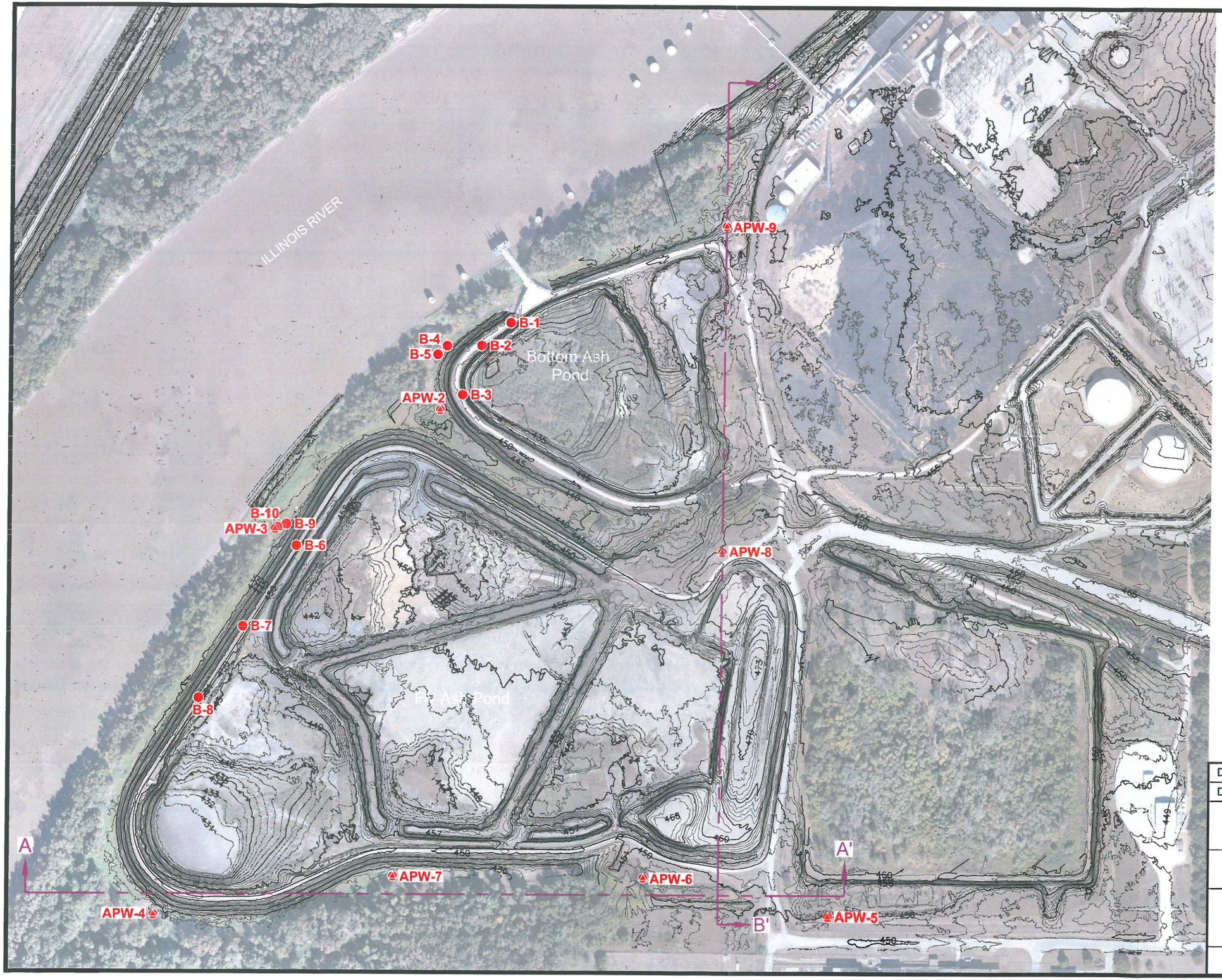
Drawn By: WAH	Ck'd By: ube	App'vd By: AMS
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

POTABLE WATER WELL SEARCH RADIUS

Project Number J024917.01	PLATE 4



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- Soil Boring Location
- Subsurface Profile (See Plate 6 and 7 for Cross-Section A-A' and B-B', Respectively)

N

0 300 600

SCALE IN FEET

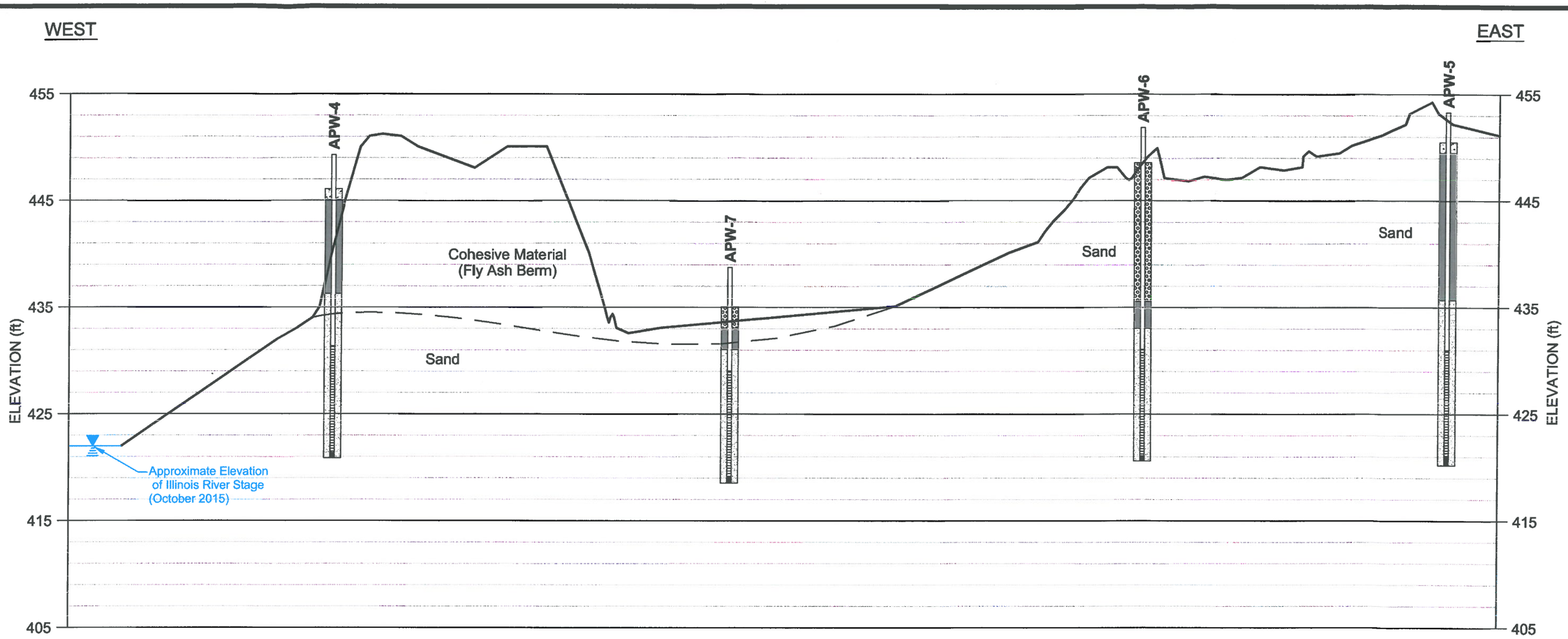
Drawn By: WAH	Ck'd By: JSE	App'vd By: AMS
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SUBSURFACE PROFILE PLAN

Project Number	
J024917.01	PLATE 5



NOTES

1. See PLATE 5 for location of Subsurface Profile A-A'.
2. Data concerning subsurface conditions have been obtained at boring locations only. Actual conditions at locations between borings may differ from the generalized profile shown here.

SCALE IN FEET
Horizontal 1" = 200'
Vertical 1" = 10'

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

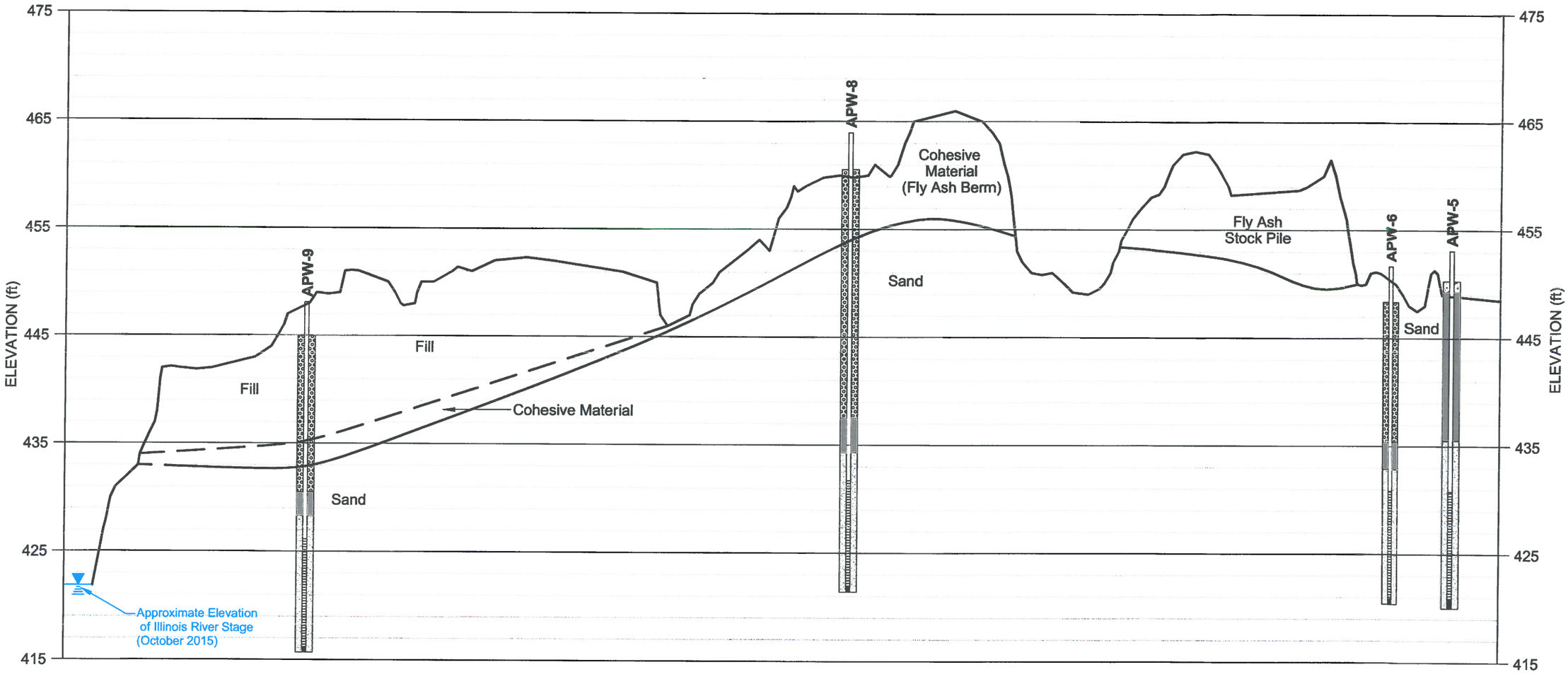
Meredosia Power Station
Meredosia, Illinois

GENERALIZED SUBSURFACE PROFILE - SECTION A-A'

Project Number	
J024917.01	PLATE 6

NORTH

SOUTH



NOTES

1. See PLATE 5 for location of Subsurface Profile B-B'.
2. Data concerning subsurface conditions have been obtained at boring locations only. Actual conditions at locations between borings may differ from the generalized profile shown here.

SCALE IN FEET
Horizontal 1" = 200'
Vertical 1" = 10'

Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 3-7-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GENERALIZED SUBSURFACE PROFILE - SECTION B-B'

Project Number J024917.01	PLATE 7

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (November 17, 2010)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2010

Project Number	
J024917.01	PLATE 8

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (December 13, 2010)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/16/20

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - DECEMBER 2010

Project Number	
J024917.01	PLATE 9

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (September 15, 2011)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

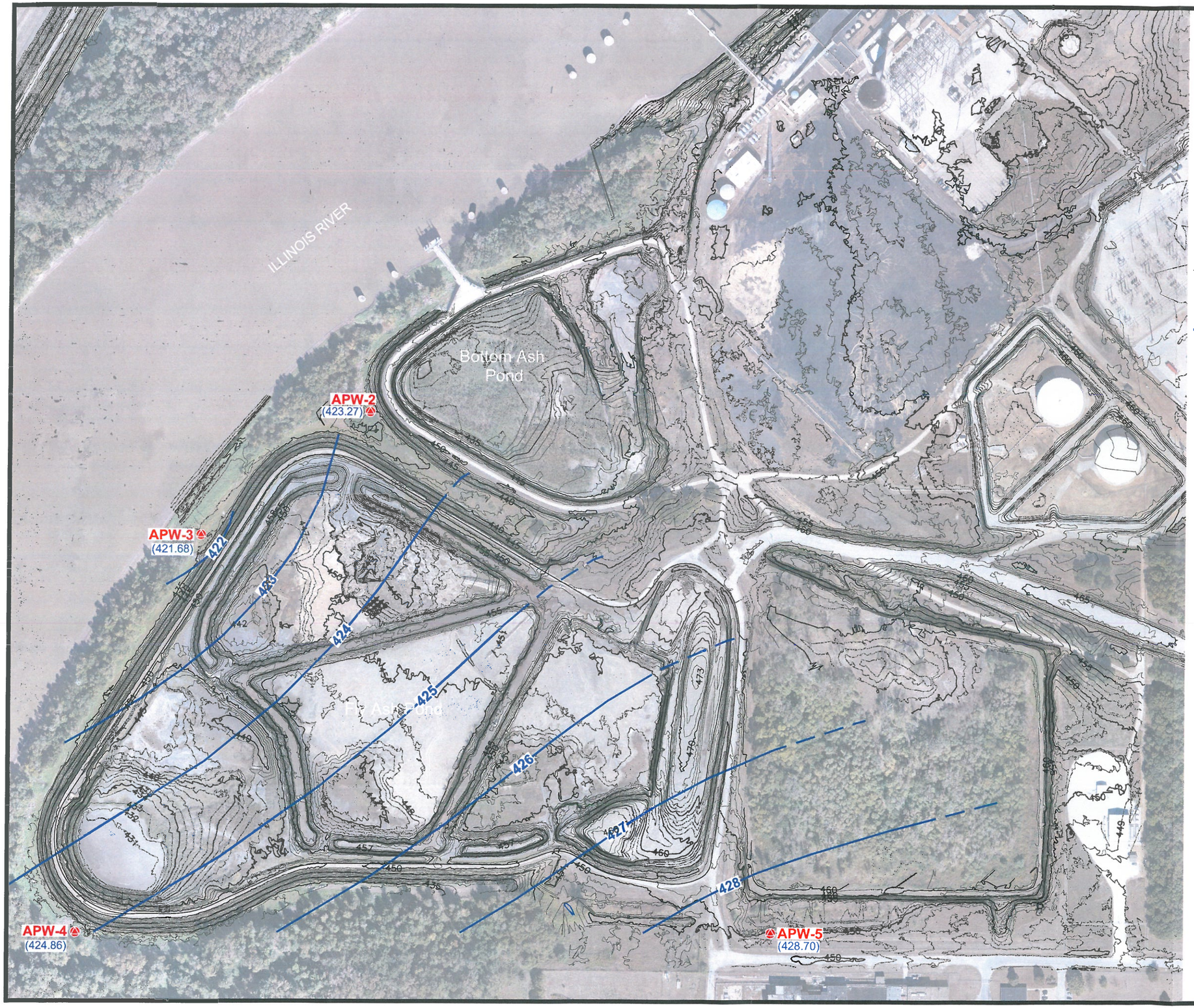
Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - SEPTEMBER 2011

Project Number	
J024917.01	PLATE 10



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (October 28, 2011)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - OCTOBER 2011

Project Number	
J024917.01	PLATE 11

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (March 26, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/26/16	Date: 7/20/16

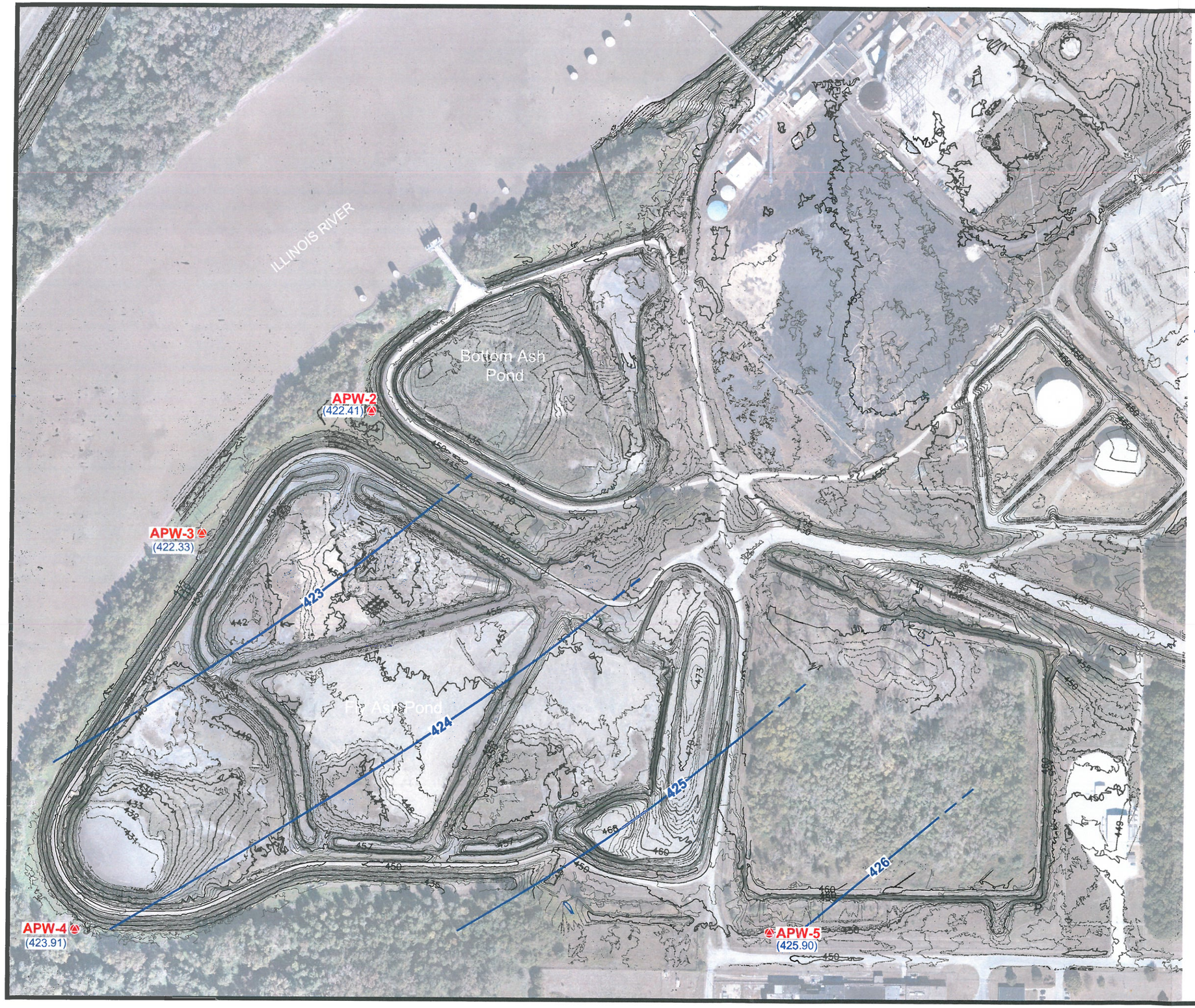
GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - MARCH 2012

Project Number J024917.01

PLATE 12



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (June 18, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - JUNE 2012

Project Number	
J024917.01	PLATE 13

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (September 17, 2012)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VAE	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - SEPTEMBER 2012

Project Number	
J024917.01	PLATE 14

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (August 25, 2015)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: NE	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - AUGUST 2015

Project Number	
J024917.01	PLATE 15

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (December 21, 2015)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: the	App'vd By: AMS
Date: 3-9-16	Date: 7/20/16	Date: 7/20/16

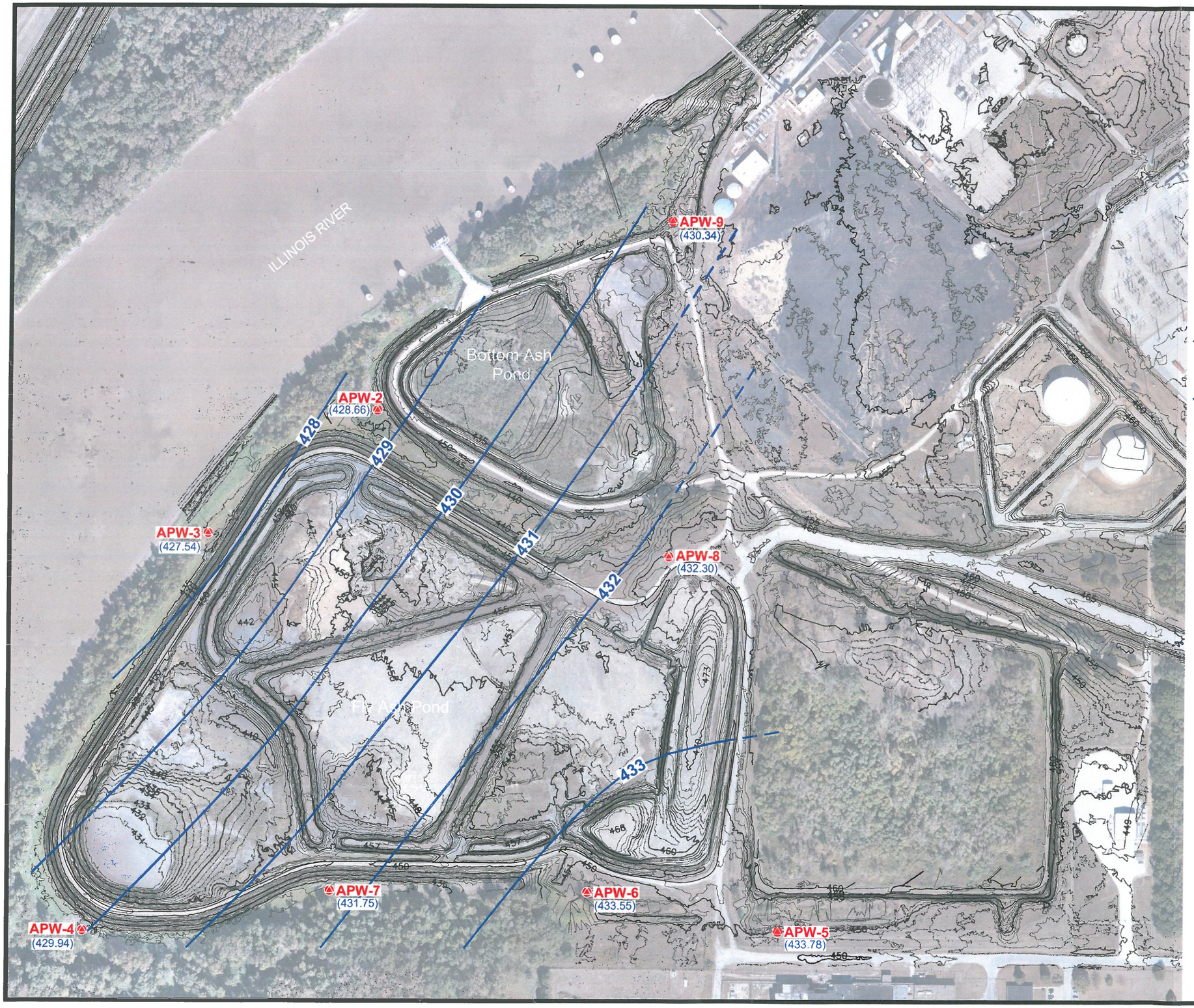
GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - DECEMBER 2015

Project Number J024917.01

PLATE 16



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (427.20) Groundwater Elevation at Well Location (February 18, 2016)
- —425— Groundwater Elevation Contour

N

0 300 600

SCALE IN FEET

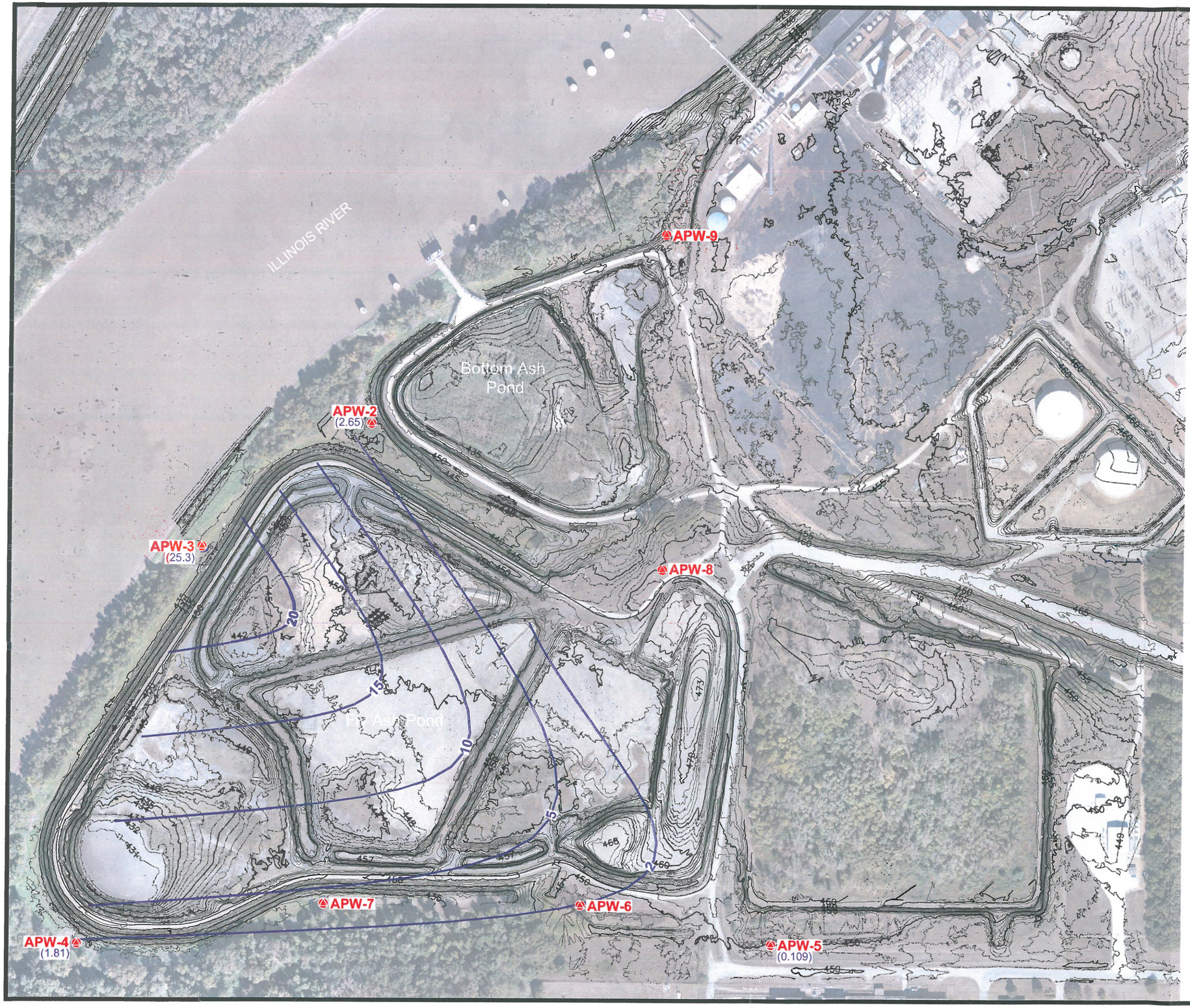
Drawn By: WAH	Ck'd By: VJR	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

GROUNDWATER ELEVATION CONTOURS - FEBRUARY 2016

Project Number	
J024917.01	PLATE 17



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.8) Boron Concentration in Groundwater, (mg/l - ppm) - August 25, 2015
- —10— Boron Concentration Isopleth, (mg/l - ppm)

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VLe	App'vd By: AMS
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BORON CONCENTRATION IN GROUNDWATER - AUGUST 2015

Project Number
J024917.01

PLATE 18

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.8) Boron Concentration in Groundwater, (mg/l - ppm) - December 21, 2015
- —10— Boron Concentration Isopleth, (mg/l - ppm)

N

0 300 600

SCALE IN FEET

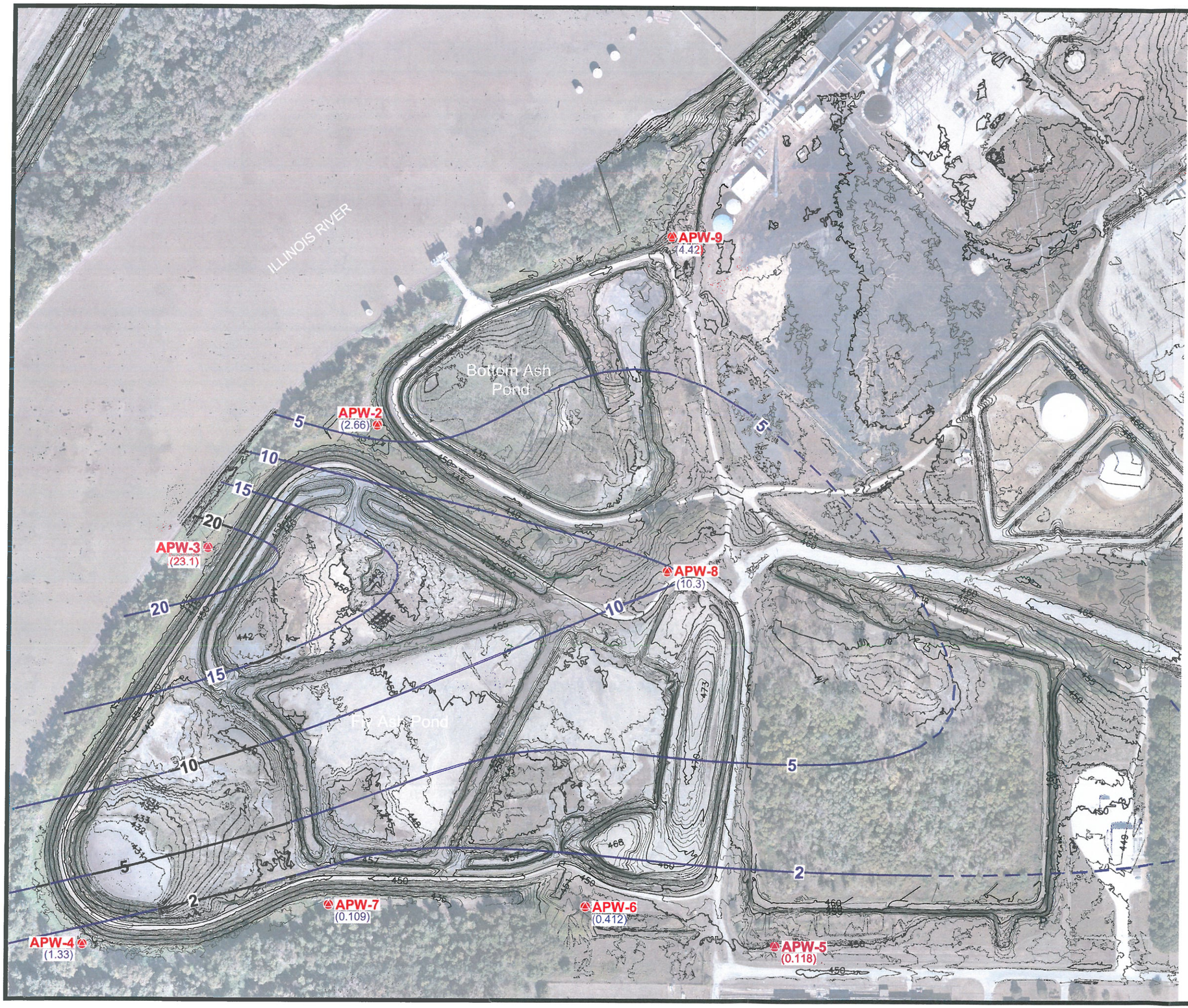
Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 4-19-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BORON CONCENTRATION IN GROUNDWATER - DECEMBER 2015

Project Number	PLATE 19
J024917.01	



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

- Monitoring Well Location
- (10.3) Boron Concentration in Groundwater, (mg/l - ppm) - February 18, 2016
- —10— Boron Concentration Isopleth, (mg/l - ppm)

Drawn By: WAH	Ck'd By: VLE	App'vd By: AMS
Date: 4-21-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

BORON CONCENTRATION IN GROUNDWATER - FEBRUARY 2016

Project Number	
J024917.01	PLATE 20

NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.
2. Monitoring Wells were located by the project surveyor.
3. Monitoring Well APW-1 is located beyond the limits of this map and is approximately 2000-feet east of Monitoring Well APW-5.

