Luminant

Dynegy Midwest Generation, LLC
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Collinsville, IL 62234

December 20, 2024

Illinois Environmental Protection Agency
DWPC – Permits MC#15
Attn: 35 I.A.C. § 845.650(e) Alternative Source Demonstration Submittal
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Baldwin Power Plant Bottom Ash Pond; IEPA ID # W1578510001-06

Dear Mr. LeCrone:

Dynegy Midwest Generation, LLC (DMG) is submitting this Alternative Source Demonstration (ASD) for potential exceedances observed from the Q3 2024 sampling event at the Bottom Ash Pond identified by Illinois Environmental Protection Agency (IEPA) ID No. W1578510001-06.

As originally conveyed to the agency in 2021, it has been DMG's position that an approved groundwater monitoring program is a prerequisite to detecting an exceedance, which is the trigger for an alternative source demonstration under Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.650(e). DMG submitted an operating permit application including a proposed groundwater monitoring program for the Bottom Ash Pond on October 25, 2021. The application is still under review by IEPA. However, IEPA has requested that DMG evaluate groundwater and implement a groundwater corrective action program prior to the issuance of a final operating permit.

While an actual exceedance cannot occur until IEPA issues an operating permit establishing a groundwater monitoring program (*see Section 845.650 and 845.120*), in response to IEPA's requests DMG evaluated the Q3 2024 groundwater samples for exceedances of the groundwater protection standards (GWPS) as described in Section 845.600 and is submitting this ASD for potential exceedances detected.

In accordance with 35 I.A.C. 845.650(e), this ASD is being submitted within 60 days from the date of determination of a potential exceedance and the ASD was placed on the facility's website within 24 hours of submittal to the agency.

One hard copy is provided with this submittal.

Sincerely,

Phil Morris, PE
Senior Director, Environmental

Enclosures
Alternate Source Demonstration, Quarter 3 2024, Bottom Ash Pond Baldwin Power Plant, Baldwin Illinois

ALTERNATIVE SOURCE DEMONSTRATION

Baldwin Power Plant Bottom Ash Pond
(Unit ID #601)
IEPA ID: W1578510001-06
35 IAC 845.650

Prepared for

Dynegy Midwest Generation, LLC
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Prepared by

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Project Number: GLP8068

December 19, 2024

Geosyntec
consultants

Alternative Source Demonstration

Baldwin Power Plant Bottom Ash Pond
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IEPA ID: W1578510001-06
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December 19, 2024

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ACRONYMS AND ABBREVIATIONS

%	percent
‰	per mille
ASD	alternative source demonstration
BAP	Bottom Ash Pond
bgs	below ground surface
BPP	Baldwin Power Plant
CCR	coal combustion residuals
cm/s	centimeters per second
DMG	Dynegy Midwest Generation, LLC
EDD	electronic data deliverable
FAPS	Fly Ash Pond System
GWPS	groundwater protection standard
IAC	Illinois Administrative Code
IPCB	Illinois Pollution Control Board
IEPA	Illinois Environmental Protection Agency
LOE	line of evidence
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
NAVD88	North American Vertical Datum of 1988
NMDS	nonmetric multidimensional scaling
NPDES	National Pollutant Discharge Elimination System
NRT	Natural Resource Technology, Inc.
PC	principal component
PCA	principal component analysis
SEP	sequential extraction procedure
XRD	X-ray diffraction

EXECUTIVE SUMMARY

Groundwater samples were collected at the Baldwin Power Plant (BPP) Bottom Ash Pond (BAP) during July 2024 for the Quarter 3, 2024 compliance monitoring event (Event 6 [E006]). While they were evaluated for statistically significant exceedances of the groundwater protection standards (GWPS) as described in Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600, potential exceedances were identified for the following constituents and wells in the Uppermost Aquifer (UA):

- Chloride and lithium at well MW-370
- Fluoride at well MW-392
- Fluoride at well MW-393

This ASD has been prepared to provide information for the BAL BAP as a result of the identified E006 fluoride potential exceedance at MW-392.

There are four lines of evidence (LOEs) that demonstrate the BPP BAP (and the Fly Ash Pond, the other regulated CCR unit at the BPP) are not the source of the fluoride detected in well MW-392 and did not contribute to the fluoride detected in well MW-392, and that shale bedrock lithology is the source. These four lines of evidence are:

1. Fluoride concentrations in the BAP porewater are historically more than 10 times lower than the minimum fluoride concentrations detected at MW-392. If the BAP were the source of fluoride in groundwater, BAP porewater concentrations would be expected to be greater than the concentrations in the UA.

2. Compliance monitoring location MW-392 has a similar geochemical signature as upgradient monitoring well MW-358. If the BAP was the source, the geochemical signatures should be different. Moreover, a statistical evaluation (via PCA) has shown that their groundwater compositions are distinct from the porewater geochemical signature.

3. The stable boron and lithium isotopic ratios in groundwater at MW-370, which is screened within similar bedrock interval and lithology as compliance well MW-392, are similar to the ratio in groundwater at upgradient monitoring well MW-358. The similarity of the geochemistry in upgradient and downgradient groundwater provides further evidence indicating that the source is the natural geology.

4. Solid phase analysis of on-site rock cores from the uppermost aquifer (i.e., bedrock) identified fluoride within the naturally occurring minerals of the shale bedrock, thereby providing an alternative source of fluoride in groundwater. Based on a review of literature, elevated concentrations of fluoride are known to occur in groundwater within the shale-limestone bedrock (i.e., uppermost aquifer at the BAP). Consequently, the UA bedrock has been identified as the source of fluoride in the UA groundwater.

It is concluded that the alternative source of fluoride is the shale bedrock lithology, whose geochemistry influences the groundwater composition. Based on the facts and evidence included and referenced herein, a source other than the CCR surface impoundment (natural variability associated with the lithology of the aquifer) caused the fluoride levels detected at well MW-392 and the BAP did not contribute to the elevated fluoride. Therefore, assessment of corrective measures is not required for fluoride at the BAP.

1. INTRODUCTION

Geosyntec Consultants, Inc. has prepared this alternative source demonstration (ASD) on behalf of Dynegy Midwest Generation, LLC (DMG), regarding the Bottom Ash Pond (BAP) coal combustion residuals (CCR) unit at the Baldwin Power Plant (BPP) near Baldwin, Illinois. This ASD is completed pursuant to Title 35 of the Illinois Administrative Code (35 I.A.C.) Part 845 ("Standards for the Disposal of CCR in Surface Impoundments") and was completed by December 24, 2024, within 60 days of determination of the potential exceedances (October 25, 2024), as required by 35 I.A.C. Section 845.650(e). This report applies specifically to the CCR Unit referred to as the Bottom Ash Pond (BAP), identification (ID) number (No.) 601, IEPA ID No. W1578510001-06, and National Inventory of Dams ID No. IL50721.

A potential statistical exceedance of fluoride above the potential site-specific groundwater protection standard (GWPS) of 4.0 milligrams per liter (mg/L) was identified at downgradient monitoring well MW-392 following the Third Quarter 2024 (Event 6 [E006]) sampling event (Ramboll 2024a).

Potential statistical exceedances of chloride at downgradient monitoring well MW-370 and fluoride at downgradient monitoring well MW-393 were identified both for the Third Quarter 2024 [E006] sampling event and the Second Quarter 2023 [E001] sampling event (Ramboll 2023a). An ASD previously submitted to address these chloride and fluoride detections for Second Quarter 2023 [E001] (Geosyntec 2023) was accepted by the Illinois Environmental Protection Agency (IEPA) on November 28, 2023 (IEPA 2023). Additionally, a potential statistical exceedance of lithium at downgradient monitoring well MW-370 was also identified both following the Third Quarter 2024 [E006] event and following the First Quarter 2024 [E003] sampling event (Ramboll 2024b). An ASD was also submitted for the lithium potential exceedance at MW-370 (Geosyntec 2024) which was accepted by IEPA on August 8, 2024 (IEPA 2024a). Therefore, these potential exceedances are not addressed in this ASD.

While the previously submitted ASDs each sufficiently demonstrated by a preponderance of the evidence that the BAP is not the cause of or contributing to the prior detected potential exceedances and that an alternative source was responsible for the potential exceedances, this ASD provides the following additional information in response to concerns raised by IEPA:

- To address IEPA's concerns regarding providing evidence of field collection methods, analysis methods, and field and laboratory quality control and quality assurance, additional information is provided in **Section 2.4.**
- To address concerns regarding collection of solid phase samples, information is also provided in **Section 3.4** regarding solid phase sample collection.
- To address the concerns regarding alternative source data, information is provided in **Sections 3.2, 3.3 and 3.4**. This information, which was also provided in previous ASDs, includes solid phase analytical laboratory data from bedrock samples collected at the site

in **Attachments 7** and **8** of this ASD submittal. These results identified the presence of fluoride and fluoride-bearing minerals (fluorapatite) in the bedrock at the site.

Under 35 I.A.C. Section 845.650(e), the owner or operator of a CCR surface impoundment may submit a demonstration that a source other than the CCR surface impoundment caused the contamination and the CCR surface impoundment did not contribute to the contamination, or that the exceedance of the groundwater protection standard resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction.

This ASD has been completed in conformance with guidance provided in the Electric Power Research Institute (EPRI) guidance for development of ASDs at CCR sites (EPRI 2017), and the Solid Waste Disposal Facility Criteria: Technical Manual (USEPA 1993). An ASD uses a multiple LOE approach to demonstrate that a potential exceedance is more likely related to the alternative source and not the regulated unit (USEPA 1993). The goal of a weight of evidence approach is to provide robust support for a causal relationship based on many smaller individual qualitative or quantitative pieces of evidence (USEPA, 2016). Critically, no individual LOE will be completely conclusive, and the final determination of a conclusion is based on the totality of the evidence provided.

Based on the facts and evidence included and referenced herein, a source other than the CCR surface impoundment (natural variability associated with the lithology of the aquifer) caused the fluoride levels detected at well MW-392 and the BAP did not contribute to the elevated fluoride. Therefore, assessment of corrective measures is not required for fluoride at the BAP.

2. BACKGROUND

2.1 Site Location and Description

The BPP is in Randolph County and St. Clair County in southwest Illinois approximately 0.5 miles west-northwest of the village of Baldwin. The BPP property is bordered by Baldwin Road to the east; the village of Baldwin to the southeast; Illinois Central Gulf railroad tracks, State Road 154, and scattered residences to the south; the Kaskaskia River to the west; and farmland to the north. CCR impoundments present at the BPP include the BAP and the closed Fly Ash Pond System (FAPS), which included the West Fly Ash Pond, East Fly Ash Pond, and Old East Fly Ash Pond.

Non-CCR impoundments present at the BPP include the Secondary Pond, Tertiary Pond, and Baldwin Lake (BPP Cooling Pond). The locations of the CCR and non-CCR impoundments are shown in **Attachment 1**. The BAP is immediately north of the FAPS, which is a closed in-place CCR unit approved for closure by the IEPA on August 16, 2016.

2.2 Description of the CCR Unit

The BPP began operation in 1970 and initially burned bituminous coal from Illinois before switching to subbituminous coal in 1999. The BAP is an unlined surface impoundment with a surface area of approximately 177 acres used to store and dispose of sluiced bottom ash from the BPP, some of which is reclaimed for beneficial reuse. The BAP is also used to temporarily store spray dry adsorption waste and to clarify plant process water, including other non-CCR station process wastewaters, which are then discharged in accordance with the station's National Pollutant Discharge Elimination System (NPDES) permit (AECOM 2016; IEPA 2016). The original construction date of the BAP is unknown but occurred sometime before 1981 based on a review of historical aerial photographs. Therefore, the unit is over 43 years old.

2.3 Geology and Hydrogeology

This section provides a summary of the site geology and hydrogeology; additional detail is provided in the Supplemental Hydrogeologic Site Characterization and Groundwater Monitoring Plan (Natural Resource Technology, Inc. [NRT] 2016) and the Hydrogeologic Site Characterization Report (Ramboll 2021).

Three hydrostratigraphic units are present at the BPP, which include the CCR, an unconsolidated Upper Unit, and a Bedrock Unit (uppermost aquifer).

- CCR: Consists primarily of bottom ash. Up to 28.2 feet of bottom ash has been observed towards the center of the BAP.
- Upper Unit (unconsolidated unit): Predominantly clay with silt and minor sand, silt layers, and occasional sand lenses, and includes lithologies identified as the Cahokia Formation, Peoria Loess, Equality Formation, and Vandalia Till. Thin sand seams present at the contact between the Upper Unit and Bedrock Unit have been identified as potential migration pathways due to higher hydraulic conductivities in comparison to those in the

surrounding clays (e.g., ~10^{-4} centimeters per second [cm/s] in sands compared with ~10^{-5} cm/s in clays) (Ramboll 2023a). Continuous sand seams have not been observed in the Upper Unit or immediately adjacent to the BAP. Due to the predominance of clay and only thin and intermittent sand lenses, this unit is not considered a continuous aquifer unit within the site boundary (NRT 2016; Ramboll 2021).

- Bedrock Unit: Pennsylvanian and Mississippian-aged interbedded shale and limestone continuously underlies the BPP and is considered the uppermost aquifer at the site. The top of bedrock ranges from 12.5 feet below ground surface (bgs) near the Kaskaskia River to 70 feet bgs within the East Fly Ash Pond (part of the FAPS). The Bedrock Unit is the uppermost aquifer, and ranges in thickness between 20 to 70 feet in thickness beneath the Site (Ramboll 2021).

A geologic cross-section originally included in the Hydrogeologic Site Characterization Report and locator map are provided as **Attachment 2**.

Groundwater at the site has previously been classified as Class II groundwater in accordance with 35 I.A.C. 620, based on the geometric mean hydraulic conductivity values measured in the monitoring wells screened in both the Upper Unit (3.2×10^{-5} cm/s) and the Bedrock Unit (5.0×10^{-6} cm/s) (NRT 2014).

On October 25, 2021, in accordance with 35 I.A.C. 845, DMG submitted an operating permit application identifying the groundwater monitoring network for the BAP. The proposed groundwater monitoring network consists of 15 monitoring wells: 13 downgradient monitoring wells (MW-192, MW-193, MW-356, MW-369, MW-370, MW-382, MW-392, MW-393, MW-394, OW-256, OW-257, PZ-170, and PZ-182) and two background monitoring wells (MW-304 and MW-358) (**Attachment 1**). Monitoring wells are screened in both the uppermost aquifer (Bedrock Unit) from approximately 350 to 404 feet and the unconsolidated unit from 388 to 414 feet (North American Vertical Datum of 1988 [NAVD88]).

The potentiometric groundwater contours and generalized groundwater flow directions at the site are shown in **Attachment 3**. Groundwater flow in bedrock is toward the northwest in the eastern and central areas of the BAP, and southwest in the east area of the FAPS. Bedrock groundwater flows toward the Secondary and Tertiary Ponds, which were created in a former surface water drainage channel. Groundwater flow directions are generally consistent across sampling events. As shown in **Attachment 3**, MW-392 is upgradient of the FAPS. Therefore, the FAPS is not anticipated to influence the fluoride concentrations at MW-392.

2.4 Data Reporting and Data Quality

Most groundwater and porewater data used in the following analyses were either submitted to IEPA with the Baldwin BAP Operating Permit Application (Burns & McDonnell 2021) or submitted quarterly to IEPA in accordance with 35 I.A.C. § 845.610(b)(3)(D) (Ramboll 2023b, 2023c, and 2024a, b, c, d, and e) and are incorporated by reference in this ASD. Data such as groundwater analytical results for monitoring wells MW-370, MW-392, and MW-393 is included and has been transmitted after each quarterly sampling event. Laboratory electronic data deliverables (EDDs) for groundwater data which include results for the TPZ-164 porewater well from 2020 through Q3 2024 and results for porewater monitoring locations XPW-01, -02, -04, -05, and -06 from 2022 through Q3 2024 have been transmitted electronically. Documentation for solid phase analyses is attached (**Attachments 7 and 8**) and referenced in the text below. All samples and data, including for the solid phase analysis, were collected in accordance with the Sampling and Analysis Plan (Ramboll 2022a) and Quality Assurance Project Plan (Ramboll 2022b).

3. ALTERNATIVE SOURCE DEMONSTRATION LINES OF EVIDENCE

This ASD for the fluoride GWPS detected at MW-392 is based on four LOEs. These LOEs are described and supported below.

3.1 LOE #1: BAP Porewater Concentrations of Fluoride are Lower than Groundwater Concentrations.

Porewater (*i.e.*, water within the CCR material of the BAP) samples have been collected from piezometer TPZ-164 since September 2018 and at five porewater wells (XPW-01, -02, -04, -05, and -06) since their installation in October 2022. Boring logs for TPZ-164 and XPW-01, -02, -04, -05, and -06 are provided in **Attachment 4**. CCR porewater is water "collected from the interstitial water between waste particles in surface impoundments as it occurs in the field" (USEPA 2014) and represents the material potentially leached from impoundments. The CCR materials are the primary source of constituent loading to the CCR porewater. Over an extended period (e.g., months to years), the CCR porewater reaches equilibrium with the CCR materials. The concentrations within the porewater are “the most representative data available for impoundments because these data are [field-collected] concentrations of leachate” (USEPA 2014). Porewater is therefore the most appropriate source term for potential flux out of CCR impoundments.

The highest detected fluoride concentration in the porewater is consistently more than 10 times lower than the maximum fluoride concentration reported at MW-392, as shown in **Figure 1**, making it improbable that the aqueous fluoride concentration would increase after it leached from the BAP. The fluoride concentrations detected in the porewater samples are less than the lower confidence limits of fluoride concentrations reported at downgradient well MW-392 (4.01 mg/L calculated using a confidence band around a linear regression) (Ramboll 2024a), indicating that fluoride concentrations at MW-392 are not related to the BAP.

Given the generally conservative (non-reactive) nature of fluoride, its concentration is expected to remain stable or decrease along the flow path from the source due to dispersion and dilution. If the BAP were the source of fluoride in groundwater, BAP porewater concentrations would be expected to be greater than the concentrations in the groundwater.