LEGEND

Monitoring Well Location

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By:	App'vd By: AMS
Date: 5-18-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

ARSENIC AND MANGANESE EXCEEDANCES - FEBRUARY 2016

Project Number	PLATE 21
J024917.01	

APPENDIX A

POTABLE WATER WELL DATA

ILLINOIS STATE GEOLOGICAL SURVEY

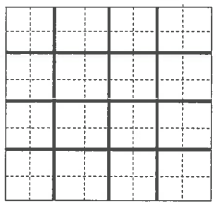
Water Well	Top	Bottom
sand, fine; silt & pebbles	0	5
sand, medium grain	5	11
sand, medium grain	11	22
sand, medium; small pebbles	22	32
sand, medium; small pebbles	32	42
sand, medium; small pebbles	42	52
sand, medium; small pebbles	52	62
sand, coarse;medium gravel & rock	62	67
limestone, chert bands; core	67	77
limestone, chert bands; core	77	88
limestone, chert bands; core	88	94
limestone, chert bands; core	94	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 27
ELEVATION 418CO **COUNTY NO.** 00561
LOCATION 460'N line, 20'W line of NW SE
LATITUDE 39.82506 **LONGITUDE** -90.567886
COUNTY Morgan **API** 121370056100 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine sand	0	25
medium sand fine gravel	25	40
fine sand	40	48
fine coarse sand & gravel	48	52
fine medium sand	52	65
fine pink sand,	65	81
coarse sand, gravel & small boulders	81	105
Total Depth		105

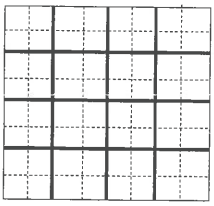
Static level 38' below casing top which is 0' above GL
Pumping level 40' when pumping at 503 gpm for 8 hours

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Central Ill.Public Service
DATE DRILLED December 1, 1960 **NO.** 4
ELEVATION 460GL **COUNTY NO.** 20656
LOCATION 2003'S line, 577'E line of section
LATITUDE 39.824389 **LONGITUDE** -90.565516
COUNTY Morgan **API** 121372065600 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

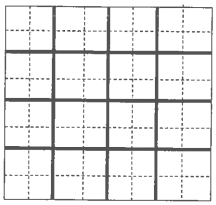
Water Well	Top	Bottom
sand, brown, medium grain	0	3
sand, brown, medium grain	3	6
sand, brown, fine grain	6	10
sand, brown, coarse grain	10	15
sand, coarse; fine gravel	15	20
sand, brown, medium grain	20	30
sand, medium, small pebbles	30	40
sand, brown, medium grain	40	50
sand, brown, fine grain	50	60
sand, coarse; medium gravel	60	70
sand, brown, fine grain	70	80
sand, coarse; coarse gravel	80	83
limestone, 2 1/8" core	83	86
limestone, 2 1/8" core	86	91
limestone, crystallized bands, very hard	91	96
limestone, 2 1/8" core	96	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 21
ELEVATION 433CO **COUNTY NO.** 00555
LOCATION 530'N 315'E SW/c NE SE
LATITUDE 39.824039 **LONGITUDE** -90.564817
COUNTY Morgan **API** 121370055500 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

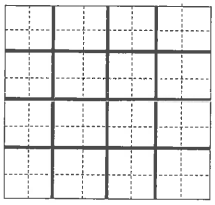
Water Well	Top	Bottom
sand, medium, light brown	0	3
sand, medium, clay content	3	6
sand, brown, medium grain	6	10
sand, medium, slight clay content	10	15
sand, brown, fine grain	15	20
sand, brown, fine grain	20	30
sand, coarse; fine gravel	30	40
sand, brown, fine grain	40	50
sand, coarse; fine gravel	50	60
sand, coarse; small gravel	60	70
sand, coarse; coarse gravel	70	80
sand, fine	80	90
sand, fine	90	98
boulders, small	98	99
sand, coarse; small gravel	99	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 20
ELEVATION 450CO **COUNTY NO.** 00554
LOCATION 485'N 350'E SW/c NE SE
LATITUDE 39.823913 **LONGITUDE** -90.564729
COUNTY Morgan **API** 121370055400 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

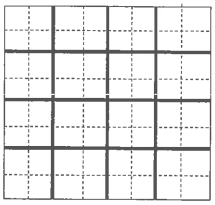
Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, brown, medium grain	30	40
sand, brown, coarse grain, medium gravel	40	50
sand, coarse, small gravel	50	60
gravel, medium	60	70
gravel, medium	70	80
gravel, medium;sand, medium brown	80	90
medium gravel & sand, traces of lignite	90	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 11
ELEVATION 456CO **COUNTY NO.** 00545
LOCATION 420'N 405'E SW/c NE SE
LATITUDE 39.823732 **LONGITUDE** -90.564583
COUNTY Morgan **API** 121370054500 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

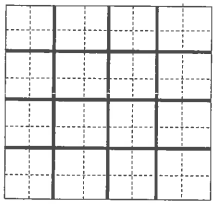
Water Well	Top	Bottom
sand, brown, medium grain	0	5
sand, brown, medium grain	5	7
sand, coarse; fine gravel	7	11
sand, coarse; fine gravel	11	16
sand, medium grain	16	26
sand, medium; medium gravel	26	36
sand, medium; medium gravel	36	46
sand, fine grain	46	56
sand, fine grain	56	66
sand, medium grain	66	76
sand, coarse; medium gravel	76	82
limestone	82	88
limestone	88	91
limestone, interbedded with flint	91	98
limestone	98	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 22
ELEVATION 434CO **COUNTY NO.** 00556
LOCATION 445'N 230'E SW/c NE SE
LATITUDE 39.823809 **LONGITUDE** -90.565185
COUNTY Morgan **API** 121370055600 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

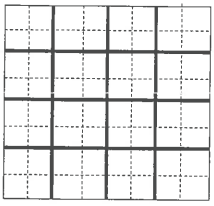
Water Well	Top	Bottom
sand, fine grain	0	3
sand, fine grain	3	6
sand, fine grain	6	10
sand, fine grain	10	15
sand, fine grain	15	25
sand, medium, clay content	25	35
sand, coarse, small pebbles	35	45
sand, coarse, small pebbles	45	55
sand, fine grain	55	65
sand, fine grain	65	75
sand, medium grain	75	85
sand, coarse; fine gravel	85	92
sand, coarse; medium gravel (rock)	92	94
limestone (core)	94	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 19
ELEVATION 444CO **COUNTY NO.** 00553
LOCATION 400'N 270'E SW/c NE SE
LATITUDE 39.823683 **LONGITUDE** -90.56508
COUNTY Morgan **API** 121370055300 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, brown, medium grain	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, brown, medium grain	30	40
sand, coarse grain, small gravel	40	50
sand, coarse, grain, medium gravel	50	60
sand, coarse grain, small gravel	60	70
sand, coarse grain, small gravel	70	80
sand, coarse, grain, med gvl, tr lignite	80	90
sand, coarse grain, medium gravel	90	100
Total Depth		100

Driller's Log filed

Owner Address:

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service

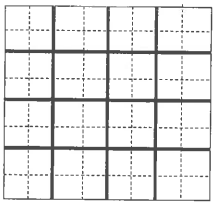
DATE DRILLED January 1, 1941 **NO.** 12

ELEVATION 457CO **COUNTY NO.** 00546

LOCATION 370'N 360'E SW/c NE SE

LATITUDE 39.823598 **LONGITUDE** -90.564781

COUNTY Morgan **API** 121370054600 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
silty sand	0	15
coarse sand & gravel	15	30
medium sand & gravel	30	50
gravel, coarse sand	50	60
fine sand	60	67
sand & gravel	67	80
fine sand	80	85
gravel	85	106
rock at	106	106
Total Depth		**106**

Casing: 12" from -2' to 81'
20" from 0' to 30'

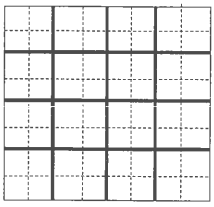
Water from sand & gravel at 0' to 0'.
Static level 27' below casing top which is 2' above GL
Pumping level 33' when pumping at 503 gpm for 24 hours

Driller's Log filed

Owner Address: ,
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY owner
FARM CIPS Meredosia Unit 4
DATE DRILLED May 1, 1974 **NO.** 5
ELEVATION 455TM **COUNTY NO.** 20658
LOCATION 1700'S line, 300'E line of SE
LATITUDE 39.823541 **LONGITUDE** -90.564662
COUNTY Morgan **API** 121372065800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

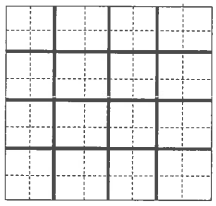
Water Well	Top	Bottom
sand, fine grain	0	3
sand, fine grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, medium; fine gravel	15	25
sand, coarse; medium gravel	25	35
sand, fine grain	35	45
sand, fine grain	45	55
sand, medium; small gravel	55	65
sand, coarse; small gravel	65	75
sand, coarse; medium gravel	75	82
limestone	82	85
limestone	85	95
limestone	95	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 23
ELEVATION 432CO **COUNTY NO.** 00557
LOCATION 380'N 160'E SW/c NE SE
LATITUDE 39.823633 **LONGITUDE** -90.565487
COUNTY Morgan **API** 121370055700 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

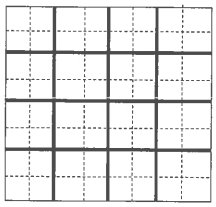
Water Well	Top	Bottom
sand, fine; little clay	0	3
sand, fine grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, coarse; fine gravel	15	25
sand, coarse; fine gravel	25	35
sand, medium, small pebbles	35	45
sand, coarse; fine gravel	45	55
sand, fine grain	55	65
sand, fine grain	65	75
sand, medium, small pebbles	75	85
sand, coarse; coarse gravel	85	93
limestone core	93	97
limestone, chert bands, core	97	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 18
ELEVATION 443CO **COUNTY NO.** 00552
LOCATION 335'N 200'E SW/c NE SE
LATITUDE 39.823507 **LONGITUDE** -90.565381
COUNTY Morgan **API** 121370055200 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine to medium sand	0	24
medium sand & fine gravel	24	55
fine sand	55	68
sand & gravel	68	73
medium sand, gravel & boulders	73	78
total depth	78	109
Total Depth		**109**

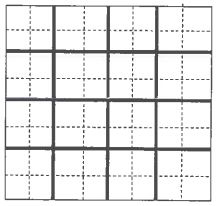
Casing: 30" from 0' to 30'
10" from 4' to 84'
Pumping level 3' when pumping at 165 gpm for 1 hour

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Central Ill.Public Ser.
DATE DRILLED November 21, 1957 **NO.** 3
ELEVATION 460GL **COUNTY NO.** 20657
LOCATION 1643'S line, 473'E line of section
LATITUDE 39.823391 **LONGITUDE** -90.565304
COUNTY Morgan **API** 121372065700 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, medium grain	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	15
sand, medium grain, clay content	15	17
sand, brown, medium grain	17	20
sand, brown, medium grain	20	30
sand, coarse; small gravel	30	40
sand, coarse; small gravel	40	50
sand, coarse; medium gravel	50	60
sand, coarse; medium gravel	60	70
sand, medium grain	70	80
sand, medium grain	80	90
sand, medium grain; medium gravel	90	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

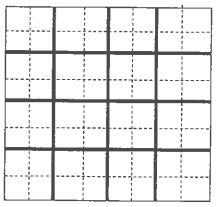
DATE DRILLED January 1, 1941 **NO.** 13

ELEVATION 456CO **COUNTY NO.** 00547

LOCATION 305'N 295'E SW/c NE SE

LATITUDE 39.823421 **LONGITUDE** -90.565065

COUNTY Morgan **API** 121370054700 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

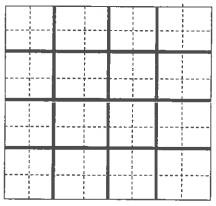
Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 10
ELEVATION 456CO **COUNTY NO.** 00544
LOCATION 255'N 350'E SW/c NE SE
LATITUDE 39.823282 **LONGITUDE** -90.564909
COUNTY Morgan **API** 121370054400 **21 - 16N - 13W**



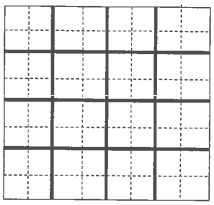
ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, silty, medium grain	0	1
sand, brown, medium grain	1	7
sand, brown, medium grain	7	10
sand, brown, slight clay content	10	13
sand, brown, slight clay content	13	19
sand, dark brown, medium grain	19	25
Total Depth		**25**

Driller's Log filed

Permit Date: **Permit #:**

COMPANY C.I.P.S.
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 1
ELEVATION 454CO **COUNTY NO.** 00535
LOCATION 190'N 410'E SW/c NE SE
LATITUDE 39.823098 **LONGITUDE** -90.564749
COUNTY Morgan **API** 121370053500 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

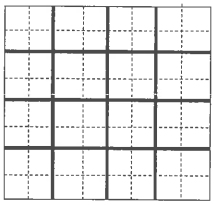
Water Well	Top	Bottom
sand, medium grain	0	3
sand, medium grain	3	6
sand, medium grain	6	10
sand, medium grain	10	15
sand, fine grain	15	25
sand, medium; fine gravel	25	35
sand, fine grain	35	45
sand, fine grain	45	50
Total Depth		50

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**



COMPANY owner

FARM Cen. Ill. Pub. Service Co

DATE DRILLED January 1, 1941 **NO.** 26

ELEVATION 423CO **COUNTY NO.** 00560

LOCATION 395'N 45'E SW/c NE SE

LATITUDE 39.823679 **LONGITUDE** -90.565885

COUNTY Morgan **API** 121370056000 **21 - 16N - 13W**

ILLINOIS STATE GEOLOGICAL SURVEY

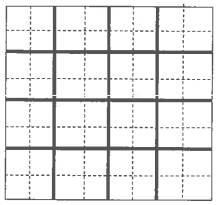
Water Well	Top	Bottom
sand, brown, medium grain	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium grain; small gravel	30	40
sand, medium grain; small gravel	40	50
sand, medium grain; small gravel	50	60
sand, medium grain; medium gravel	60	70
sand, medium grain; small gravel	70	80
sand, medium grain; small gravel	80	90
sand, medium grain; small gravel	90	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 14
ELEVATION 456CO **COUNTY NO.** 00548
LOCATION 240'N 230'E SW/c NE SE
LATITUDE 39.823245 **LONGITUDE** -90.565349
COUNTY Morgan **API** 121370054800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

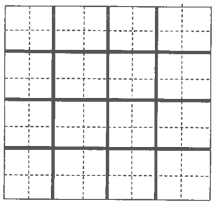
Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain, small gravel	20	25
Total Depth		**25**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 9
ELEVATION 456CO **COUNTY NO.** 00543
LOCATION 215'N 310'E SW/c NE SE
LATITUDE 39.823173 **LONGITUDE** -90.565083
COUNTY Morgan **API** 121370054300 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

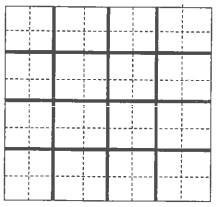
Water Well	Top	Bottom
sand, silty	0	2
sand, brown, medium grain	2	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	14
sand,brown,medium grain,slight clay	14	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 2
ELEVATION 454CO **COUNTY NO.** 00536
LOCATION 150'N 370'E SW/c NE SE
LATITUDE 39.822992 **LONGITUDE** -90.564922
COUNTY Morgan **API** 121370053600 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, fine grain	0	3
sand, medium grain	3	6
sand, fine grain	6	10
sand, fine grain	10	15
sand, medium, small pebbles	15	25
sand, fine grain	25	35
sand, medium grain	35	45
sand, fine grain	45	55
sand, fine grain	55	65
sand, coarse; fine gravel	65	75
sand, coarse; medium gravel	75	81
limestone core	81	86
limestone with chert bands	86	89
limestone	89	91
limestone	91	100
Total Depth		100

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co

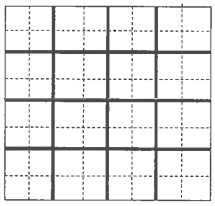
DATE DRILLED January 1, 1941 **NO.** 24

ELEVATION 431CO **COUNTY NO.** 00558

LOCATION 310'N 95'E SW/c NE SE

LATITUDE 39.823442 **LONGITUDE** -90.565774

COUNTY Morgan **API** 121370055800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

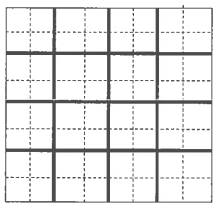
Water Well	Top	Bottom
sand, medium grain	0	3
sand, medium grain	3	10
sand, medium grain	10	20
sand, medium grain; small gravel	20	30
sand, medium grain	30	40
sand, coarse; large gravel	40	50
sand, coarse; large gravel	50	56
sand, fine	56	60
sand, fine; small gravel	60	70
sand, fine; small gravel	70	80
sand, coarse; coarse gravel	80	90
gravel, medium, clay content	90	95
limestone	95	96
limestone	96	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 17
ELEVATION 446CO **COUNTY NO.** 00551
LOCATION 270'N 135'E SW/c NE SE
LATITUDE 39.82333 **LONGITUDE** -90.565661
COUNTY Morgan **API** 121370055100 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

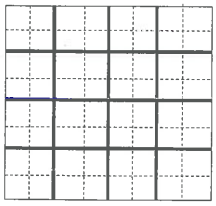
Water Well	Top	Bottom
sand, brown, medium grain	0	2
sand, brown, medium grain	2	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	25
Total Depth		25

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 8
ELEVATION 457CO **COUNTY NO.** 00542
LOCATION 175'N 270'E SW/c NE SE
LATITUDE 39.823063 **LONGITUDE** -90.565256
COUNTY Morgan **API** 121370054200 21 - 16N - 13W



ILLINOIS STATE GEOLOGICAL SURVEY

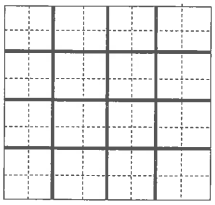
Water Well	Top	Bottom
sand, brown, silty	0	3
sand, brown, medium grain	3	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, brown, traces of fine gravel	20	25
Total Depth		**25**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 3
ELEVATION 454CO **COUNTY NO.** 00537
LOCATION 105'N 330'E SW/c NE SE
LATITUDE 39.822869 **LONGITUDE** -90.5651
COUNTY Morgan **API** 121370053700 21 - 16N - 13W



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, brown	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium grain; small gravel	30	40
sand, medium grain; small gravel	40	50
sand; small gravel	50	60
sand; coarse gravel	60	70
sand, fine grain; traces small gravel	70	80
sand, fine grain	80	90
sand, coarse	90	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service Co.

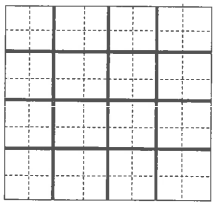
DATE DRILLED January 1, 1941 **NO.** 15

ELEVATION 454CO **COUNTY NO.** 00549

LOCATION 175'N 160'E SW/c NE SE

LATITUDE 39.823068 **LONGITUDE** -90.565647

COUNTY **Morgan** **API** **121370054900** **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

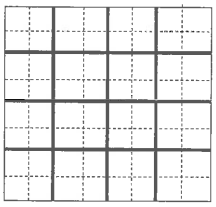
Water Well	Top	Bottom
sand, brown, medium grain	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	20
sand, brown, medium grain	20	30
sand, medium coarse grain, small gravel	30	40
sand, medium coarse grain, small gravel	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 7
ELEVATION 456CO **COUNTY NO.** 00541
LOCATION 130'N 230'E SW/c NE SE
LATITUDE 39.822943 **LONGITUDE** -90.565434
COUNTY Morgan **API** 121370054100 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

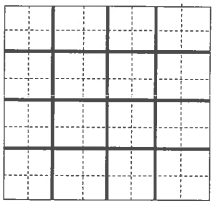
Water Well	Top	Bottom
sand, silty,brown	0	1
sand, brown, medium grain	1	5
sand, brown, medium grain	5	10
sand,brown,medium grain,slight clay	10	10
sand, brown, medium grain	10	28
sand, medium gravel	28	30
sand, medium gravel, water showing	30	40
sand, medium gravel, water showing	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 4
ELEVATION 454CO **COUNTY NO.** 00538
LOCATION 65'N 290'E SW/c NE SE
LATITUDE 39.82276 **LONGITUDE** -90.565273
COUNTY Morgan **API** 121370053800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

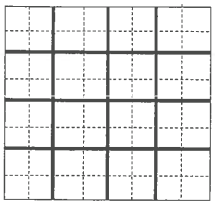
Water Well	Top	Bottom
sand, brown, medium grain	0	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, light brown, medium grain	20	30
no record	30	31
sand, coarse; medium gravel	31	35
sand, coarse; medium gravel	35	40
sand, fine grain	40	50
sand, fine grain	50	60
gravel, small, pea size	60	70
sand, coarse; small gravel	70	80
sand, coarse; small gravel	80	86
limestone	86	92
limestone	92	95
limestone	95	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 25
ELEVATION 436CO **COUNTY NO.** 00559
LOCATION 245'N 25'E SW/c NE SE
LATITUDE 39.823266 **LONGITUDE** -90.566072
COUNTY Morgan **API** 121370055900 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

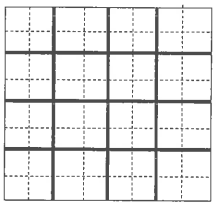
Water Well	Top	Bottom
sand, brown, medium grain	0	4
clay, sandy	4	5
sand, brown, medium grain	5	10
sand, brown, medium grain	10	20
sand, medium; medium gravel	20	30
sand, medium; medium gravel	30	40
sand, coarse; medium gravel	40	50
sand, fine; coarse gravel	50	60
sand, fine	60	70
sand; medium gravel	70	80
sand, coarse; small gravel	80	90
sand, coarse; small gravel	90	93
sand, coarse; small gravel	93	95
limestone	95	96
limestone	96	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co.
DATE DRILLED January 1, 1941 **NO.** 16
ELEVATION 446CO **COUNTY NO.** 00550
LOCATION 190'N 80'E SW/c NE SE
LATITUDE 39.823113 **LONGITUDE** -90.565919
COUNTY Morgan **API** 121370055000 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand, silty, brown	0	2
sand, brown, medium grain	2	10
sand, brown, medium grain	10	20
sand, brown, medium coarse grain	20	30
sand, brown, small gravel	30	40
sand, medium coarse, medium gravel	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM Cen. Ill. Pub. Service

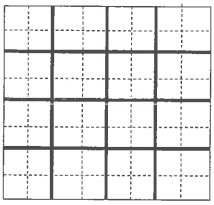
DATE DRILLED January 1, 1941 **NO.** 6

ELEVATION 454CO **COUNTY NO.** 00540

LOCATION 85'N 190'E SW/c NE SE

LATITUDE 39.82282 **LONGITUDE** -90.565614

COUNTY Morgan **API** 121370054000 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

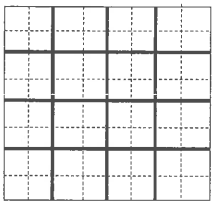
Water Well	Top	Bottom
sand, silty, brown	0	3
sand, brown, medium grain	3	5
sand, brown, medium grain	5	10
sand, brown, slight clay content	10	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	29
sand, medium gravel, water showing	29	30
sand, medium grain, medium gravel	30	40
sand, medium grain, medium gravel	40	50
Total Depth		**50**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service
DATE DRILLED January 1, 1941 **NO.** 5
ELEVATION 454CO **COUNTY NO.** 00539
LOCATION 25'N 250'E SW/c NE SE
LATITUDE 39.822653 **LONGITUDE** -90.565447
COUNTY Morgan **API** 121370053900 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

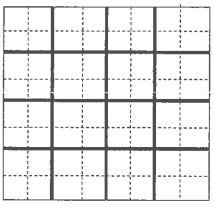
Water Well	Top	Bottom
sand, medium; silt & pebbles	0	5
sand, medium; fine gravel	5	14
sand, medium; fine gravel	14	24
sand, fine grain	24	34
sand, fine grain	34	44
sand, fine grain	44	54
sand, coarse; small pebbles	54	64
sand, coarse; medium gravel	64	67
limestone (broken), core	67	77
limestone (broken), core	77	87
limestone (broken), core	87	100
Total Depth		**100**

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 28
ELEVATION 417CO **COUNTY NO.** 00562
LOCATION 290'N 180'W SE/c NW SE
LATITUDE 39.823398 **LONGITUDE** -90.566769
COUNTY Morgan **API** 121370056200 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

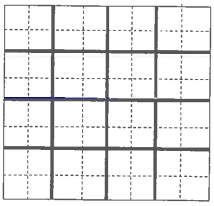
Water Well	Top	Bottom
silt, sandy, dark brown	0	3
silt, sandy, dark brown	3	6
sand, medium & silt	6	10
sand, fine, light brown	10	15
sand, medium; fine gravel	15	20
sand, coarse; coarse gravel	20	30
sand, fine; small stones	30	40
sand, fine	40	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 29
ELEVATION 429CO **COUNTY NO.** 00563
LOCATION 200'N 95'W SE/c NW SE
LATITUDE 39.823148 **LONGITUDE** -90.566536
COUNTY Morgan **API** 121370056300 21 - 16N - 13W



ILLINOIS STATE GEOLOGICAL SURVEY

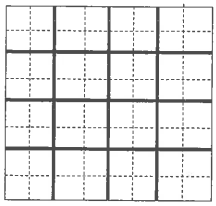
Water Well	Top	Bottom
sand, brown, slight clay content	0	3
sand, brown, medium grain	3	10
sand, brown, medium grain	10	19
sand, course; medium gravel	19	20
sand, course; medium gravel	20	30
sand, coarse; small gravel	30	40
sand, coarse; medium gravel	40	50
sand, fine	50	60
sand, coarse	60	70
sand, coarse	70	80
sand, coarse	80	89
sand, coarse;small gvl w/tr of lignite	89	90
limestone	90	96
limestone	96	100
Total Depth		100

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 30
ELEVATION 442CO **COUNTY NO.** 00564
LOCATION 115'N 5'W SE/c NW SE
LATITUDE 39.822911 **LONGITUDE** -90.566281
COUNTY Morgan **API** 121370056400 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand fill	0	20
clay	20	30
coarse sand & gravel	30	104
rock at	104	104
Total Depth		**104**

Casing: 30" STEEL .312 from 0' to 30'
12" STEEL .375 from 0' to 79'

Screen: 25' of 12" diameter 6 slot

Size hole below casing: 38"

Water from alluvial at 30' to 102'.
Static level 25' below casing top which is 2' above GL

Driller's Log filed

Owner Address: Meredosia, IL

Location source: Platbook verified

Permit Date: September 8, 1977 **Permit #:** 66466

COMPANY Ruester, John T.

FARM Central Ill. Public Ser.Co.

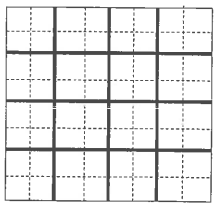
DATE DRILLED April 25, 1978 **NO.** 6

ELEVATION 448GL **COUNTY NO.** 20758

LOCATION 100'S line, 50'W line of SW NE SE

LATITUDE 39.822865 **LONGITUDE** -90.566098

COUNTY Morgan **API** 121372075800 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

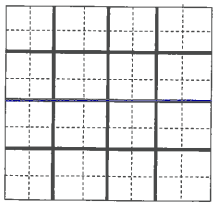
Water Well	Top	Bottom
sand, brown, medium grain	0	8
sand, medium, clay content	8	10
sand, brown, medium grain	10	15
sand, brown, medium grain	15	20
sand, brown, medium grain	20	30
sand & medium gravel	30	35
sand, coarse; medium gravel	35	40
sand, coarse; medium gravel	40	45
sand, coarse; fine gravel	45	50
Total Depth		50

Driller's Log filed

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Cen. Ill. Pub. Service Co
DATE DRILLED January 1, 1941 **NO.** 31
ELEVATION 454CO **COUNTY NO.** 00565
LOCATION 40'N 70'E SW/c NE SE
LATITUDE 39.8227 **LONGITUDE** -90.566074
COUNTY Morgan **API** 121370056500 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine brown sand	0	30
coarse sand	30	50
medium sand	50	70
fine to medium sand	70	90
sand & gravel	90	105
rock at	105	105
Total Depth		**105**

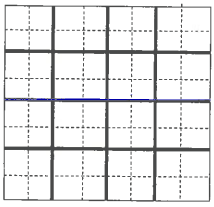
Casing: 12" from -1' to 79'
30" from 0' to 31'
Water from sand & gravel at 0' to 0'.
Static level 32' below casing top which is 0' above GL
Pumping level 39' when pumping at 517 gpm for 22 hours

Driller's Log filed
Sample set # 58921 (0' - 103') Received: December 8, 1973

Owner Address: ,
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY owner
FARM CIPS Meredosia Power Sta unit 4,#
DATE DRILLED August 30, 1973 **NO.** 5
ELEVATION 445TM **COUNTY NO.** 00639
LOCATION 1300'S line, 500'E line of SE
LATITUDE 39.822448 **LONGITUDE** -90.565551
COUNTY Morgan **API** 121370063900 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

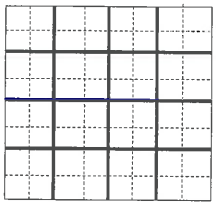
Test Hole	Top	Bottom
crushed stone	0	1
silty sand	1	5
fine sand	5	20
fine to medium sand	20	25
fine to coarse sand	25	35
coarse sand	35	40
med. to coarse sand w/gravel	40	45
fine to medium sand	45	50
fine to coarse sand	50	70
fine to coarse sand w/gravel	70	75
silty, fine to medium sand	75	85
fine to coarse sand	85	95
medium to coarse sand	95	101
fine to coarse sand w/boulders	101	104
Total Depth		104

Sample set # 67974 (5' - 103') Received: July 1, 1994

Owner Address: Meredosia, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Brotcke, Paul
FARM CIPS Power Station
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21579
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372157900 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fine-medium sand	0	24
medium sand & fine gravel	24	55
fine sand	55	68
sand & gravel	68	73
medium sand, gravel & boulders	73	78
Total Depth		78

Pumping level 0' when pumping at 165 gpm for 1 hour

Permit Date: **Permit #:**

COMPANY

FARM CIPS

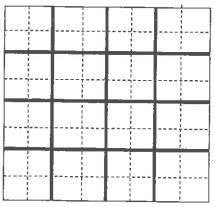
DATE DRILLED November 21, 1957 **NO.** 3

ELEVATION 460 **COUNTY NO.** 21982

LOCATION NW NE SE

LATITUDE 39.825368 **LONGITUDE** -90.564994

COUNTY Morgan **API** 121372198200 **21 - 16N - 13W**



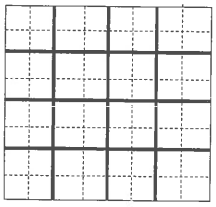
ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fine sand	0	25
medium sand-fine gravel	25	40
fine sand	40	48
fine-coarse sand & gravel	48	52
fine-medium sand	52	65
fine pink sand	65	81
coarse sand, gravel & small boulders	81	105
Total Depth		105

Static level 38' below casing top which is 0' above GL
Pumping level 40' when pumping at 503 gpm for 8 hours

Permit Date: **Permit #:**

COMPANY
FARM CIPS
DATE DRILLED December 1, 1960 **NO.** 4
ELEVATION 460 **COUNTY NO.** 21981
LOCATION NE NE SE
LATITUDE 39.825356 **LONGITUDE** -90.563863
COUNTY Morgan **API** 121372198100 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fill sand	0	20
fine sand	20	40
medium sand	40	85
medium sand with gravel	85	104
rock at	104	104
Total Depth		104

Casing: 36" STEEL 166.35#/FT from -2' to 30'
16" STEEL 62.58#/FT from -2' to 79'

Screen: 25' of 16" diameter .05 slot

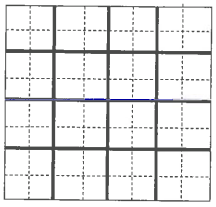
Grout: NEAT from 0 to 30.