3.2 LOE #2: MW-392 Has a Similar Geochemical Signature to Upgradient Monitoring Well MW-358.

The groundwater at MW-392 has a similar geochemical signature to the groundwater from background monitoring well MW-358, further indicating that MW-392 is not affected by the BAP. A Piper diagram, which is used for illustrating the relative concentration of major cations and anions in groundwater samples, shows that groundwater at MW-392 appears to be predominantly composed of chloride and monovalent cations, consistent with the composition of both background well MW-358 and adjacent downgradient monitoring well MW-393, at which a previous potential fluoride exceedance was identified (**Figure 2**).[1] The potential fluoride exceedance at MW-393 was addressed by an ASD which was accepted by IEPA (Geosyntec 2023; IEPA 2023). This groundwater composition is different from the composition of samples of BAP porewater, which tends to have greater relative contributions of alkalinity, sulfate, and divalent cations such as calcium and magnesium (**Figure 2**).

Piper diagrams typically show the relative proportions and individual concentrations (respectively) of only major cations and anions. Advanced statistical approaches such as principal component analysis (PCA) or non-metric multidimensional scaling (NMDS) use a broader suite of analytes to evaluate the similarity or dissimilarity of different samples or groups and identify analytes that are main drivers for dissimilarities (Mumford et al., 2007).

PCA is often used to simplify large datasets with multiple variables by creating new uncorrelated variables known as principal components (PCs). The PCs are linear combinations of the original variables; the first few PCs typically capture most of the variation within the dataset. Factor loadings are calculated based on the correlation between PCs and the original variables. As such, variables with notably higher positive or negative factor loadings are main drivers of similarity or dissimilarity and clustering of samples. Factor scores are calculated based on the correlation between the combined chemical composition of each sample and the PCs. Samples with similar chemical compositions show similar factor scores and tend to cluster together on a PCA biplot.

In this ASD, the dataset used for PCA included 113 samples collected between 2022 and 2024 from background wells MW-304 and MW-358, downgradient wells MW-370, MW-392 and MW-393, and the BAP porewater wells.[2] The downgradient locations were selected based on observed potential statistical exceedances of the GWPS, the site hydrogeology and groundwater flow direction, and the spatial distribution of well locations. PCA requires that input variables have similar scales of measurement and variances. As such, data were standardized by mean-centering and scaling to unit variance prior to performing PCA.

The fraction of total variation explained by each PC is shown in **Figure 3a**, with the first two PCs (Dimensions 1 and 2 on **Figure 3a**) accounting for approximately 69 percent (%) of the total variation in the datasets. Additionally, the quality of representation of each variable is presented in **Figure 3b,** demonstrating that for most variables, the more than 50% of the variation is captured by the first two PCs.

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[1] November 2023 results from MW-358 are used for visualization in the Piper diagram, as a shift in groundwater composition was observed for samples collected at MW-358 in 2024. A review of field parameters, measured groundwater elevations, and reported concentrations indicated that background monitoring well MW-358 was potentially compromised some time following the November 2023 sampling event. Subsequent investigations by Ramboll Americas Engineering Solutions, Inc. confirmed that groundwater was entering the well casing above the well screen and the well no longer provided representative samples of the uppermost aquifer from the screened interval. Data collected from MW-358 after November 2023 is excluded from the analyses performed for this ASD.

[2] Analytes included in this PCA include total alkalinity, boron, pH, barium, chloride, calcium, lithium, sulfate, and fluoride. The dataset used for PCA analysis is provided with this submission as **Attachment 5**.

PCA results are often visualized using biplots, where samples are projected on to the first two PCs (i.e., factor scores), and factor loadings are represented as vectors. The closer the data points are on the graph, the greater the similarity in their chemical composition. The biplot of PCA results from this study is shown on **Figure 4**, where the background samples are plotted in orange, the downgradient samples in dark blue, and the porewater samples in gray. The factor loadings, represented as vectors on the biplot, indicate that constituents such as calcium and barium are responsible for shifting the chemical signature of samples towards the porewater cluster. In contrast, constituents such as lithium, fluoride, and chloride are the main drivers for shifting chemical composition in the direction of the downgradient and background samples cluster. These results are generally consistent with the findings of the Piper diagram (**Figure 2**), which identified a higher relative abundance of chloride in the bedrock groundwater samples compared to CCR porewater.

Furthermore, as illustrated in the biplot (**Figure 4**), the porewater samples cluster separately from the downgradient and background wells. The biplot shows no overlap between the 95% bivariate data ellipses for: (i) porewater samples from within the BAP in gray, (ii) and downgradient and background bedrock groundwater samples in blue and orange (represented by the orange ellipse). These results are generally consistent with the findings of the Piper diagram (**Figure 2**), which identified clusters of porewater samples distinct from background and downgradient locations. Furthermore, the PCA demonstrates that background and downgradient samples cluster together, indicating that the chemical composition of the downgradient samples from MW-392 is relatively similar to background and other downgradient samples.

Clustering was further explored using Ward's hierarchical clustering method, a distance measure employed in agglomerative algorithms and commonly applied in hydrogeochemical studies. The analysis was performed on a scaled and centered dataset. As illustrated in the dendrogram (**Figure 5**), this analysis supported the distinction between porewater samples within the gray box and the combined group of downgradient and background groundwater wells in the orange box.

Non-metric multidimensional scaling (NMDS) analysis of the dataset from Q1 2023 to Q3 2024 was conducted to evaluate more recent site conditions and to further compare the chemical composition of porewater, background, and select downgradient samples. Additionally, the results of NMDS analysis can be used for validation of previous findings from PCA. As some wells were installed in 2022, the 2023 and 2024 samples are likely to be more representative of equilibrium conditions after having more time to interact with the aquifer following installation. While both PCA and NMDS aim to reduce dimensionality of multivariate datasets (e.g., the geochemical composition of waters) and visualize similarities among samples to interpret the underlying patterns, their methods are distinct. PCA relies on linear transformations and captures the maximum variance within datasets through orthogonal components, whereas NMDS utilizes non-metric rank orders to achieve a non-linear representation of the original distances between samples. Therefore, NMDS is more flexible in relation to input requirements, particularly as it does not require that datasets be normally distributed. NMDS analysis results are typically presented in two-dimensional space with arbitrary dimensions, where the distance between two samples is representative of their relative similarity.

The results of the NMDS on the BAL dataset are displayed in **Figure 6**. Qualitatively, the NMDS findings presented on **Figure 6** align closely with those from the PCA (**Figure 4**) and indicate that: (i) the porewater sample cluster (gray symbols) is separate from the downgradient (shades of blue) and background (shades of orange) samples; and (ii) the chemical compositions of the background and downgradient wells appear more similar to each other than to the composition of porewater. If BAP porewater was influencing the groundwater in downgradient wells MW-392, MW-393 and MW-370, the groundwater geochemistry would be more similar to porewater. However, they are distinct and the similarity between upgradient and downgradient groundwater instead supports the conclusion that the groundwater composition is influenced by natural lithology.

3.3 LOE #3: Stable Lithium and Boron Isotopes Provide Further Evidence that the UA has a Geochemical Signature Distinct from BAP Porewater.

Boron isotopes (^{11}B and ^{10}B) can be useful tracers in groundwater systems in sedimentary environments (United States Geological Survey, 2004). Depleted (lower; or more negative) boron isotope ratios (reported as $\delta^{11}B$, which is calculated as the ratio of $^{11}B/^{10}B$ relative to an international standard) are an indicator of CCR constituents in aqueous samples due to the depleted $\delta^{11}B$ found in source coal (Ruhl et al. 2014) and coal ash. Alternatively, sediments formed during deposition from marine environments, such as the shales identified within the uppermost aquifer at the site, can be enriched in $\delta^{11}B$ (i.e., more positive values) during deposition (Spivack et al. 1987).

Aqueous samples were collected from select locations to represent multiple lithologies and locations relevant to the BAP, as summarized in **Table 1**. These locations included TPZ-164 to represent BAP CCR porewater conditions, and upgradient well MW-358 and compliance well MW-370 to represent wells screened within the downgradient shale (including compliance wells MW-392 and MW-393 screened within similar bedrock interval and lithology). MW-370 and MW-392 in the bedrock UA generally have a consistent geochemical signature, as indicated by the outcome of the PCA described in Section 3.2. The samples were submitted to SmartGas Sciences, LLC (Columbus, Ohio) for analysis of total boron and stable boron isotopes and to Isodetect GmbH (Leipzig, Germany) for analysis of total lithium and stable lithium isotopes. The analytical laboratory reports are provided in **Attachment 6**.

If the BAP porewater were influencing the groundwater within UA, a similar isotopic distribution for boron and lithium between the porewater and groundwater would be expected. However, the boron stable isotopic signatures for the BAP CCR porewater and groundwater at MW-370 are markedly different, providing further evidence that the UA groundwater, which is similar in composition at both MW-370 and MW-392 based on the PCA analyses (summarized in Section 3.2, is dissimilar to the BAP. Porewater from TPZ-164 had the most depleted $\delta^{11}B$ value, with a reported $\delta^{11}B$ of 2.8 per mille (‰).

The BAP porewater has a boron isotopic composition consistent with the reported $\delta^{11}B$ range for Illinois basin coal-derived CCR of -8.8‰ to 6.3‰ (Ruhl et al 2014) (**Figure 7**). Upgradient well MW-358 and compliance well MW-370 both had more positive $\delta^{11}B$ values, with reported results of 31.1‰ and 32.4‰, respectively (**Table 1**). The enrichment of $\delta^{11}B$ in these groundwater samples is inconsistent with influences from CCR. Instead, these results are consistent with elevated $\delta^{11}B$ values typically detected in shale formations, with these more positive values due to deposition in marine environments (Spivack et al., 1987; Warner et al., 2013).

Typical ranges detected for $\delta^{11}B$ in groundwater unimpacted by CCR are 4.0‰ to 34.0‰ (Buszka et al., 2007; Warner et al., 2013). MW-258, an upgradient well screened within the interbedded limestone and shale formation had a $\delta^{11}B$ value (14.2‰) that was lower than what was detected at shale lithologies at MW-358 and MW-370, but still isotopically distinct from BAP porewater. This variability in $\delta^{11}B$ values within the bedrock at the Site may be attributed to differences in mineralogy or depositional environment over time.

Lithium isotopes (^{7}Li and ^{6}Li) are similarly useful tracers in groundwater and have been identified as particularly applicable for distinguishing water containing CCR constituents (Harkness et al., 2015). Lithium isotope ratios (reported as $\delta^{7}Li$, which are calculated as the ratio of $^{7}Li/^{6}Li$ relative to an international standard) can be an indicator of CCR constituents, as coals have $\delta^{7}Li$ values ranging from -7.0 ‰ to 12.8‰, much lower than the ~31‰ commonly observed for seawater (Warner et al., 2014; Harkness et al., 2015). Release of ^{6}Li from exchangeable sites on clays within shale during burial and formation can significantly alter groundwater $\delta^{7}Li$ values compared to expectations based on the depositional environment (Warner et al., 2014).

MW-370 groundwater also has a lithium isotope composition ($\delta^{7}Li$ = 20.7‰) consistent with upgradient groundwater from shale lithologies at MW-358 ($\delta^{7}Li$ = 26.0‰), with slight differences potentially related to variations in burial history between the screening depths at these locations. The lithium data are provided in **Table 1** and presented on **Figure 8**. The lithium isotope signature for the BAP porewater ($\delta^{7}Li$ = 17.1‰) is somewhat similar to the bedrock lithium signature and is not consistent with the ranges of $\delta^{7}Li$ for other CCR material effluents ($\delta^{7}Li$ from -6.2 to 8.7‰; Harkness et al., 2015).

When examining the isotopic composition of MW-370 groundwaters using both boron and lithium isotope data in combination (**Figure 9**), it is clear that the BAP porewater is isotopically distinct for lithium and boron from all analyzed groundwaters. Together, these results provide further evidence that wells screened within the shale lithology, including at downgradient locations such as MW-392, are dissimilar to the BAP and instead are more strongly influenced by the bedrock lithology where they are screened. This is also consistent with results from both the Piper diagram (**Figure 2**) and PCA analysis (**Figure 5**).

3.4 LOE #4: Fluoride Occurs Naturally in the Shale Bedrock of the Uppermost Aquifer.

Geosyntec reviewed the results of analyses completed of solid phase samples collected from the Site to support the conclusion that statistical exceedances of the site-specific fluoride GWPS at MW-392 are associated with the limestone and shale bedrock formation. Solid phase samples were collected from the cores recovered during the installation of monitoring wells MW-358 and

MW-392 following well installation in September and October 2022, respectively. The boring logs for MW-392 and MW-358 are provided in **Attachment 4**. The samples were shipped under chain-of-custody protocol to SGS Canada Inc. for analysis of total anions, total Kjeldahl nitrogen (TKN) and radium-226. The samples were also analyzed via X-ray diffraction (XRD) to identify minerals in the solid samples.

Solid phase analysis of total anions identified reportable concentrations of fluoride within the bedrock of the uppermost aquifer at the Site – i.e., it is a naturally occurring inorganic substance within the mineral matrix of the bedrock (**Attachment 7**). The presence of fluoride within the solid phase of the UA (bedrock) contributes to higher concentrations and naturally occurring fluoride in the groundwater.

Solid phase analysis of bedrock from compliance location MW-392 via XRD identified fluoride-bearing minerals in the solid phase materials (**Attachment 8**). Fluorapatite [$Ca_5(PO_4)_3F$], a fluoride-bearing mineral, was identified in samples collected from the shale formation at downgradient well MW-392 (**Table 2; Attachment 8**). The highest abundance of fluorapatite (2.7%) was identified in a sample collected at 80 to 82 feet below ground surface at downgradient well MW-392. This sample is at the same depth as the screened interval for MW-392. The presence of fluoride within the aquifer solids of the shale in the uppermost aquifer, including the presence of a fluoride-bearing mineral, provide an alternative source for fluoride in groundwater other than the BAP.

Studies have found that fluoride concentrations in groundwater are comparable to or higher than those observed at MW-392 and are often found within the Pennsylvanian and Mississippian-aged interbedded shale and limestone of the UA. A USGS summary found that water within the upper parts of the Pennsylvanian-aged aquifers is generally similar throughout the Illinois and Indiana basins (Cable et al, 1971). This groundwater is influenced by the interaction with the variable interbedded rock types present in the uppermost aquifer at the BAP and can vary from a sodium bicarbonate to a sodium chloride type within a few feet of change in depth (Lloyd and Lyke 1995). Similarly, Lloyd and Lyke (1995) noted that “the fluoride content of the water [in Pennsylvanian-aged aquifers] is great enough to mottle the teeth of persons who drink it on a continual basis,” with concentrations reported as high as 15 mg/L. These studies suggest that contact with Pennsylvanian-aged bedrock can result in natural variability in the reported fluoride concentrations in groundwater at ranges consistent with those detected at the site.

4. CONCLUSIONS

It has been demonstrated that the fluoride detected at MW-392 is not caused by a release from the BAP CCR unit, but instead is attributed to the influence of the shale bedrock lithology on groundwater composition. The following summarizes the four LOEs used to support this demonstration:

1. Fluoride concentrations in the BAP porewater are historically more than 10 times lower than the minimum fluoride concentrations detected at MW-392. If the BAP were the source of fluoride in groundwater, BAP porewater concentrations would be expected to be greater than the concentrations in the UA.

2. Compliance monitoring location MW-392 has a similar geochemical signature as upgradient monitoring well MW-358 If the BAP was the source, the geochemical signatures should be different. Moreover, a statistical evaluation (via PCA) has shown that their groundwater compositions are distinct from the porewater geochemical signature.

3. The stable boron and lithium isotopic ratios in groundwater at MW-370, which is screened within similar bedrock interval and lithology as compliance well MW-392, are similar to the ratio in groundwater at upgradient monitoring well MW-358. The similarity of the geochemistry in upgradient and downgradient groundwater provides further evidence that the likely source is the natural geology.

4. Solid phase analysis of rock cores from the UA (i.e., bedrock) identified fluoride within the naturally occurring minerals of the shale bedrock, thereby providing an alternative source of fluoride in groundwater. Based on a review of literature, elevated concentrations of fluoride are known to occur in groundwater within the shale-limestone bedrock (i.e., UA at the BAP). Consequently, the UA bedrock is likely the source of fluoride in the UA groundwater.

It is concluded that the alternative source of fluoride is the shale bedrock lithology, whose geochemistry influences the groundwater composition. This information serves as the written ASD prepared in accordance with 35 I.A.C. § 845.650(e). Based on the facts and evidence included and referenced herein, a source other than the CCR surface impoundment (natural variability associated with the lithology of the aquifer) caused the elevated fluoride observed at well MW-392 and the CCR surface impoundment did not contribute to the elevated fluoride. Therefore, implementation of corrective measures is not required for fluoride at the BAP CCR unit.

5. REFERENCES

Data presented in documents referenced in this ASD are considered incorporated by reference and may be found in **Attachment 9** or at publicly accessible internet addresses provided following each reference below.

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TABLES

Table 1 - Boron and Lithium Isotope Analytical Results
Baldwin Power Plant - Bottom Ash Pond

Sample ID	Sample Location	Sample Description	Total Boron (µg/L)	δ^{11}B (‰)	+/- (2SE)	Total Lithium (µg/L)	δ^{7}Li (‰)	+/- (2SE)
20230206 TPZ-164	TPZ-164	Porewater	1116	2.8	1.2	28	17.1	0.75
20230206 Cooling Pond	Cooling Pond	Surface Water	240	5.7	1.2	3.1	35.2	0.74
20230206 MW-370	MW-370	Downgradient Shale	2061	32.4	1.2	227	20.7	0.73
20230206 PZ-170	PZ-170	Downgradient PMP	326	43.2	1.2	44	17.1	0.73
20230206 MW-158R	MW-158R	Background PMP	86	18.0	1.2	23	31.5	0.54
20230207 MW-358	MW-358	Background Deep Shale	1778	31.1	1.2	185	26.0	0.7
20230207 MW-258	MW-258	Background Shale	1248	14.2	1.2	--	--	--

Notes:

‰: parts per thousand (per mille)

µg/L: micrograms per liter

--: Sample not analyzed

PMP: potential migration pathway

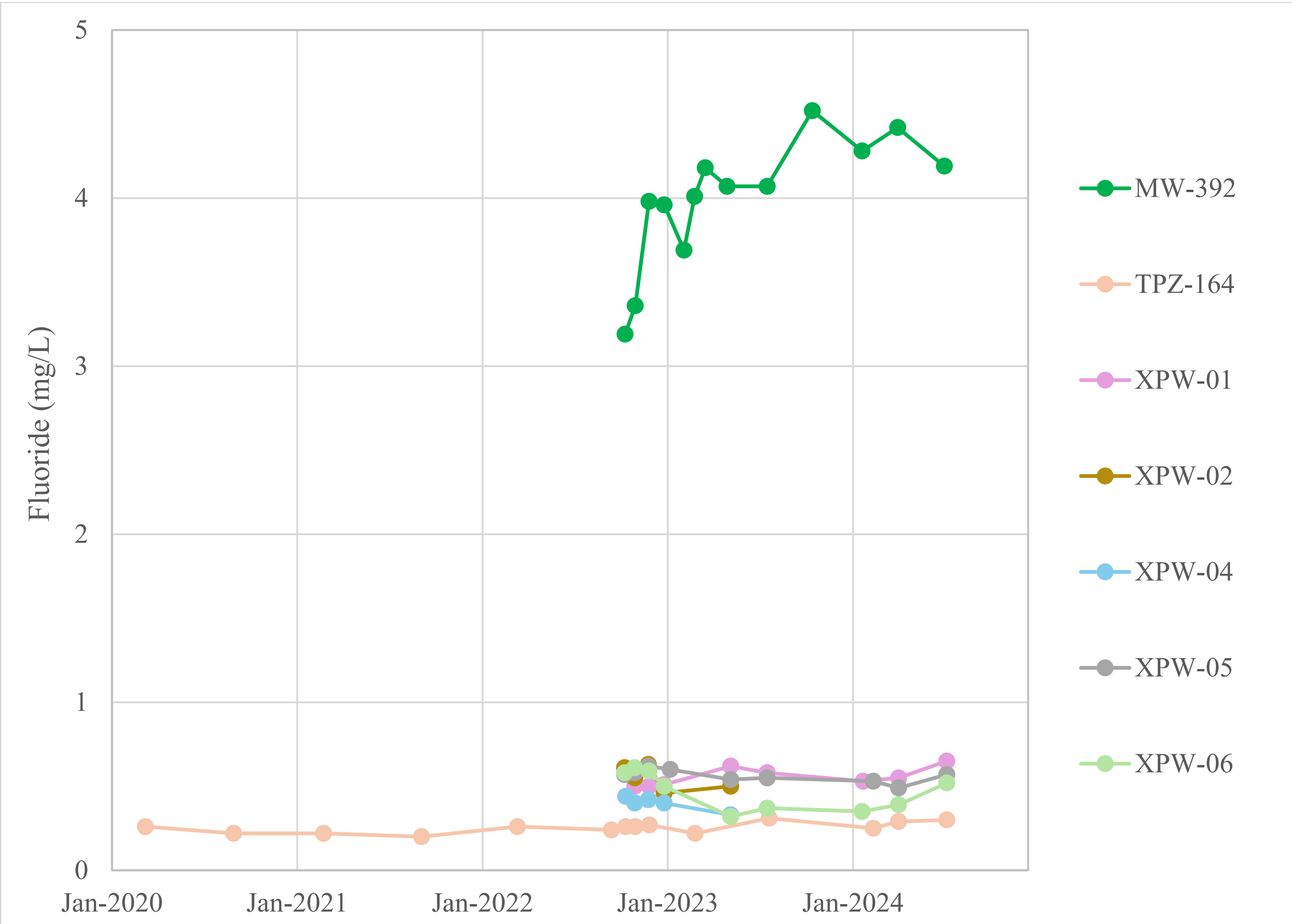
SE: standard error

Table 2 - Summary of Rietveld Quantitative Analysis
X-Ray Diffraction Results
Baldwin Power Plant

Well ID			MW-358	MW-358	MW-392	MW-392	MW-392
Depth (ft bgs)			(47-49)	(86-88)	(32-33.5)	(66-68)	(80-82)
Location			Upgradient	Upgradient	Downgradient	Downgradient	Downgradient
Boring Log Description			Shallow Shale	Deeper Shale Body	Clay with increasing sand content	Shale	Shale transitioning to limestone
Mineral/Compound	**Formula**	**Mineral Type**	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	SiO_2	Silicate	29.2	30.7	53.5	22.7	29.8
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Mica	18.8	19.7	13.1	15.9	13.1
Albite	$NaAlSi_3O_8$	Feldspar	0.4	2.5	8.5	0.6	0.6
Microcline	$KAlSi_3O_8$	Feldspar	8.6	5.9	6.8	5.1	1.0
Diaspore	aAlO.OH	Oxyhydroxide	-	-	-	2.8	-
Magnetite	Fe_3O_4	Oxide	0.5	0.3		0.1	1.4
Anatase	TiO_2	Oxide	0.8	1.8	-	1.0	0.8
Calcite	$CaCO_3$	Carbonate	0.5	1.0	-	14.9	28.1
Fluorapatite	$Ca_5(PO_4)_3F$	Phosphate	-	-		0.2	2.7
Ankerite	$CaFe(CO_3)_2$	Carbonate	-	-		0.8	-
Clay Minerals							
Kaolinite	$Al_2Si_2O_5(OH)_4$	Kaolin	4.8	15.0	7.5	3.6	5.5
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \bullet 10H_2O$	Smectite	6.8	4.8	0.0	5.8	3.5
Nontronite	$Fe_2(Al,Si)_4O_{10}(OH)_2Na_{0.3}(H_2O)_4$	Smectite	4.6	4.3		3.3	4.2
Illite/Montmorillonite	$KAl_4(Si,Al)_8O_{10}(OH)_4 \bullet 4H_2O$	Mixed Layer I/S	8.8	2.7		7.1	3.6
Illite	$K(Al,Mg,Fe)_2(Si,Al)_4O_{10}(OH)_2$	Illite	15.0	9.2		10.4	4.1
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Chlorite	1.3	2	7.0	6.1	1.6
Clay Minerals Total			41	38	15	36	23
Clays + Muscovite Total			60	58	28	52	36

Notes
Only samples collected within the shale bedrock are shown. Additional sample data is provided in Attachment 8.
Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample
The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.
Sample depths are shown in feet below ground surface (ft bgs).
wt %: percentage by weight

FIGURES



Notes:
mg/L: milligrams per liter

Fluoride Time Series Graph

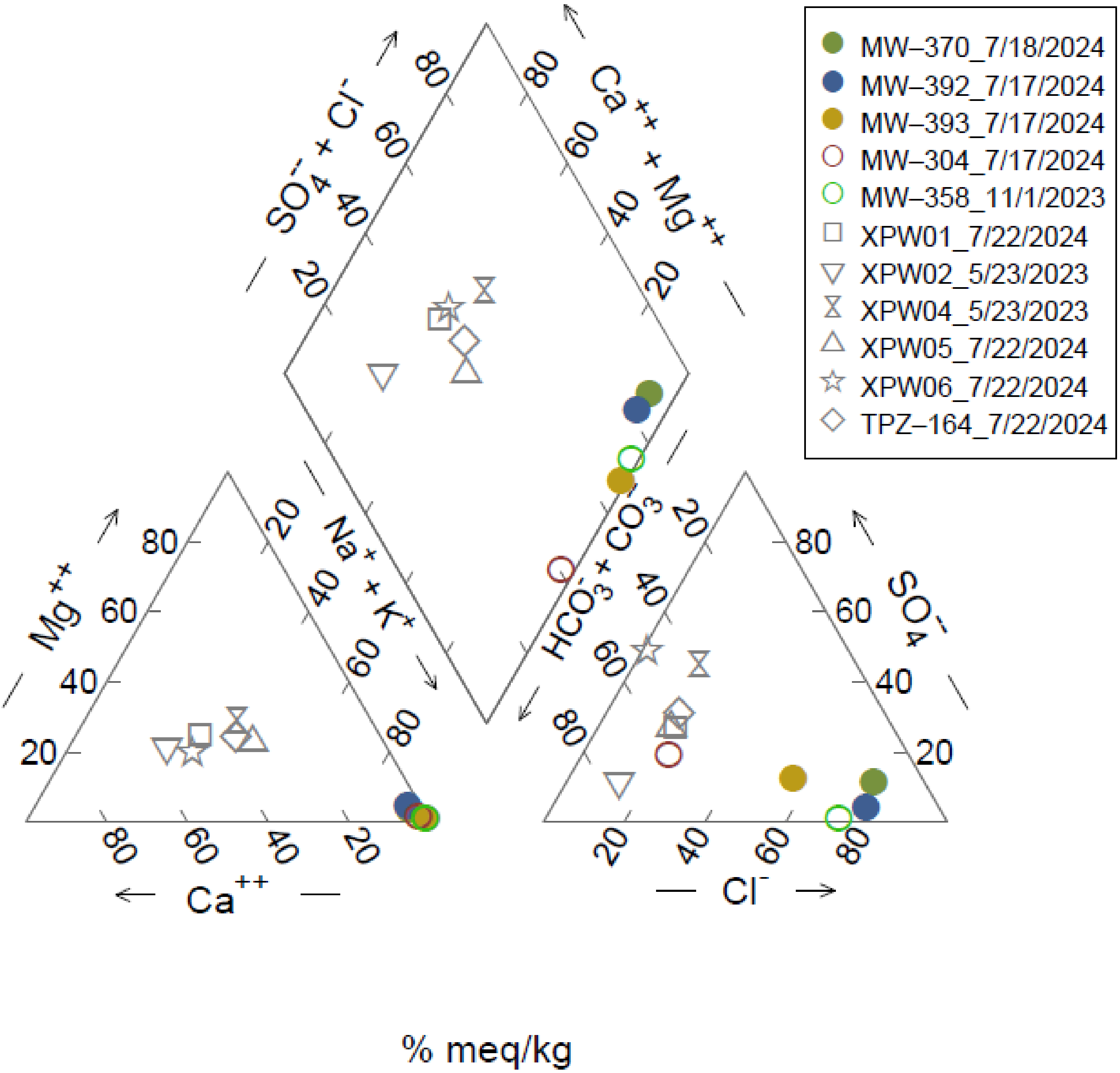
Baldwin Power Plant

Geosyntec consultants

Figure **1**

Columbus, Ohio

December 2024



Notes:

1. Downgradient wells MW-370, MW-392 and MW-393 are shown with solid circle symbology. Background wells MW-304 and MW-358 are shown with hollow circle symbology. BAL BAP source water (i.e., XPW01-02, XPW04-06, and TPZ-164) are shown with hollow grey symbology.
2. % meq/kg: percent milliequivalents per kilogram

Piper Diagram

Baldwin Power Plant – Bottom Ash Pond

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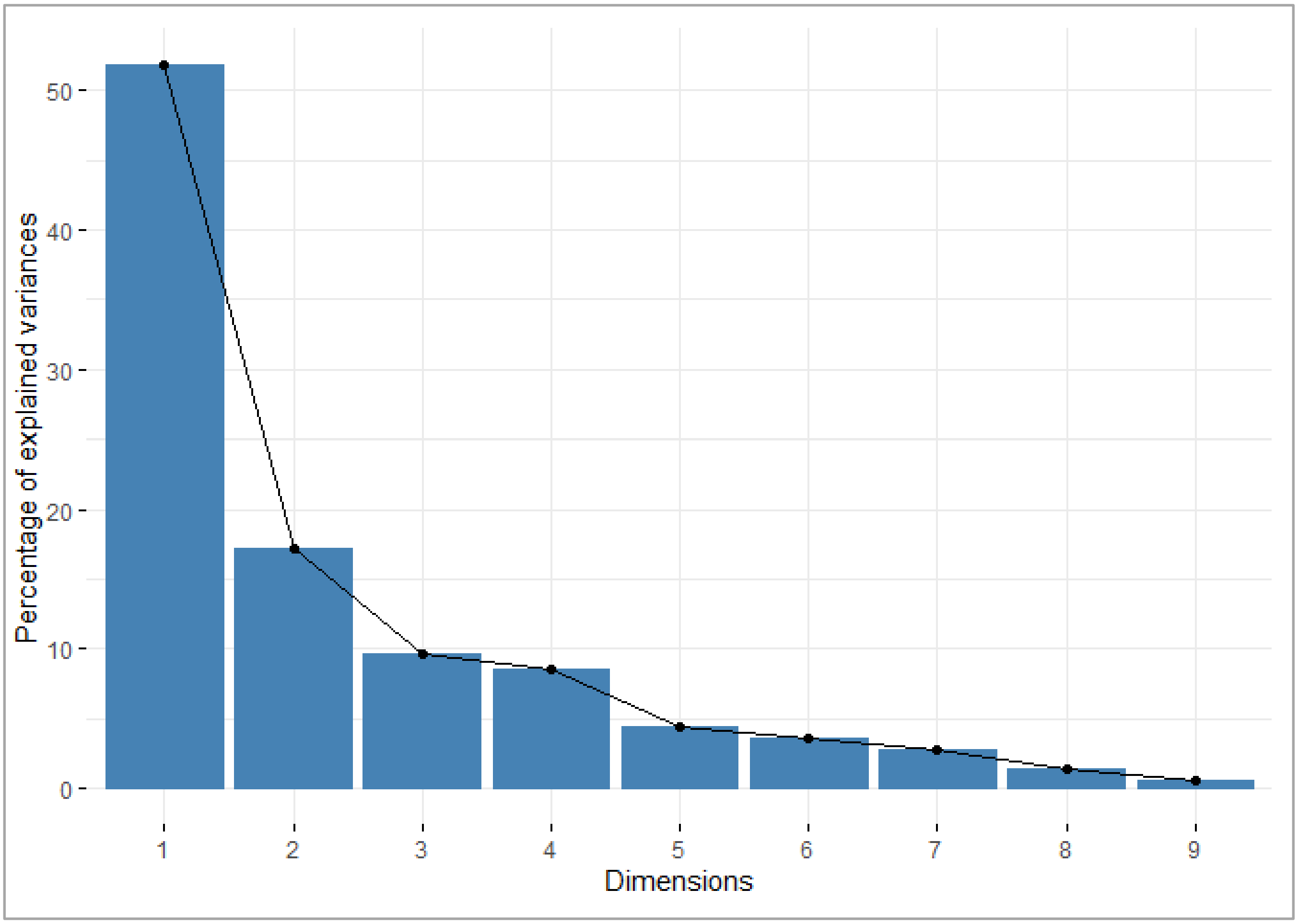
Figure 2

Columbus, Ohio

December 2024



Notes:

1. Samples collected between 2022 and 2024 from background wells MW-304 and MW-358, downgradient wells MW-370, MW-392 and MW-393, and porewater wells TPZ-164, XPW-01, XPW-02, XPW-04, XPW-05, and XPW-06 were included in the evaluation.

Principal Component Analysis - Quality of Representation of Principal Components

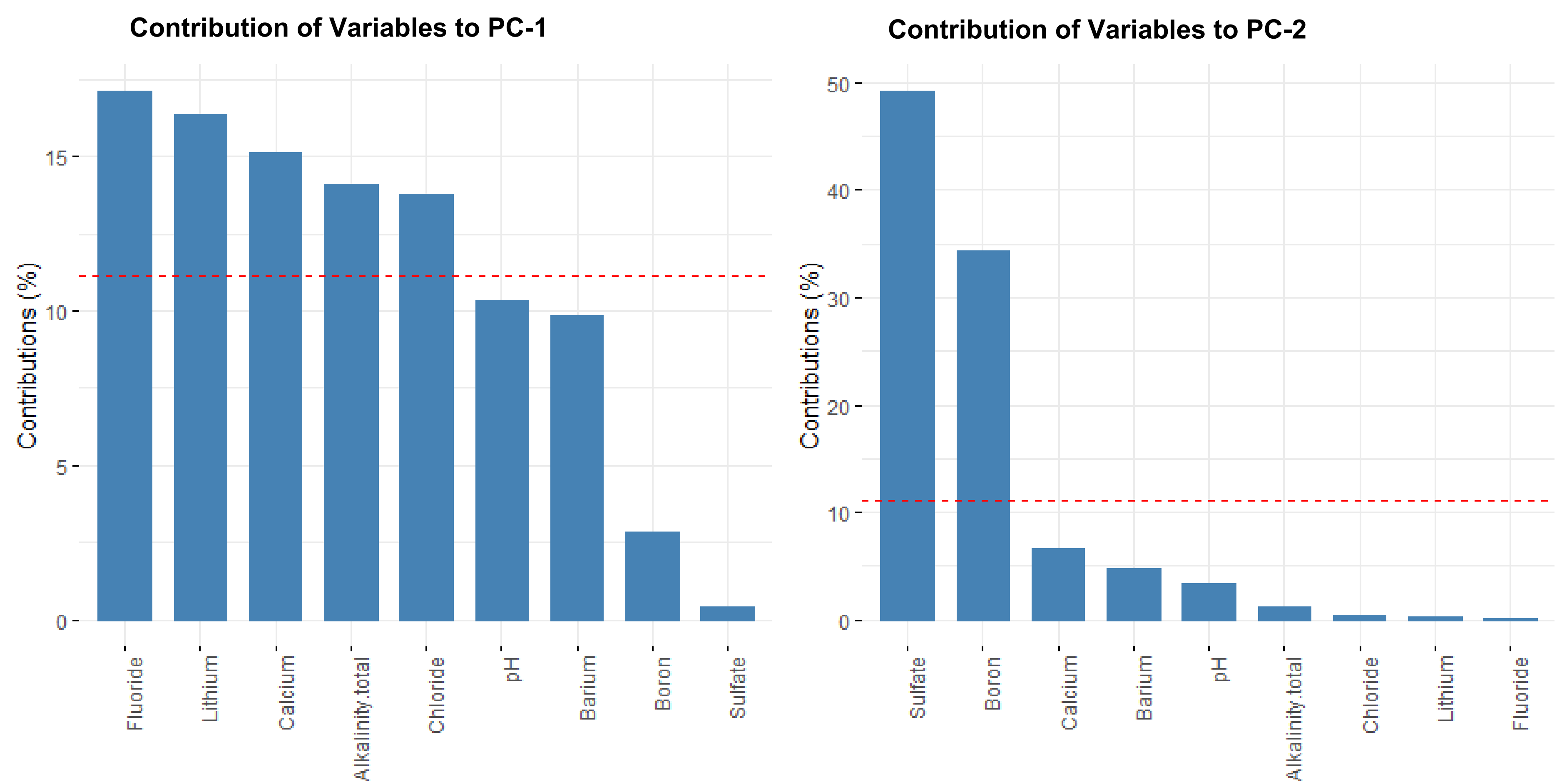
Baldwin Power Plant – Bottom Ash Pond

Geosyntec consultants

Columbus, Ohio

December 2024

Figure **3a**



Notes:
1. The dashed red line represents the anticipated value for uniform contribution. The constituents with a contribution exceeding the reference line are considered significant in its contribution to each PC (principal component).