Water from sand & gravel at 32' to 104'.
Static level 32' below casing top which is 2' above GL
Permanent pump installed at 75'
on July 11, 1994, with a capacity of 600 gpm

Owner Address: 800 S. Washington St. Meredosia, IL
Location source: Location from permit

Permit Date: June 9, 1994 **Permit #:**

COMPANY Brotcke Engineering
FARM Central IL Public Service C
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21613
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372161300 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Noncommunity - Public Water Well	Top	Bottom
fill sand	0	20
fine sand	20	40
medium sand	40	85
medium sand w/ gravel	85	104
rock @	104	104
Total Depth		**104**

Casing: 36" STEEL from -2' to 30'
16" STEEL from -2' to 79'

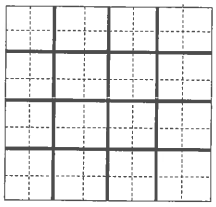
Grout: NEAT from 0 to 30.

Water from sand & gravel at 32' to 104'.
Static level 32' below casing top which is 2' above GL
Permanent pump installed at 75'
on July 11, 1994, with a capacity of 600 gpm
Remarks: IEPA well #13700182

Owner Address: ,
Address of well: 800 Washington
Meredosia, IL
Location source: Location from the driller

Permit Date: June 9, 1994 **Permit #:**

COMPANY Brotcke Engineering
FARM CIPS
DATE DRILLED June 21, 1994 **NO.** 7
ELEVATION 0 **COUNTY NO.** 21980
LOCATION SE NE SE
LATITUDE 39.823501 **LONGITUDE** -90.564221
COUNTY Morgan **API** 121372198000 **21 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	40
medium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

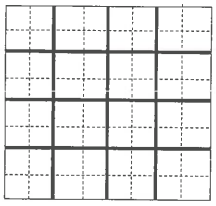
Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL
Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM National Starch & Chem. Co
DATE DRILLED July 7, 1964 **NO.** 4
ELEVATION 435GL **COUNTY NO.** 20802
LOCATION 1669'N line, 1850'E line of NE
LATITUDE 39.814322 **LONGITUDE** -90.570968
COUNTY Morgan **API** 121372080200 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ss #31677	0	0
sand	0	20
sand & gravel	20	60
coarse sand & gravel	60	92
Total Depth		92

Casing: 12" ID from -2' to 72'

Water from at 70' to 90'.

Static level 25' below casing top which is 0' above GL

Pumping level 0' when pumping at 500 gpm for 0 hours

Remarks: see file for detail sample study

Driller's Log filed

Sample set # 31677 (0' - 92') Received: October 21, 1958

Owner Address: ,

Location source: Location from permit

Permit Date: September 9, 1958 **Permit #:**

COMPANY owner

FARM National Starch Prod.

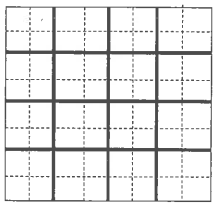
DATE DRILLED October 1, 1958 **NO.** 2

ELEVATION 442GL **COUNTY NO.** 00147

LOCATION 310'N line, 1200'E line of NE

LATITUDE 39.818045 **LONGITUDE** -90.568641

COUNTY Morgan **API** 121370014700 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

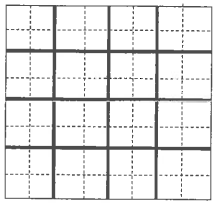
Water Well	Top	Bottom
sand	0	45
sand & gravel	45	90
Total Depth		90

Casing: 16" STEEL 3/8 WALL from -2' to 65'
Screen: 25' of 16" diameter .8 slot
Water from drift at 65' to 90'.

Owner Address: P.O. Box 197 Meredosia, IL
Location source: Location from permit

Permit Date: October 13, 1978 **Permit #:** 80737

COMPANY owner
FARM National Starch
DATE DRILLED October 24, 1978 **NO.** 11
ELEVATION 0 **COUNTY NO.** 20760
LOCATION 1408'N line, 855'E line of NE
LATITUDE 39.815 **LONGITUDE** -90.567407
COUNTY Morgan **API** 121372076000 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	40
medium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

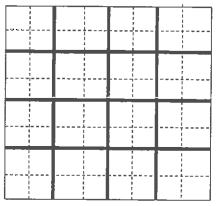
Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL
Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM National Starch & Chem. Co
DATE DRILLED July 7, 1964 **NO.** 4
ELEVATION 435GL **COUNTY NO.** 20802
LOCATION 1669'N line, 1850'E line of NE
LATITUDE 39.814322 **LONGITUDE** -90.570968
COUNTY Morgan **API** 121372080200 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Semi-Private Water Well	Top	Bottom
top soil	0	2
fine sand	2	17
medium-coarse sand	17	40
medium-coarse gravel	40	62
coarse sand at	62	62
Total Depth		62

Casing: 5" SS SCREEN from 0' to 4'
5" PLAIN CASING from 4' to 62'

Screen: 4' of 5" diameter .012 slot

Grout: BENTONITE from 4 to 25.

Permanent pump installed at 45'
on , with a capacity of 10 gpm

Owner Address: P.O. Box #500 Meredosia, IL

Address of well: Co. Rd. #1975N

Location source: Location from permit

Permit Date: July 16, 1993 **Permit #:**

COMPANY Dirks, Michael J.

FARM National Starch & Chemical Co.

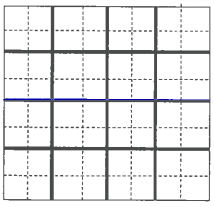
DATE DRILLED July 26, 1993 **NO.**

ELEVATION 0 **COUNTY NO.** 21524

LOCATION NW SE NE

LATITUDE 39.814361 **LONGITUDE** -90.567035

COUNTY Morgan **API** 121372152400 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

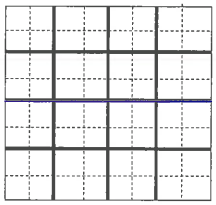
Water Well	Top	Bottom
sand & gravel	0	89
Total Depth		89

Casing: 16" OD STEEL 3/8"WALL from 0' to 63'
Screen: 25' of 16" diameter .08 slot
Water from sand & gravel at 63' to 88'.
Static level 26' below casing top which is 2' above GL
Pumping level 33' when pumping at 600 gpm for 8 hours

Owner Address: Merdosia, IL
Location source: Location from permit

Permit Date: October 16, 1977 **Permit #:** 61809

COMPANY Miller, J.P. Artesian Well Co.
FARM Natl. Starch & Chem.
DATE DRILLED June 21, 1977 **NO.** 6A
ELEVATION 0 **COUNTY NO.** 20759
LOCATION 1889'N line, 871'E line of NE
LATITUDE 39.813672 **LONGITUDE** -90.567465
COUNTY Morgan **API** 121372075900 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand	0	40
medium to fine sand	40	70
sand & gravel	70	94
gravel & boulders	94	98
Total Depth		98

Casing: 12" STEEL CASING from 0' to 78'

Static level 25' below casing top which is 0' above GL

Pumping level 34' when pumping at 600 gpm for 15 hours

Owner Address: ,

Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner

FARM National Starch & Chem. Co

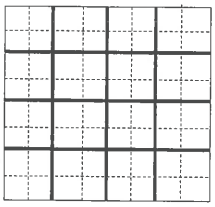
DATE DRILLED July 7, 1964 **NO.** 4

ELEVATION 435GL **COUNTY NO.** 20802

LOCATION 1669'N line, 1850'E line of NE

LATITUDE 39.814322 **LONGITUDE** -90.570968

COUNTY Morgan **API** 121372080200 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
fine sand, not clean	0	18
fine sand, clean	18	60
Total Depth		60

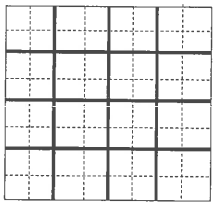
Casing: 16" STEEL 3/8" WALL from 0' to 49'
8" STEEL 25# from 0' to 52'
Screen: 10' of 8" diameter 40 slot
Water from aluvium at 0' to 62'.
Static level 20' below casing top which is 2' above GL
Pumping level 25' when pumping at 120 gpm for 2 hours

Driller's Log filed

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1971 **Permit #:** 10077

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED January 1, 1971 **NO.** 2A
ELEVATION 0 **COUNTY NO.** 00629
LOCATION 2154'N line, 1108'E line of NE
LATITUDE 39.812952 **LONGITUDE** -90.568313
COUNTY Morgan **API** 121370062900 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
drift- sand & gravel	0	96
Total Depth		96

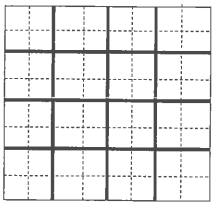
Casing: 16" STEEL 62.58 LB. from 0' to 70'
Screen: 25' of 16" diameter .08 slot
Water from drift at 50' to 96'.
Static level 17' below casing top which is 0' above GL
Pumping level 24' when pumping at 800 gpm for 8 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 58824 (0' - 95') Received: September 19, 1973

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: May 1, 1973 **Permit #:** 18880

COMPANY Miller, J.P. Artesian Well Co.
FARM National Starch & Chemical
DATE DRILLED May 1, 1973 **NO.** 9
ELEVATION 0 **COUNTY NO.** 00638
LOCATION 2600'N line, 1400'E line of NE
LATITUDE 39.811734 **LONGITUDE** -90.569358
COUNTY Morgan **API** 121370063800 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #55587	0	0
sandy brown clay	0	20
sandy gravel	20	92
Total Depth		92

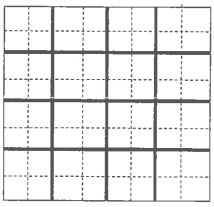
Casing: 24" STEEL 3/8" WALL from 0' to 50'
12" STEEL 3/8" WALL from 0' to 62'
Screen: 30' of 12" diameter 50 slot
Water from drift at 0' to 92'.
Static level 26' below casing top which is 0' above GL

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 55587 (0' - 93') Received: October 1, 1968

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1968 **Permit #:** NF 4615

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED August 31, 1968 **NO.** 8
ELEVATION 0 **COUNTY NO.** 00422
LOCATION 2150'N line, 1400'E line of NE
LATITUDE 39.812976 **LONGITUDE** -90.569359
COUNTY Morgan **API** 121370042200 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Non Potable Water Well	Top	Bottom
brown silty sand	0	5
fine sand	5	18
medium to large sand w/1" gravel	18	83
sand w/medium to large gravel	83	85
gravel	85	86
Total Depth		86

Casing: 24" STEEL 94.62#/FT from -2' to 51'

Screen: 15' of 24" diameter 100 slot

Grout: CEMENT from 0 to 20.

Size hole below casing: 42"

Water from sand & gravel at 0' to 0'.
Static level 18' below casing top which is 2' above GL
Pumping level 33' when pumping at 1500 gpm for 8 hours

Permanent pump installed at 65'
on September 17, 1996, with a capacity of 1500 gpm

Owner Address: PO Box 500 Meredosia, IL

Address of well: S. Washington St.
Meredosia, IL

Add'l loc. info: FALSE
Process water only

Location source: Location from permit

Permit Date: August 28, 1996 **Permit #:** 137-046

COMPANY Stollhans, Jeff

FARM National Starch & Chem. Co

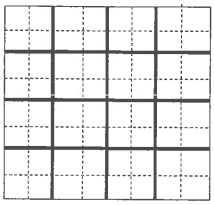
DATE DRILLED September 13, 1996 **NO.** 16

ELEVATION 0 **COUNTY NO.** 21769

LOCATION SW SW NE

LATITUDE 39.812578 **LONGITUDE** -90.570974

COUNTY Morgan **API** 121372176900 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #55586	0	0
sandy brown clay	0	24
fine sand & gravel	24	69
medium sand & small gravel	69	96
Total Depth		96

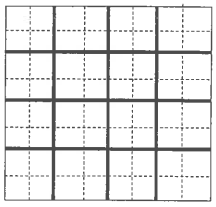
Casing: 8" STEEL 3/8" WALL from 0' to 96'
Screen: 16' of 8" diameter 25 slot
Water from drift at 0' to 96'.
Static level 26' below casing top which is 0' above GL

Driller's Log filed
Sample set # 55586 (0' - 97') Received: October 1, 1968

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: January 1, 1968 **Permit #:** NF 4614

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED August 31, 1968 **NO.** 7
ELEVATION 0 **COUNTY NO.** 00421
LOCATION 0'N 0'E SW/c NW SE NE
LATITUDE 39.813492 **LONGITUDE** -90.569044
COUNTY Morgan **API** 121370042100 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #57364	0	0
sandy top soil	0	18
fine sand	18	45
fine sand, small gravel	45	55
fine sand	55	65
fine sand, small gravel	65	93
very large boulders	93	95
rock at	95	95
Total Depth		95

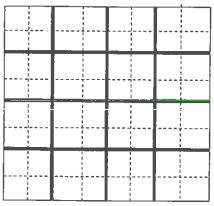
Casing: 26" 3/8 WALL from 0' to 63'
12" 48 POUND from 0' to 68'
Screen: 25' of 12" diameter 40 slot
Water from glacial drift at 0' to 95'.
Static level 25' below casing top which is 2' above GL
Pumping level 34' when pumping at 1000 gpm for 6 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 57364 (2' - 93') Received: February 4, 1971

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: June 24, 1970 **Permit #:** 10077

COMPANY Diehl Pump and Supply Co.
FARM National Starch
DATE DRILLED December 18, 1970 **NO.** 8
ELEVATION 0 **COUNTY NO.** 00628
LOCATION 1800'N line, 625'E line of NE
LATITUDE 39.813907 **LONGITUDE** -90.566585
COUNTY Morgan **API** 121370062800 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #54997	0	0
sandy clay	0	21
fine sand, very little gravel	21	60
sand & gravel	60	90
Total Depth		**90**

Casing: 18" CASING STEEL 3/8" from 0' to 60'
12" STEEL WALL from 0' to 67'

Screen: 25' of 10" diameter 35 slot

Size hole below casing: 18"

Water from glacial drift at 0' to 0'.
Static level 27' below casing top which is 0' above GL
Pumping level 47' when pumping at 780 gpm for 3 hours

Driller's Log filed

Sample set # 54997 (50' - 91.5') Received: December 14, 1967

Owner Address: Meredosia, IL

Location source: Location from permit

Permit Date: January 1, 1967 **Permit #:** 3350

COMPANY Diehl Pump and Supply Co.

FARM National Starch

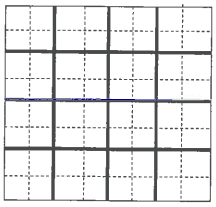
DATE DRILLED February 1, 1968 **NO.** 6

ELEVATION 0 **COUNTY NO.** 00396

LOCATION 1800'N line, 900'E line of NE

LATITUDE 39.81392 **LONGITUDE** -90.567569

COUNTY Morgan **API** 121370039600 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #60435	0	0
sand	0	40
sand & fine gravel	40	90
rock at	90	90
Total Depth		90

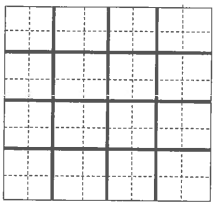
Casing: 16" from -2' to 65'
Screen: 25' of 16" diameter slot
Static level 25' below casing top which is 0' above GL
Pumping level 38' when pumping at 1075 gpm for 2 hours

Sample set # 60435 (0' - 90') Received: August 30, 1976

Owner Address: ,
Location source: Location from permit

Permit Date: January 20, 1976 **Permit #:** 44276

COMPANY owner
FARM National Starch & Chem.Co
DATE DRILLED February 17, 1976 **NO.** 10
ELEVATION 0 **COUNTY NO.** 20682
LOCATION 1403'N line, 332'E line of NE
LATITUDE 39.81499 **LONGITUDE** -90.565535
COUNTY Morgan **API** 121372068200 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
fine brown sand	0	40
fine light brown sand	40	55
medium to coarse brown sand & gravel	55	90
Total Depth		91

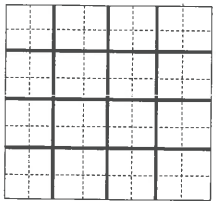
Casing: 16" BLACK 375 from -2' to 64'
Screen: 25' of 16" diameter .08 slot
Grout: CEMENT from 0 to 20.

Water from sand & gravel at 64' to 91'.
Static level 28' below casing top which is 2' above GL
Pumping level 36' when pumping at 800 gpm for 6 hours
Permanent pump installed at 50'
on November 10, 1988, with a capacity of 800 gpm

Owner Address: South Washington St. Meredosia, IL
Location source: Location from permit

Permit Date: September 23, 1988 **Permit #:** 006133

COMPANY Peterson, Steven R.
FARM National Starch-Chemical Co.
DATE DRILLED October 11, 1988 **NO.**
ELEVATION 0 **COUNTY NO.** 21398
LOCATION NE NE NE
LATITUDE 39.817955 **LONGITUDE** -90.565139
COUNTY Morgan **API** 121372139800 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
SS #67434 (0'-80.5')	0	0
fine reddish brown sand	0	15
fine-med lt brown to reddish brown sand	15	25
fine-medium light brown sand	25	30
med lt brn sand, some cobbles in samples	30	45
medium light brown sand	45	50
med lt brown sand, lignite in sample	50	55
medium to fine light brown sand	55	60
medium light brown sand	60	80
medium to fine light brown sand	80	81
Total Depth		81

Casing: 8" CARBON STEEL 24.7# from -2' to 58'

Screen: 20' of 8" diameter 60 slot

Grout: CONCRETE from 0 to 20.

Size hole below casing: 34"

Water from at 24' to 81'.
Static level 24' below casing top which is 2' above GL
Pumping level 26' when pumping at 0 gpm for 1 hour

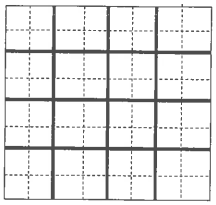
Permanent pump installed at 50'
on March 8, 1991, with a capacity of 80 gpm

Sample set # 67434 (0' - 80.5') Received: April 17, 1981

Owner Address: S. Washington Meredosia, IL
Location source: Location from the driller

Permit Date: January 15, 1991 **Permit #:** 13736

COMPANY Skouby, Marion
FARM National Starch
DATE DRILLED February 13, 1991 **NO.**
ELEVATION 0 **COUNTY NO.** 21647
LOCATION SW NE NE
LATITUDE 39.816167 **LONGITUDE** -90.56688
COUNTY Morgan **API** 121372164700 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ss #20134	0	0
sand	0	30
sand, coarse	30	40
Total Depth		**40**

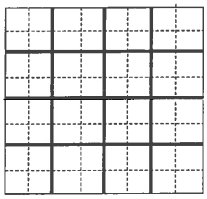
Casing: 8" from 0' to 0'
Screen: 10' of " diameter 16 slot

Driller's Log filed
Sample set # 20134 (0' - 40') Received: January 1, 1950

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Meredosia, Village of
DATE DRILLED April 1, 1950 **NO.** 1
ELEVATION 455GL **COUNTY NO.** 00514
LOCATION 900'N line, 3000'E line of section
LATITUDE 39.831189 **LONGITUDE** -90.5543
COUNTY Morgan **API** 121370051400 **22 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

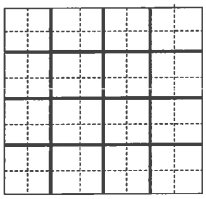
Municipal Water Supply	Top	Bottom
no record	0	84
Total Depth		**84**

Casing: 8" CASING from 0' to 70'
8" SCREEN from 70' to 84'
Screen: 14' of 8" diameter 25 slot
Water from coarse sand at 69' to 84'.

Owner Address: ,
Address of well: 120' NNE of WTP

Permit Date: **Permit #:**

COMPANY Elmer W. Franke/Calhoun Drlg.
FARM Meredosia, Village
DATE DRILLED September 1, 1973 **NO.** 3
ELEVATION 0 **COUNTY NO.** 21944
LOCATION SE NE NW
LATITUDE 39.830881 **LONGITUDE** -90.554188
COUNTY Montgomery **API** 121352194400 **22 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
Total Depth		88

Permit Date: **Permit #:** 37760

COMPANY

FARM Meredosia Village

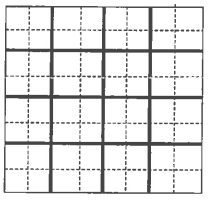
DATE DRILLED **NO.** 4

ELEVATION 0 **COUNTY NO.** 20971

LOCATION 805'N line, 2950'E line of NE

LATITUDE 39.83145 **LONGITUDE** -90.554082

COUNTY Morgan **API** 121372097100 **22 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
ss #20135	0	0
s,lgt brn,f,rndd,well srtd,drty,noncalc	0	5
s,lgt brn,f,rndd,well srtd,few calc grns	5	10
s,f,rndd,well srtd,few calc grns,clean	10	25
sand,light brown,fine/med,clean,noncalc	25	30
s,lgt brn,f/med,clean,few calc grns	30	35
sand,lgt brn,f/vy crd,clean,mly calc	35	40
Pleistocene	5	40
Total Depth		**40**

Casing: 8" from 0' to 0'

Screen: 10' of " diameter 16 slot

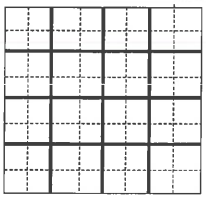
Remarks: see logbook for detail sample study

Driller's Log filed
Survey Sample Study filed
Sample set # 20135 (0' - 40') Received: January 1, 1950

Owner Address: ,
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Meredosia, Village of
DATE DRILLED April 1, 1950 **NO.** 2
ELEVATION 0 **COUNTY NO.** 00515
LOCATION 725'S 10'W NE/c NW
LATITUDE 39.831665 **LONGITUDE** -90.552929
COUNTY Morgan **API** 121370051500 **22 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

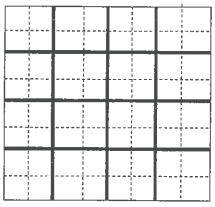
Municipal Water Supply	Top	Bottom
no record	0	25
sand & gravel	25	92
Total Depth		92

Casing: 10" CASING from -1' to 72'
10" SCREEN from 72' to 92'
Screen: 20' of 10" diameter slot
Water from sand & gravel at 25' to 92'.
Static level 27' below casing top which is 1' above GL
Pumping level 32' when pumping at 300 gpm for 3 hours

Owner Address:
Address of well: 200' NNW of WTP

Permit Date: **Permit #:**

COMPANY Albrecht Well Drilling Inc
FARM Meredosia, Village
DATE DRILLED September 2, 1980 **NO.** 5
ELEVATION 0 **COUNTY NO.** 21945
LOCATION 612'S line, 2425'E line of section
LATITUDE 39.820473 **LONGITUDE** -90.553748
COUNTY Montgomery **API** 121352194500 **22 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
railroad embankment ballast stone, cinders, & silty clay loam fill drilled 5' to seat augers	0	5
brown silty clay loam moist (v. stiff)	5	8
brown silty clay loam moist (hard)	8	10
dark brown & grey silty clay loam moist (v. stiff)	10	13
dark brown & grey silty clay moist (v. stiff)	13	18
grey clay v. moist (stiff)	18	20
grey & brown clay v. moist (medium)	20	23
grey & brown clay v. moist (stiff)	23	25
grey & brown clay v. moist (medium)	25	28
grey & brown silty clay loam v. moist (stiff)	28	30
grey silty clay v. moist (stiff)	30	33
grey silty clay v. moist (medium)	33	35
grey clay loam wet (soft)	35	38
grey silty clay loam v. moist (soft)	38	40
grey sand (coarse) w/medium pebble gravel wet (v. loose)	40	43
grey sand (coarse) w/some small gravel wet medium	43	45
brown sand (medium) w/some small gravel wet (medium)	45	50
brown sand (medium) wet (medium)	50	53
brown sand (medium-coarse) w/some small gravel wet (medium)	53	55
brown sand (medium-coarse) w/some small gravel wet (dense)	55	58

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAS 2585 P-96-056-85

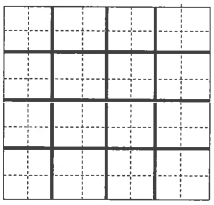
DATE DRILLED June 9, 1986 **NO.** 1(NW.Abut)

ELEVATION 438GL **COUNTY NO.** 21245

LOCATION 0'S 0'W NE/c SW SE NW

LATITUDE 39.833731 **LONGITUDE** -90.582965

COUNTY Pike **API** 121492124500 **1 - 3S - 2W**



brown sand (coarse) w/some small gravel wet (medium)	58	60
brown sand (coarse) w/some medium pebble gravel wet (dense)	60	65
brown sand (medium-coarse) w/some fine pebble gravel wet (dense	65	70
brown sand (medium-coarse) w/some gravel wet (dense)	70	71.5
Total Depth		71

ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
brown-brown & grey silty clay loam moist (stiff)	0	7
grey & brown silty clay loam v. moist (medium)	7	9
grey silty clay wet (medium)	9	12
grey silty clay wet (soft)	12	14
grey silty clay wet (medium)	14	17
grey silty clay wet (soft)	17	22
grey clay loam wet (soft)	22	27
grey sand (fine-medium) w/some clay bonding wet (v. loose)	27	29
grey sand (medium-coarse) w/some medium pebble gravel wet (medium)	29	39
grey sand (fine-medium) wet (medium)	39	44
grey sand (medium-coarse) w/some fine pebble gravel wet (medium)	44	49
grey sand (medium-coarse) w/some medium pebble gravel wet (medium)	49	57
grey sand (medium-coarse) w/some medium pebble gravel wet (dense)	57	60.5
Total Depth		60

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAS 2585 Illinois Route 99

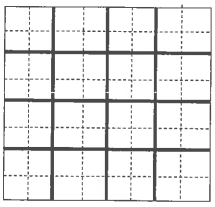
DATE DRILLED June 19, 1986 **NO.** 2(SE.Abut)

ELEVATION 427GL **COUNTY NO.** 21246

LOCATION SW SE NW

LATITUDE 39.832804 **LONGITUDE** -90.584075

COUNTY Pike **API** 121492124600 1 - 3S - 2W



ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
concrete pavement & subbase material	0	3
dark grey silty clay loam moist (soft)	3	7
dark grey silty clay loam moist (stiff)	7	12
grey & brown silty clay moist (stiff)	12	14
grey sand (fine) wet (v. loose)	14	19
grey sand (fine) wet (loose)	19	22
grey sand (fine) wet (medium)	22	27
grey sand (medium) wet (medium)	27	37
grey sand (medium-coarse) w/some gravel wet (dense)	37	42
grey sand (medium) wet (medium)	42	54
grey sand (medium-coarse) w/some fine pebble gravel wet (dense)	54	59
grey sand (medium-coarse) w/some fine pebble gravel wet (medium)	59	64
grey sand (medium-coarse) w/some fine pebble gravel wet (dense)	64	67
standard 50 tsf bearing achieved. augered and additional 10' to check for possible limestone bedrock	67	70
grey sand w/some gravel throughout wet (medium-dense) from elev.365.7 to 354.7	70	78
Total Depth		**78**

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAP 745 Il. Rte. 104

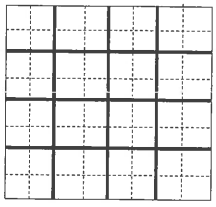
DATE DRILLED June 3, 1986 **NO.** 2(W.Abut)

ELEVATION 433GL **COUNTY NO.** 21248

LOCATION 2640'N line, 2640'W line of section

LATITUDE 39.831966 **LONGITUDE** -90.579769

COUNTY Pike **API** 121492124800 **1 - 3S - 2W**



ILLINOIS STATE GEOLOGICAL SURVEY

Engineering Test	Top	Bottom
concrete pavement & subbase material	0	2
brown sand (medium) moist (loose) w/some shells @ 9.5 - 10.5'	2	10.5
grey clay moist (medium)	10.5	14
grey clay moist (stiff)	14	17
grey silty clay v. moist (medium)	17	19
grey sand (fine) wet (loose)	19	22
grey sand (fine) wet (v. loose)	22	24
grey sand (fine) wet (loose)	24	27
grey sand (fine) wet (medium)	27	29
grey sand (fine) wet (loose)	29	31
grey sand (medium) wet (medium)	31	37
grey sand (fine-medium) wet (medium)	37	44
grey fine pebble gravel wet (medium)	44	49
grey gravel (fine-medium pebble) wet (medium)	49	54
brown sand (coarse) w/some gravel wet (dense)	54	59
grey sand (fine) wet (dense)	59	63.5
grey sand (fine) wet (medium)	63.5	65.5
Total Depth		**65**

Permit Date: **Permit #:**

COMPANY IL Dept. of Transportation

FARM FAP 745 Ill. RTE. 104

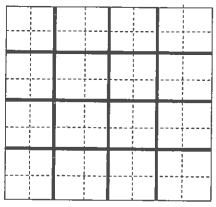
DATE DRILLED June 2, 1986 **NO.** 1 (E.Abut)

ELEVATION 436GL **COUNTY NO.** 21247

LOCATION

LATITUDE 39.831875 **LONGITUDE** -90.579775

COUNTY Pike **API** 121492124700 1 - 3S - 2W



ILLINOIS STATE GEOLOGICAL SURVEY

Test Hole	Top	Bottom
ss #56380	0	0
fine sand	0	20
fine sand, small gravel	20	45
fine sand, coarse gravel	45	55
fine sand, small gravel	55	71
medium sand, small gravel	71	85
medium sand, large gravel	85	90
Total Depth		90

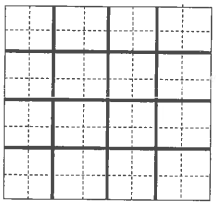
Casing: 24" 3/8 WALL from 0' to 60'
12" 52 LB. from 0' to 64'
Screen: 26' of 12" diameter 60 slot
Water from sand & gravel at 0' to 90'.
Static level 14' below casing top which is 2' above GL
Pumping level 32' when pumping at 1000 gpm for 8 hours

Remarks: see file for detail sample study
Driller's Log filed
Sample set # 56380 (0' - 90') Received: August 26, 1969

Owner Address: Meredosia, IL
Location source: Location from permit

Permit Date: June 29, 1969 **Permit #:** 06700

COMPANY Lorenz D A
FARM W.R. Grace Co.
DATE DRILLED September 11, 1969 **NO.** DL-3
ELEVATION 0 **COUNTY NO.** 00607
LOCATION NE NE NE
LATITUDE 39.817955 **LONGITUDE** -90.565139
COUNTY Morgan **API** 121370060700 **28 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

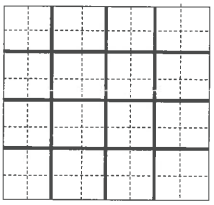
Water Well	Top	Bottom
sand	0	36
sand & gravel	36	67
fine to medium gravel	67	91
Total Depth		91

Casing: 16" STEEL .375 from 3' to 66'
Screen: 25' of 16" diameter .08 slot
Water from drift at 66' to 91'.
Static level 12' below casing top which is 0' above GL
Pumping level 22' when pumping at 1000 gpm for 8 hours

Owner Address: P.O. Box 153 Meredosia, IL
Location source: Location from permit

Permit Date: May 11, 1979 **Permit #:** 85480

COMPANY Hakala, Richard L.
FARM Grace, W.R. & Co.
DATE DRILLED May 15, 1979 **NO.** 4
ELEVATION 0 **COUNTY NO.** 20770
LOCATION 1980'N line, 450'W line of NW
LATITUDE 39.813373 **LONGITUDE** -90.562736
COUNTY Morgan **API** 121372077000 **27 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
fine to medium sand	0	40
medium to coarse sand	40	50
medium sand	50	62
coarse sand to fine gravel	62	73
medium to coarse sand	73	78
fine to medium sand with gravel	78	85
coarse sand & fine to medium gravel	85	90
medium sand to fine gravel	90	91
coarse sand, gravel & boulders	91	95
Total Depth		**95**

Casing: 24" STEEL from -2' to 65'
24" STAINLESS STL SCREEN from 65' to 94'

Screen: 29' of 24" diameter .05 slot

Grout: NEAT CEMENT from 0 to 20.

Grout: BENTONITE CHIPS from 20 to 27.

Grout: SILICA #2 NORTHERN from 27 to 94.