Contribution of Variables to First Two Principal Components
Baldwin Power Plant – Bottom Ash Pond

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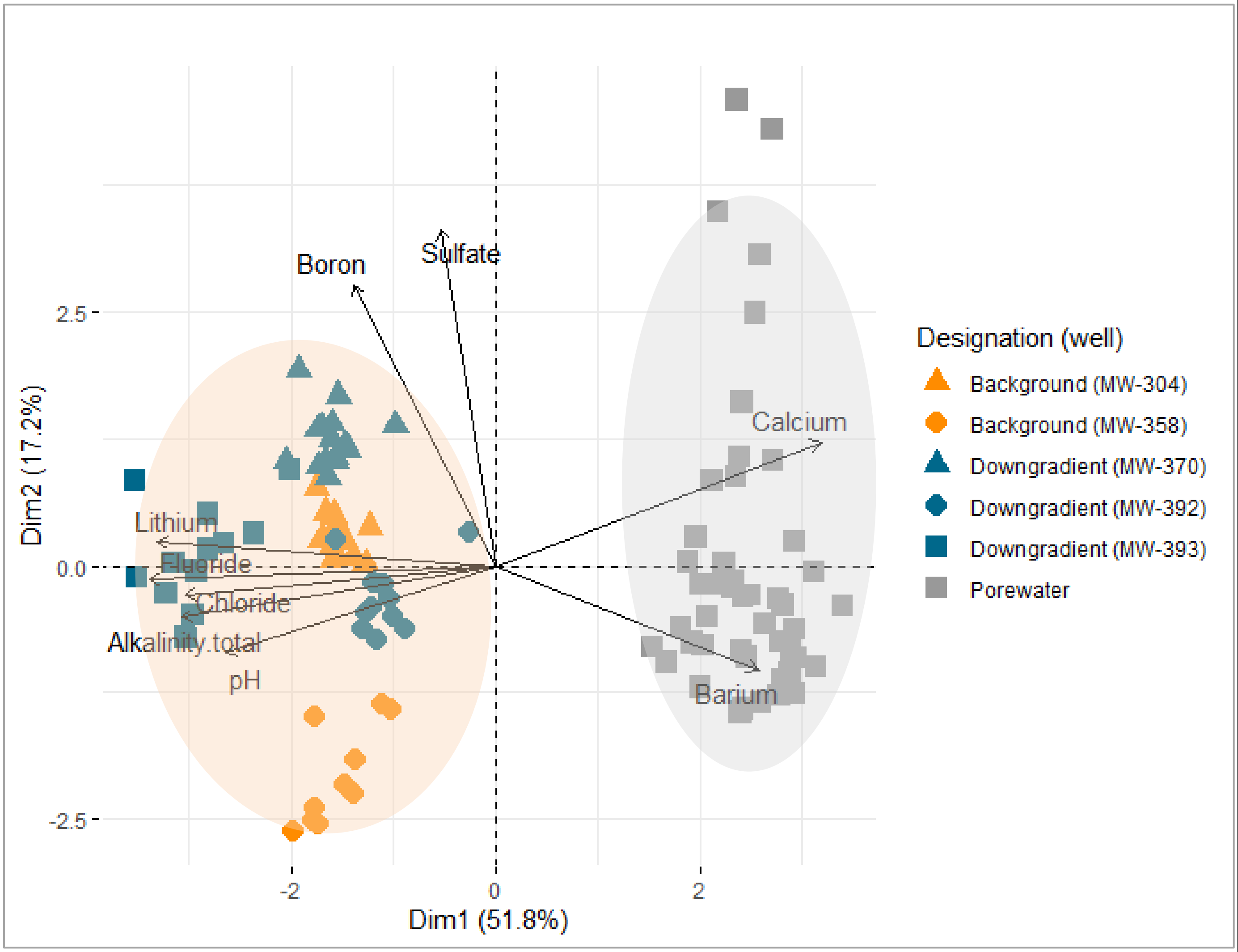
Figure **3b**

Columns, Ohio | December 2024



Notes:

1. The 95% data ellipse for each hydrostratigraphic unit is shown. Gray for porewater, and orange for background and downgradient groups.
2. The arrows signify the correlations between the constituents and the principal components.
3. PCA – Principal Component Analysis.
4. Dim – Dimension.

Principal Component Analysis Biplot

Baldwin Power Plant – Bottom Ash Pond

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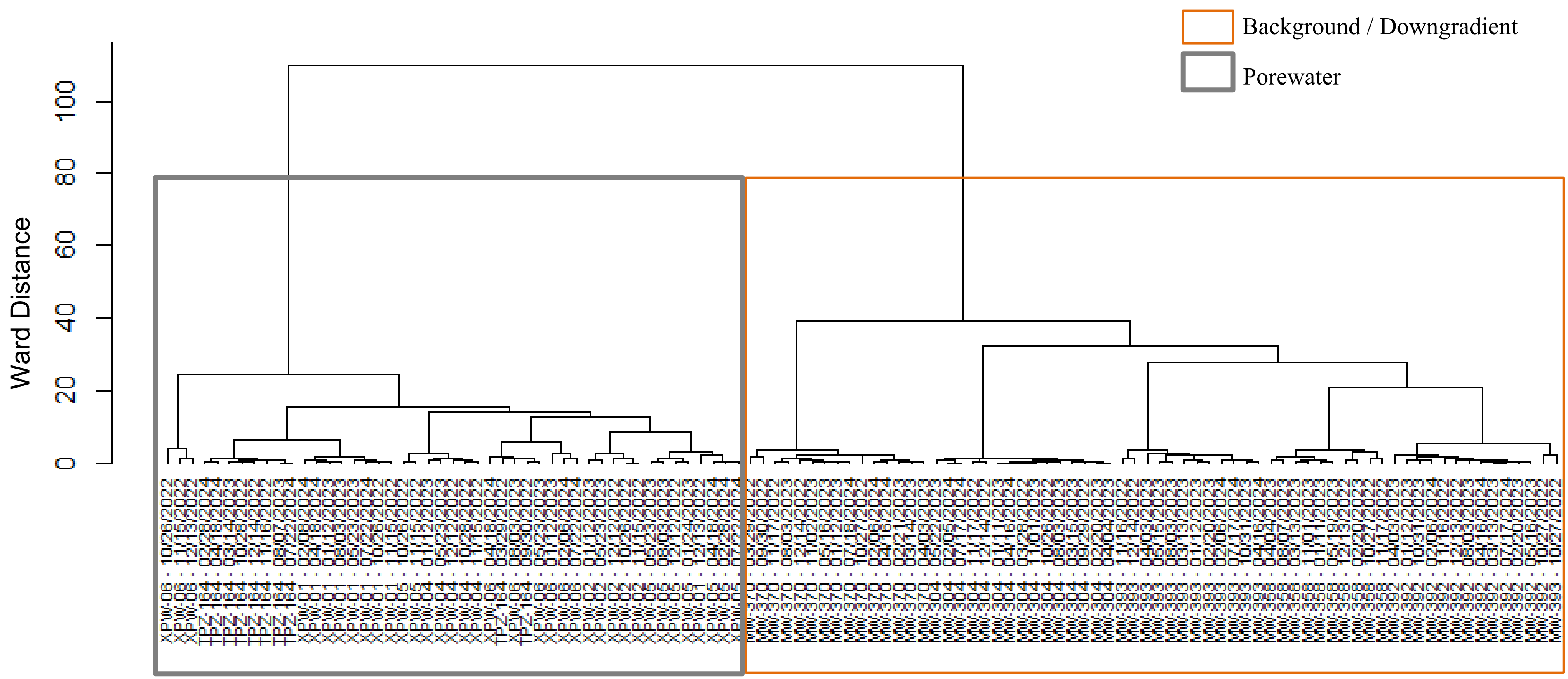
Figure **4**

Columbus, Ohio | December 2024



Notes:
1. The cluster analysis used Euclidean distances, and Ward's method as the clustering algorithm.
2. In the dendrogram, samples on the same branch are more similar to each other. The samples with the highest similarity are on the closest branches.
3. The boxes around the branches represent the two clusters into which samples from each source grouped.
4. Porewater wells are in gray box with thicker lines, and background and downgradient wells are in orange.

Dendrogram Graph from Cluster Analysis

Baldwin Power Plant

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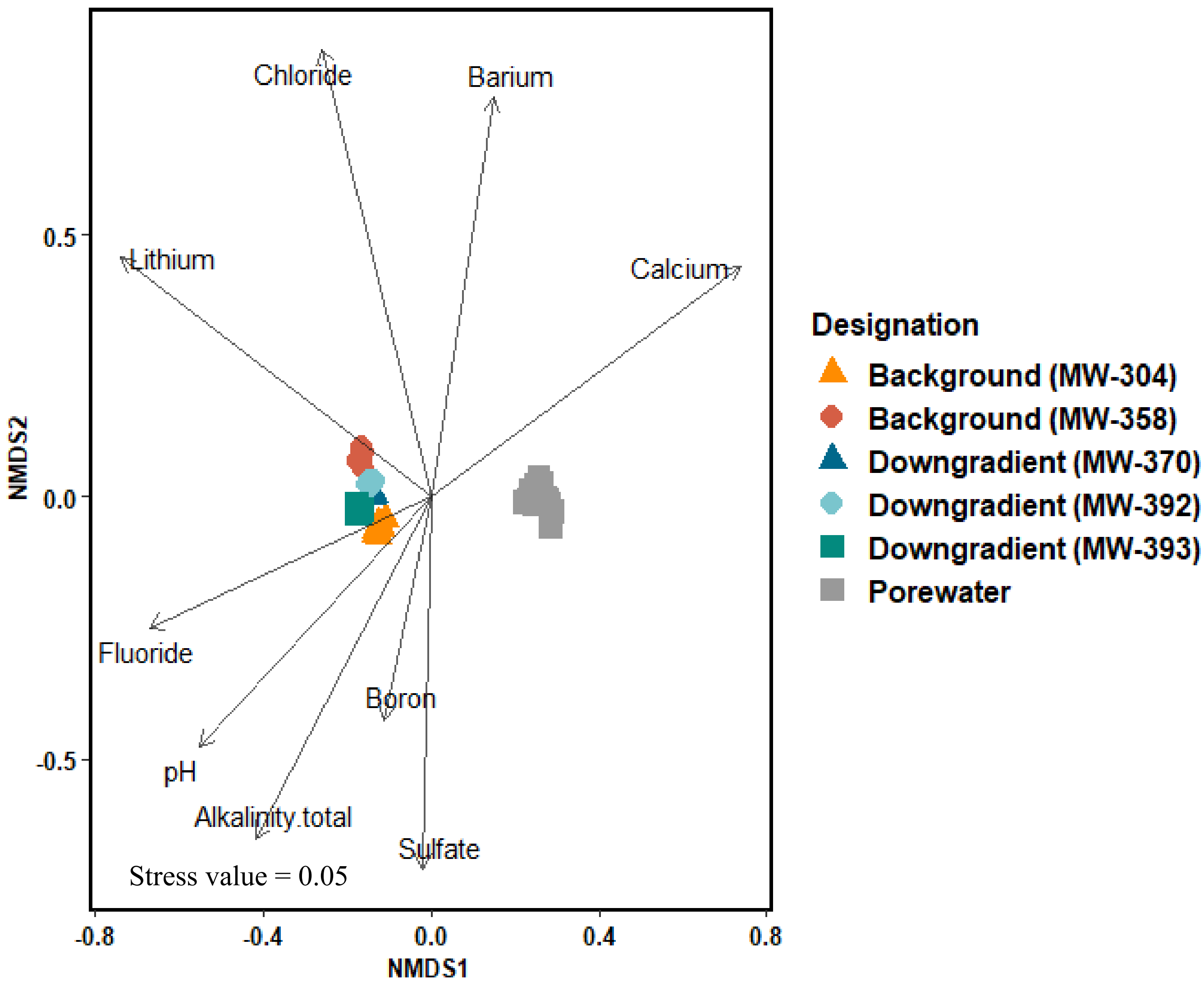
Columbus, Ohio | December 2024

Figure **6**



Notes:
1. NMDS: Non-metric Multidimensional Scaling.
2. The arrows represent the correlation between the constituents and the NMDS axes.
3. The stress value represents the goodness of fit of the NMDS ordination in reduced dimensions to the observed dissimilarity. The stress value (0.05) from the analysis indicates an excellent fit.

Non-Metric Multidimensional Scaling Plot

Baldwin Power Plant – Bottom Ash Pond

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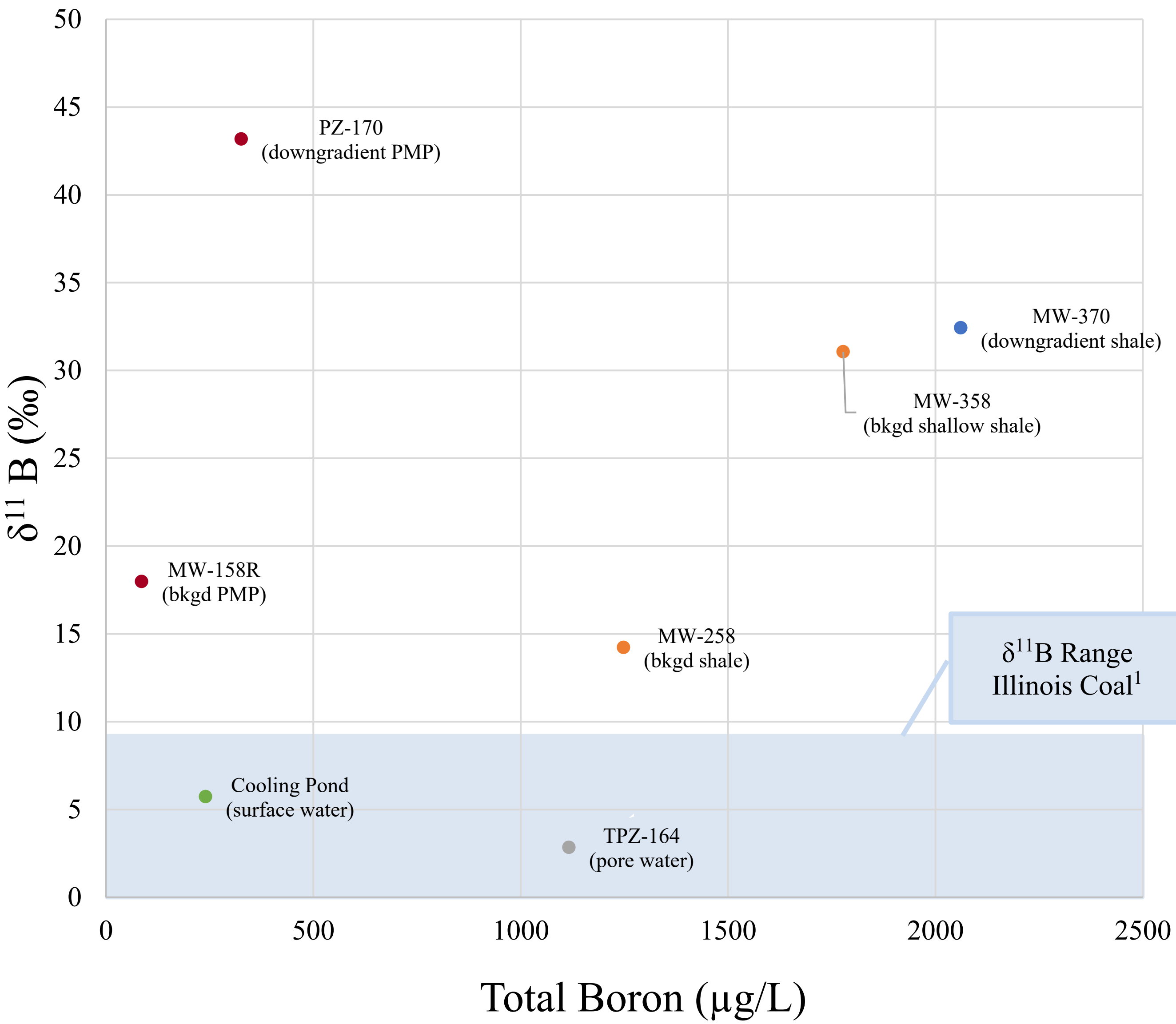
Columbus, Ohio | December 2024

Figure **6**



Notes:
1. δ^{11}B range from Ruhl et al 2014.
µg/L: micrograms per liter
‰: per mille
Bkgd: background
PMP: potential migration pathway

Boron Isotope Distribution

Baldwin Power Plant – Bottom Ash Pond

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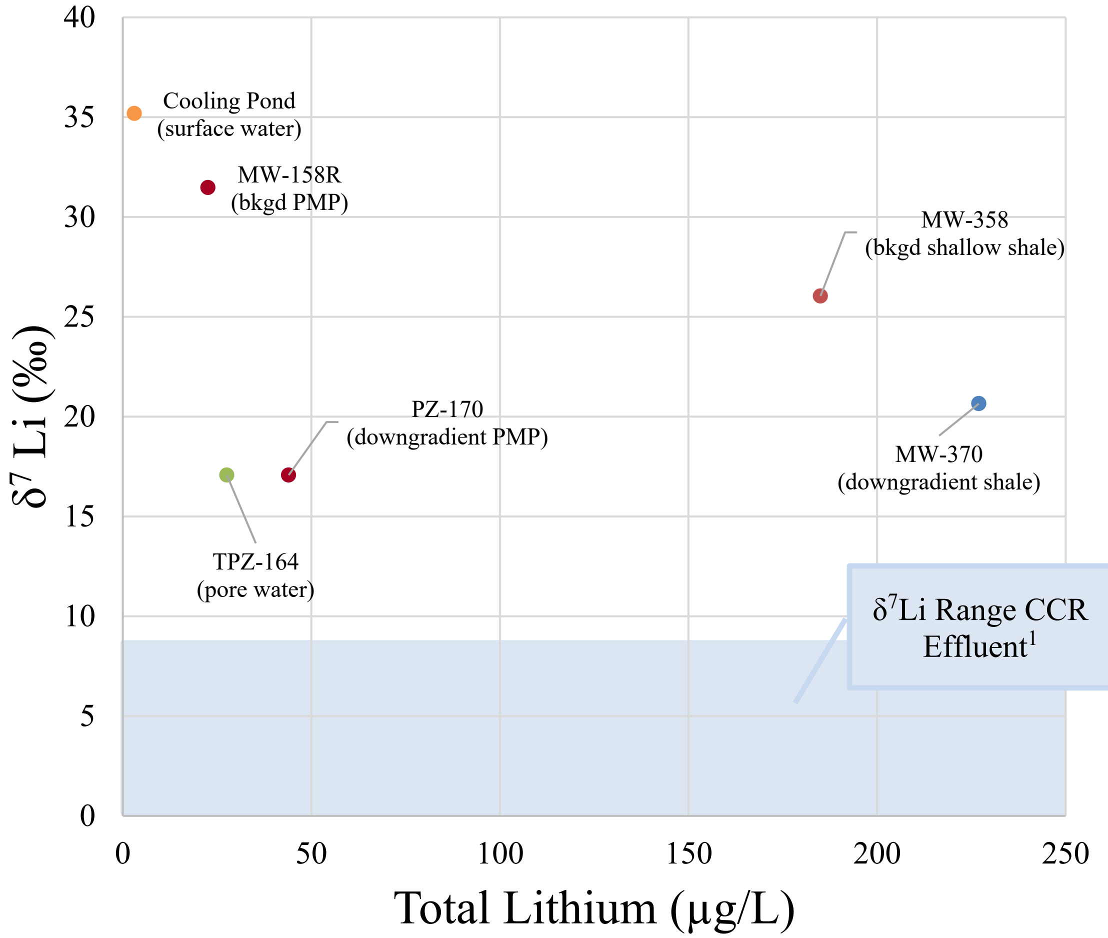
Columbus, Ohio | December 2024

Figure 7



Notes:
1. δ^7Li range from Ruhl et al 2015.
µg/L: micrograms per liter
‰: per mille
Bkgd: background
PMP: potential migration pathway

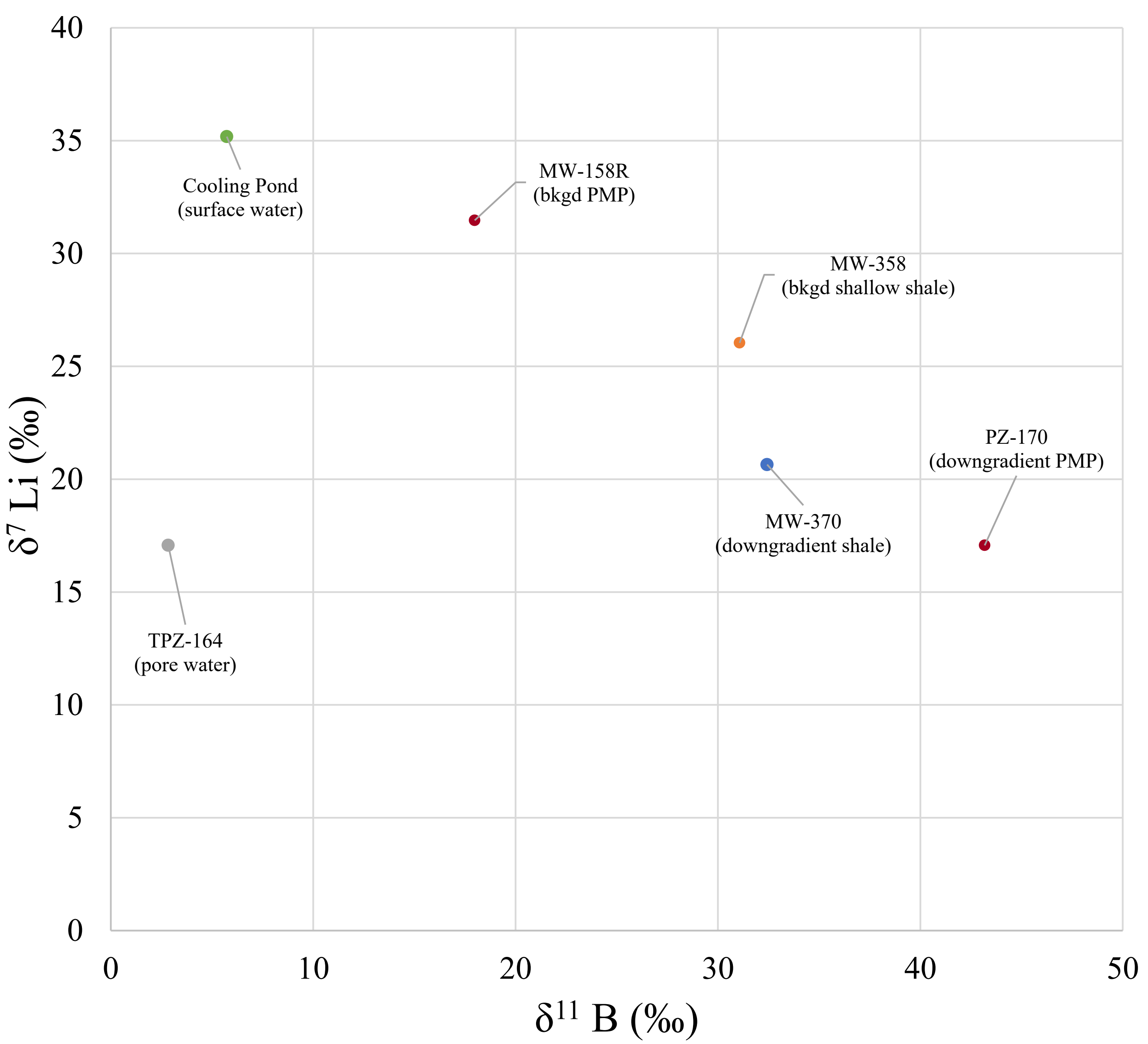
Lithium Isotope Distribution

Baldwin Power Plant – Bottom Ash Pond

Geosyntec consultants

Columbus, Ohio | December 2024

Figure 8



Notes:
µg/L: micrograms per liter
‰: per mille
Bkgd: background
PMP: potential migration pathway

Isotopic Composition of Lithium and Boron

Baldwin Power Plant – Bottom Ash Pond

Geosyntec consultants

Figure **9**

Columbus, Ohio | December 2024

ATTACHMENT 1

Part 845 Groundwater Monitoring Network

BACKGROUND WELL
COMPLIANCE WELL
PORE WATER WELL
REGULATED UNIT (SUBJECT UNIT)
FLY ASH POND SYSTEM
SITE FEATURE
CAPPED AREA
PROPERTY BOUNDARY

0 400 800 Feet

35 IAC § 845.600 GROUNDWATER MONITORING SYSTEM

BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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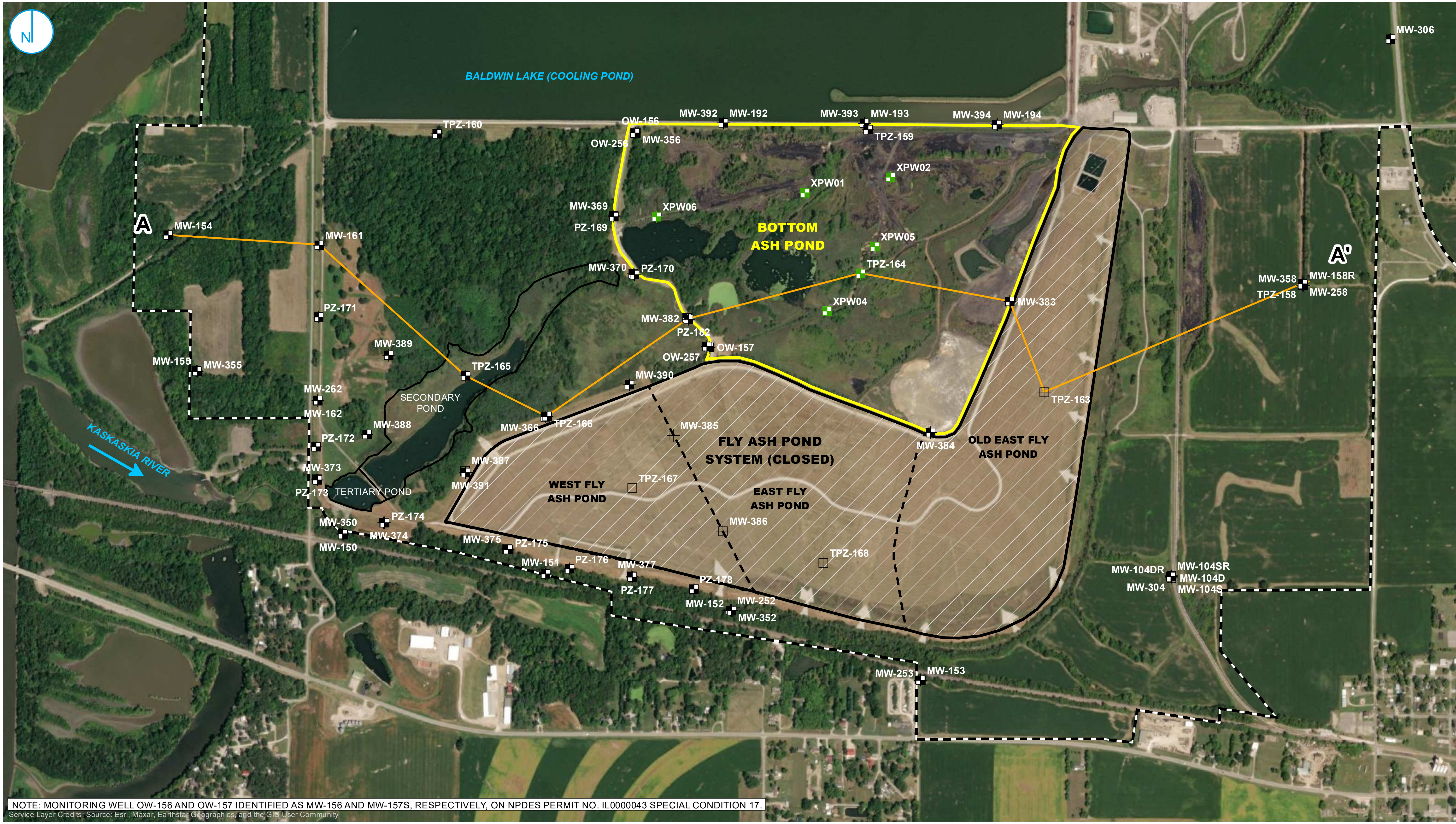
ATTACHMENT 2
Geologic Cross Section



NOTE: MONITORING WELL OW-156 AND OW-157 IDENTIFIED AS MW-156 AND MW-157S, RESPECTIVELY, ON NPDES PERMIT NO. IL0000043 SPECIAL CONDITION 17.

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Dem\Baldwin_AP\2023\Figure 3_Cross Section Locations.mxd

PROJECT: 169000XXXX | DATED: 4/24/2023 | DESIGNER: GALARNMC

MONITORING WELL AND PIEZOMETER LOCATION
PORE WATER WELL
CLOSED MONITORING WELL
CCR SOURCEWATER SAMPLE

CROSS SECTION TRANSECT

A to A'

REGULATED UNIT (SUBJECT UNIT) FLY ASH
POND SYSTEM (CLOSED)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 400 800 Feet

CROSS SECTION LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

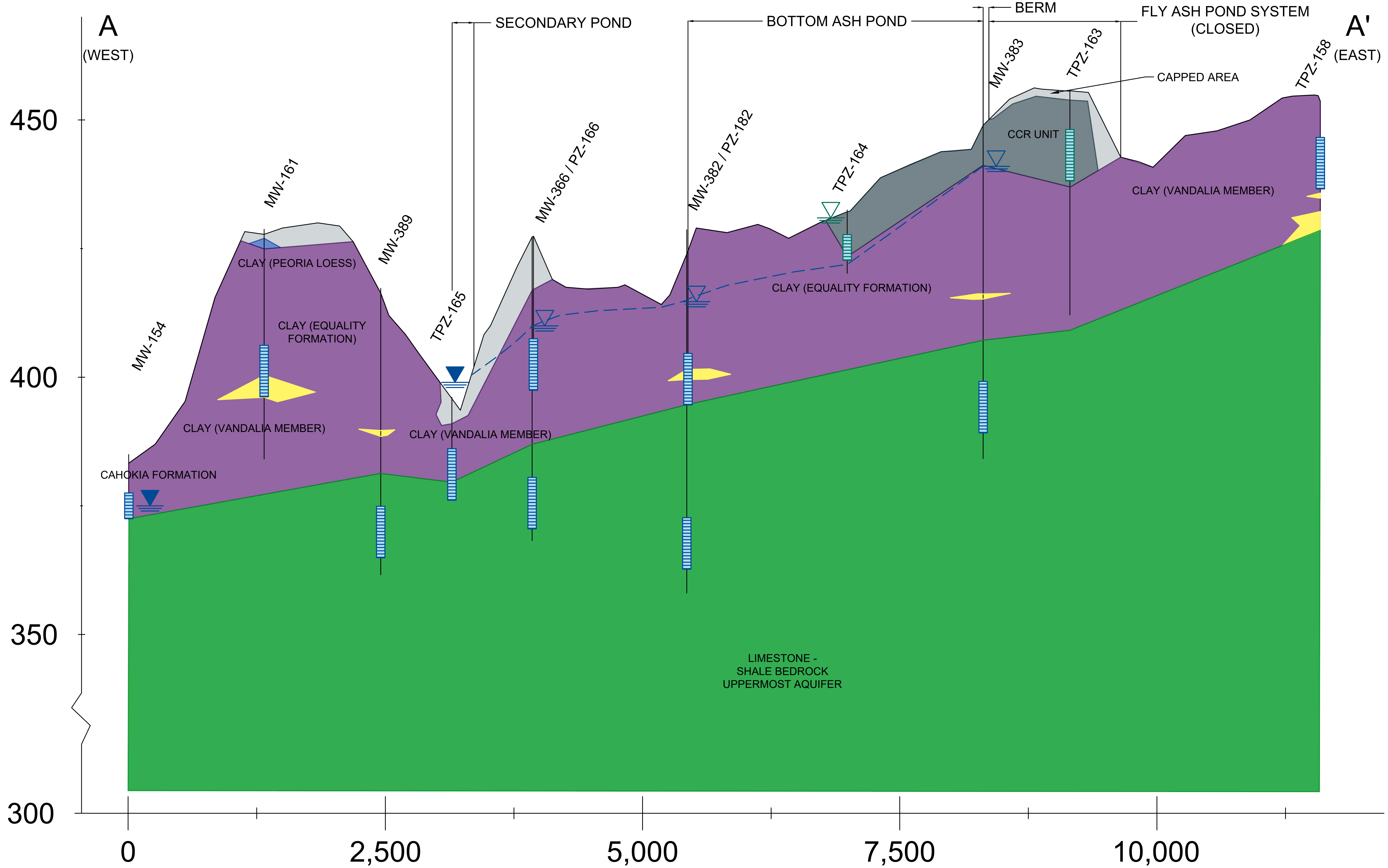
FIGURE 3

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES

1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 50X.
4. Groundwater elevations measured on September 15, 2020.



LEGEND

- COAL COMBUSTION RESIDUALS (CCR)
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPERMOST AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

20'
0
1,000'

CROSS SECTIONS A-A'

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILINOIS

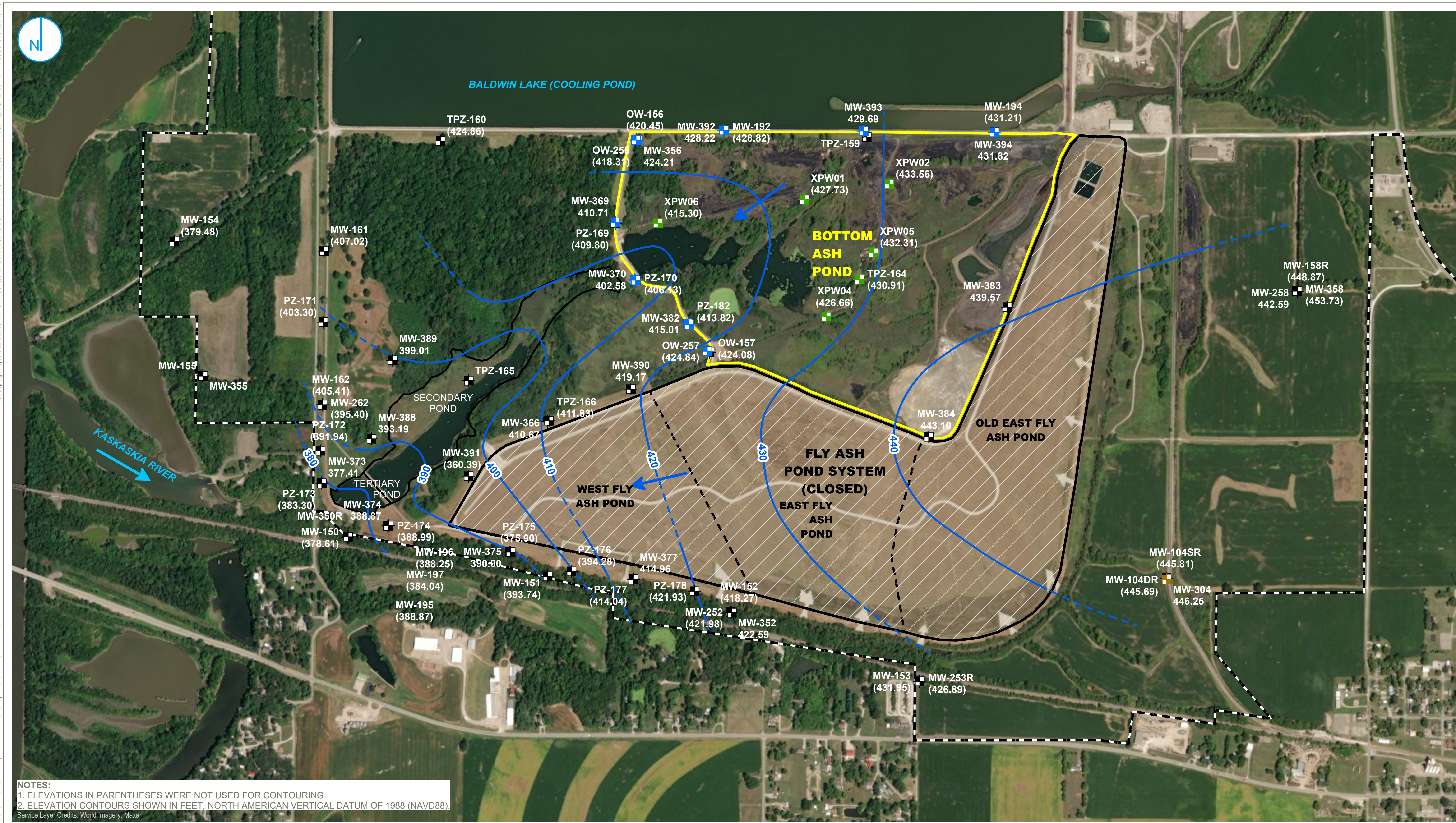
FIGURE 2-7

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 1940100806 DATED: 10/13/2021 ...\sites\vistra\Shared Documents\-CCR GW\Deliverables\Part 845 Operating Permits\Sites\Baldwin BAP\Hydrogeo\Figures\EVS\CAD\Baldwin Cross Sections.dwg