Water from sand & gravel at 16' to 94'.
Static level 16' below casing top which is 2' above GL
Pumping level 40' when pumping at 2503 gpm for 20 hours

Permanent pump installed at 60'
on January 25, 2011, with a capacity of 1850 gpm

Remarks: driller's est. well yield 3000 gpm

Sample set # 69973 (0' - 95') Received: January 9, 2012

Owner Address: ,

Address of well: 1994 Old Grace Road

Location source: Location from permit

Permit Date: **Permit #:**

COMPANY Water Well Solutions

FARM T.A. Terminal

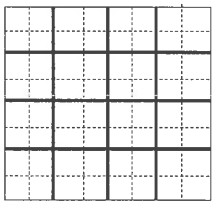
DATE DRILLED November 23, 2011 **NO.** 6

ELEVATION **COUNTY NO.** 22134

LOCATION NW NW SW

LATITUDE 39.81073 **LONGITUDE** -90.563186

COUNTY Morgan **API** 121372213400 **27 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

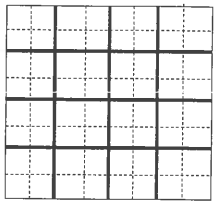
Industrial Water Well	Top	Bottom
fine to medium sand	0	40
medium to coarse sand	40	50
medium sand	50	62
coarse sand to fine gravel	62	73
medium to coarse sand	73	78
fine to medium sand with gravel	78	85
coarse sand & fine to medium gravel	85	90
medium sand to fine gravel	90	91
coarse sand, gravel & flat boulders	91	95
Total Depth		100

Casing: 24" STEEL from -2' to 65'
24" STAINLESS STL SCREEN from 65' to 94'
Screen: 29' of 24" diameter .05 slot
Grout: NEAT CEMENT from 0 to 20.
Grout: BENTONITE CHIPS from 20 to 27.
Grout: SILICA #3 NORTHERN from 27 to 94.

Water from sand & gravel at 20' to 94'.
Static level 20' below casing top which is 2' above GL
Pumping level 43' when pumping at 2485 gpm for 24 hours
Permanent pump installed at 60'
on January 19, 2011, with a capacity of 1850 gpm
Remarks: driller's est. well yield 3000 gpm
Sample set # 69972 (0' - 100') Received: January 9, 2012
Owner Address: ,
Address of well: 1994 Old Grace Road
Location source: Location from permit

Permit Date: **Permit #:**

COMPANY Water Well Solutions
FARM T.A. Terminal
DATE DRILLED November 23, 2011 **NO.** 5
ELEVATION **COUNTY NO.** 22133
LOCATION NW NW SW
LATITUDE 39.81073 **LONGITUDE** -90.563186
COUNTY Morgan **API** 121372213300 **27 - 16N - 13W**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
sand fine	0	30
sand coarse	30	50
coarse sand and gravel	50	60
gravel small to large	60	73
Total Depth		**73**

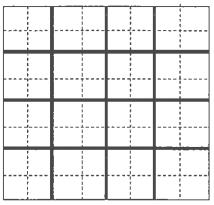
Casing: 10" STEEL from 0' to 61'
" 12' SCREEN from 0' to 73'

Screen: 12' of 9.5" diameter 50 slot
Water from sand gravel at 61' to 73'.
Static level 4' below casing top which is 3' above GL
Pumping level 15' when pumping at 300 gpm for 2 hours

Owner Address: Box 328 Jacksonville, IL
Location source: Platbook verified

Permit Date: December 11, 1975 **Permit #:** 43710

COMPANY Chadwick, G. W.
FARM Ill. Road Contractors Inc.
DATE DRILLED December 20, 1975 **NO.**
ELEVATION 0 **COUNTY NO.** 20621
LOCATION SE SE NE
LATITUDE 39.832804 **LONGITUDE** -90.571759
COUNTY Pike **API** 121492062100 **1 - 3S - 2W**



APPDENDIX B

BORING LOGS

Surface Elevation: 449.0 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand, trace clay lenses		6-16-10	SS1
5			3-11-13 -14	SS2
			5-7-9	SS3
10			5-9-14	SS4
			4-4-4	SS5
15	FILL: black clay with sand			
	Very soft, gray, interbedded SILT and CLAY with organics - ML/CL		0-0-1	SS6
20			2-2-3	SS7
	Medium stiff, gray CLAY - (CH)		92	ST8
25			87 89	ST9
30				
	Loose, gray, clayey SAND with gravel - SP		1-4-4	SS10
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		5-7-7	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/22/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.0 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
45			4-5-4	SS12
50			5-7-9	SS13
55			9-8-9	SS14
60			7-12-15	SS15
	Boring terminated at 60 feet			
65				
70				
75				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand with black clay lenses		5-7-9	SS1
5			6-10-8	SS2
			7-8-13	SS3
10			5-5-9	SS4
			3-3-3	SS5
15				
	Black, clayey SAND, trace gravel - SP			ST6
20				
	Medium stiff, gray CLAY - CH		3-4-4	SS7
25				
			3-3-3	SS8
30				
	Soft, gray, clayey SILT with sand and clay lenses - ML		2-1-1	SS9
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		0-2-4	SS10

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SKL	App'vd. by: JW
Date: 10/26/10	Date: 11/2/10	Date: 11/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5, 1.0, 1.5, 2.0, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL — LL (10, 20, 30, 40, 50)
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*				
			3-6-6	SS11	▲
45	Boring terminated at 46 feet.				
50					
55					
60					
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SK	App'vd. by: DAV
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown sand with black clay lenses		4-6-8	SS1
			5-6-9	SS2
5				ST3
			8-10-16	SS4
10			8-13-15	SS5
			6-8-8	SS6
15	FILL: black clay with sand, trace gravel			SS7
	Soft to medium stiff, gray CLAY - CH		2-2-2	SS8
20	with organics		86	ST9
				ST10
25			1-2-3	SS11
30				
	Soft, brown, clayey SILT with sand - ML		1-2-1	SS12
35				
	Medium dense, brown, fine to coarse SAND, trace gravel - SP		5-5-7	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SLC	App'vd. by: Dmy
Date: 10/26/10	Date: 12/nn/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-3

Project No. J017150.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5 1.0 1.5 2.0 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL LL (10 20 30 40 50)
	Medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*				
			6-7-7	SS14	▲ 13
45					
			6-7-9	SS15	▲ 16
50					
			5-8-9	SS16	▲ 17
55					
			8-8-13	SS17	▲ 21
60	Boring terminated at 60 feet.				
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SC	App'vd. by: DW
Date: 10/26/10	Date: 12/7/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 431.6 Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY - (CH)		1-2-2	SS1
			*	ST2
5			1-2-3	SS3
			0-2-2	SS4
10				
	Soft, gray, silty CLAY, trace sand - CL		0-1-1	SS5
15				
	Very soft, gray, sandy CLAY with silt - CL ▽		0-0-0	SS6
20				
	Very loose, brown, fine to coarse SAND, trace gravel - SP		0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * Disturbed sample Datum: IL State Plane Coordinates, West Zone. N: 1148688.82' E: 2182505.605'

Drawn by: KA	Checked by: SLC	App'vd. by: DM
Date: 10/26/10	Date: 12/15/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-4

Project No. J017150.01

Surface Elevation: 431.8 Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray, silty CLAY - CL		2-2-3	SS1
			2-2-2	SS2
5	Medium stiff to very soft, brown and gray CLAY - CH		1-1-3	SS3
			89	ST4
10				
			0-0-0	SS5
15				
	Very soft, gray, silty CLAY with sand - CL		0-0-0	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - TV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 23 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148661.88' E: 2182476.0360'

Drawn by: KA	Checked by: SC	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-5

Project No. J017150.01

Surface Elevation: 450.8 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand pockets		3-6-10	SS1
	FILL: brown, fine sand, trace clay		3-8-9	SS2
5			4-6-7	SS3
	FILL: black ash and sand			ST4
10				ST5
	FILL: brown, fine sand, trace gravel		6-7-13	SS6
15				
	Very stiff, gray, silty CLAY with sand - CL ▽		0-5-15	SS7
20	Very loose, gray silty SAND - SM		0-0-0	SS8
25	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL)		0-1-3	SS9
30				
			0-0-0	SS10
35				
			0-0-0	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SL	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-6

Project No. J017150.01

Surface Elevation: 450.8 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL) *(continued)*			
			1-1-1	SS12
45				
	Dense, brown, fine to coarse SAND - SP			
			7-13-42	SS13
50	Boring terminated at 50 feet.			
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SK	App'vd. by: JM
Date: 10/26/10	Date: 11/3/10	Date: 11/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-6

Project No. J017150.01

Surface Elevation: 450.5 Datum msl

Completion Date: 10/19/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay, ash and sand		5-8-9	SS1
	FILL: brown, fine sand		2-6-6	SS2
5			4-6-9	SS3
	FILL: black sand and ash with clay lenses		3-6-5	SS4
10				SS5
			3-7-9	SS6
15				
			6-4-3	SS7
20	Medium stiff, brown, sandy CLAY - CL			
	Medium stiff to very soft, gray, silty CLAY with sand - CL		3-4-5	SS8
25			87	ST9
			86	
			95	ST10
30				
			1-0-0	SS11
35				
			*	ST12

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 450.5 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to very soft, gray, silty CLAY with sand - CL *(continued)*			
	sandy			ST13
45				
	Medium dense to dense, brown, fine to medium coarse SAND - SP		5-8-10	SS14
50				
			7-9-14	SS15
55				
			13-17-19	SS16
60	Boring terminated at 60 feet,			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/15/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 451.1 | Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand		5-6-10	SS1
	FILL: brown sand, trace to some clay			
			2-4-6	SS2
5			0-5-7	SS3
			4-8-12	SS4
10	FILL: black clay with sand		0-4-6	SS5
				ST6
15				
	FILL: gray, clayey sand with black clay lenses		2-4-6	SS7
20			4-3-3	SS8
	Medium stiff, black to gray CLAY - CH		2-3-4	SS9
25				
			0-2-3	SS10
30	Medium stiff to soft, gray clayey SILT with sand - ML		101	ST11
				SS12
35				
			0-0-2	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SL	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 451.1 | Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, gray clayey SILT with sand - ML *(continued)*			
	Dense to medium dense, brown, fine to coarse SAND with gravel - SP			
45			13-16-16	SS14
50			7-9-11	SS15
55			5-7-9	SS16
60	Boring terminated at 60 feet.		10-13-14	SS17
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 433.6 | Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, black and gray CLAY - (CH)			
			2-3-4	SS1
			1-1-1	SS2
5				ST3
			86	ST4
10				
	Soft to very soft, gray, silty CLAY with silt seams and sand - CL			
			0-1-1	SS6
15				
			0-1-2	SS7
20				
			0-0-0	SS8
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148133.361' E: 2182009.017'

Drawn by: KA	Checked by: SVC	App'vd. by: DMV
Date: 11/3/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-9

Project No. J017150.01

Surface Elevation: 433.2 | Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray silty CLAY, trace sand and wood - CL			
			2-3-3	SS1
			2-2-3	SS2
5				
			0-2-3	SS3
			0-1-2	SS4
10				
			95	ST5
15				
	Very loose to medium dense, gray, silty SAND with silty clay seams - SM			
20			0-1-1	SS6
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148120.612' E: 2181976.582'

Drawn by: KA	Checked by: SH	App'vd. by: DW
Date: 11/3/10	Date: 12/2/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-10

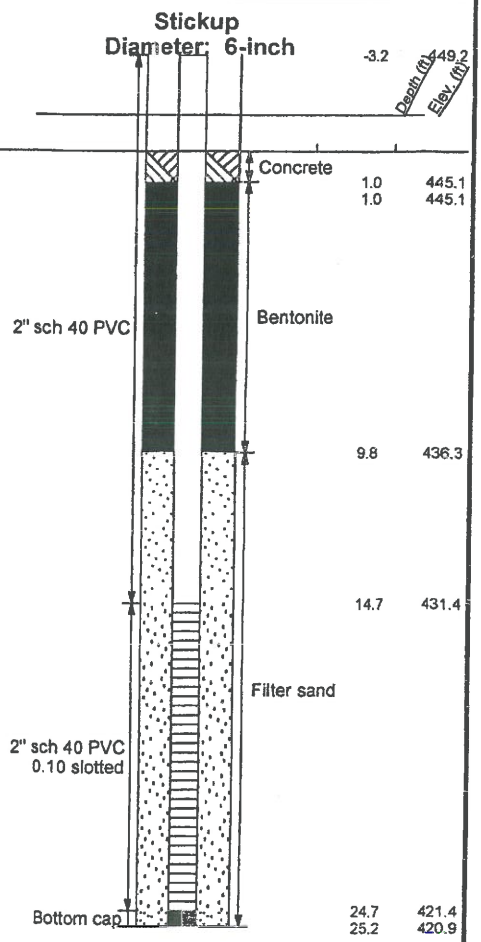
Project No. J017150.01

Surface Elevation: 446.06 | Completion Date: 10/26/10

Datum msl | Northing: 1147018.68 | Easting: 2185605.2

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			1-1-1	SS1
			2-2-1	SS2
5			2-4-4	SS3
			3-3-3	SS4
10				
	Loose, brown fine to coarse SAND, trace gravel - SP ▽		1-1-2	SS5
15				
			1-1-2	SS6
20				
	Loose, brown, fine SAND - SP		0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 1/11/11

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

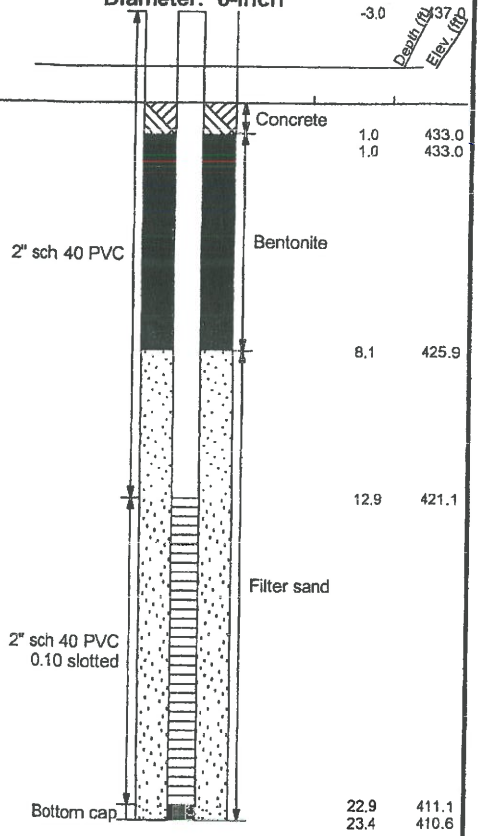
LOG OF BORING: APW-1

Project No. J017150.01

Surface Elevation: 433.97
Datum msl
Completion Date: 10/25/10
Northing: 1148489.69
Easting: 2182485.19

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY, trace sand - CH			
			2-2-2	SS1
			2-2-2	SS2
5			2-2-4	SS3
			0-2-3	SS4
10				
			2-2-3	SS5
15				
	Soft, gray, silty CLAY with shells, trace to some sand - CL			
			0-1-1	SS6
20				
	Very loose, brown, fine to medium SAND - SP			
			0-0-1	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KSP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-2/MW-2

Project No. J017150.01

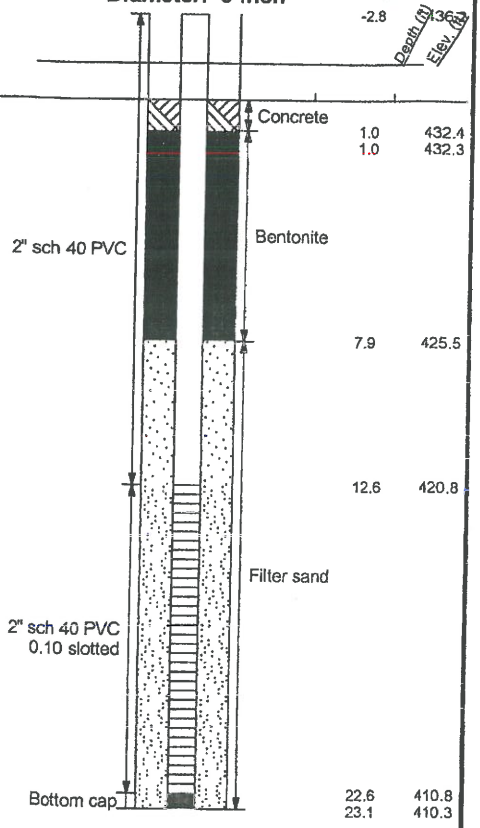
LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 433.35
Datum msl

Completion Date: 10/25/10
Northing: 1148118.6
Easting: 2181973.76

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff, brown and gray CLAY, trace sand and wood - CH			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
	Gray, silty CLAY, trace sand - CL		95	ST5
15				
	Soft, gray, silty SAND with shells and silty clay seams - SM			
			0-1-1	SS6
20				
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: MSP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-3/B-10

Project No. J017150.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

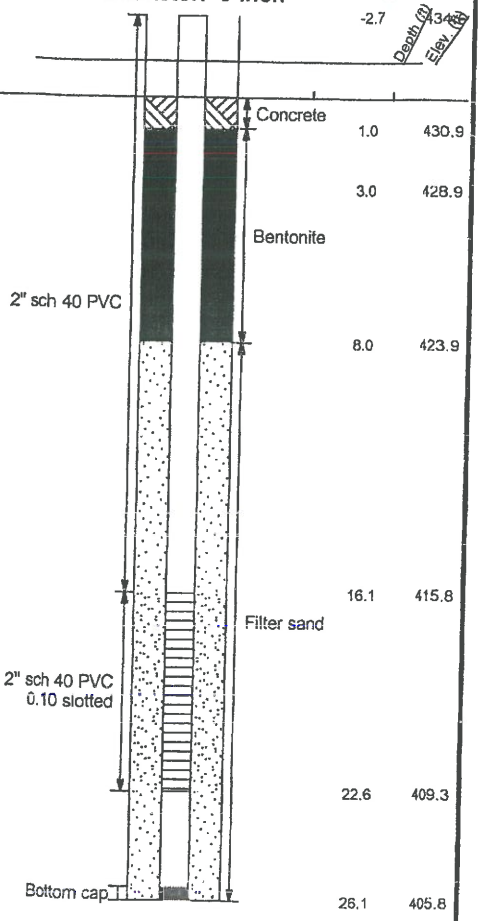
LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 431.90
Datum msl

Completion Date: 10/26/10
Northing: 1146935.94
Easting: 2181602.97

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray CLAY, trace sand and wood - CH			
			0-0-4	SS1
			2-4-4	SS2
5			1-1-1	SS3
			1-1-2	SS4
10				
	Loose, brown, fine SAND - SP			
			3-6-7	SS5
15				
			0-2-2	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 11.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA | Checked by: DT | App'vd. by: ABP
Date: 11/3/10 | Date: 2-17-11 | Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-4

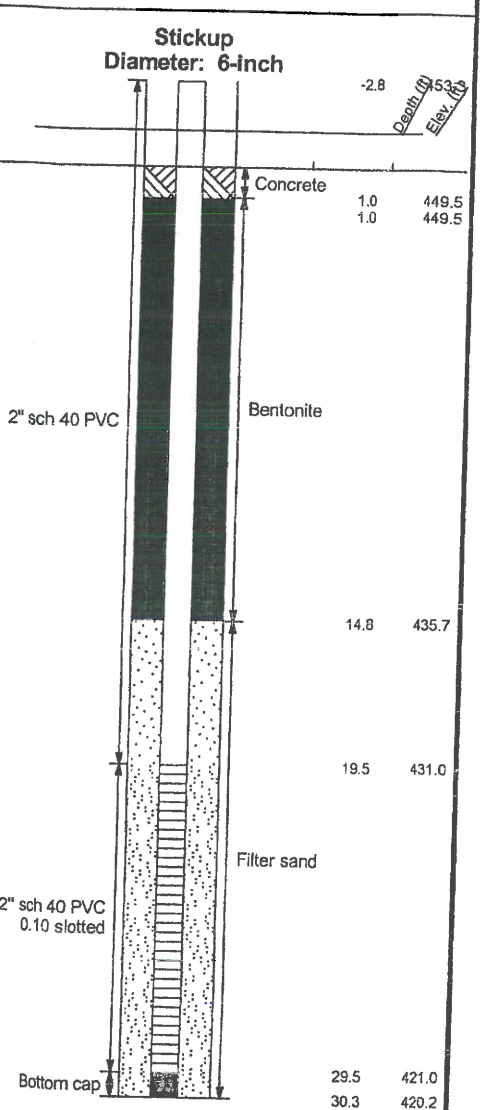
Project No. J017150.01

Surface Elevation: 450.48
Datum msl

Completion Date: 10/26/10
Northing: 1146922.64
Easting: 2183711.11

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			3-3-3	SS1
5			2-2-2	SS2
			1-3-4	SS3
10			2-3-3	SS4
15			2-3-4	SS5
20	Loose, brown, fine to coarse SAND, trace to some gravel - SP		2-1-2	SS6
25			3-3-3	SS7
30	Boring terminated at 30 feet.		1-1-1	SS8
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTR	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-5

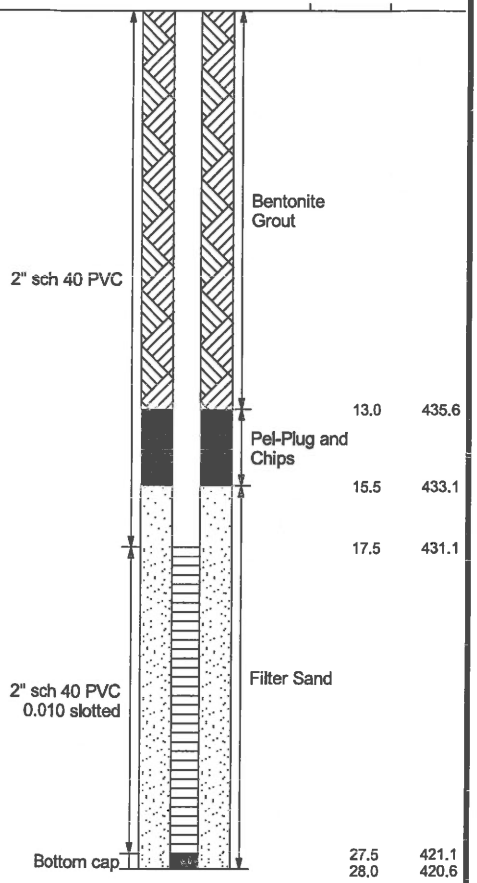
Project No. J017150.01

Surface Elevation: 448.55
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.570556

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained SAND - SP		0-3-4	SS1
			3-4-6	SS2
5			2-3-1	SS3
			2-2-2	SS4
			3-3-5	SS5
10			4-5-6	SS6
			1-3-3	SS7
			1-2-3	SS8
15			4-6-7	SS9
	Brown, medium grained SAND - SP ▽		4-3-4	SS10
			1-2-2	SS11
20				
	Blind drilled - heaving sands			
25				
	Boring terminated at 28 feet.			
30				
35				

WELL DIAGRAM

Stickup = 3.3 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-6

Project No. J024917.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

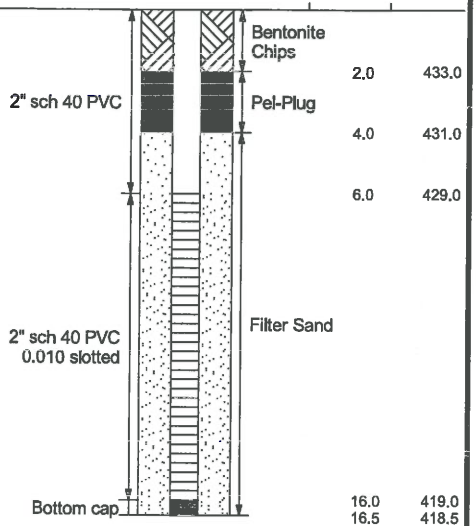
LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

Surface Elevation: 435.03
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.573333

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Black, silty CLAY - CL		2-4-3	SS1
	Brown, silty CLAY - CL		2-3-4	SS2
5			1-2-1	SS3
	Brown, fine grained SAND - SP		1-1-1	SS4
			0-0-1	SS5
10	Blind drilled - heaving sands			
15				
	Boring terminated at 17 feet.			
20				
25				
30				
35				

WELL DIAGRAM

Stickup = 3.7 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 6 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-7

Project No. J024917.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

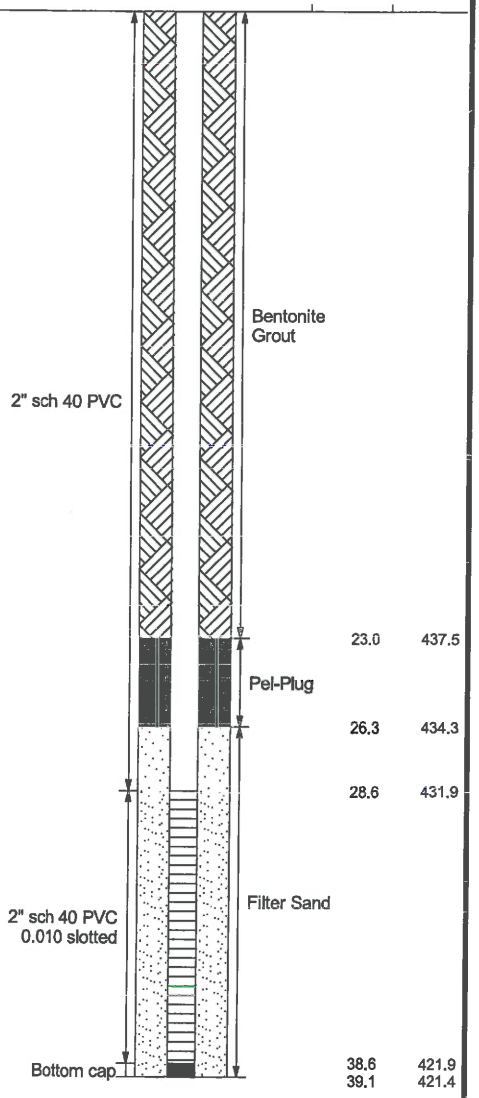
Surface Elevation: 460.54
Datum: _____

Completion Date: 10/1/2015
Latitude: 39.818611
Longitude: -90.5697222

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained, poorly graded SAND - SP		3-9-9	SS1
			7-11-12	SS2
5			3-4-5	SS3
			2-3-3	SS4
			2-3-4	SS5
10			2-3-5	SS6
			3-5-9	SS7
15			5-7-7	SS8
			5-7-8	SS9
			5-7-8	SS10
20			9-15-16	SS11
			7-12-13	SS12
25			8-13-14	SS13
			9-10-11	SS14
	Brown, medium grained, poorly graded SAND - SP		6-6-9	SS15
30			5-8-9	SS16
			4-5-6	SS17
35	Blind drilled - heaving sands			
40	Boring terminated at 40 feet.			

WELL DIAGRAM

Stickup = 3.4 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 32 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-8

Project No. J024917.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

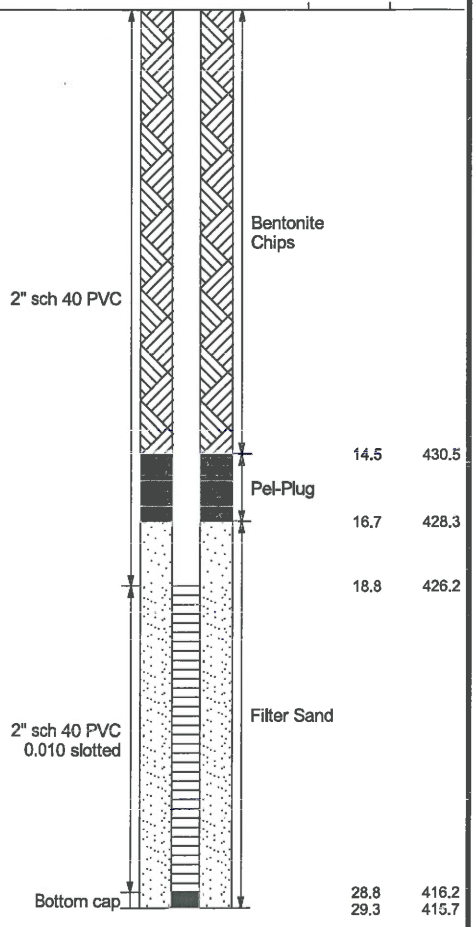
LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

Surface Elevation: 444.97
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.821388
Longitude: -90.569722

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: black, silty sand with coal CCR		4-3-2	SS1
			2-3-3	SS2
5			3-8-8	SS3
			2-4-1	SS4
			2-3-10	SS5
10	Gray SILT - ML		4-3-2	SS6
			5-6-5	SS7
	Brown, fine grained SAND - SP		3-4-3	SS8
15			3-3-4	SS9
	Brown, medium grained SAND - SP		3-3-4	SS10
20		▽	1-2-1	SS11
			2-2-4	SS12
	Blind drilled - heaving sands			
25				
30	Boring terminated at 30 feet.			
35				

WELL DIAGRAM

Stickup = 3.1 ft
Diameter: 8 1/2 inch



GROUNDWATER DATA

ENCOUNTERED AT 20 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:
CCR = Coal Combustion Residuals

Drawn by: AGB	Checked by:	App'vd. by:
Date: 10/9/2015	Date:	Date:

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-9

Project No. J024917.01

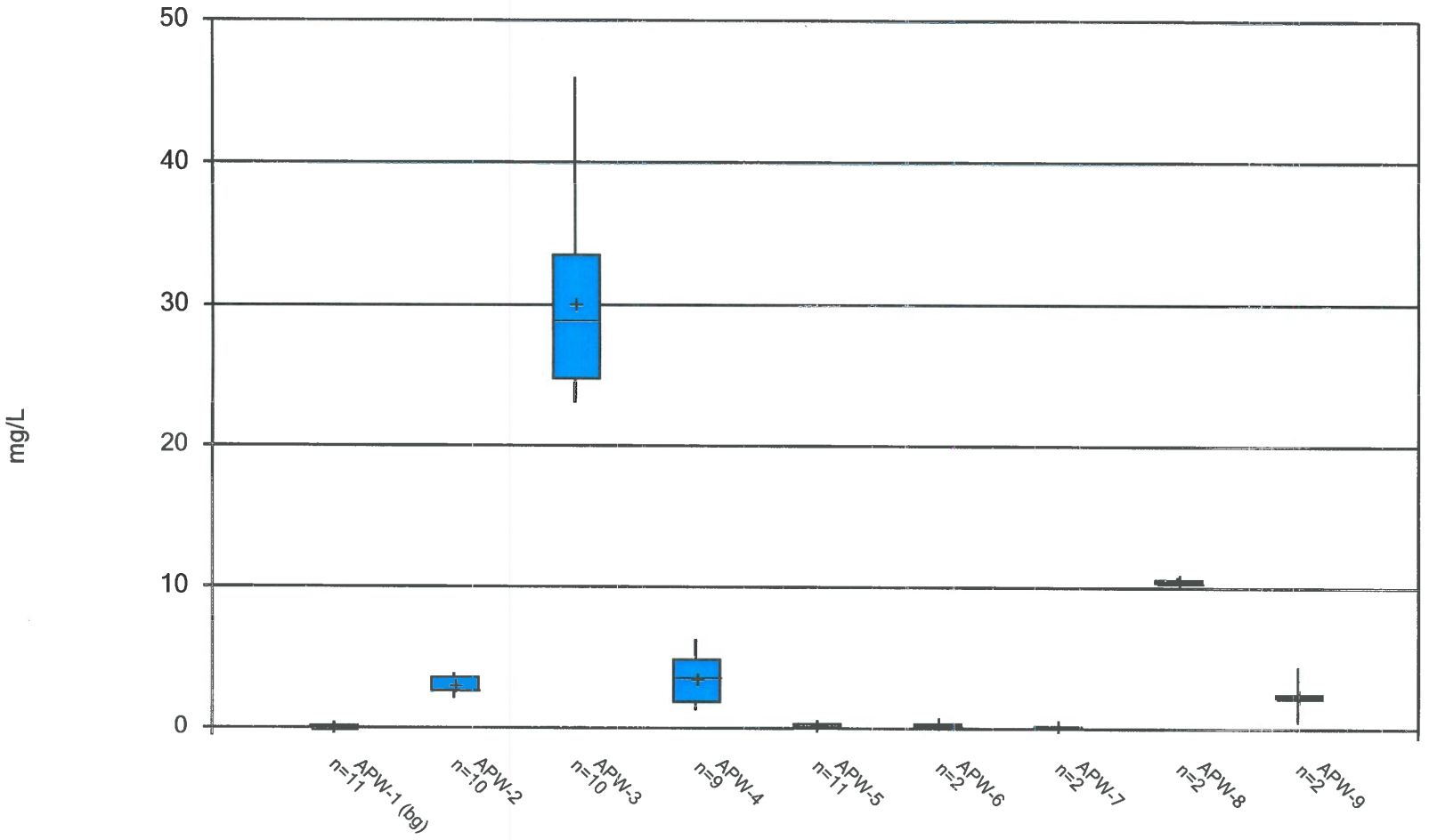
NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