ATTACHMENT 3
Uppermost Aquifer Potentiometric Surface Map – July 15, 2024



Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2024\Baldwin\BAP_601\BAL_601_BAP_2024.aprx\BAL 601 BAP Pot Surface 20240715

PROJECT: 169000XXXX | DATED: 12/17/2024 | DESIGNER: GALARNMC

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
PORE WATER WELL

GROUNDWATER ELEVATION CONTOUR (10-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

REGULATED UNIT (SUBJECT UNIT)
FLY ASH POND SYSTEM (CLOSED)
SITE FEATURE
CAPPED AREA
PROPERTY BOUNDARY

0 400 800 Feet

POTENTIOMETRIC SURFACE MAP
JULY 15, 2024

2024 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

ATTACHMENT 4
Boring Logs

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW358

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	10/5/2022	10/8/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW358	Feet (NAVD88)	453.59 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,726.26 N, 2,387,756.63 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 42.9882"
Long -89° 50' 57.9018"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	180 97		0–3.8	0 - 3.8' **SILT:** ML, very dark grayish brown (10YR 3/2), organic material (0-10%), moist to wet. 2.1' dry.	ML									CS= Core Sample Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
			3.8–8.9	3.8 - 8.9' **CLAYEY SILT:** ML/CL, light gray (10YR 7/2), very dark grayish brown (10YR 3/2) and yellowish brown (10YR 5/8) mottling (20-30%), dry.	ML/CL									
			8.9–12	8.9 - 13' **SILTY CLAY WITH SAND:** (CL/ML)S, grayish brown (10YR 5/2), strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) mottling (20-30%), organic material (0-10%), low toughness, low to medium plasticity, stiff.	(CL/ML)S									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature]

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
					(CL/ML)S									
			13	13 - 17.8' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2), strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) mottling (20-30%), low toughness, medium to high plasticity, stiff to very stiff.										
2 CS	60 60		15		CL/ML									
			16	16.1' mottling discontinues.										
			18	17.8 - 21' **SILTY CLAY WITH SAND:** (CL/ML)S, brown (10YR 5/3), strong brown (7.5YR 5/6) and gray (10YR 6/1) mottling (20-30%), gravel (5-15%), no dilatancy, high toughness, low to medium plasticity, hard, moist.	(CL/ML)S									
3 CS	48 36		20											
			21	21 - 26.5' **SHALE:** BDX (SH), dark gray (GLEY 1 4/N), weathered, thin bedding, moderately fractured.	BDX (SH)									
4 CORE	36 32		24	24' -25.2' wet.										RUN #4: Modified RQD = (21/32) = 66%
5 CORE	36 29		26.5	26.5 - 27.5' **LIMESTONE:** BDX (LS), dark gray (5Y 4/1), shaley, fossiliferous, very strong.	BDX (LS)									RUN #5: Modified RQD = (0/29) = 0%
			27.5	27.5 - 31.3' **SHALE:** BDX (SH), grayish black (N2), weathered, highly decomposed to residual soil, wet to moist.	BDX (SH)									
			29	29.3' thinly bedded, moderately decomposed.										
6 CORE	72 60		30	30' slightly decomposed to competent, moderately fractured.										RUN #6: Modified RQD = (45/60) = 75%
			31.3	31.3 - 32' **COAL:** COAL, black (N1).	COAL									
			32											

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number MW358

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				32 - 33' **SHALE:** BDX (SH), grayish black (N2), slightly decomposed to competent, moderately fractured, wet to moist.	BDX (SH)									
			33	33 - 36' **SHALEY LIMESTONE:** BDX (LS/SH), medium gray (N5), weathered, shaley, higly decomposed, slightly fractured.	BDX (LS/SH)									
7 CORE	72 71		36	36 - 40.8' **SHALEY LIMESTONE:** to **SHALE:** BDX (LS/SH), interbedded shale.	BDX (LS/SH)									RUN #7: Modified RQD = (67/71) = 94%
			41	40.8 - 42' **LIMESTONE:** BDX (LS), medium light gray (N6), strong to moderately fractured, slightly decomposed, narrow apertures.	BDX (LS)									
8 CORE	96 85		42	42 - 58.9' **SHALE:** BDX (SH), medium gray (N5) to medium dark gray (N4), weathered, weak, thinly bedded, moderately to highly fractured.	BDX (SH)									RUN #8: Modified RQD = (81/85) = 94%
			48	47.5' dark grayish brown (10YR 4/2), pale olive (5Y 6/4) discoloration, more competent.										
9 CORE	60 60		50	50.2' weak to moderate.										RUN #9: Modified RQD = (52/60) = 87%
			51	50.8' olive gray (5Y 5/2).										
			52											

Boring Number MW358

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	42 - 58.9' **SHALE:** BDX (SH), medium gray (N5) to medium dark gray (N4), weathered, weak, thinly bedded, moderately to highly fractured. *(continued)* 52.2' dark grayish green (5GY 4/2).										
			54	54.1' medium dark gray (N4) to medium gray (N5), weak, highly decomposed, no visible bedding, dry.										
10 CORE	60 58		55		BDX (SH)									RUN #10: Modified RQD = (42/58) = 72%
			56	55.7' dark grayish green (5GY 4/2).										
			57	57.2' light brownish gray (10YR 6/2), thinly bedded, laminated.										
			58	58.2' medium dark gray (N4), strong, intensely fractured, thinly bedded.										
			59	58.9 - 64' **LIMESTONE:** BDX (LS), medium gray (N5), very strong, moderately fractured, visible laminations.										
11 CORE	36 31		60											RUN #11: Modified RQD = (8/31) = 26%
			61											
			62		BDX (LS)									
12 CORE	36 36		63											RUN #12: Modified RQD = (31/36) = 86%
			64	64 - 75.3' **SHALE:** BDX (SH), medium dark gray (N4) to medium gray (N5), strong, thinly bedded to laminated, moderately fractured. 64.3' grayish green (5GY 5/2), weathered, weak, decomposed.										
			65											
13 CORE	48 48		66											RUN #13: Modified RQD = (43/48) = 90%
			67											
			68		BDX (SH)									
			69	69.3' medium dark gray (N4), weathered, moderate strength.										
14 CORE	60 58		70											RUN# 14: Modified RQD = (57/58) = 99%
			71											
			72											

Boring Number MW358

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73–75	64 - 75.3' **SHALE:** BDX (SH), medium dark gray (N4) to medium gray (N5), strong, thinly bedded to laminated, moderately fractured. *(continued)*	BDX (SH)									
15 CORE	60 56		75–77	75.3 - 77.1' **LIMESTONE:** BDX (LS), gray (5Y 6/1), fossiliferous, very strong.	BDX (LS)									RUN #15: Modified RQD = Not Recorded
			77–78	77.1 - 78.2' **SHALE:** BDX (SH), medium dark gray (N4), weathered, weak to moderate strength, moderately decomposed.	BDX (SH)									
16 CORE	60 51		78–84	78.2 - 84.8' **LIMESTONE:** BDX (LS), medium dark gray (N4) to medium gray (N5), shaley, fossiliferous, very strong, moderately fractured, laminations (0-5%).	BDX (LS)									RUN #16: Modified RQD = (23/51) = 45%
17 CORE	60 60		85–90	84.8 - 90' **SHALE:** BDX (SH), dark gray (N3), weathered, weak to moderate strength, moderately decomposed, moderately fractured, thin bedding.	BDX (SH)									RUN #17: Modified RQD = (28/60) = 47%
			90	90' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name: Baldwin Power Plant	License/Permit/Monitoring Number:	Boring Number: MW392	
Boring Drilled By: Name of crew chief (first, last) and Firm: Blake Weller, Cascade Drilling	Date Drilling Started: 9/9/2022	Date Drilling Completed: 9/26/2022	Drilling Method: Sonic
Common Well Name: MW392	Final Static Water Level: Feet (NAVD88)	Surface Elevation: 434.07 Feet (NAVD88)	Borehole Diameter: 6.0 inches
Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒ State Plane 558,140.20 N, 2,382,717.92 E E/W; 1/4 of 1/4 of Section , T N, R	Lat 38° 11' 57.132"; Long -89° 52' 0.9632"	Local Grid Location: ☐ N ☐ S Feet; ☐ E ☐ W Feet	
Facility ID:	County: Randolph	State: IL	Civil Town/City/ or Village: Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 46		0–1	0 - 1.2' **FILL, WELL-GRADED GRAVEL WITH CLAY:** GW-GC, pinkish gray (7.5YR 6/2), angular, moist.	(FILL) GW-GC									CS= Core Sample
			1–10	1.2 - 16' **FILL, LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	(FILL) CL									Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
2 CS	120 62		10–12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

Boring Number MW392

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13–16	1.2 - 16' **FILL, LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist. *(continued)*	(FILL) CL									
			16–20	16 - 20' **LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	CL									
3 CS	120 33		20	20 - 33' **LEAN CLAY:** CL, pinkish gray (7.5YR 6/2), sand (0-5%), medium to high plasticity, stiff, moist.	CL									
4 CS	120 104		30	30' increasing sand and gravel content.										

Depth In Feet scale: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				20 - 33' **LEAN CLAY:** CL, pinkish gray (7.5YR 6/2), sand (0-5%), medium to high plasticity, stiff, moist. *(continued)*	CL									
			33	33 - 35' **WELL-GRADED SAND WITH SILT AND GRAVEL:** (SW-SM)g, fine to medium sand, dry.	(SW-SM)g									
			35	35 - 36.5' **SANDY SILT WITH GRAVEL:** s(ML)g, light yellowish brown (10YR 6/4), dry.	s(ML)g									
			36.5	36.5 - 39' **CLAYEY SILT:** ML/CL, gray (7.5YR 5/1), sand (5-10%), coal (0-5%), gravel (0-5%), dry.	ML/CL									
			39	39 - 40' **SILTY CLAY:** CL/ML, sand (0-5%), low to medium plasticity, stiff.	CL/ML									
5 CS	120 108		40	40 - 48' **SILT WITH SAND:** (ML)s, light brownish gray (10YR 6/2), dry.	(ML)s									
			44	44' increasing clay content.										
			45	45' (2.5Y 6/2).										
			48	48 - 52' **SILT:** ML, gray (2.5Y 5/1), sand (0-5%), dry.	ML									
6 CS	84 81		50											
			52											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			52–57	52 - 57' **SHALE:** BDX (SH), dark gray (5Y 4/1), highly weathered, hard, dry. 53' very dark gray (7.5YR 3/1).	BDX (SH)									
7 CORE	60 4		57–57.5	57 - 57.5' **LIMESTONE:** BDX (LS), gray (5Y 6/1), slightly fractured.	BDX (LS)									RUN #7: Modified RQD = 0% (No Solid Recovery > 4")
8 CORE	96 78		57.5–70	57.5 - 70' **SHALE:** BDX (SH), dark gray (5Y 4/1), weathered, soft, moderately fractured to highly fractured limestone beds (0-5%). 66.3' - 67.2' highly fractured, very soft, wet.	BDX (SH)									RUN #8: Modified RQD = (28/78) = 36%
9 CORE	120 62		70–72	70 - 74.4' **LIMESTONE:** BDX (LS), gray (5Y 6/1), moderately to intensely fractured, moderately wide apertures.	BDX (LS)									RUN #9: Modified RQD = (28/78) = 36%

Boring Number MW392

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73, 74	70 - 74.4' **LIMESTONE:** BDX (LS), gray (5Y 6/1), moderately to intensely fractured, moderately wide apertures. *(continued)*	BDX (LS)									
10 CORE	48 48		75, 76, 77, 78, 79, 80, 81	74.4 - 81.8' **SHALE:** BDX (SH), medium dark gray (N4) to dark gray (N3), slightly weathered, moderately fractured, thinly bedded.	BDX (SH)									RUN #10: Modified RQD = (28/48) = 58%
			82, 83, 84	81.8 - 84' **LIMESTONE:** BDX (LS), medium light gray (N6), shaley, fossiliferous, moderately fractured, thinly bedded. 83.2' medium gray (N5).	BDX (LS)									
				84' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW393

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/9/2022	10/4/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW393	Feet (NAVD88)	434.59 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 558,133.57 N, 2,383,944.49 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 57.027"
Long -89° 51' 45.5976"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 86		0 - 1	0 - 1' **FILL, WELL-GRADED GRAVEL:** GW, pinkish gray (7.5YR 6/2), angular, moist.	(FILL) GW									CS= Core Sample
			1 - 20	1 - 20' **FILL, LEAN CLAY:** CL, brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	(FILL) CL									Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
2 CS	120 120		10	10' sand (0-5%), iron concretions (0-5%).										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

Boring Number MW393

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13–19	1 - 20' **FILL, LEAN CLAY:** CL, brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist. *(continued)* 18' medium to high plasticity.	(FILL) CL									
3 CS	120 120		20–23	20 - 24' **LEAN CLAY:** CL, light brown (7.5YR 6/4), mottling, sand (0-5%), medium to high plasticity, cohesive, moist.	CL									
			24–26	24 - 27' **CLAYEY SAND:** SC, gray (10YR 6/1), fine to medium sand, wet.	SC									
4 CS	120 105		27–30	27 - 31' **SILT WITH SAND:** (ML)s, dark gray (7.5YR 4/1), sand (0-5%), moist. 30' coal fragments (0-5%).	(ML)s									
			31–32	31 - 40' **SILTY CLAY:** CL/ML, dark gray (7.5Y 4/1), organic material (0-5%), gravel (0-5%), stiff to very stiff, moist.	CL/ML									

RAMBOLL

Boring Number MW393

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33–40	31 - 40' **SILTY CLAY:** CL/ML, dark gray (7.5Y 4/1), organic material (0-5%), gravel (0-5%), stiff to very stiff, moist. *(continued)*	CL/ML									
5 CS	120 120		40–50	40 - 50' **SILT:** ML, grayish brown (2.5Y 5/2), very stiff to hard, platy, dry.	ML									
6 CS	120 92		50–52	50 - 55' **SILT:** ML, dark gray (7.5YR 4/1), sand (0-5%), very stiff to hard, dry.	ML									

RAMBOLL

Boring Number MW393

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				50 - 55' **SILT:** ML, dark gray (7.5YR 4/1), sand (0-5%), very stiff to hard, dry. *(continued)*	ML									
			53											
			54											
			55	55 - 57' **CLAYEY SILT:** ML/CL, gray (10YR 6/1), sand (0-5%), gravel (0-5%), medium plasticity, moist.	ML/CL									
			56											
			57	57 - 60' **LIMESTONE:** BDX (LS), gray (10YR 6/1), rock flour and angular chips (<2").	BDX (LS)									
			58											
			59											
7 CORE	120 60		60	60 - 70' **SHALE:** BDX (SH), medium gray (N5), weathered, very weak, residual soil, soft, slightly fractured.	BDX (SH)									RUN #7: Modified RQD = (31/60) = 52%
			61											
			62											
			63											
			64											
			65											
			66											
			67											
			68											
			69											
8 CORE	42 40		70	70 - 73.5' **LIMESTONE:** BDX (LS), medium dark gray (N4), weathered, shaley, thinly bedded, moderately fractured.	BDX (LS)									RUN #8: Modified RQD = (32/40) = 80%
			71											
			72											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	70 - 73.5' **LIMESTONE:** BDX (LS), medium dark gray (N4), weathered, shaley, thinly bedded, moderately fractured. *(continued)* 72' medium gray (N5).	BDX (LS)									
9 CORE	78 40		74 75 76 77 78 79	73.5 - 85' **SHALE:** BDX (SH), medium gray (N5), weathered, moderately to slightly fractured, thinly laminated.	BDX (SH)									RUN #9: Modified RQD = (30/40) = 75%
10 CORE	60 45		80 81 82 83 84	83.5' more competent.										RUN #10: Modified RQD = (34/45) = 76%
			85	85' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW394

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/25/2022	10/5/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW394	Feet (NAVD88)	435.51 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 558,123.63 N, 2,385,095.76 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 56.8911"
Long -89° 51' 31.1756"

Local Grid Location: Feet ☐N ☐S Feet ☐E ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	72 67		0–2.6	0 - 2.6' **FILL, WELL-GRADED GRAVEL WITH CLAY:** GW-GC, brown (10YR 4/3), angular, moist.	(FILL) GW-GC									CS= Core Sample Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
			2.6–20	2.6 - 20' **LEAN CLAY:** CL, brown (10YR 5/3), reddish brown bottling (20%), sand (0-5%), low to medium plasticity, very stiff to hard, moist.	CL				4					
			5						4					
2 CS	120 120		6											
			6.5						2.5					
			7.5						3.5					
			8.5						2					
			9.2	9.2' brown (7.5YR 5/3), medium to high plasticity.										
			9.5						2					
			10.5						3					
			11.5						2.25					

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204	Tel: (414)837-3607 Fax: (414)837-3608

Boring Number MW394

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				2.6 - 20' **LEAN CLAY:** CL, brown (10YR 5/3), reddish brown bottling (20%), sand (0-5%), low to medium plasticity, very stiff to hard, moist. *(continued)*										
			13						2.25					
			14	14' low to medium plasticity.										
									2.5					
			15											
3 CS	120 120		16		CL									
				16.5' increasing sand and gravel content, gray (GLEY 1 5/1) iron concretions (50%).										
			17											
			18											
			19											
			20	20 - 22.1' **SILTY SAND:** SM, yellowish brown (10YR 5/6), fine sand, clay (0-5%), moist.										
			21		SM									
			22	22.1 - 36.8' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), greenish gray (GLEY 1 5/10Y) and yellowish brown (10YR 5/6) mottling, sand (0-5%), medium to high plasticity, hard, moist.										
			23						4.5					
			24						4.5					
			25						4.5					
4 CS	120 112		26						4.5					
			27		CL				4.5					
			28						4.5					
			29											
			30						4.5					
			31						4.5					
			32						4.5					

Boring Number MW394

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	22.1 - 36.8' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), greenish gray (GLEY 1 5/10Y) and yellowish brown (10YR 5/6) mottling, sand (0-5%), medium to high plasticity, hard, moist. *(continued)*					3.75					
			34						4.25					
			35	34.4' olive yellow (5Y 6/6), low to medium plasticity.	CL				4.5					
5 CS	120 113		36											
			37	36.8 - 48' **Weathered SHALE Bedrock:** BDX (SH), pale olive (5Y 6/3), weathered, argillaceous, fissile, moist.										
			38											
			39											
			40	40' olive gray (5Y 5/2).										
			41											
			42											
			43		BDX (SH)									
			44											
			45											
6 CS	96 96		46											
			47											
			48	48 - 58' **LIMESTONE:** to **SHALE:** BDX (LS), olive gray (5Y 4/2), interbedded limestone and shale, fissile.										
			49											
			50	50' - 50.2' limestone, very strong.	BDX (LS)									
			51											
			52											

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 CS	48 48		53, 54, 55, 56, 57	48 - 58' **LIMESTONE:** to **SHALE:** BDX (LS), olive gray (5Y 4/2), interbedded limestone and shale, fissile. *(continued)* 53.7' - 53.9' limestone, very strong. 54' - 55.6' dark gray (10YR 4/1) to gray (10YR 5/1), more competent. 55.6' gray (10YR 6/1) to dark gray (10YR 4/1), more competent.	BDX (LS)									
8 CORE	18 14		58, 59	58 - 59.7' **LIMESTONE:** BDX (LS), medium gray (N5), shaley, laminated, moderately fractured.	BDX (LS)									RUN #8: Modified RQD = (4/14) = 29%
9 CORE	60 60		60, 61, 62, 63, 64	59.7 - 68' **SHALE:** BDX (SH), medium dark gray (N4), weathered, very weak to weak, thinly bedded, moderately fractured.	BDX (SH)									RUN #9: Modified RQD = (48/60) = 80%
10 CORE	57 56		65, 66, 67	64.5 - 67.2' highly decomposed, weathered, wet.										RUN #10: Modified RQD = Not Recorded
			68	68 - 68.4' **LIMESTONE:** BDX (LS), light olive gray (5Y 6/2) to olive gray (5/2).	BDX (LS)									
			69, 70	68.4 - 70.8' **SHALE:** BDX (SH), medium dark gray (N4), weathered, very weak to weak, thinly bedded, moderately fractured.	BDX (SH)									
11 CORE	68 68		71	70.8 - 71' **LIMESTONE:** BDX (LS), dark gray (N3), shaley.	BDX (LS)									RUN #11: Modified RQD = (42/68) = 62%
			72	71 - 77.6' **SHALE:** BDX (SH), dark gray (N3),										

SOIL BORING LOG INFORMATION SUPPLEMENT

RAMBOLL

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
12 CORE	60 59		73–77	strong, thinly bedded, moderately fractured. 71 - 77.6' **SHALE:** BDX (SH), dark gray (N3), strong, thinly bedded, moderately fractured. *(continued)*	BDX (SH)									RUN #12: Modified RQD = (44/59) = 75%
			78–79	77.6 - 80' **LIMESTONE:** BDX (LS), medium gray (N5), shaley, weak, moderately fractured.	BDX (LS)									
13 CORE	60 48		80–85	80 - 85' **SHALE:** BDX (SH), medium dark gray (N4), weathered, weak, thinly bedded, moderately fractured, moist to wet.	BDX (SH)									RUN #13: Modified RQD = (40/48) = 83%
			85	85' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-370

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	11/20/2015	11/24/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-370	Feet (NAVD88)	418.67 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒

State Plane 556,826.50 N, 2,381,936.14 E E/Ⓦ

1/4 of 1/4 of Section , T N, R

Lat 38° 11' 44.1702"

Long -89° 52' 10.8084"

Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–2	0 - 2' **SILTY CLAY** CL/ML.	CL/ML								0-28' Blind Drilled. See log PZ-170 for soil description.
			2–4	2 - 4' Shelby Tube Sample.									
			4–8	4 - 8' **SILTY CLAY** CL/ML.	CL/ML								
			8–10	8 - 10' **SILTY CLAY** to **LEAN CLAY:** CL/ML.	CL/ML								
			10–12	10 - 12' **LEAN CLAY:** CL.	CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

Natural Resource Technology

Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12	12 - 14' Shelby Tube Sample.										
			14	14 - 24' **SILTY CLAY** CL/ML.	CL/ML									
			24	24 - 26' Shelby Tube Sample.										
			26	26 - 28' **SILTY CLAY** CL/ML.	CL/ML									
1 SS	10 10	23 50/4"	28	28 - 28.4' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace angular limestone gravel, soft, medium plasticity, moist.	CL									
1 CORE	60 18.5		28.4	28.4 - 28.9' **SHALE:** BDX (SH), gray, highly decomposed, very weak.	BDX (SH)									Core 1, RQD=51%
			28.9	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong.	BDX (LS/SH)									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

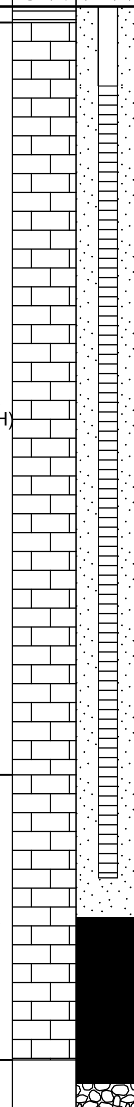
Boring Number MW-370

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong. *(continued)*									
2 CORE	51.5 12		34	33.9' - 38.1' gray, greenish gray in fractures, trace fossils, moderately to highly decomposed, slightly to moderately disintegrated, clay in shoe with a hard, reddish brown inclusion.	BDX (LS/SH)								Core 2, RQD=0%
			35, 36, 37	36' - 37.9' vertical fracture.									
3 CORE	24 25		38, 39	38.1 - 44' **SHALE:** BDX (SH), bluish gray, intensely fractured (extremely narrow to narrow apertures), highly decomposed, weak.									Core 3, RQD=40%
4 CORE	24 11		40										Core 4, RQD=0%
5 CORE	36 32		41, 42, 43	40.6' - 40.8 shaley limestone layer, light gray to gray, microcrystalline, moderately decomposed, very strong. 41.1' - 43.2 gray, moderately to highly decomposed.	BDX (SH)								Core 5, RQD=78%
6 CORE	12 28		44, 45	44 - 45.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to narrow apertures), thin to medium bedded, microcrystalline, slightly decomposed, clay cement in apertures, very strong.	BDX (LS/SH)								Core 6, RQD=29%
7 CORE	45 27		46	45' shale layer, bluish gray, moderately fractured (extremely narrow to narrow apertures), highly decomposed, weak.									Core 7, RQD=65%
			47, 48	45.7 - 52.2' **SHALE:** BDX (SH), bluish gray, moderately fractured (tight to narrow), highly decomposed, weak.									
8 CORE	24 30		49, 50, 51		BDX (SH)								Core 8, RQD=78%
9 CORE	24 24		52										Core 9, RQD=0%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				52' clay cement.										
10 CORE	24 36		53 54	52.2 - 61.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (very narrow to narrow), thin to medium bedded, microcrystalline, slightly decomposed, cemented clay in apertures, very strong. 52.7' - 53' clayey sand in aperture. 53' - 53.1 shale bed, bluish gray, fossiliferous, moderately fractured (very narrow to narrow), highly decomposed, weak. 53.1' white to bluish gray, gray in the fractures (extremely narrow to moderately narrow apertures), thinly to medium bedded, slightly to moderately disintegrated.	BDX (LS/SH)									Core 10, RQD=0%
11 CORE	24 30		55 56 57	55.7' moderately disintegrated.										Core 11, RQD=18%
12 CORE	30 27		58 59 60	58.1' highly decomposed.										Core 12, RQD=39%
13 CORE	36 53		61											Core 13, RQD=89%
			62 63 64 65	61.7 - 65.3' **LIMESTONE:** BDX (LS).	BDX (LS)									
			66	65.3 - 66' Overdrilled for Well Installation.										
				66' End of Boring.										Bedrock corehole reamed 6" in diameter to 66' for well installation.



SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-170

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/29/2015	7/29/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-170	Feet (NAVD88)	418.58 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,822.69 N, 2,381,944.92 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 44.106"
Long -89° 52' 10.6752"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 8	4 5 6 9	0–2	0 - 2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (15-25%), trace roots, grass, gravel, and coarse sand, cohesive, nonplastic to low plasticity, hard (>4.5 tsf), dry.	CL/ML								
2 ST	24 21		2–4	2 - 4' Shelby Tube Sample.									ST2: 24" push at 500lbs of pressure.
3 SS	24 15	2 3 5 7	4–6	4 - 8' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (5-15%), trace very fine sand and gravel, low plasticity, very stiff to hard (2.5->4.5 tsf), dry.	CL/ML								
4 SS	24 17	3 5 8 8	6–8	6' - 7.4' trace gray (10YR 5/1) mottling.									
5 SS	24 17	3 4 6 6	8–10	8 - 10' **SILTY CLAY** to **LEAN CLAY:** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (5-15%), trace very fine sand and gravel, silt content decreases with depth, clay content increases with depth, medium plasticity, very stiff (3.25 tsf), dry.	CL/ML								
6 SS	24 20	3 4 5 5	10–12	10 - 12' **LEAN CLAY:** CL, brown (5YR 4/3), trace very dark brown (10YR 2/2) mottling, trace silt, silt content increasing with depth, medium to high plasticity, stiff (1.75-2.0 tsf).	CL								
7 ST	24 24		12–13	12 - 14' Shelby Tube Sample.									ST7: 24" push at 250lbs of pressure.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

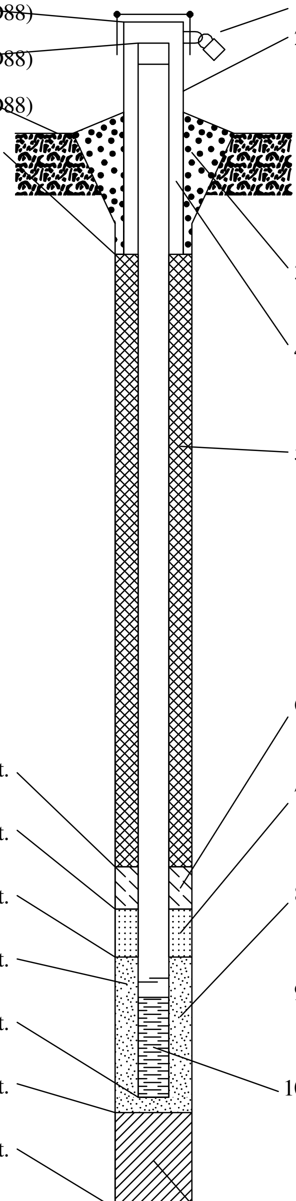
Boring Number PZ-170

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				12 - 14' Shelby Tube Sample. *(continued)*										
8 SS	24 21	3 5 7 8	14	14 - 24' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (10-20%), trace gravel, cohesive, low plasticity, stiff to very stiff (1.0-3.0 tsf), dry to moist. 14.9' - 15.3' very dark brown (10YR 2/2) mottling.										
9 SS	24 24	2 4 4 6	16	16' - 18.5' increaed very dark brown (10YR 2/2) mottling (5-15%), very fine sand (0-10%), trace fine gravel, subangular, cohesive, low to medium plasticity, dry to moist. 16.8' - 17.1' very dark brown (10YR 2/2) mottling.										
10 SS	24 24	1 3 3 3	18	18' - 20' silt (15-25%), very fine sand (0-10%), trace fine gravel, medium plasticity, moist. 19' layer of gravel (2" thick, subangular to subrounded).	CL/ML									
11 SS	24 20	1 2 5 7	20	19.8' very soft (0.25 tsf). 20' - 24' subangular to subrounded gravel, low plasticity, dry to moist. 20.8' increased gravel content (10-15%). 21.2' decrease in gravel content (5-15%).										
12 SS	24 20.5	3 6 8 10	22											
13 ST	24 24		24	24 - 26' Shelby Tube Sample.										ST13: 24" push at 650lbs of pressure.
14 SS	24 22	3 6 12 14	26	26 - 28.2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (10-30%), very fine sand (0-15%), trace fine subangular to subrounded gravel, gravel decreases with depth to no gravel, trace <1mm thick very fine sand seams, cohesive, low to medium plasticity, plasticity increasing with depth, very stiff to hard (2.0->4.5 tsf), moist, decreasing silt and sand content with depth.	CL/ML									
15 SS	24 22	9 17 24 35	28	28.2 - 30' **LEAN CLAY:** CL, very dark gray (2.5Y 3/1), trace silt, cohesive, medium to high plasticity, hard (>4.5 tsf), dry. 28.5' black (2.5Y 2.5/1). 28.9' greenish gray (GLEY 1 6/1).	CL									
16 SS	17 13	11 30 50 for 5"	30	30 - 31.1' **SHALE:** to **LEAN CLAY:** BDX (SH), greenish gray (GLEY 1 6/1), trace silt, cohesive, medium to high plasticity, dry, shale (residual soil to highly decomposed, very weak, fissile).	BDX (SH)									Hollow Stem Auger Refusal at 31.1 ft bgs on Shale Bedrock.
			31	31.1' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

MONITORING WELL CONSTRUCTION

Facility/Project Name: Baldwin Energy Complex	Local Grid Location of Well: ______ft. ☐ N. ☐ S. ______ft. ☐ E. ☐ W.	Well Name: MW-370
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 11' 44.170" Long. -89° 52' 10.808" or	
Facility ID	St. Plane 556,826.50 ft. N, 2,381,936.14 ft. E. E / (W)	Date Well Installed: 11/25/2015
Type of Well: mw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Mark Baetje, Bulldog Drilling
Distance from Waste/Source: ft. — State: Illinois	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☒ Downgradient; n ☐ Not Known — Gov. Lot Number:	



A. Protective pipe, top elevation ______ ft. (NAVD88)

B. Well casing, top elevation 420.85 ft. (NAVD88)

C. Land surface elevation 418.67 ft. (NAVD88)

D. Surface seal, bottom 417.7 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☒ Hollow Stem Auger ☐ Other ☐

15. Drilling fluid used: Water ☒ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required): Village of Baldwin

E. Bentonite seal, top 389.7 ft. (NAVD88) or 29.0 ft.

F. Fine sand, top ______ ft. (NAVD88) or ______ ft.

G. Filter pack, top 367.7 ft. (NAVD88) or 51.0 ft.

H. Screen joint, top 365.7 ft. (NAVD88) or 53.0 ft.

I. Well bottom 355.7 ft. (NAVD88) or 63.0 ft.

J. Filter pack, bottom 355.2 ft. (NAVD88) or 63.5 ft.

K. Borehole, bottom 352.7 ft. (NAVD88) or 66.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Three steel bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ Other ☒ Sand
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. 30 % Bentonite . . . Bentonite-cement grout ☒
   e. ______Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Unimin Corporation, FILTERSIL
   b. Volume added ______ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer ______
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐ Other ☒
   2.1' of bentonite chips, 0.4' of bedrock drill cuttings

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 2/26/2016

Signature: Brad Rhodes

Firm: Natural Resource Technology
234 W. Florida Street, Floor 5, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

KELRON ENVIRONMENTAL
Incorporated

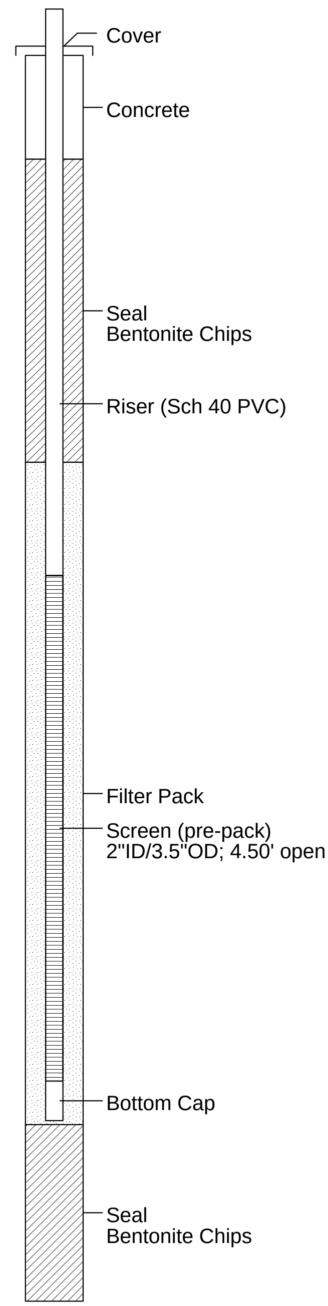
LOG OF PROBEHOLE TPZ-164

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 432.50
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Surf. Elev. 432.50	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry							
1								
2								
		430						
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay							
		429						
4			1		17/24		AR	
	- wet	428						
5								
		427						
6								
		426						
7								
		425						
8								
		424		3				
9	CLAY (lean), stiff, medium to high plasticity, dark gray (10YR 4/1), moist - @8.9' - light yellowish brown (10YR 6/4) with <10% light gray mottling - @9.3' - gray (10YR 6/1) with 25-50% brownish-yellow mottling (10YR 6/6)	423	2	3 5	18/18		CL	
10								
	- light olive brown <Shelby Tube Sample ST164-12 @ 10-12'> grain size analysis: 7.2% Sand, 62.2% Silt, 30.6% Clay	422						
11			3		23/24		CL	
	END BOREHOLE AT 10.3 FEET BLS END Split-Spoon Sampling at 12 feet BLS	421						
12								
		420						
		419						