APPENDIX C

STATISTICAL ANALYSIS PLOTS

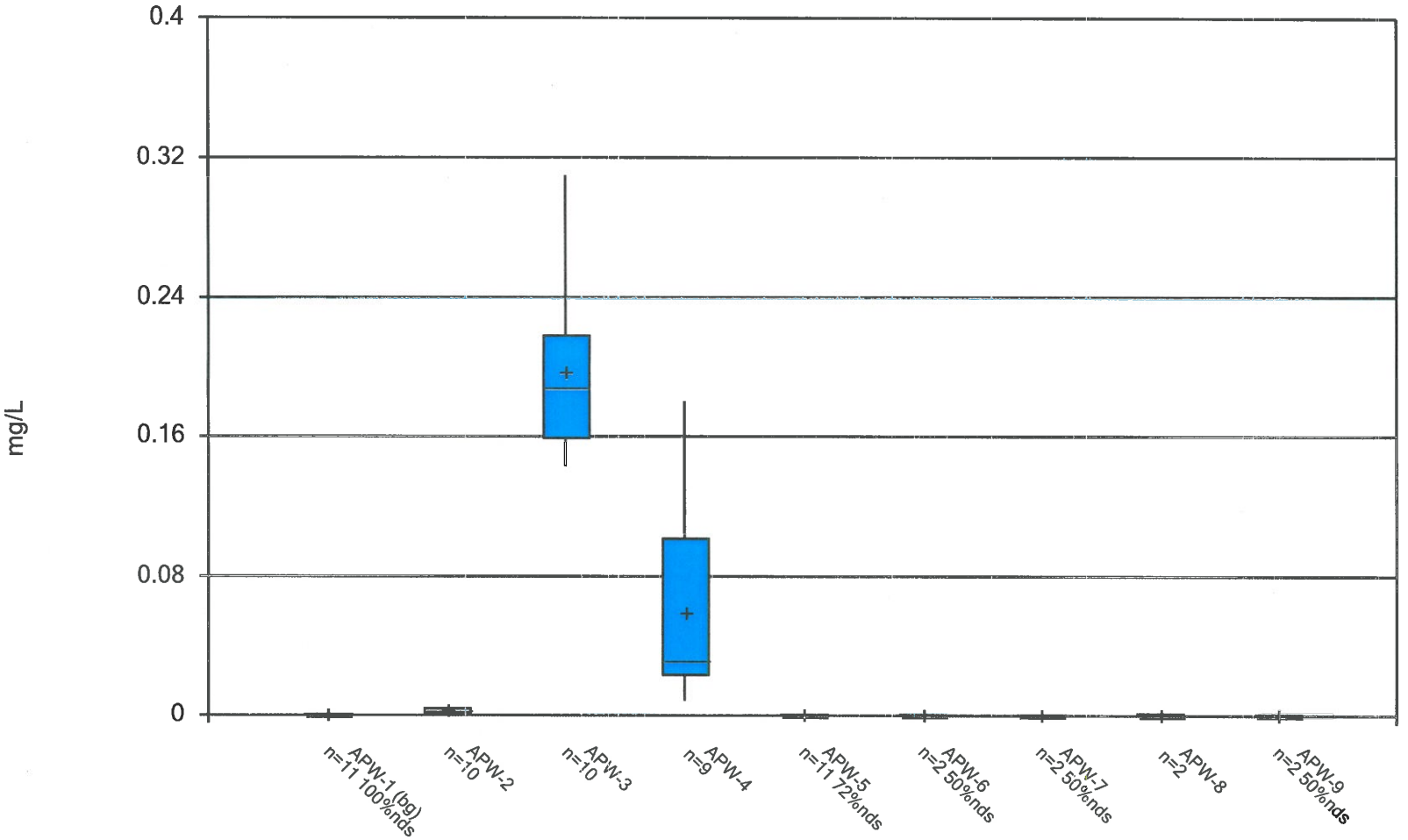
Box & Whiskers Plot



Constituent: Boron Dissolved Analysis Run 4/18/2016 3:06 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Box & Whiskers Plot

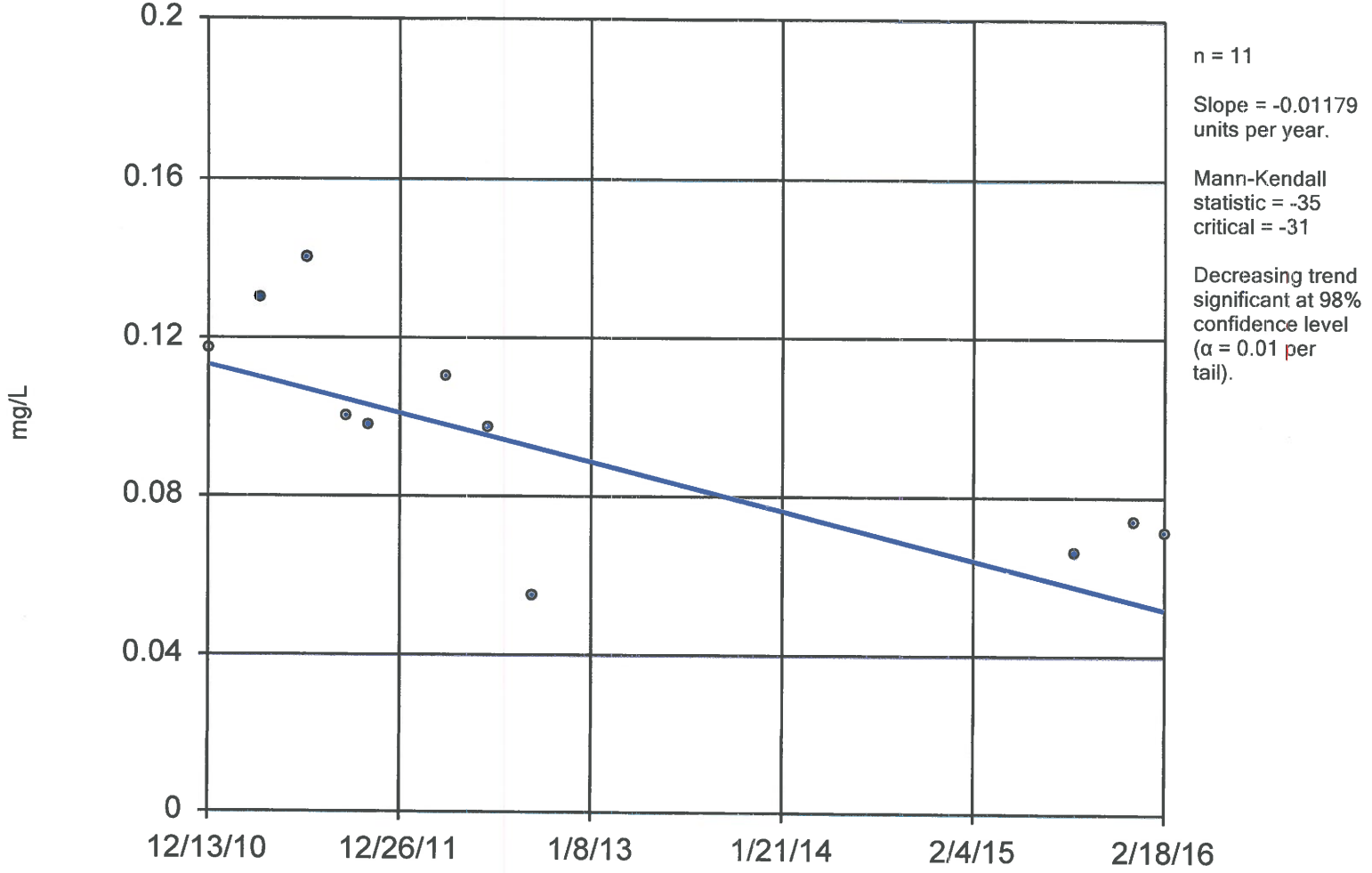


Constituent: Arsenic Dissolved Analysis Run 4/18/2016 3:07 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sen's Slope Estimator

APW-1 (bg)

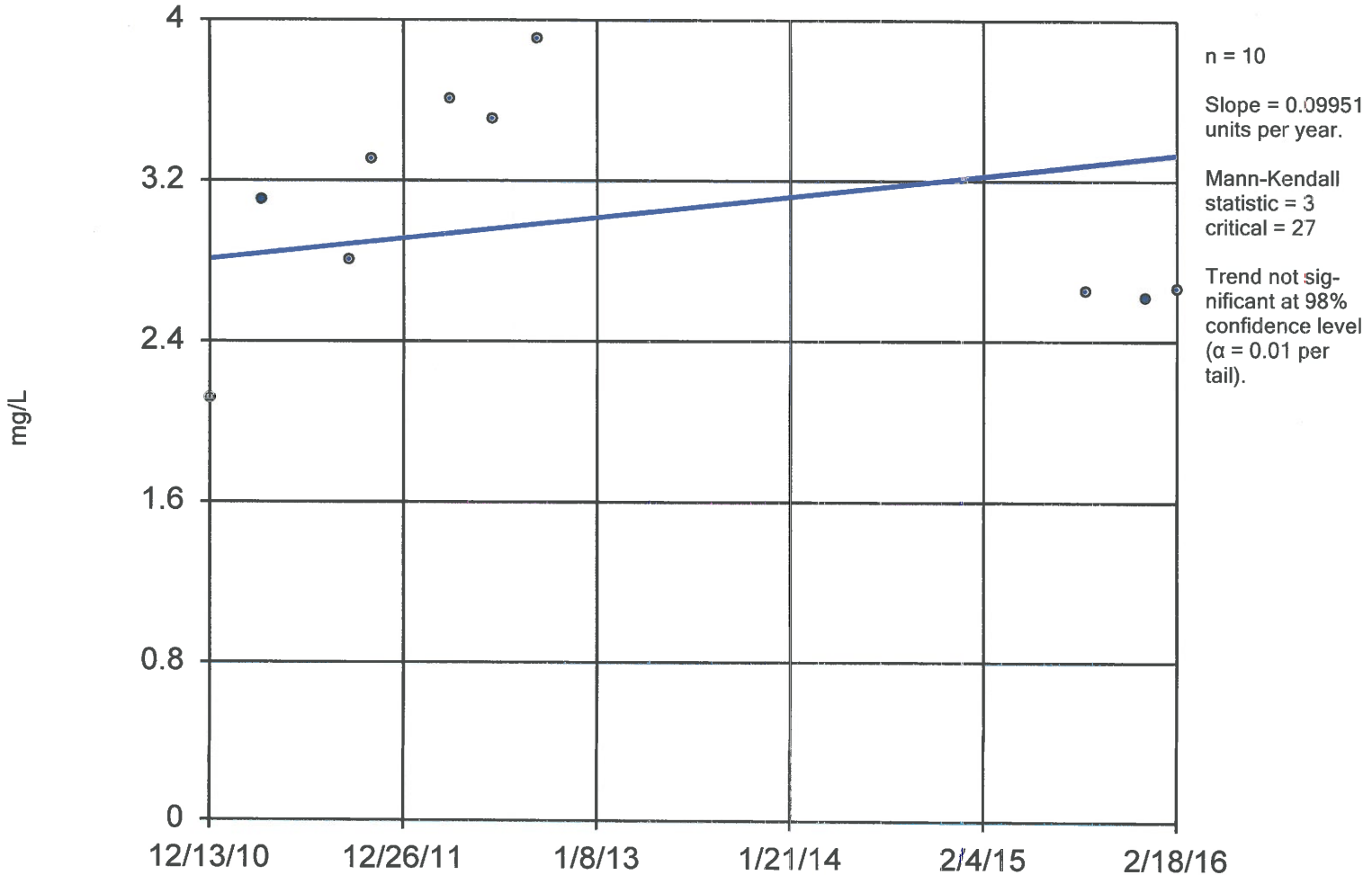


Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sen's Slope Estimator

APW-2

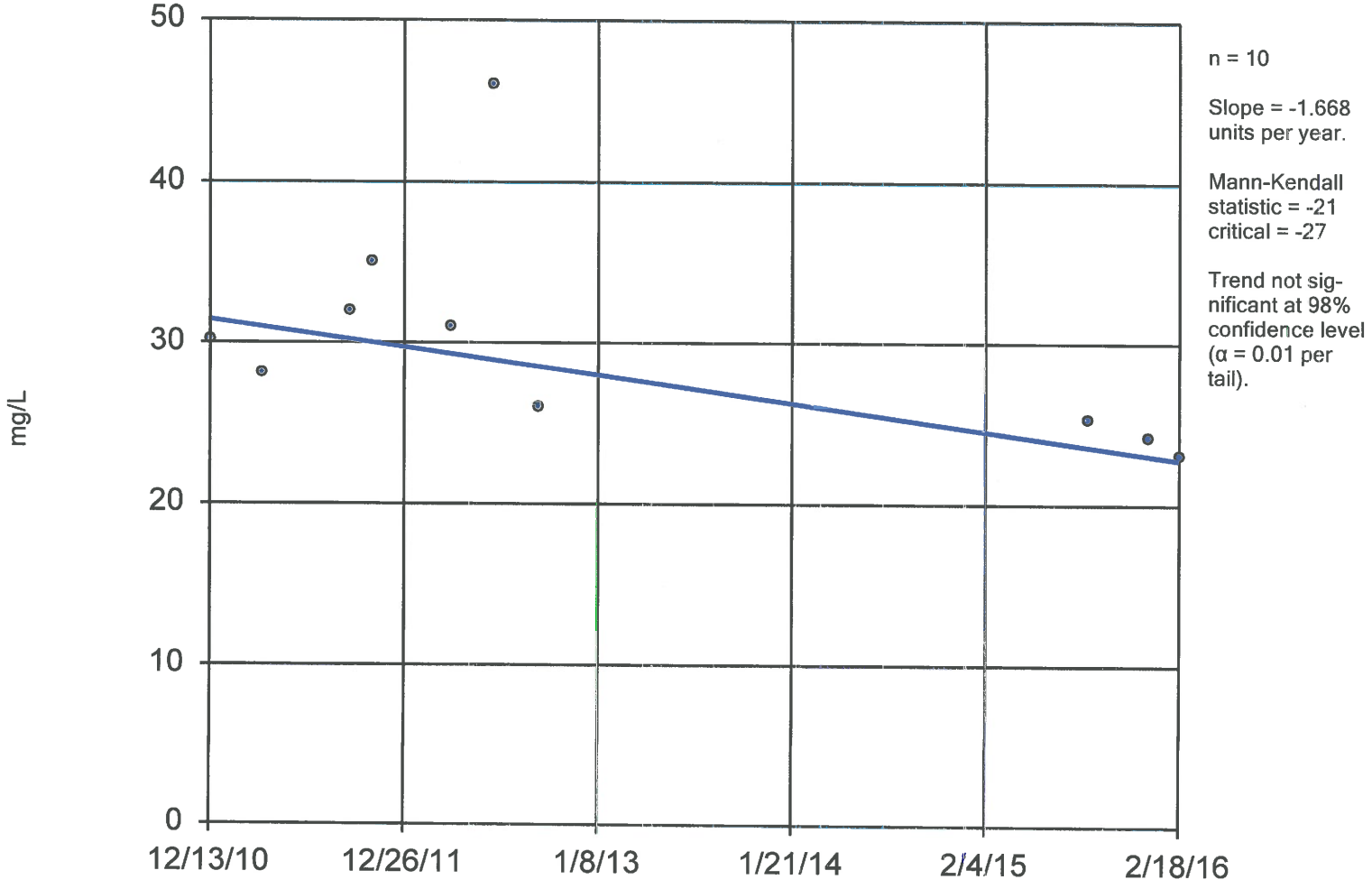


Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sen's Slope Estimator

APW-3

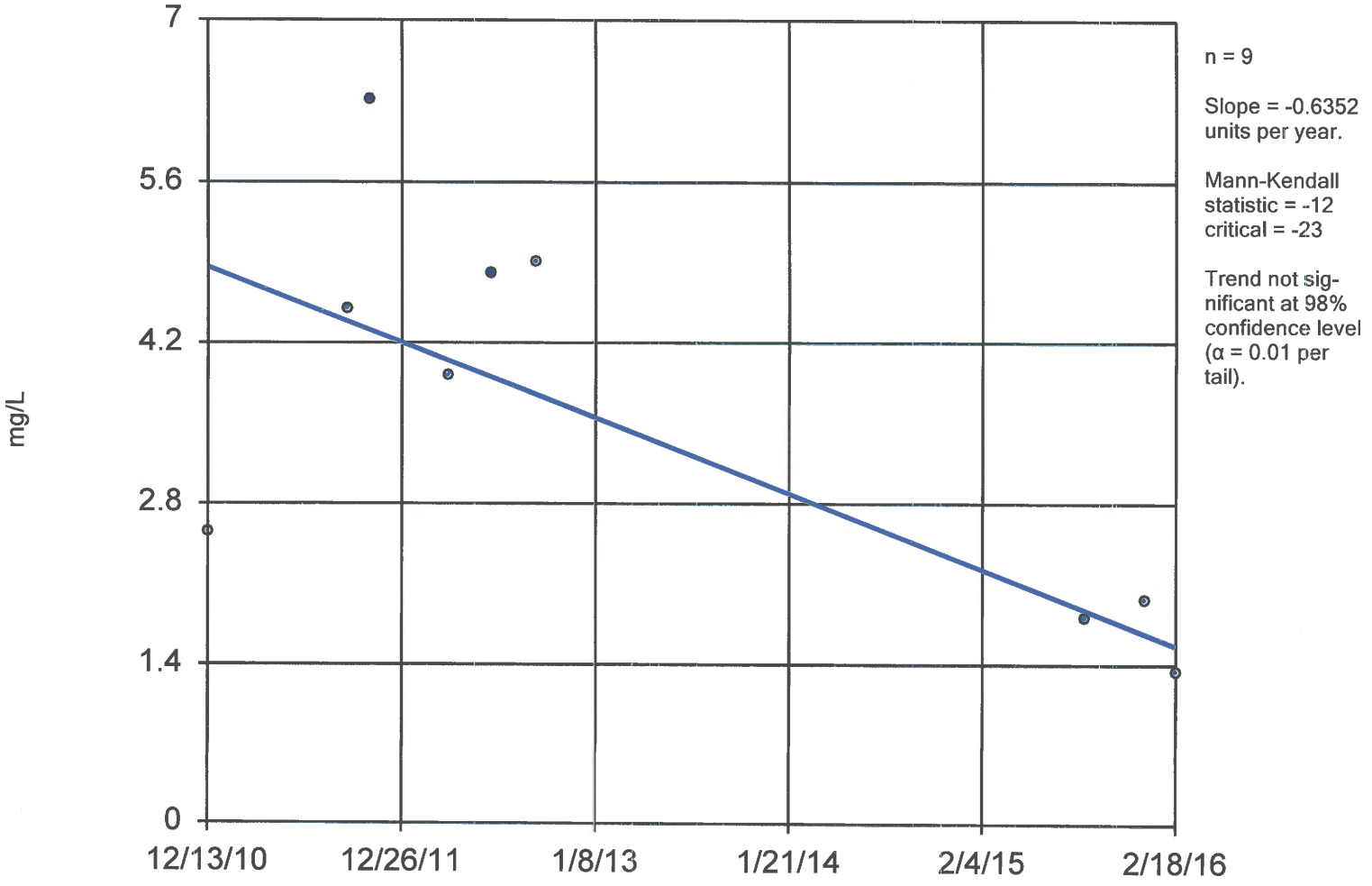


Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sen's Slope Estimator

APW-4

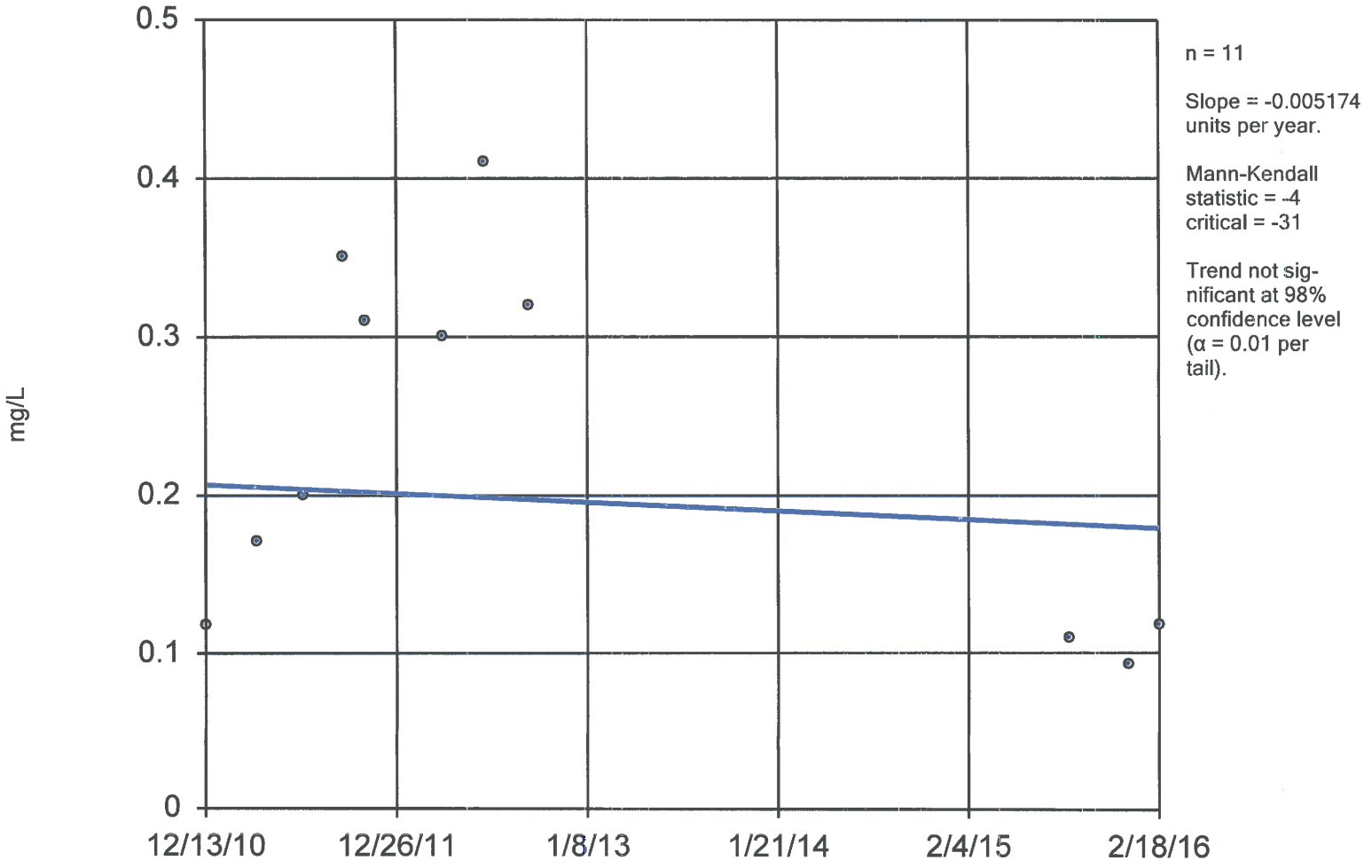


Constituent: Boron Dissolved Analysis Run 4/18/2016 3:04 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Sen's Slope Estimator

APW-5



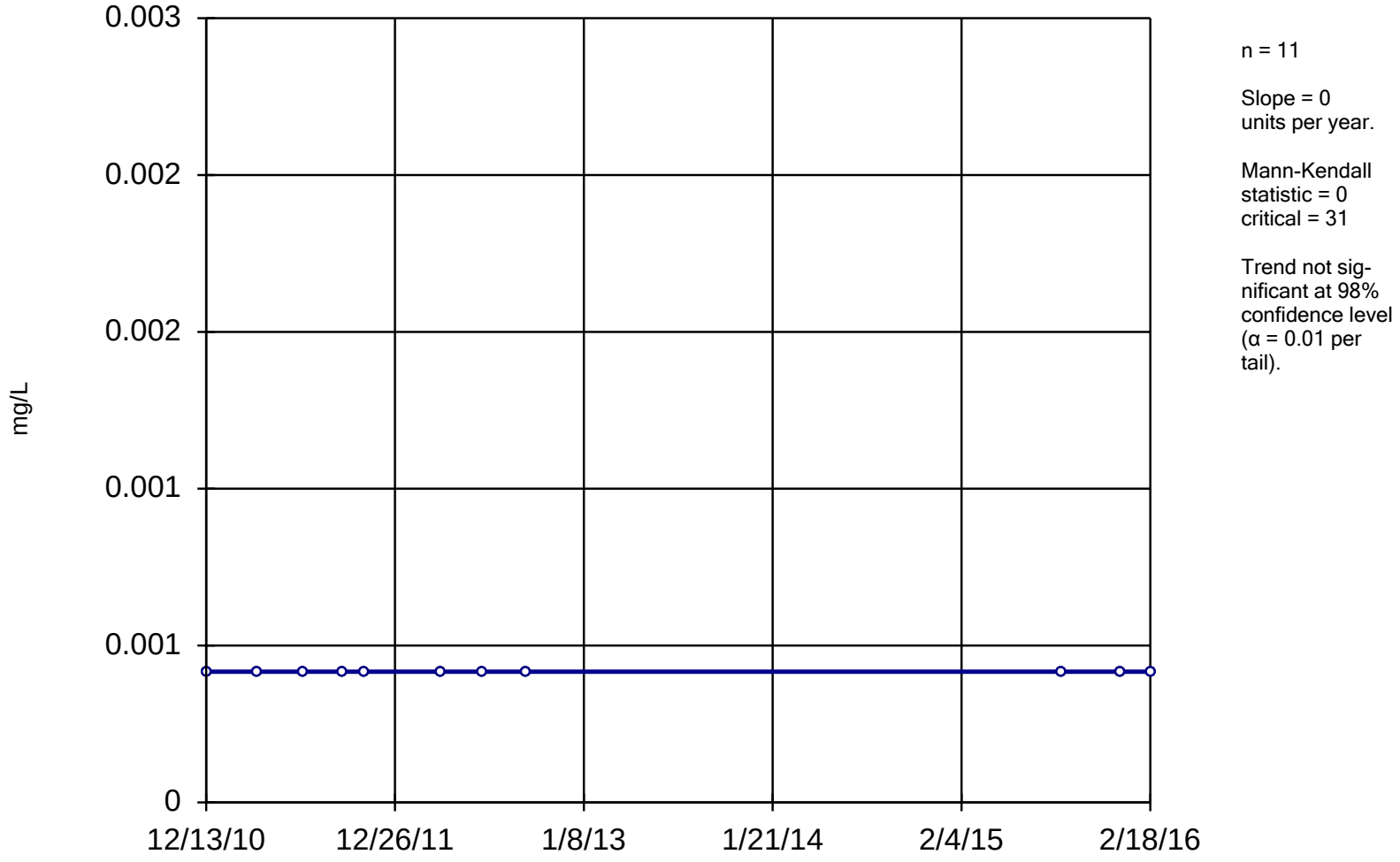
Constituent: Boron Dissolved Analysis Run 4/18/2016 3:05 PM

Facility: Meredosia Client: Geotechnology Data File: Final EDD

Hollow symbols indicate censored values.

Sen's Slope Estimator

APW-1 (bg)



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 31

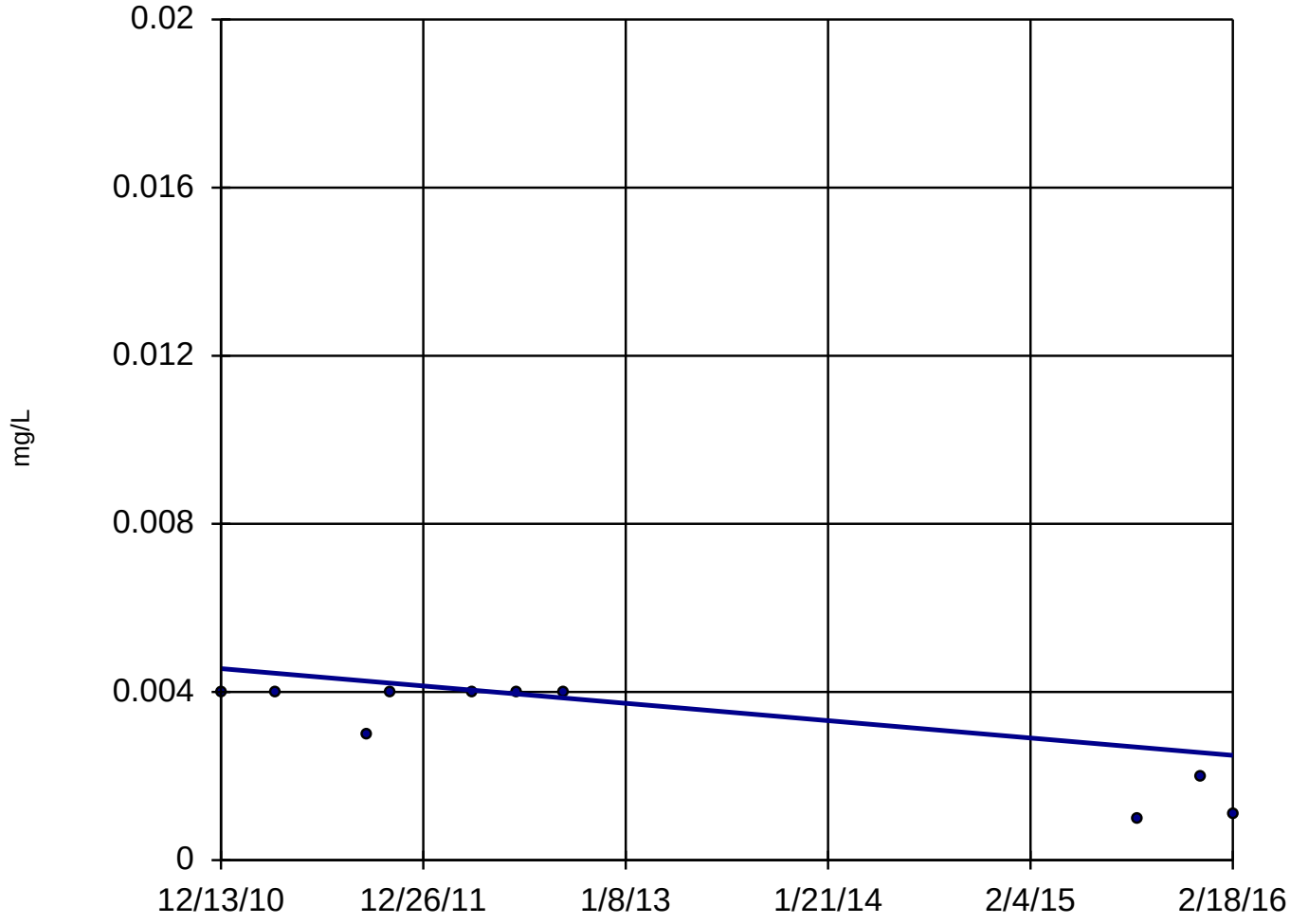
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Arsenic Dissolved Analysis Run 10/25/2016 1:31 PM

OU3 HBR Client: Geotechnology Data: Final EDD

Sen's Slope Estimator

APW-2



n = 10

Slope = -0.000398 units per year.

Mann-Kendall statistic = -18
critical = -27

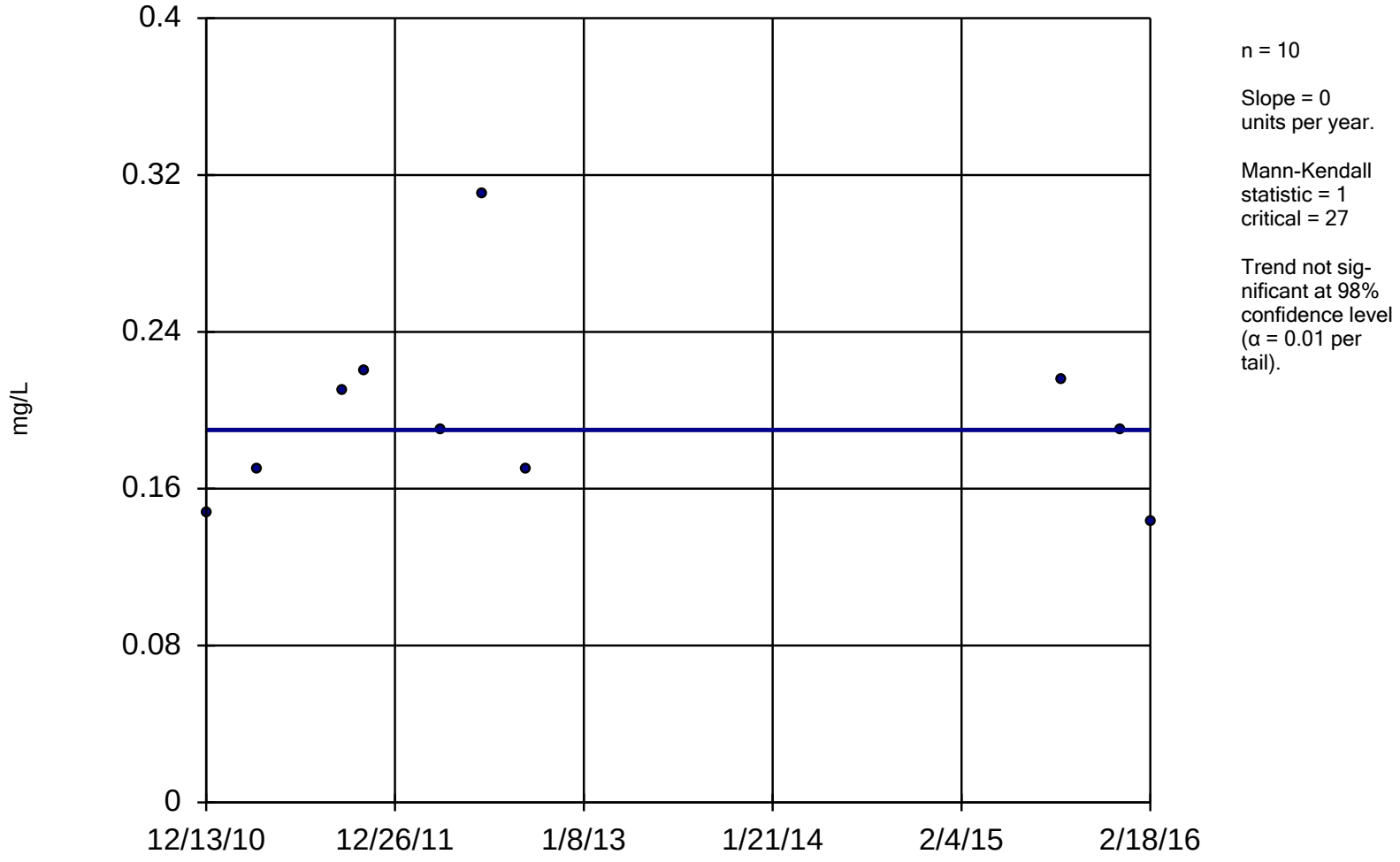
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic Dissolved Analysis Run 10/25/2016 1:31 PM

OU3 HBR Client: Geotechnology Data: Final EDD

Sen's Slope Estimator

APW-3



n = 10

Slope = 0
units per year.

Mann-Kendall
statistic = 1
critical = 27

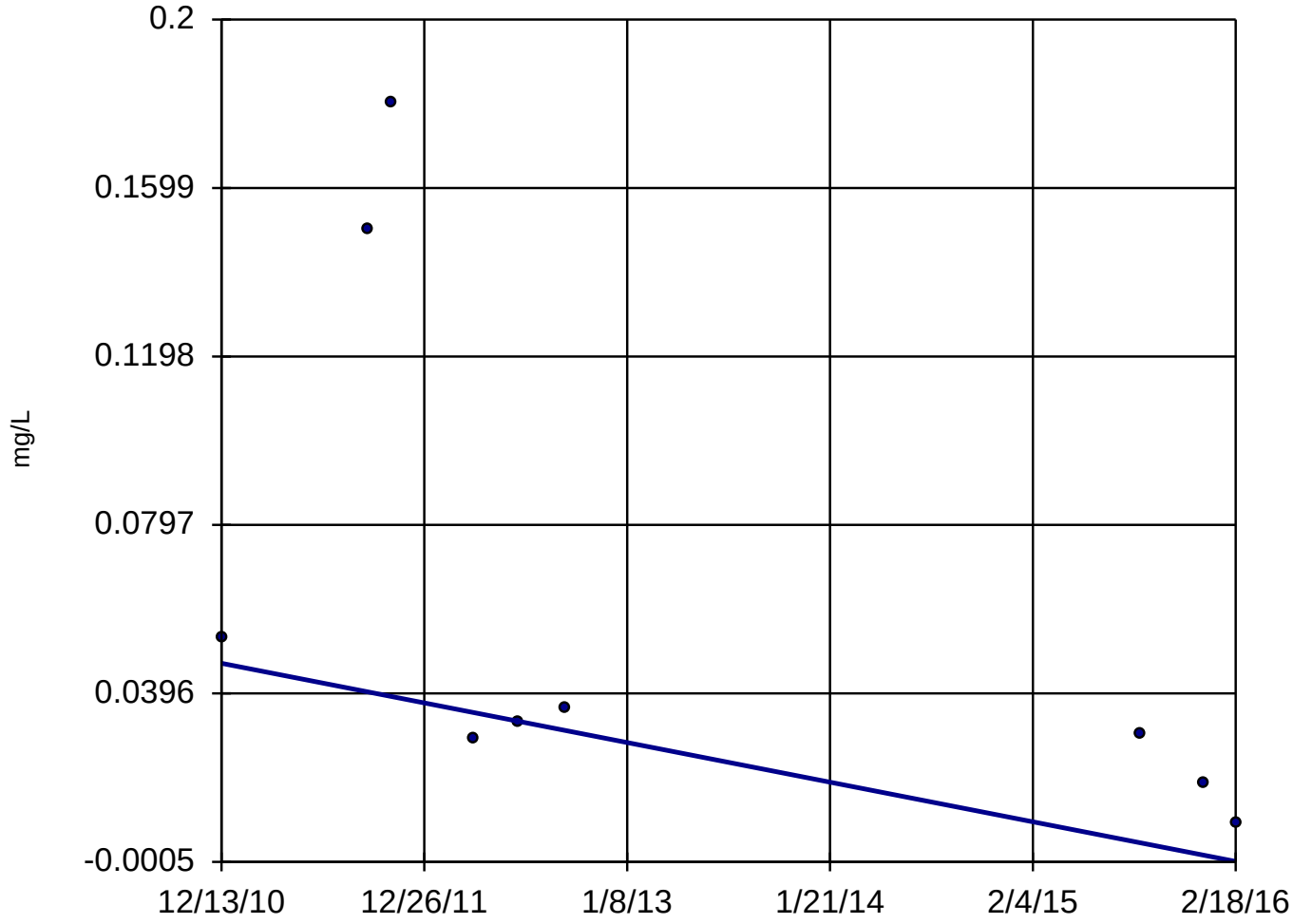
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Arsenic Dissolved Analysis Run 10/25/2016 1:32 PM

OU3 HBR Client: Geotechnology Data: Final EDD

Sen's Slope Estimator

APW-4



n = 9

Slope = -0.009098 units per year.

Mann-Kendall statistic = -22
critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

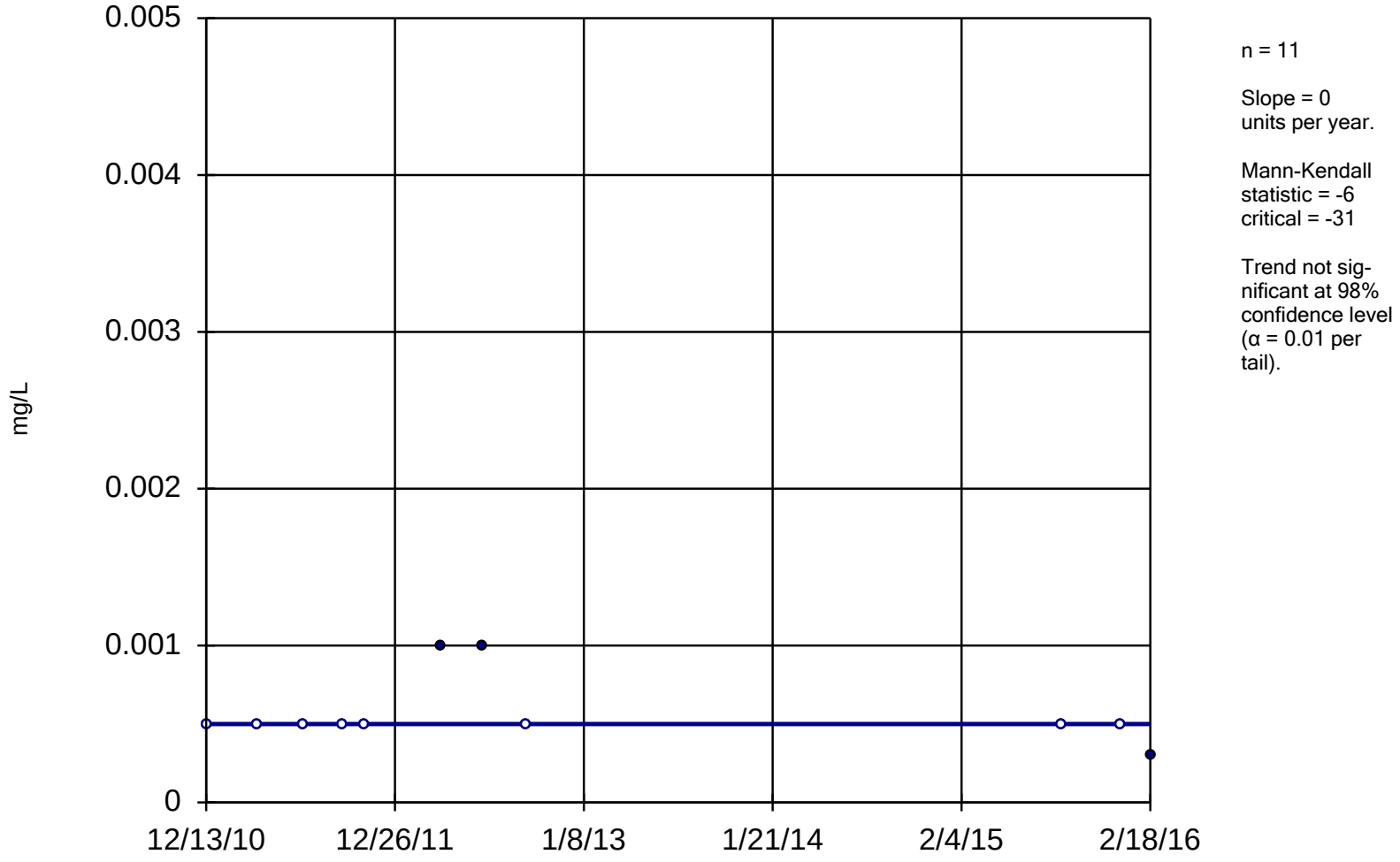
Constituent: Arsenic Dissolved Analysis Run 10/25/2016 1:32 PM

OU3 HBR Client: Geotechnology Data: Final EDD

Hollow symbols indicate censored values.

Sen's Slope Estimator

APW-5



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = -6
critical = -31

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Arsenic Dissolved Analysis Run 10/25/2016 1:32 PM

OU3 HBR Client: Geotechnology Data: Final EDD

APPENDIX D

HELP GROUNDWATER MODEL DATA

In order to assess the drainage capabilities of the proposed Meredosia Ash Pond, Geotechnology utilized the USEPA Hydrologic Evaluation of Landfill Performance (HELP) model to simulate conditions at the site. The version of software used was HELP 3.07 (1 November 1997). For the purposes of this evaluation, the ash pond designed cap has been divided into 6 layers as follows:

Layer 1 – Closure Turf (Geotextile/Turf Layer)
Layer 2 – Closure Turf Drainage Layer
Layer 3 – Membrane (50 mil HDPE)
Layer 4 – Fly Ash (at elevations above the piezometric surface of the pond, but 100% saturated to reflect conservative conditions at initial placement)
Layer 5 – Fly Ash (at elevations below the piezometric surface of the pond, at 100% saturation)
Layer 6 – Fine Silty Sand (conservative for the range of sands encountered)

Model parameters for the layers were the default values for each selected layer type as provided by the HELP software module, or were input by the user (for synthetic materials) with manufacturer provided parameters. Geotechnology utilized user-selected variables of 5 pinholes and 1 installation defect per each acre of membrane material as the modeled values, with a "good" initial installation quality. We assumed the Illinois River was at nominal stage and does not affect the drainage. During future flooding events, groundwater elevation may increase to the point where the lower levels of the ash are rewetted. In the case of a 100-year flood, it is not expected that the conditions in the ash will be as saturated as provided in this model due to the limited time of flooding and relatively low permeability of the ash compared to the underlying native sands.

Geotechnology utilized a user-generated Soil Conservations Service (SCS) Curve Number of 95% and an evaporative zone depth of 0.8 inches for the model based on the site location. Evapotranspiration data were calculated using site latitude, an artificial vegetative surface, and a growing season from April 19 to October 10. Average wind speed at the site was chosen from the Springfield, Illinois National Oceanic and Atmospheric Administration (NOAA) Station, and humidity input was calculated from NOAA data provided for Meredosia, Illinois. Precipitation and temperature coefficients were selected from the HELP database-provided site (Columbia, Missouri) and adjusted for site latitude. The model was run without groundwater influx parameters. The model indicates that steady state conditions (<0.05 inches of head on the sand layer) will be achieved within approximately six months of closure activities at the two ash ponds on site.

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**
** HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
** HELP MODEL VERSION 3.07 (1 NOVEMBER 1997)
** DEVELOPED BY ENVIRONMENTAL LABORATORY
** USAE WATERWAYS EXPERIMENT STATION
** FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
****
****

PRECIPITATION DATA FILE: C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE: C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE: C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA: C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE: C:\HELP3\DATAMER2.D10
OUTPUT DATA FILE: C:\HELP3\RBCA1.OUT

TIME: 11:49 DATE: 4/15/2016

****

TITLE: Meredosia

****

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE SPECIFIED BY THE USER.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.60	INCHES
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0180	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.720000011000E-03	CM/SEC

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0050	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC
SLOPE	=	4.00	PERCENT
DRAINAGE LENGTH	=	750.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.05	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	5.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 30

THICKNESS	=	240.00	INCHES
POROSITY	=	0.5410	VOL/VOL
FIELD CAPACITY	=	0.1870	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5410	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 30

THICKNESS	=	264.00	INCHES
POROSITY	=	0.5410	VOL/VOL
FIELD CAPACITY	=	0.1870	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5410	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999987000E-04	CM/SEC

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 7

THICKNESS	=	480.00	INCHES
POROSITY	=	0.4730	VOL/VOL
FIELD CAPACITY	=	0.2220	VOL/VOL
WILTING POINT	=	0.1040	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4730	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.520000001000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	95.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	41.900	ACRES
EVAPORATIVE ZONE DEPTH	=	0.8	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.012	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.420	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.012	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	499.716	INCHES
TOTAL INITIAL WATER	=	499.716	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
MEREDOSIA IL

STATION LATITUDE	=	39.83	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	109	
END OF GROWING SEASON (JULIAN DATE)	=	283	
EVAPORATIVE ZONE DEPTH	=	0.8	INCHES
AVERAGE ANNUAL WIND SPEED	=	9.40	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.70	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	67.70	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	72.80	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.57	1.86	3.19	3.83	4.47	3.76
3.51	2.93	3.64	3.34	2.02	1.95

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
27.50	32.50	41.70	54.80	64.10	72.90
77.60	76.00	68.40	57.10	43.50	32.90

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR COLUMBIA MISSOURI
AND STATION LATITUDE = 39.83 DEGREES

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.65	0.98	4.35	2.34	2.09	5.12
	1.99	2.71	2.91	5.84	0.59	3.18
RUNOFF	0.268	0.076	3.142	0.562	0.817	1.215
	0.076	0.413	1.655	4.155	0.135	2.372
EVAPOTRANSPIRATION	0.237	0.691	1.145	1.773	1.675	3.834
	1.966	2.312	1.253	1.680	0.453	0.559
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0004	0.0023	0.0009	0.0006	0.0007
	0.0001	0.0003	0.0004	0.0011	0.0003	0.0018
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0004	0.0021	0.0071	0.0039	0.0029	0.0032
	0.0007	0.0014	0.0017	0.0041	0.0013	0.0053
PERCOLATION/LEAKAGE THROUGH LAYER 6	54.4649	19.1717	12.2311	8.0304	6.2079	4.7599
	4.0537	3.4231	2.8656	2.5884	2.2323	2.0824

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.026	0.122	0.487	0.254	0.179	0.209
	0.031	0.079	0.104	0.259	0.081	0.364
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.080	0.211	0.299	0.225	0.208	0.197
	0.107	0.164	0.187	0.285	0.183	0.370
AVERAGE DAILY HEAD ON TOP OF LAYER 6	4.633	0.242	0.140	0.095	0.071	0.056
	0.046	0.039	0.034	0.029	0.026	0.024

STD. DEVIATION OF DAILY	22.615	0.047	0.019	0.009	0.005	0.003
HEAD ON TOP OF LAYER 6	0.002	0.002	0.001	0.001	0.001	0.001

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.75	4981177.000	100.00
RUNOFF	14.887	2264236.500	45.46
EVAPOTRANSPIRATION	17.579	2673680.250	53.68
DRAINAGE COLLECTED FROM LAYER 2	0.0089	1348.050	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.033986	5169.242	0.10
AVG. HEAD ON TOP OF LAYER 3	0.1828		
PERC./LEAKAGE THROUGH LAYER 6	122.111244	18572754.000	372.86
AVG. HEAD ON TOP OF LAYER 6	0.4529		
CHANGE IN WATER STORAGE	-121.836	-18530826.000	-372.02
SOIL WATER AT START OF YEAR	499.716	76005376.000	
SOIL WATER AT END OF YEAR	377.881	57474548.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-17.406	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.86	1.75	3.39	5.43	9.02	6.65
	3.39	1.19	0.84	5.12	1.57	0.67
RUNOFF	0.146	2.270	3.338	2.979	6.238	3.405
	1.386	0.404	0.179	4.267	0.565	0.319

RBCA1

EVAPOTRANSPIRATION	0.611	0.427	1.316	2.334	3.009	3.243
	1.703	1.084	0.350	1.151	0.628	0.490
LATERAL DRAINAGE COLLECTED	0.0007	0.0001	0.0005	0.0009	0.0012	0.0010
FROM LAYER 2	0.0005	0.0001	0.0016	0.0013	0.0007	0.0027
PERCOLATION/LEAKAGE THROUGH	0.0040	0.0024	0.0032	0.0042	0.0043	0.0035
LAYER 3	0.0020	0.0008	0.0047	0.0043	0.0028	0.0084
PERCOLATION/LEAKAGE THROUGH	1.8995	1.5731	1.6060	1.4391	1.3817	1.2485
LAYER 6	1.2092	1.1317	1.0323	1.0082	0.9299	0.9066

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.237	0.131	0.178	0.276	0.288	0.243
TOP OF LAYER 3	0.132	0.041	0.343	0.294	0.176	0.581
STD. DEVIATION OF DAILY	0.214	0.000	0.191	0.232	0.272	0.281
HEAD ON TOP OF LAYER 3	0.223	0.115	0.327	0.304	0.267	0.230
AVERAGE DAILY HEAD ON	0.022	0.020	0.018	0.017	0.016	0.015
TOP OF LAYER 6	0.014	0.013	0.012	0.011	0.011	0.010
STD. DEVIATION OF DAILY	0.001	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.88	6369823.000	100.00
RUNOFF	25.496	3877910.000	60.88
EVAPOTRANSPIRATION	16.345	2486056.250	39.03
DRAINAGE COLLECTED FROM LAYER 2	0.0114	1726.946	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.044646	6790.513	0.11
AVG. HEAD ON TOP OF LAYER 3	0.2433		
PERC./LEAKAGE THROUGH LAYER 6	15.365823	2337095.750	36.69
AVG. HEAD ON TOP OF LAYER 6	0.0149		
CHANGE IN WATER STORAGE	-15.339	-2332968.000	-36.63
SOIL WATER AT START OF YEAR	377.881	57474548.000	
SOIL WATER AT END OF YEAR	362.542	55141580.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.886	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.74	2.95	1.91	2.30	1.25	3.82
	8.48	0.95	5.48	2.08	2.67	1.16
RUNOFF	2.459	2.121	0.531	1.093	0.696	1.824
	4.299	0.054	3.751	0.637	1.542	0.260
EVAPOTRANSPIRATION	0.096	0.889	1.304	1.204	0.768	2.022
	4.004	1.227	1.642	1.371	1.250	0.372
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0021	0.0009	0.0008	0.0010	0.0007
	0.0011	0.0001	0.0006	0.0008	0.0017	0.0003
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0070	0.0036	0.0029	0.0031	0.0036
	0.0041	0.0006	0.0025	0.0036	0.0055	0.0023
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.8677	0.7468	0.7898	0.7322	0.7255	0.6688
	0.6678	0.6424	0.5990	0.5954	0.5543	0.5595

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.138	0.530	0.235	0.204	0.212	0.223
	0.259	0.030	0.162	0.227	0.377	0.134
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.030	0.237	0.258	0.253	0.320	0.194
	0.247	0.078	0.231	0.238	0.310	0.152
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.010	0.009	0.009	0.009	0.008	0.008
	0.008	0.007	0.007	0.007	0.007	0.006
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 3

RBCA1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	35.79	5443552.000	100.00
RUNOFF	19.266	2930366.500	53.83
EVAPOTRANSPIRATION	16.149	2456188.000	45.12
DRAINAGE COLLECTED FROM LAYER 2	0.0102	1553.305	0.03
PERC./LEAKAGE THROUGH LAYER 3	0.041437	6302.389	0.12
AVG. HEAD ON TOP OF LAYER 3	0.2274		
PERC./LEAKAGE THROUGH LAYER 6	8.149208	1239470.120	22.77
AVG. HEAD ON TOP OF LAYER 6	0.0079		
CHANGE IN WATER STORAGE	-7.785	-1184027.870	-21.75
SOIL WATER AT START OF YEAR	362.542	55141580.000	
SOIL WATER AT END OF YEAR	354.618	53936332.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.140	21218.414	0.39
ANNUAL WATER BUDGET BALANCE	0.0000	2.176	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.80	2.25	2.37	2.92	4.89	4.29
	2.02	4.10	3.72	1.07	2.94	2.40
RUNOFF	0.586	1.541	1.387	1.382	1.789	1.468
	0.137	1.452	1.793	0.022	1.683	1.930
EVAPOTRANSPIRATION	0.353	0.761	1.322	1.149	3.297	3.003
	1.881	2.388	1.942	0.917	1.206	0.461
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0015	0.0019	0.0006	0.0013	0.0006
	0.0002	0.0007	0.0010	0.0004	0.0020	0.0023
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0056	0.0062	0.0024	0.0051	0.0027
	0.0012	0.0025	0.0038	0.0022	0.0068	0.0074
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.5398	0.4892	0.5039	0.4772	0.4789	0.4493
	0.4517	0.4385	0.4116	0.4133	0.3914	0.3909

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.131 0.064	0.392 0.163	0.424 0.257	0.153 0.141	0.329 0.477	0.160 0.498
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.001 0.145	0.254 0.231	0.274 0.237	0.241 0.168	0.239 0.217	0.205 0.303
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.006 0.005	0.006 0.005	0.006 0.005	0.006 0.005	0.005 0.005	0.005 0.004
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	33.77	5136316.500	100.00
RUNOFF	15.170	2307287.750	44.92
EVAPOTRANSPIRATION	18.679	2840977.500	55.31
DRAINAGE COLLECTED FROM LAYER 2	0.0124	1883.304	0.04
PERC./LEAKAGE THROUGH LAYER 3	0.048741	7413.380	0.14
AVG. HEAD ON TOP OF LAYER 3	0.2659		
PERC./LEAKAGE THROUGH LAYER 6	5.435782	826766.250	16.10
AVG. HEAD ON TOP OF LAYER 6	0.0052		
CHANGE IN WATER STORAGE	-5.527	-840596.500	-16.37
SOIL WATER AT START OF YEAR	354.618	53936332.000	
SOIL WATER AT END OF YEAR	349.231	53116956.000	
SNOW WATER AT START OF YEAR	0.140	21218.414	0.41
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.668	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.31	0.76	4.61	6.11	2.96	7.06
	0.87	1.98	3.38	2.79	3.89	2.30
RUNOFF	0.116	0.531	2.830	3.019	0.715	4.162
	0.103	0.369	1.915	1.795	2.559	0.983
EVAPOTRANSPIRATION	0.194	0.281	1.802	3.116	2.530	2.893
	0.767	1.562	1.247	1.254	1.317	0.911
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.0001	0.0001	0.0016	0.0015	0.0009	0.0011
	0.0001	0.0003	0.0006	0.0008	0.0017	0.0007
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0027	0.0025	0.0054	0.0056	0.0036	0.0040
	0.0006	0.0014	0.0023	0.0029	0.0056	0.0030
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.3862	0.3427	0.3694	0.3482	0.3489	0.3338
	0.3365	0.3309	0.3111	0.3122	0.2973	0.2996

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	0.131	0.143	0.364	0.385	0.230	0.267
	0.037	0.081	0.160	0.189	0.390	0.187
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.001	0.082	0.272	0.240	0.259	0.266
	0.108	0.155	0.236	0.259	0.290	0.240
AVERAGE DAILY HEAD ON TOP OF LAYER 6	0.004	0.004	0.004	0.004	0.004	0.004
	0.004	0.004	0.004	0.004	0.003	0.003
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.02	5630630.500	100.00
RUNOFF	19.098	2904761.000	51.59
EVAPOTRANSPIRATION	17.872	2718264.500	48.28
DRAINAGE COLLECTED FROM LAYER 2	0.0095	1444.178	0.03

PERC./LEAKAGE THROUGH LAYER 3	0.039613	6025.084	0.11
AVG. HEAD ON TOP OF LAYER 3	0.2135		
PERC./LEAKAGE THROUGH LAYER 6	4.016714	610930.187	10.85
AVG. HEAD ON TOP OF LAYER 6	0.0039		
CHANGE IN WATER STORAGE	-3.976	-604767.562	-10.74
SOIL WATER AT START OF YEAR	349.231	53116956.000	
SOIL WATER AT END OF YEAR	345.255	52512188.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.523	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.47	1.74	3.33	3.82	4.04	5.39
	3.35	2.19	3.27	3.38	2.33	1.94
STD. DEVIATIONS	1.23	0.90	1.19	1.81	3.09	1.43
	3.00	1.27	1.67	2.03	1.28	1.01
RUNOFF						
TOTALS	0.715	1.308	2.246	1.807	2.051	2.415
	1.200	0.538	1.859	2.175	1.297	1.173
STD. DEVIATIONS	0.993	0.970	1.227	1.127	2.384	1.296
	1.819	0.532	1.270	1.965	0.960	0.950
EVAPOTRANSPIRATION						
TOTALS	0.298	0.610	1.378	1.915	2.256	2.999
	2.064	1.714	1.287	1.275	0.971	0.559
STD. DEVIATIONS	0.198	0.250	0.248	0.826	1.034	0.656
	1.185	0.606	0.599	0.282	0.399	0.208
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.0002	0.0008	0.0014	0.0010	0.0010	0.0008
	0.0004	0.0003	0.0008	0.0009	0.0013	0.0016

STD. DEVIATIONS	0.0003	0.0009	0.0007	0.0004	0.0003	0.0002
	0.0004	0.0002	0.0005	0.0003	0.0007	0.0010
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0025	0.0039	0.0051	0.0038	0.0038	0.0034
	0.0017	0.0013	0.0030	0.0034	0.0044	0.0053
STD. DEVIATIONS	0.0013	0.0022	0.0017	0.0012	0.0009	0.0005
	0.0014	0.0008	0.0012	0.0009	0.0023	0.0027
PERCOLATION/LEAKAGE THROUGH LAYER 6						
TOTALS	11.6316	4.4647	3.1000	2.2054	1.8286	1.4921
	1.3438	1.1933	1.0439	0.9835	0.8810	0.8478
STD. DEVIATIONS	23.9518	8.2352	5.1269	3.2834	2.4802	1.8604
	1.5515	1.2838	1.0552	0.9358	0.7930	0.7280

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3						
AVERAGES	0.1323	0.2634	0.3375	0.2543	0.2476	0.2203
	0.1045	0.0789	0.2051	0.2219	0.3002	0.3528
STD. DEVIATIONS	0.0747	0.1867	0.1292	0.0871	0.0603	0.0400
	0.0953	0.0524	0.0948	0.0599	0.1649	0.1927
DAILY AVERAGE HEAD ON TOP OF LAYER 6						
AVERAGES	0.9350	0.0564	0.0354	0.0260	0.0208	0.0176
	0.0153	0.0136	0.0123	0.0112	0.0104	0.0097
STD. DEVIATIONS	2.0672	0.1042	0.0585	0.0387	0.0283	0.0219
	0.0177	0.0146	0.0124	0.0107	0.0093	0.0083

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	36.24	(3.567)	5512299.0	100.00
RUNOFF	18.783	(4.2906)	2856912.50	51.828
EVAPOTRANSPIRATION	17.325	(1.0653)	2635033.25	47.803
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.01046	(0.00142)	1591.157	0.02887
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.04168	(0.00553)	6340.122	0.11502

AVERAGE HEAD ON TOP OF LAYER 3	0.227 (0.031)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	31.01575 (51.11133)	4717403.000	85.57959
AVERAGE HEAD ON TOP OF LAYER 6	0.097 (0.199)		
CHANGE IN WATER STORAGE	-30.892 (51.0256)	-4698637.00	-85.239

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.59	393931.219
RUNOFF	2.144	326045.4060
DRAINAGE COLLECTED FROM LAYER 2	0.00013	20.29407
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000370	56.22432
AVERAGE HEAD ON TOP OF LAYER 3	0.800	
MAXIMUM HEAD ON TOP OF LAYER 3	1.569	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	13.3 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	7.397256	1125100.62000
AVERAGE HEAD ON TOP OF LAYER 6	126.484	
SNOW WATER	2.25	342081.3750

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5253
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0148

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	0.2646	0.4411
2	0.1556	0.7778
3	0.0000	0.0000
4	51.6723	0.2153
5	66.1214	0.2505
6	227.0400	0.4730
SNOW WATER	0.000	

APPENDIX E

MODFLOW AND MT3DMS MODEL DATA

MODFLOW was developed by the United States Geological Survey (USGS) to solve three-dimensional transient head distributions using finite difference approximations. The user can input soil properties, multiple layers, heterogeneities, variable thicknesses, variable gradients, flow boundaries, wells, and can define confined or unconfined flow systems. Major assumptions of the program include that groundwater is governed by Darcy's law; the formation behaves as a continuous porous medium; flow is not affected by chemical, temperature, or density gradients; and hydraulic properties are constant within a grid cell.

MT3DMS calculates concentration distributions for a single chemical as a function of time and location using a finite difference solution. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. MT3DMS accounts for advection, diffusion, dispersion, sorption, and first order decay. Major assumptions of the module include changes in the concentration field do not affect the flow field; concentrations of solutes do not interact with each other; chemical and hydraulic properties are constant within a cell; sorption is instantaneous and fully reversible; and decay is not reversible.

The current configuration was calibrated to groundwater elevation data collected between 2009 and 2015 in the MODFLOW program and the boron and arsenic concentration data was used to calibrate the MT3DMS module. The prediction scenario includes the clean closure and capping of the two ash ponds.

Model Setup

A two layer grid with twelve objects was established with 100-foot grid spacing parallel and perpendicular to the primary flow direction. The grid size was decreased to a 50-foot grid in the vicinity of the ash ponds. Areas adjacent to the flow and transport boundaries, soil properties, and river stage fluctuations were the same for the calibration and prediction scenarios. The upgradient (east) edge of the model was a general head boundary to allow for flow reversals due to the Illinois River fluctuations. The bottom of the aquifer (estimated), north boundary, and south boundary was modeled as no-flow boundaries. The downgradient boundary was a river object to model the Illinois River. The top boundary (land surface) was a specified flux boundary condition to model rainfall infiltration and seepage through the ash ponds.

Simplifying assumptions were made for this model.

- indicator chemicals instantaneously dissolve into water;
- leachate instantaneously migrates to the groundwater;
- leachate concentrations remain constant over time and the source is not depleted;
- the Illinois River has a consistent annual pattern; and
- the cap has an instantaneous effect on the percolation rate.

MODFLOW and MT3DMS Input Values

Layers

The top layer included the two ash pond objects and the topographic surface. This layer was between 2 and 42 feet thick depending on the location of the layer. The bottom layer represented the unconfined sand aquifer and was 50 feet thick.

Soil Parameters

Soil parameters were estimated using published values for the units as observed during drilling activities, from laboratory testing results, or defaults provided within the MODFLOW and MT3DMS program. Soil parameters were refined during model calibration using observed data.

Recharge

Water recharge rates were modeled using results from the HELP model for the proposed closure configuration. Rainfall and infiltration rates were applied across the site using average annual rainfall data from the City of Meredosia.

River Parameters

The Illinois River was represented by a head-dependent flux that required inputs for river stage, width, bed thickness, and bed hydraulic conductivity. River stage data was obtained from the river gauge located adjacent to the site (National Weather Service http://water.weather.gov/) from years 2009 to 2015. River stages were split into high stage (March to July) and low stage (August to February) for each year.

Source Concentration

The source concentration of boron and arsenic in the Fly Ash and Bottom Ash Ponds was based on calibration results at the end of 25 years. The Fly Ash Pond boron concentration was modeled as a constant source of 25 mg/L. The Bottom Ash Pond boron concentration was modeled as a constant source of 3 mg/L. Boron and other contaminants dissolve more slowly into water from bottom ash instead of fly ash due to the higher temperatures that form bottom ash stabilizing the chemicals as solids (Cox 1978; Leaching of Boron from Coal Ash). Both the Fly Ash Pond and the Bottom Ash Pond arsenic concentrations were modelled as a constant source of 0.3 mg/L (Want, T. et al. 2005; The Leaching Behavior of Arsenic from Fly Ash). An arsenic concentration leached from bottom ash was not found, therefore, the arsenic concentration in fly ash was used for bottom ash as a conservative value. Retardation and decay were not used to be conservative.

Model Results

Boron and arsenic concentrations for the current configuration were modeled for 25 years to represent a scenario where the ash ponds were not closed. After 25 years, monitoring well APW-3 (the well with historically highest concentrations) stabilized at 16.9 mg/L of boron and 0.208 mg/L of arsenic, which exceed the respective Class I Groundwater standards. As shown in the tables below, APW-2, APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards for boron and arsenic at 25 years with no action.

Boron Concentration in Groundwater for the No Action Scenario at 25 Years

Well	Boron (mg/l)
APW-1	0.010
APW-2	10.2
APW-3	16.9
APW-4	0.330
APW-5	0.002
APW-6	7.60
APW-7	8.89
APW-8	12.9
APW-9	0.261

Yellow highlighting indicates a prediction exceeding the Class I Groundwater standard of 2 mg/l.

Arsenic Concentration in Groundwater for the No Action Scenario at 25 Years

Well	Arsenic (mg/l)
APW-1	0.0000689
APW-2	0.181
APW-3	0.208
APW-4	0.00144
APW-5	0.0000943
APW-6	0.0586
APW-7	0.0272
APW-8	0.169
APW-9	0.00413

Yellow highlighting indicates a prediction exceeding the Class I Groundwater standard of 0.010 mg/l.

Within three years after dewatering and complete closure of the two ash ponds on site, modeling results indicate that boron will be below the Class I Groundwater standards at each well on the site. Boron concentrations at each of the monitoring wells after three years are shown in the table below.

Boron Concentration in Groundwater for the Ash Pond Closure Scenario at at 3 years after Closure and Dewatering

Well	Boron (mg/l)
APW-1	0.056
APW-2	0.124
APW-3	0.955
APW-4	0.011
APW-5	0.033
APW-6	0.067
APW-7	0.030
APW-8	1.17
APW-9	0.014

Within six years after dewatering and complete closure of the two ash ponds on site, modeling results indicate that arsenic will be below the Class I Groundwater standards at each well on the site. Arsenic and boron concentrations at each of the monitoring wells after six years are shown in the tables below.

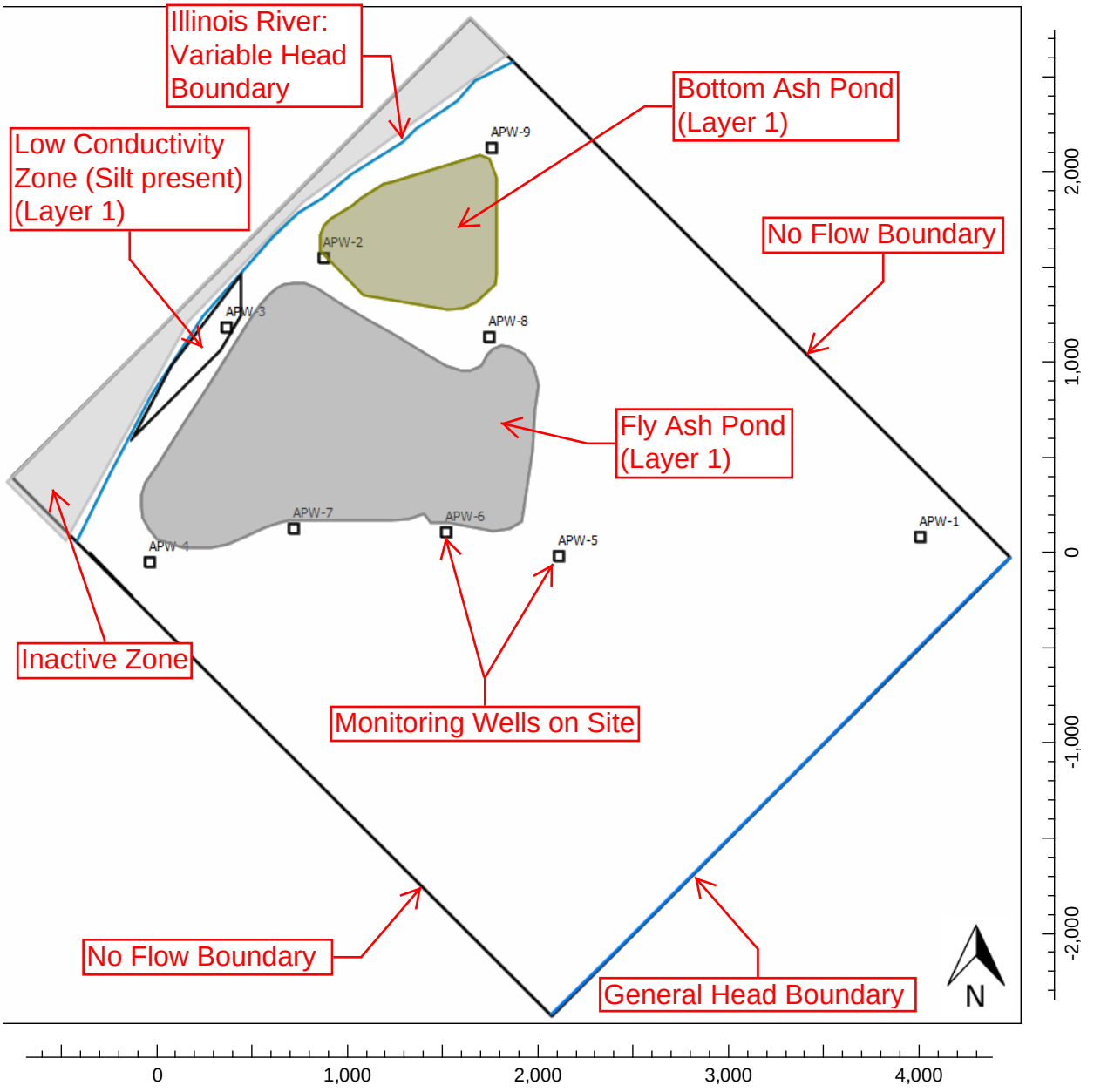
Arsenic Concentration in Groundwater for the Ash Pond Closure Scenario at at 6 years after Closure and Dewatering

Well	Arsenic (mg/l)
APW-1	0.000165
APW-2	0.0000830
APW-3	0.00924
APW-4	0.0000664
APW-5	0.0000929
APW-6	0.000154
APW-7	0.000262
APW-8	0.0000971
APW-9	0.0000572

Boron Concentration in Groundwater for the Ash Pond Closure Scenario at at 6 years after Closure and Dewatering

Well	Boron (mg/l)
APW-1	0.024
APW-2	0.182
APW-3	0.091
APW-4	0.014
APW-5	0.029
APW-6	0.063
APW-7	0.014
APW-8	0.88
APW-9	0.038

MODEL OBJECTS - NO ACTION SCENARIO
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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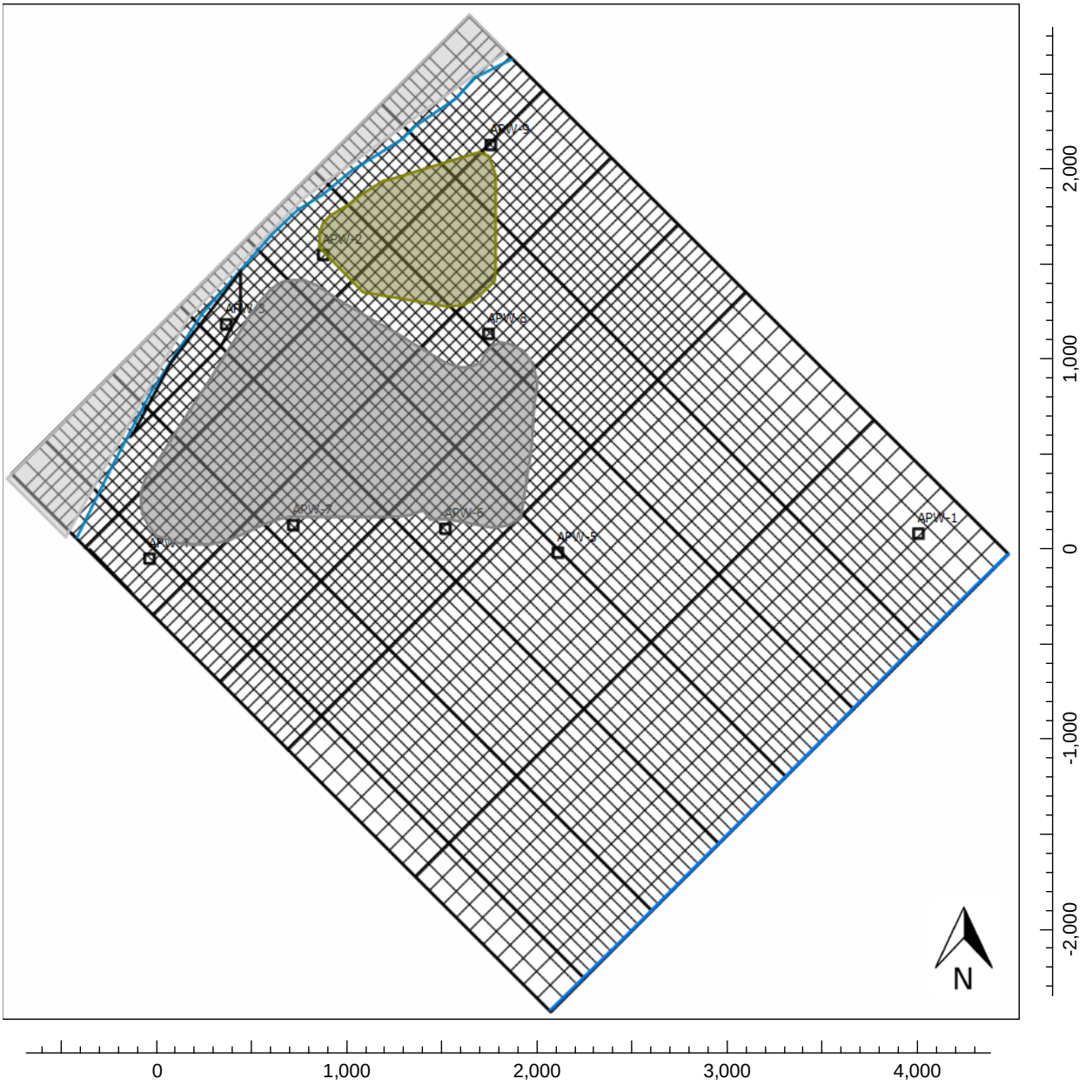
GRID LAYOUT - NO ACTION SCENARIO
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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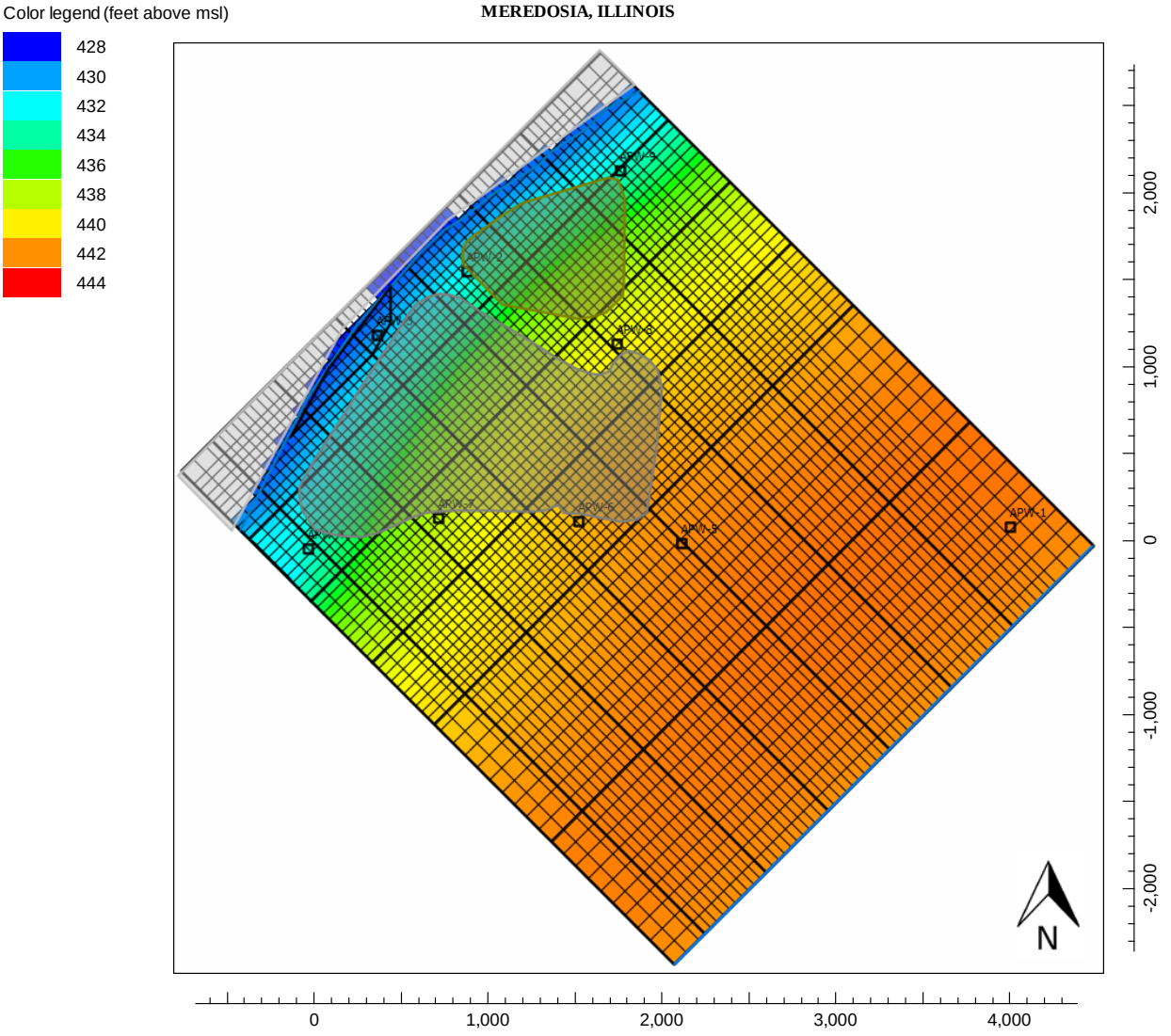
POTENTIOMETRIC HEAD AT 25 YEARS - NO ACTION SCENARIO
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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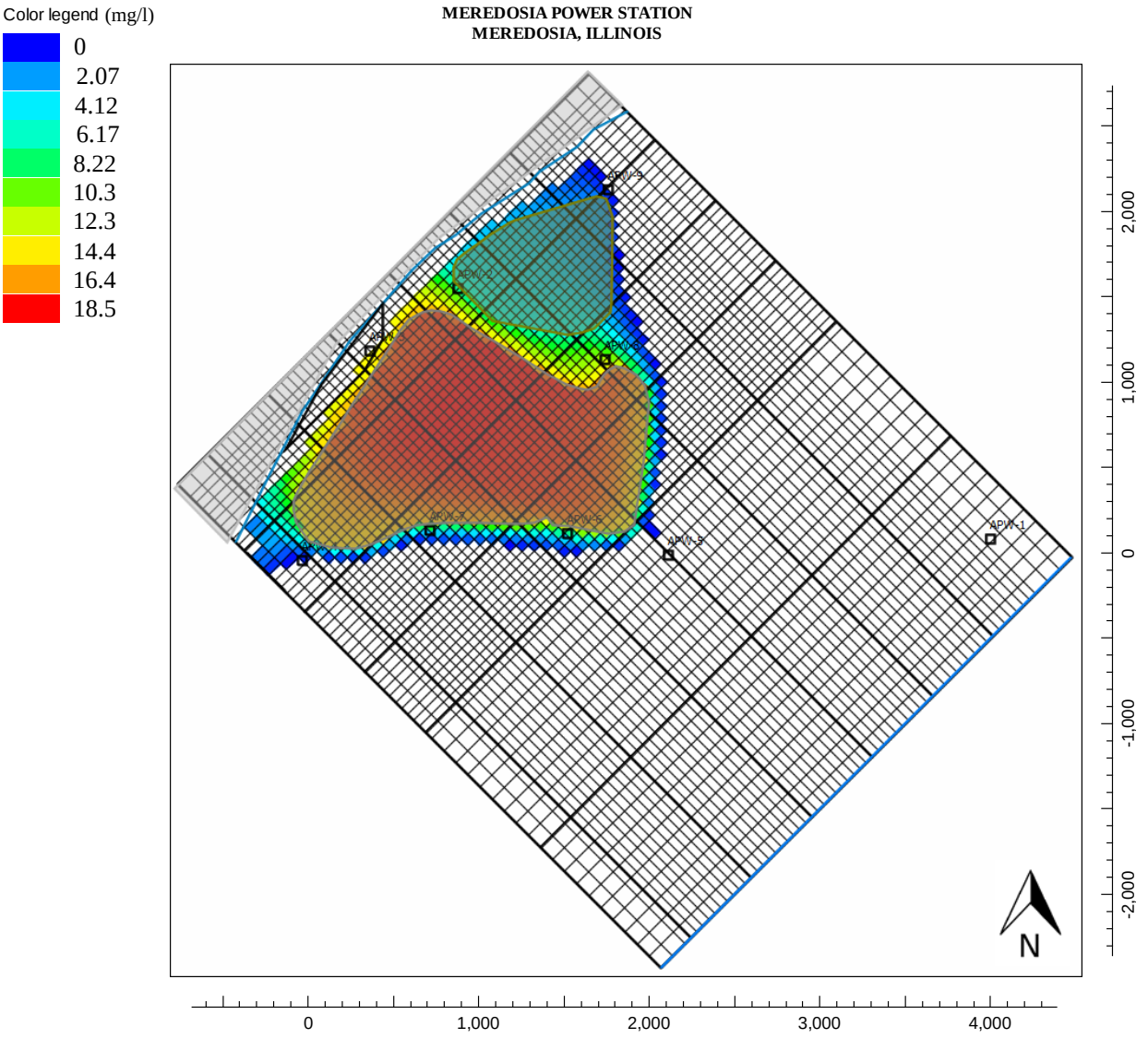
BORON CONCENTRATION IN GROUNDWATER AT 25 YEARS
NO ACTION SCENARIO - LAYER 1
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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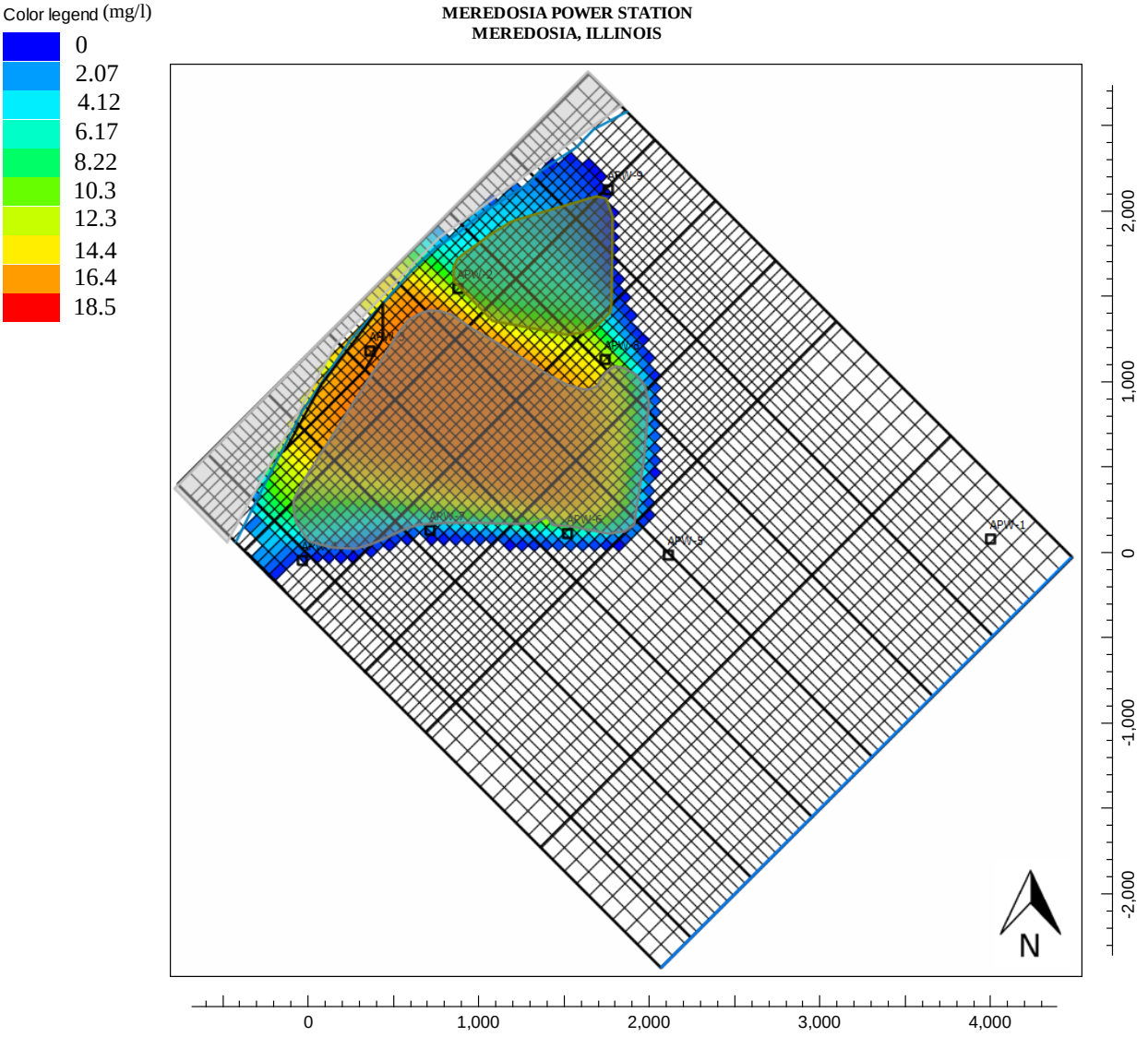
BORON CONCENTRATION IN GROUNDWATER AT 25 YEARS
NO ACTION SCENARIO - LAYER 2
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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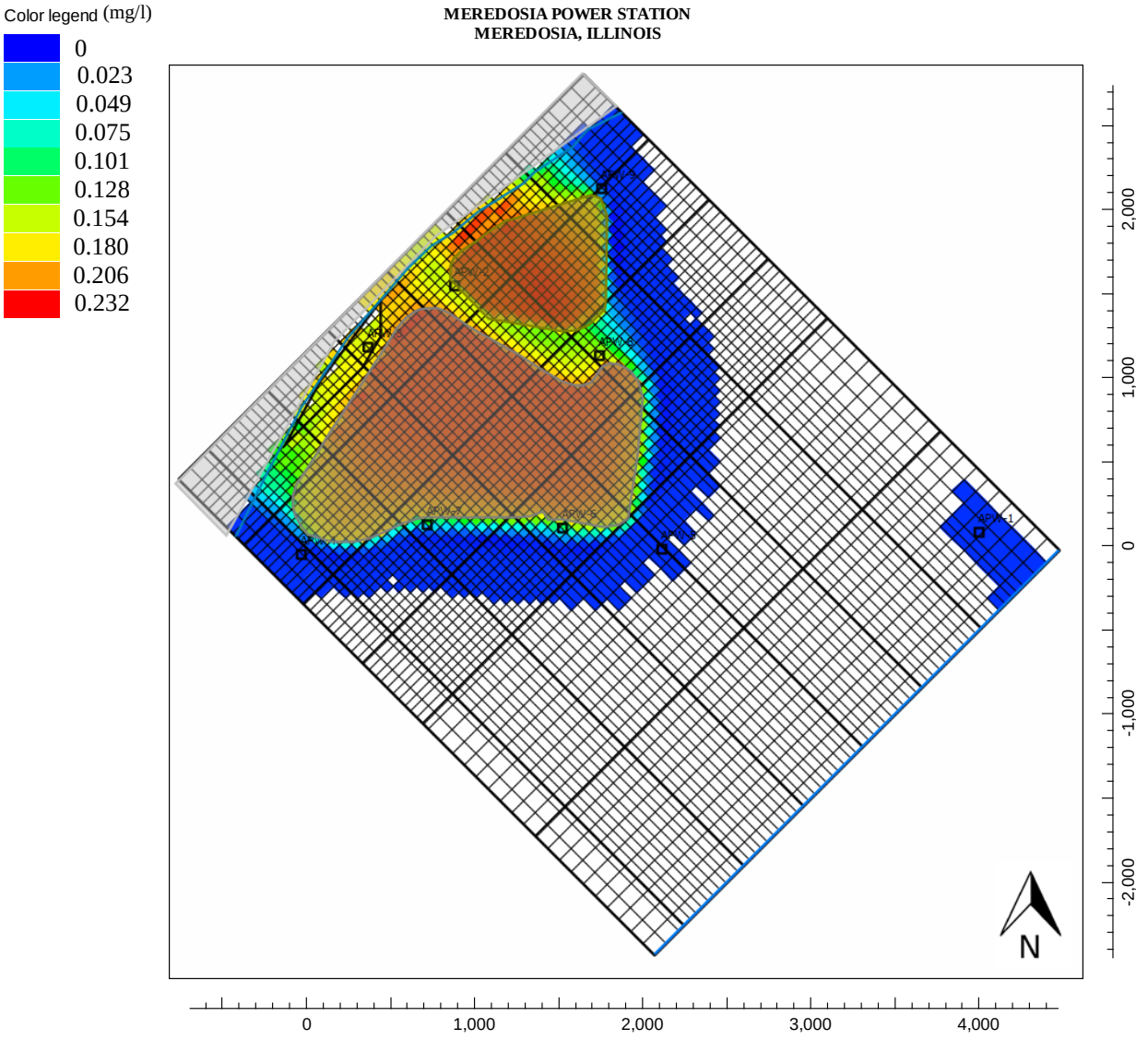
ARSENIC CONCENTRATION IN GROUNDWATER AT 25 YEARS
NO ACTION SCENARIO - LAYER 1
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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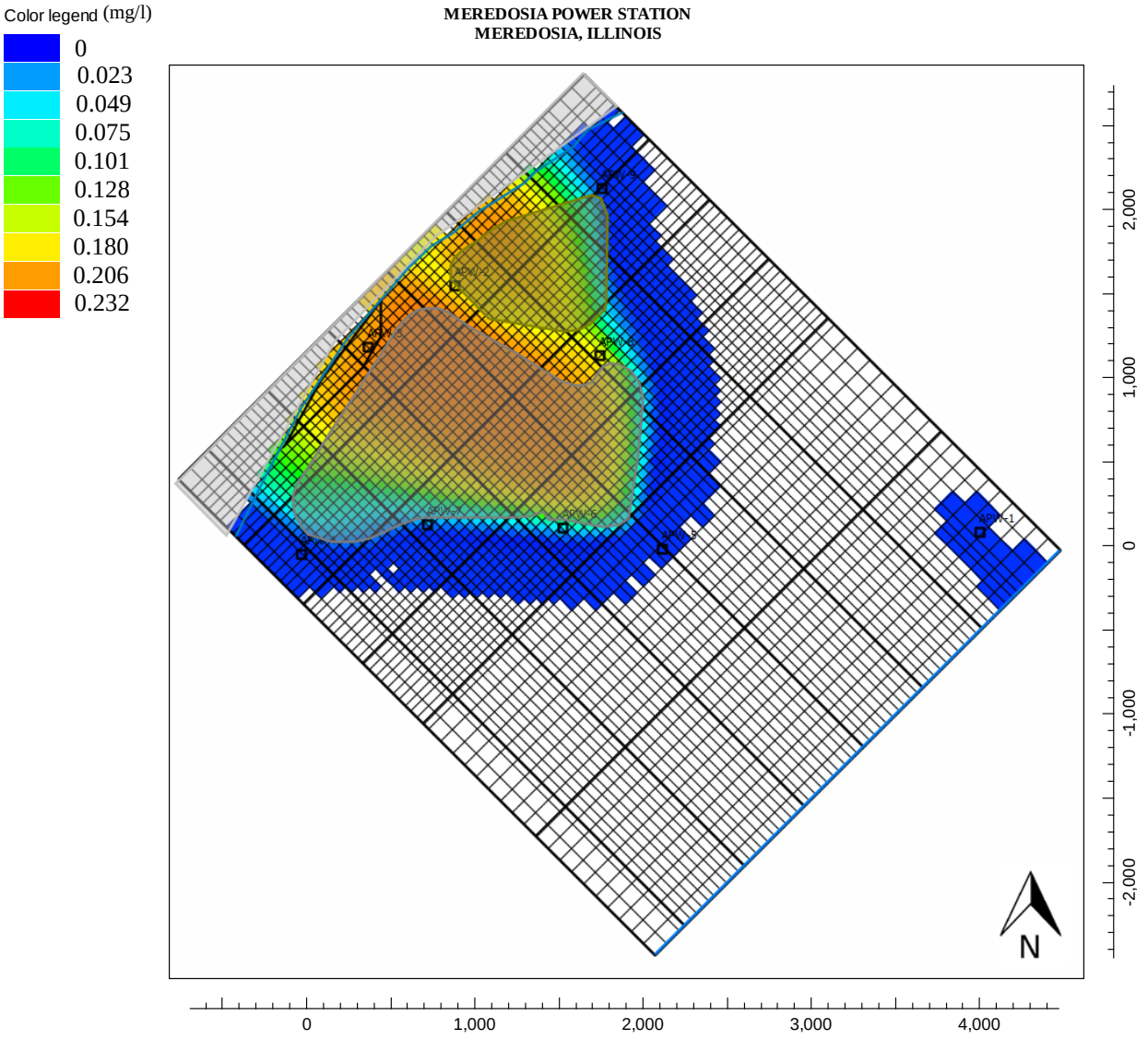
ARSENIC CONCENTRATION IN GROUNDWATER AT 25 YEARS
NO ACTION SCENARIO - LAYER 2
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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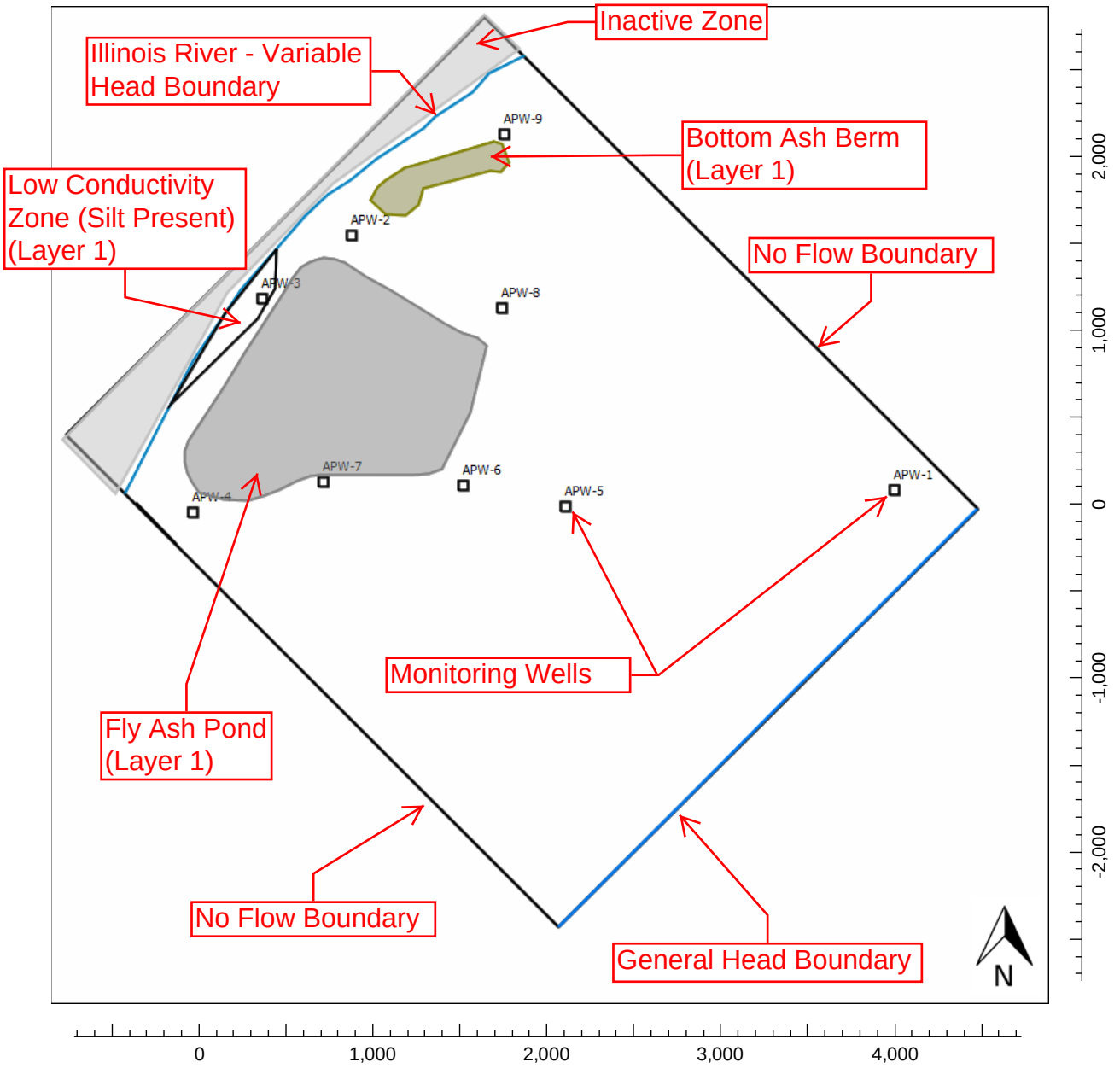
MODEL OBJECTS - ASH POND CLOSURE SCENARIO
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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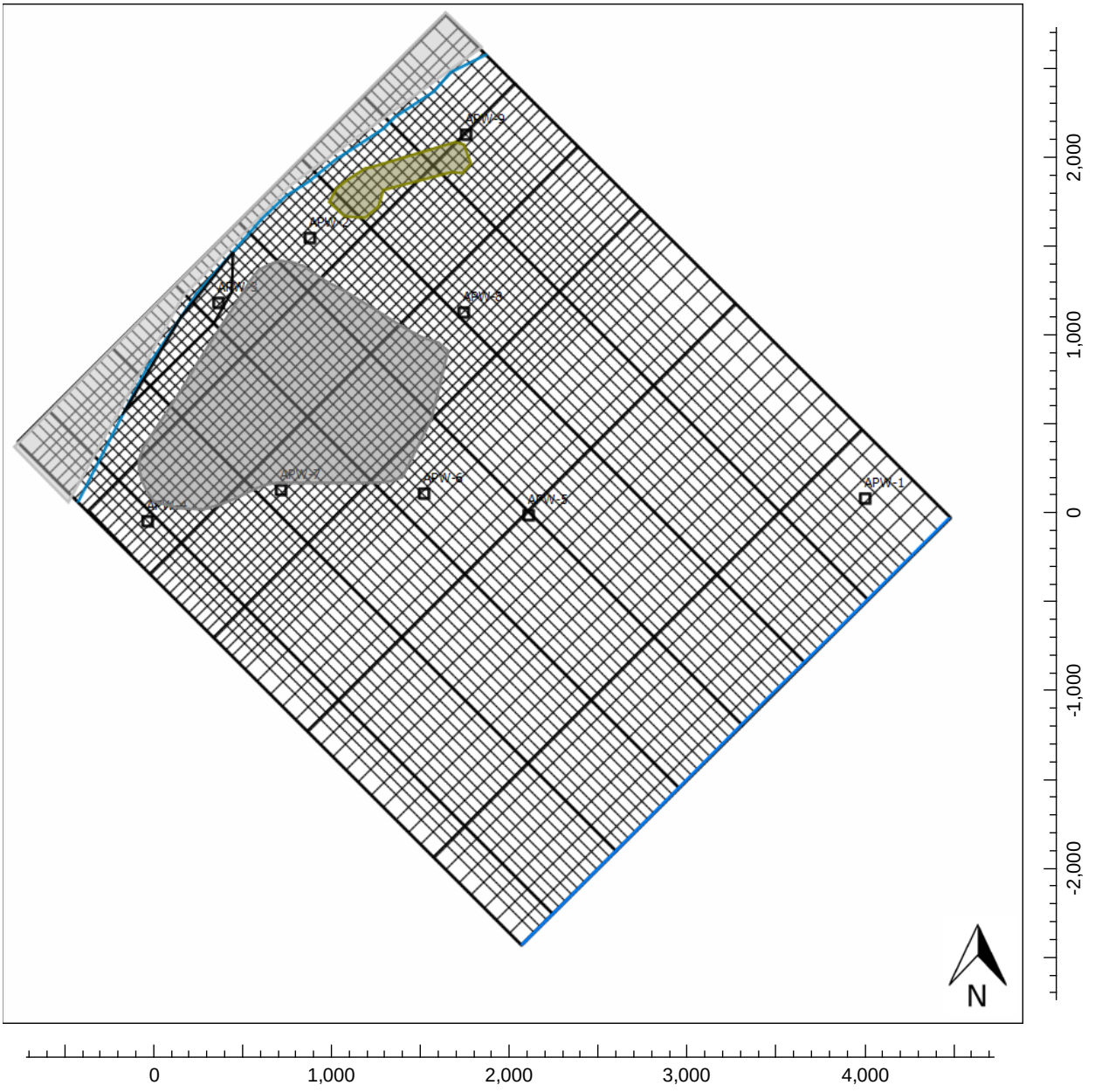
GRID LAYOUT - ASH POND CLOSURE SCENARIO
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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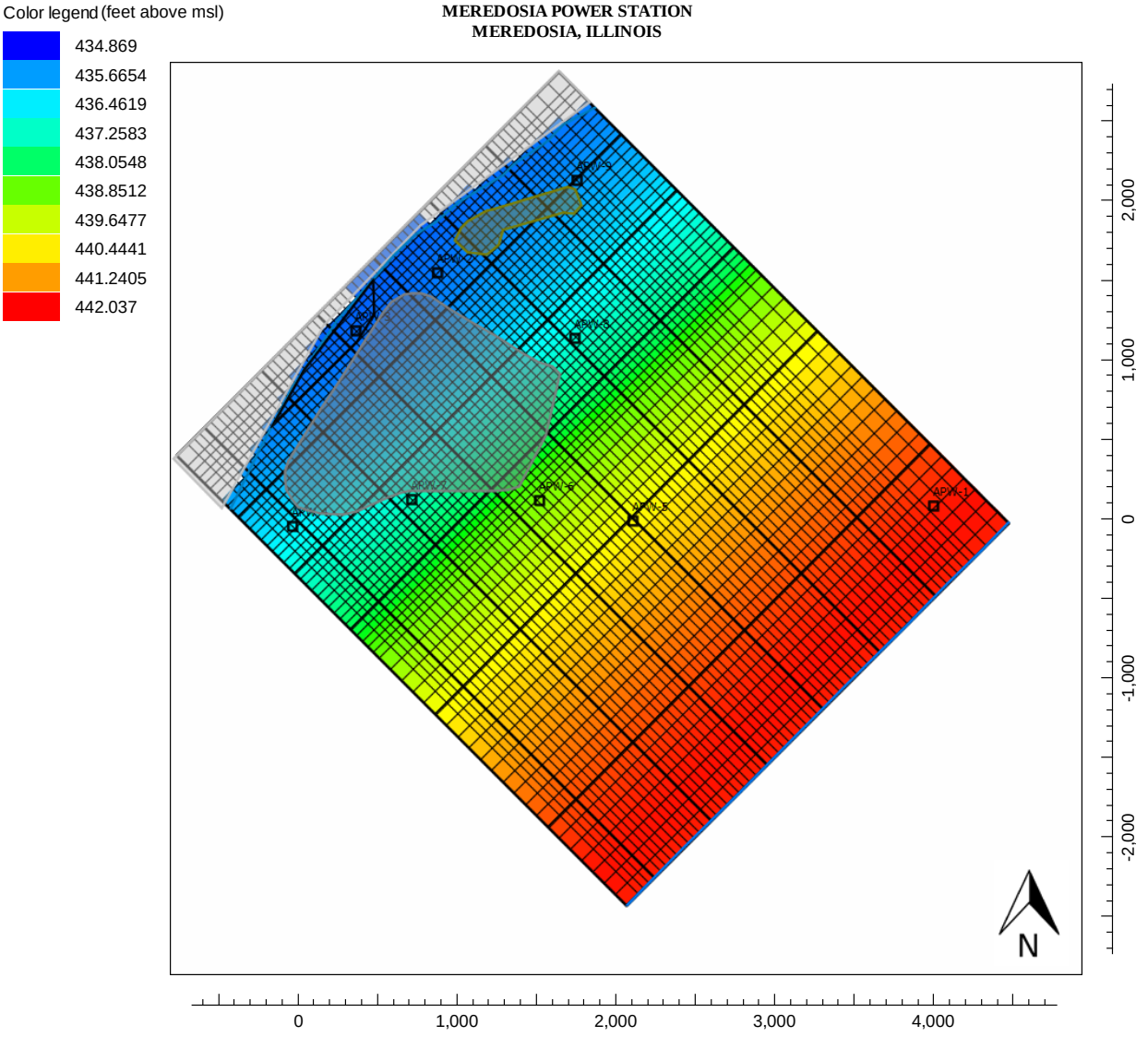
POTENTIOMETRIC HEAD - ASH POND CLOSURE SCENARIO
3 YEARS AFTER CLOSURE AND DEWATERING
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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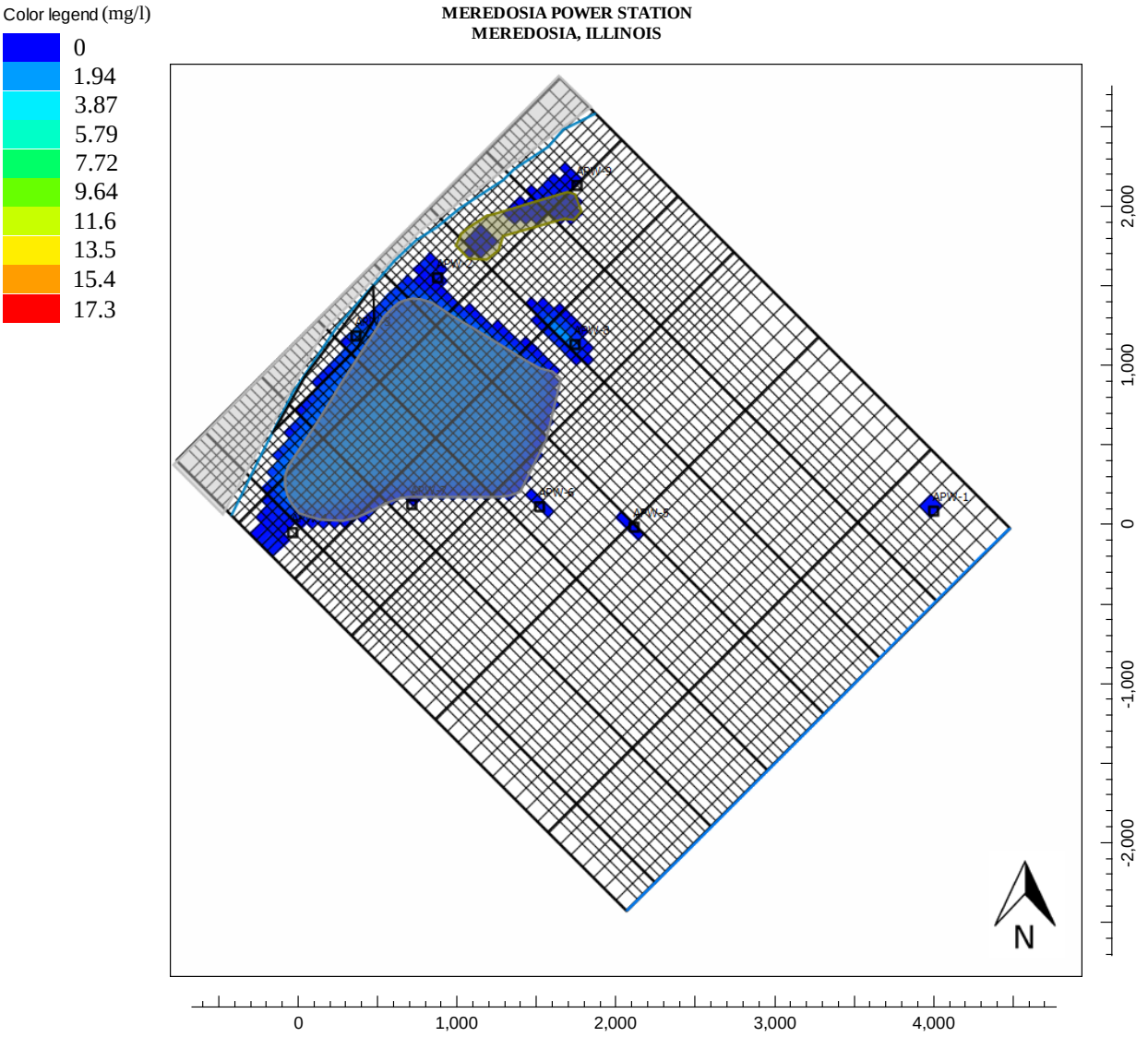
BORON CONCENTRATION IN GROUNDWATER - ASH POND CLOSURE SCENARIO
3 YEARS AFTER CLOSURE AND DEWATERING - LAYER 1
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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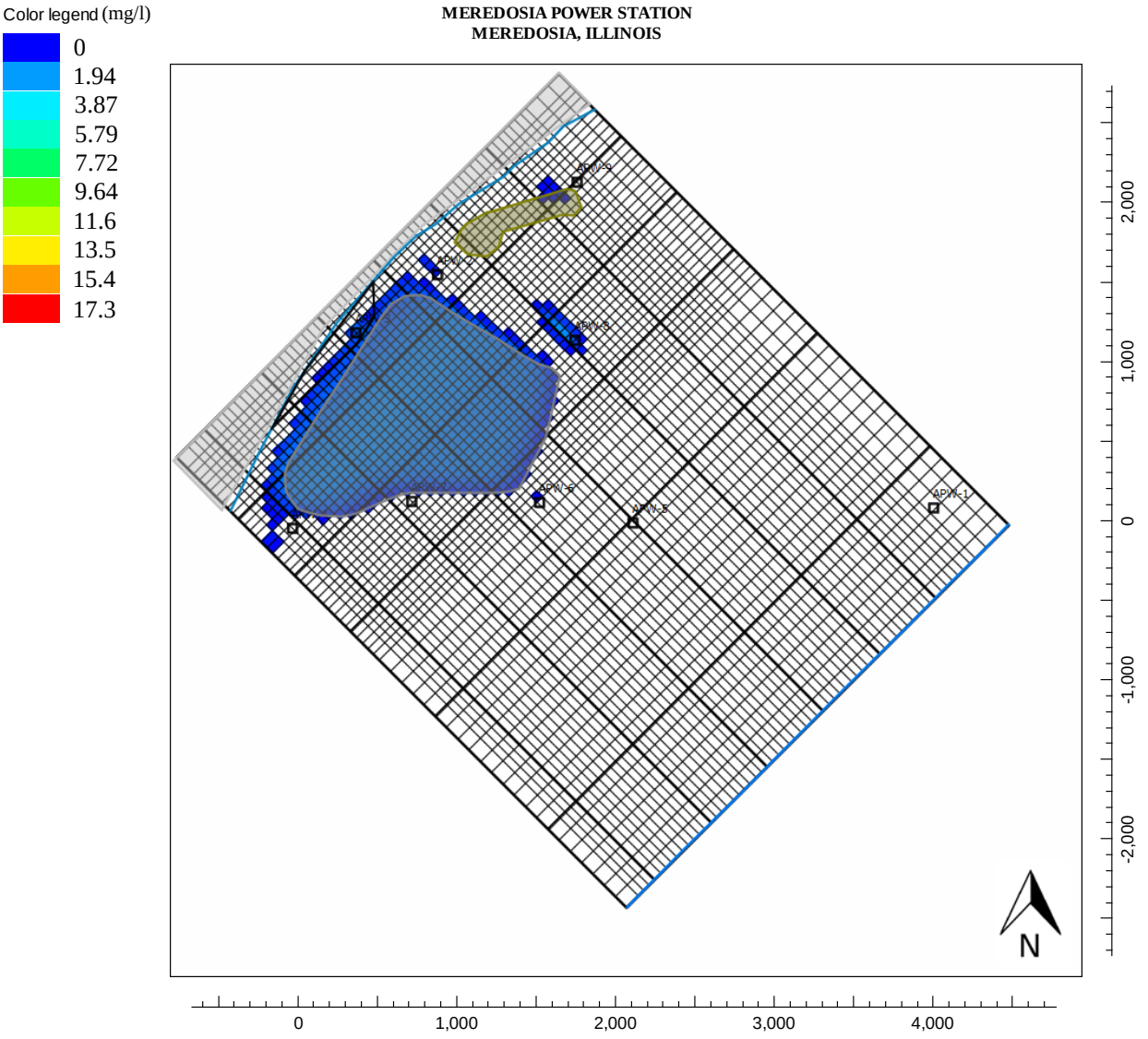
BORON CONCENTRATION IN GROUNDWATER - ASH POND CLOSURE SCENARIO
3 YEARS AFTER CLOSURE AND DEWATERING - LAYER 2
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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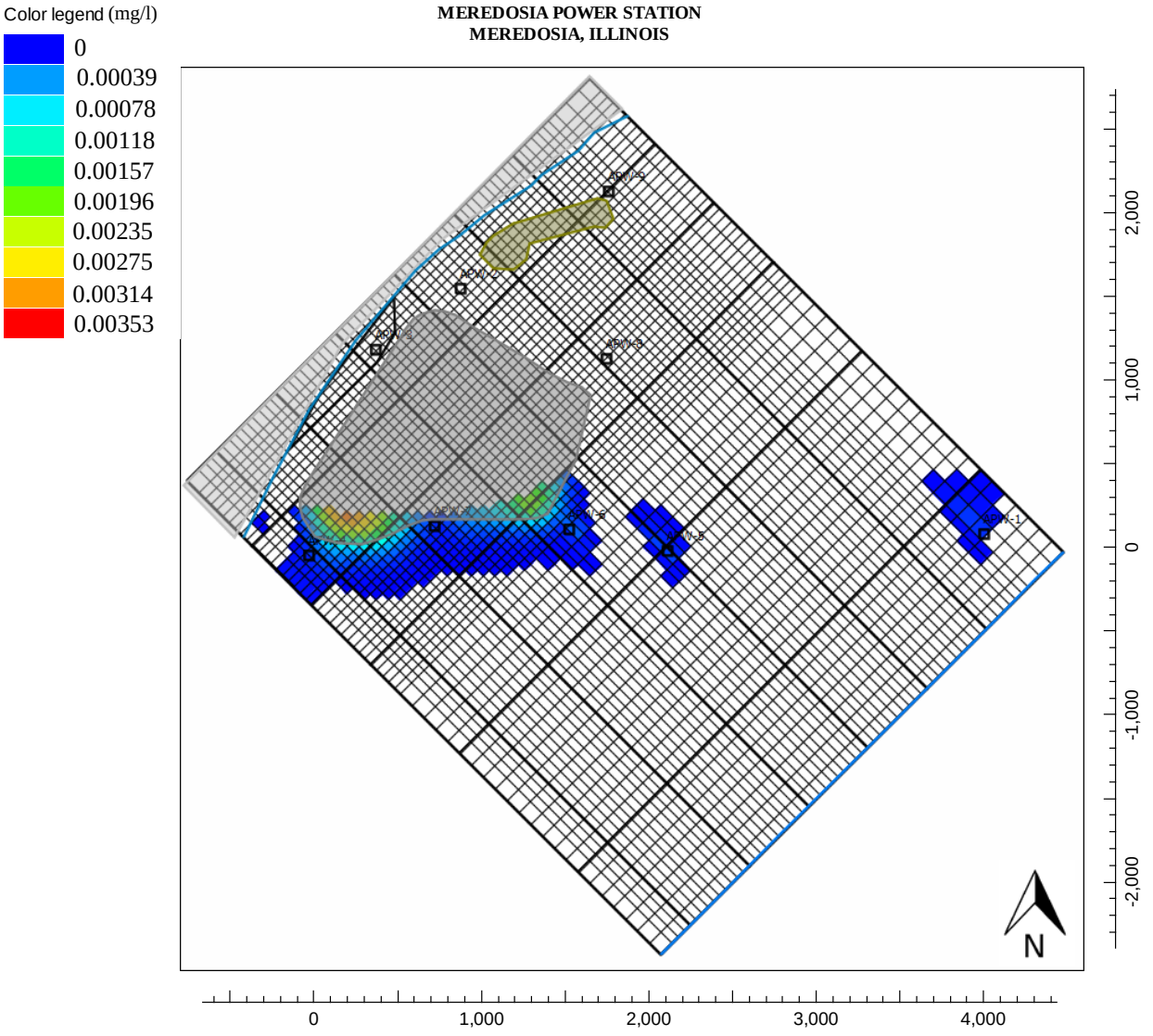
ARSENIC CONCENTRATION IN GROUNDWATER - ASH POND CLOSURE SCENARIO
6 YEARS AFTER CLOSURE AND DEWATERING - LAYER 1
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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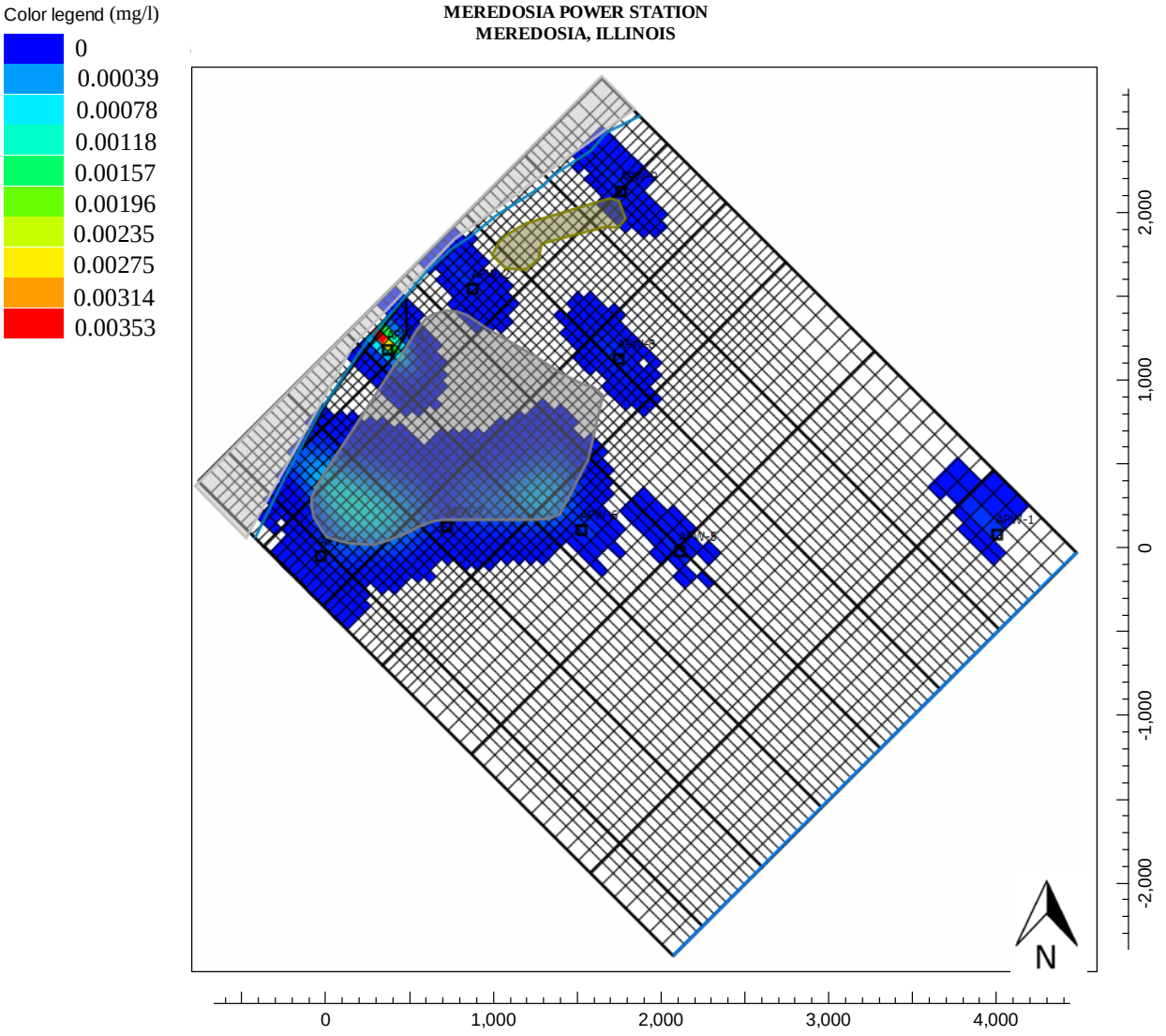
ARSENIC CONCENTRATION IN GROUNDWATER - ASH POND CLOSURE SCENARIO
6 YEARS AFTER CLOSURE AND DEWATERING - LAYER 2
MEREDOSIA POWER STATION
MEREDOSIA, ILLINOIS



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APPENDIX F

ILLINOIS RIVER LOADING DATA

Meredosia Power Plant
Boron Loading in the Illinois River

Boron Concentrations
Cmax=highest single concentration (mg/L)
Cavg=mean concentration of APWs-2, 3, 4, and 9 (closest to river) (mg/L)

Values from sampling events December 2010 through February 2016			Values from Modflow/MT3DMS Modelling		
Boron Cmax	46	mg/L	Boron $C_{3yr,max}$	1.17	mg/L
Boron Cavg	11.87	mg/L	Boron $C_{3yr,avg}$	0.276	mg/L

Groundwater Flow
Q=K*I*A
Q=groundwater discharge volume into river (gpd)
K=hydraulic conductivity, from value in NRT report (gpd/ft^2)
Imax=maximum observed hydraulic gradient (ft/ft)
Iavg=mean hydraulic gradient (ft/ft)
A=cross section of aquifer, 52 feet thick x 2000 feet long (ft^2)

K	1200	gpd/ft^2
Imax	0.00625	ft/ft
Iavg	0.00377	ft/ft
A	104,000	ft^2
Qmax	780,000	gpd
Qavg	470,496	gpd

Boron Mass Loading Rate
L=Q*C
L = Boron Loading (gpd*mg/L)

Lmax	35,880,000	gpd*mg/L	Lmax,3yr	912,600	gpd*mg/L
Lavg	5,584,788	gpd*mg/L	Lavg,3yr	129,857	gpd*mg/L

Illinois River Flow
Q7,10=7-day, 10 year low flow, from IL Water Survey 1988 (most recent calculated value)
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd
Qavg=average annual flow from 1936 to 1988, from USGS NWIS
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd

(1) Q7,10	2,390,904,625	gpd
(2) Qavg	13,818,782,542	gpd

Flow through Mixing Zone = 50 feet from shore, river is 750 feet wide = Q_{river}*50 ft/750 ft

(1)$Q7,10_{mix}$	159,393,642	gpd
(2)$Qavg_{mix}$	921,252,169	gpd

Boron Concentration Loading

Existing	Boron Loading max (1)	**0.225**	**mg/L**
	Boron Loading max (2)	**0.0389**	**mg/L**
	Boron Loading avg (1)	**0.0350**	**mg/L**
	Boron Loading avg (2)	**0.00606**	**mg/L**
3 Years Post Closure	Boron Loading max (1)	**0.00573**	**mg/L**
	Boron Loading max (2)	**0.000991**	**mg/L**
	Boron Loading avg (1)	**0.000815**	**mg/L**
	Boron Loading avg (2)	**0.000141**	**mg/L**

Public and Food Processing Water Supply Standard 1.0 mg/L

Boron loading is less than the Public and Food Processing Water Supply Standard for the calculated scenarios.

Meredosia Power Plant
Arsenic Loading in the Illinois River

Arsenic Concentrations
Cmax=highest single concentration (mg/L)
Cavg=mean concentration of APWs-2, 3, 4, and 9 (closest to river) (mg/L)

Values from sampling events December 2010 through February 2016			Values from Modflow/MT3DMS Modelling		
Arsenic Cmax	0.31	mg/L	Arsenic $C_{6yr,max}$	0.0092	mg/L
Arsenic Cavg	0.08	mg/L	Arsenic $C_{6yr,avg}$	0.002	mg/L

Groundwater Flow
Q=K*I*A
Q=groundwater discharge volume into river (gpd)
K=hydraulic conductivity, from value in NRT report (gpd/ft^2)
Imax=maximum observed hydraulic gradient (ft/ft)
Iavg=mean hydraulic gradient (ft/ft)
A=cross section of aquifer, 52 feet thick x 2000 feet long (ft^2)

K	1200	gpd/ft^2
Imax	0.00625	ft/ft
Iavg	0.00377	ft/ft
A	104,000	ft^2
Qmax	780,000	gpd
Qavg	470,496	gpd

Arsenic Mass Loading Rate
L=Q*C
L = Arsenic Loading (gpd*mg/L)

Lmax	241,800	gpd*mg/L	Lmax,3yr	7,176	gpd*mg/L
Lavg	37,640	gpd*mg/L	Lavg,3yr	941	gpd*mg/L

Illinois River Flow
Q7,10=7-day, 10 year low flow, from IL Water Survey 1988 (most recent calculated value)
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd
Qavg=average annual flow from 1936 to 1988, from USGS NWIS
converted from cfs to gpd with factor of 1cfs = 646190.4 gpd

(1) Q7,10	2,390,904,625	gpd
(2) Qavg	13,818,782,542	gpd

Flow through Mixing Zone = 50 feet from shore, river is 750 feet wide = Q_{river}*50 ft/750 ft

(1)$Q7,10_{mix}$	159,393,642	gpd
(2)$Qavg_{mix}$	921,252,169	gpd

Arsenic Concentration Loading

Existing	Arsenic Loading max (1)	**0.00152**	**mg/L**
	Arsenic Loading max (2)	**0.000262**	**mg/L**
	Arsenic Loading avg (1)	**0.000236**	**mg/L**
	Arsenic Loading avg (2)	**0.0000409**	**mg/L**
6 Years Post Closure	Arsenic Loading max,6yr (1)	**0.0000450**	**mg/L**
	Arsenic Loading max,6yr (2)	**0.00000779**	**mg/L**
	Arsenic Loading avg,6yr (1)	**0.00000590**	**mg/L**
	Arsenic Loading avg,6yr (2)	**0.00000102**	**mg/L**

Public and Food Processing Water Supply Standard 0.05 mg/L

Arsenic loading is less than the Public and Food Processing Water Supply Standard for the calculated scenarios.