Well: TPZ-164
Elev.: 435.10



11-08-2013 C:\Consulting A\Power Plants\Baldwin\Baldwin 2013 Hydrogeologic Study\Field Work Phase\Boring Logs\BEC164.BOR

KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-164

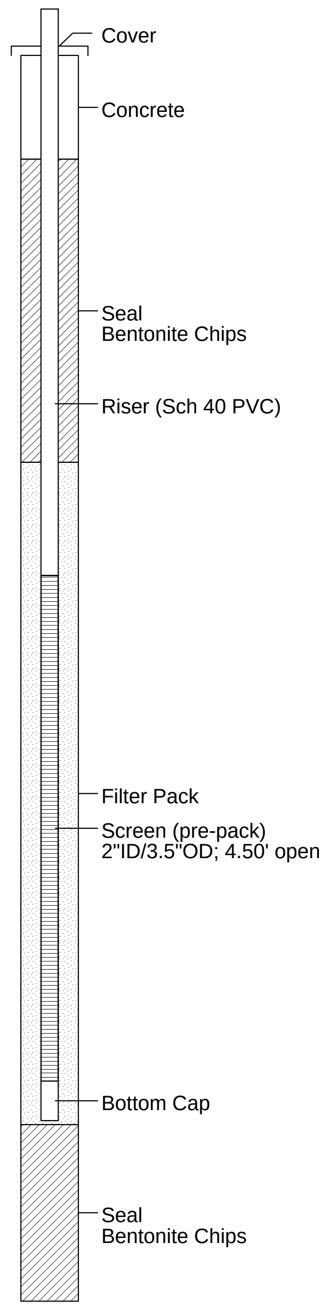
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 432.50
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry					
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay	1		17/24		AR
4.5	- wet					
8.7	CLAY (lean), stiff, medium to high plasticity, dark gray (10YR 4/1), moist - @8.9' - light yellowish brown (10YR 6/4) with <10% light gray mottling - @9.3' - gray (10YR 6/1) with 25-50% brownish-yellow mottling (10YR 6/6)	2	3 3 5	18/18		CL
10.3	- light olive brown <Shelby Tube Sample ST164-12 @ 10-12'> grain size analysis: 7.2% Sand, 62.2% Silt, 30.6% Clay	3		23/24		CL
	END BOREHOLE AT 10.3 FEET BLS END Split-Spoon Sampling at 12 feet BLS					

Surf. Elev. 432.50: 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419

Well: TPZ-164
Elev.: 435.10



RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		XPW01

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Arlen Little Cascade Drilling	9/23/2022	9/23/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW01	Feet (NAVD88)	435.12 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 557,530.38 N, 2,383,427.03 E E/W (W circled)
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 51.0807"
Long -89° 51' 52.1047"

Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 45			0 - 0.5' **FILL, ASH (Coal):** SM, black (10YR 2/1), silt to sand-sized ash, organic material (5-10%), loose, wet.	(FILL) SM									CS= Core Sample
			1	0.5 - 1.5' **FILL, SILTY CLAY:** CL/ML, medium to high plasticity, stiff.	(FILL) CL/ML				1					
			2	1.5 - 3.2' **FILL, ASH (Coal):** SM, black (10YR 2/1), silt to sand-sized ash, wet.	(FILL) SM									
			3	3.2 - 4.1' **FILL, SILTY CLAY:** CL/ML, gray (10YR 5/1), medium plasticity, soft, moist.	(FILL) CL/ML				0.5					
			4	4.1 - 11' **FILL, ASH (Coal):** SM, black (10YR 2/1), silt to sand-sized ash, wet. 5.4' very dark gray.	(FILL) SM									
			5											
			6											
			7											
			8											
			9											
2 CS	48 30		10											
			11	11 - 11.9' **FILL, ASH (Coal):** SW-SM, black (10YR 2/1), silt to sand-sized ash, wet.	(FILL) SW-SM									
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204	Tel: (414)837-3607 Fax: (414)837-3608

Boring Number XPW01

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	11.9 - 14' **SILTY CLAY:** CL/ML, dark grayish brown (10YR 4/2), yellowish brown to gray (10YR 5/1) mottling (10-20%), medium to high plasticity, very stiff, moist. *(continued)*	CL/ML				2.75 3					
			14	14' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		XPW02

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Arlen Little Cascade Drilling	9/24/2022	9/24/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW02	Feet (NAVD88)	434.86 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 557,667.96 N, 2,384,171.76 E E/W (W circled)
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 52.4167"
Long -89° 51' 42.7697"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 120		0–9.5	0 - 9.5' **FILL, ASH (Coal):** SM, greenish black (GLEY 1 2.5/1), silt to sand-sized ash, gravel (0-5%), loose, moist.	(FILL) SM									CS=Core Sample
2 CS	48 48		9.5–11	9.5 - 11' **FILL, ASH (Coal):** SW-SM, reddish black (2.5YR 2.5/1), silt to sand-sized ash, silt (5-15%), moist to wet.	(FILL) SW-SM									
			11–12	11 - 14' **SILTY CLAY:** CL/ML, dark greenish gray (GLEY 1 4/1), medium to high plasticity, stiff to very stiff, moist.	CL/ML				1.25					

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
(signature)	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204 Tel: (414)837-3607 Fax: (414)837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number XPW02

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	11 - 14' **SILTY CLAY:** CL/ML, dark greenish gray (GLEY 1 4/1), medium to high plasticity, stiff to very stiff, moist. *(continued)* 13' yellowish brown (10YR 5/4).	CL/ML				2.5 2					
			14	14' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		XPW04

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/24/2022	9/24/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW04	Feet (NAVD88)	430.59 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,502.51 N, 2,383,618.45 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 40.9132"
Long -89° 51' 49.7489"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 85		0–6	0 - 6' **FILL, ASH (Coal):** SM, black (10YR 2/1) to very dark gray (10YR 3/1), silt to sand-sized ash, clay (5-15%), gravel (0-5%), wood (0-5%), moist.	(FILL) SM									CS=Core Sample
2 CS	60 60		6–12	6 - 16.5' **FILL, ASH (Coal):** SW, black (10YR 2/1), sand-sized ash, silt (10-20%), clay (0-5%), loose, wet.	(FILL) SW									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

Boring Number XPW04

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	6 - 16.5' **FILL, ASH (Coal):** SW, black (10YR 2/1), sand-sized ash, silt (10-20%), clay (0-5%), loose, wet. *(continued)*	(FILL) SW									
			14											
3 CS	60 50.4		15	15' interbedded silty clay.										
			16											
			17	16.5 - 20' **SILTY CLAY:** CL/ML, greenish gray (GLEY 1 6/1), yellowish brown mottling (10%), sand (0-5%), medium to high plasticity, very stiff, moist.	CL/ML				2.75					
			18						3.25					
			19						3.5					
			20	20' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		XPW05

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/24/2022	9/24/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW05	Feet (NAVD88)	434.12 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 557,062.95 N, 2,384,034.20 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 46.4401"
Long -89° 51' 44.5179"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 55		0–10	0 - 21.9' **ASH (Coal):** (SW)g, black (10YR 2/1) to very dark gray (10YR 3/1), sand-sized ash, silt (5-15%), clay (0-5%), organic material (0-5%), loose, moist.	(SW)g									
2 CS	120 88		10–12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

Boring Number XPW05

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
3 CS	120 120		13–22	0 - 21.9' **ASH (Coal):** (SW)g, black (10YR 2/1) to very dark gray (10YR 3/1), sand-sized ash, silt (5-15%), clay (0-5%), organic material (0-5%), loose, moist. *(continued)* 15' saturated.	(SW)g									
			22–24.5	21.9 - 24.5' **ASH (Coal):** ML, dark gray (10YR 4/1) to dark grayish brown (10YR 4/2), silt-sized ash, clay (5-15%), sand (0-5%), non-plastic, wet.	ML									
			25–28	24.5 - 28.2' **ASH (Coal):** (SW)g, black (10YR 2/1), sand-sized ash, silt (5-15%), loose, wet.	(SW)g									
			29–30	28.2 - 30' **SILTY CLAY:** CL/ML, gray (10YR 5/1), light yellowish brown (10YR 6/4) mottling, sand (0-5%), very stiff to hard, medium plasticity, moist.	CL/ML				3.5 4.5					
			30	30' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		XPW06

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Arlen Little Cascade Drilling	9/22/2022	9/22/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW06	Feet (NAVD88)	418.06 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 557,323.97 N, 2,382,140.04 E E/W(circled)
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 49.0814"
Long -89° 52' 8.2353"
Local Grid Location: ☐ N ☐ S Feet; ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	72 72		0–5	0 - 5' **FILL, ASH (Coal):** SM, black (10YR 2/1) to very dark grayish brown (10YR 3/2), silt to sand-sized ash, angular gravel (5-15%), clay (5-15%), loose, moist.	(FILL) SM									CS=Core Sample
			5	5 - 5.4' **FILL, ASH (Coal):** CL/ML, dark greenish gray (GLEY 1 4/1), medium plasticity, soft.	(FILL) CL/ML									
2 CS	120 120		5.4–9.9	5.4 - 9.9' **FILL, ASH (Coal):** SM, black (10YR 2/1), silt to sand-sized ash, clay (5-15%), loose, moist. 7 - 9.9' interbedded silty clay.	(FILL) SM									
			9.9–12	9.9 - 16' **SILTY CLAY:** CL/ML, greenish gray (GLEY 1 6/1), sand (0-5%), organic material (0-5%), medium to high plasticity, very stiff, moist. 10.5' light olive brown (2.5Y 5/3), yellowish brown to reddish brown mottling (50%).	CL/ML									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
(signature)	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204 Tel: (414)837-3607 Fax: (414)837-3608

Boring Number XPW06

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	9.9 - 16' **SILTY CLAY:** CL/ML, greenish gray (GLEY 1 6/1), sand (0-5%), organic material (0-5%), medium to high plasticity, very stiff, moist. *(continued)*										
			14	13.7' dark greenish gray (GLEY 1 4/1), reddish brown mottling (10%).	CL/ML									
			15											
			16	16' End of Boring.										

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Baldwin Power Plant	______ ft. ☐ N. ☐ S. ______ ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 11' 51.1" Long. -89° 51' 52.1" or	XPW01
Facility ID	St. Plane 557,530 ft. N, 2,383,427 ft. E. E / (W)	Date Well Installed 09/23/2022
Type of Well	Section Location of Waste/Source ____ 1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Arlen Little
Distance from Waste/ Source ft. / State IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	Cascade Drilling

A. Protective pipe, top elevation 438.45 ft. (NAVD88)

B. Well casing, top elevation 437.66 ft. (NAVD88)

C. Land surface elevation 435.12 ft. (NAVD88)

D. Surface seal, bottom 434.1 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Sonic Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required):

______

E. Bentonite seal, top 434.1 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top 431.1 ft. (NAVD88) or 4.0 ft.

G. Filter pack, top 430.1 ft. (NAVD88) or 5.0 ft.

H. Screen joint, top 428.1 ft. (NAVD88) or 7.0 ft.

I. Well bottom 423.1 ft. (NAVD88) or 12.0 ft.

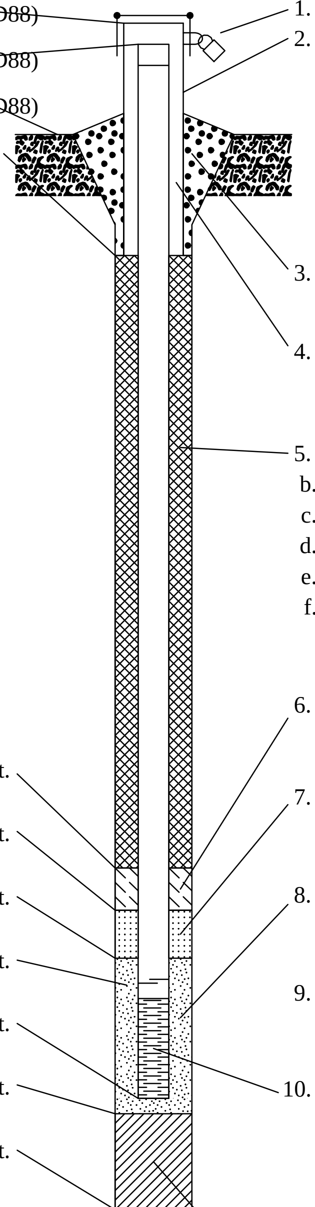
J. Filter pack, bottom 421.1 ft. (NAVD88) or 14.0 ft.

K. Borehole, bottom 421.1 ft. (NAVD88) or 14.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 5.0 ft.
c. Material: Steel ☒
Other ☐
d. Additional protection? ☐ Yes ☒ No
If yes, describe: ______

3. Surface seal: Bentonite ☐
Concrete ☒
Other ☐

4. Material between well casing and protective pipe:
Bentonite ☐
Other ☐

5. Annular space seal: a. Granular/Chipped Bentonite ☒
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐
d. ____ % Bentonite . . . Bentonite-cement grout ☐
e. ____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐
Tremie pumped ☐
Gravity ☒

6. Bentonite seal: a. Bentonite granules ☐
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
c. ______ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
a. ______
b. Volume added ______ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Filtersil
b. Volume added ______ ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒
Flush threaded PVC schedule 80 ☐
Other ☐

10. Screen material: Schedule 40 PVC
a. Screen Type: Factory cut ☒
Continuous slot ☐
Other ☐
b. Manufacturer ______
c. Slot size: 0.010 in.
d. Slotted length: 5.0 ft.

11. Backfill material (below filter pack): None ☒
Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 12/16/2022

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Baldwin Power Plant	______ ft. ☐ N. ☐ S. ______ ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 11' 52.4" Long. -89° 51' 42.8" or	XPW02
Facility ID	St. Plane 557,668 ft. N, 2,384,172 ft. E. E/W (W circled)	Date Well Installed: 09/24/2022
Type of Well	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Arlen Little Cascade Drilling
Distance from Waste/Source ______ ft. — State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known — Gov. Lot Number:	

A. Protective pipe, top elevation 438.60 ft. (NAVD88)

B. Well casing, top elevation 437.92 ft. (NAVD88)

C. Land surface elevation 434.86 ft. (NAVD88)

D. Surface seal, bottom 433.9 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Sonic Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 433.9 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top 430.9 ft. (NAVD88) or 4.0 ft.

G. Filter pack, top 429.9 ft. (NAVD88) or 5.0 ft.

H. Screen joint, top 428.9 ft. (NAVD88) or 6.0 ft.

I. Well bottom 423.9 ft. (NAVD88) or 11.0 ft.

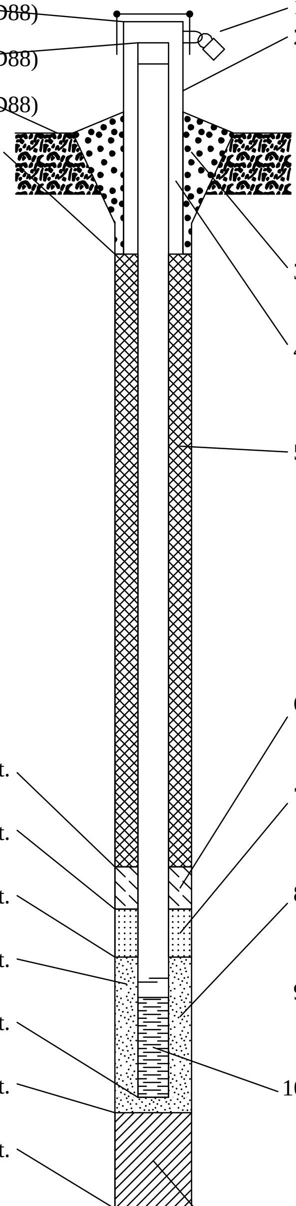
J. Filter pack, bottom 422.9 ft. (NAVD88) or 12.0 ft.

K. Borehole, bottom 420.9 ft. (NAVD88) or 14.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ______
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. ______ Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filtersil
   b. Volume added ______ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer ______
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
    3/8" bentonite chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 12/16/2022

Signature	Firm
(signature)	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204 Tel: (414)837-3607 Fax: (414)837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Baldwin Power Plant	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	XPW04
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 11' 40.9" Long. -89° 51' 49.7" or St. Plane 556,503 ft. N, 2,383,618 ft. E. E /(W)	
Facility ID	Section Location of Waste/Source	Date Well Installed 10/05/2022
Type of Well	____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Arlen Little Cascade Drilling
Distance from Waste/ Source ____ ft. / State IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known Gov. Lot Number	

A. Protective pipe, top elevation 434.91 ft. (NAVD88)

B. Well casing, top elevation 434.58 ft. (NAVD88)

C. Land surface elevation 430.59 ft. (NAVD88)

D. Surface seal, bottom 429.6 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Sonic Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 429.6 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top 426.1 ft. (NAVD88) or 4.5 ft.

G. Filter pack, top 425.1 ft. (NAVD88) or 5.5 ft.

H. Screen joint, top 424.1 ft. (NAVD88) or 6.5 ft.

I. Well bottom 414.1 ft. (NAVD88) or 16.5 ft.

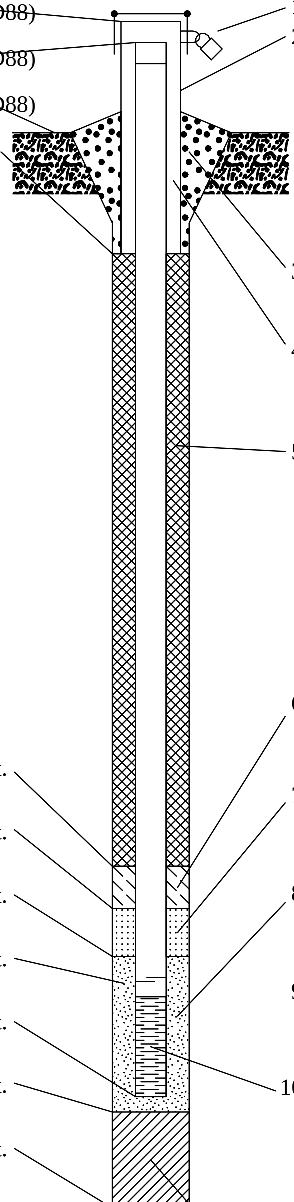
J. Filter pack, bottom 413.1 ft. (NAVD88) or 17.5 ft.

K. Borehole, bottom 410.6 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ____
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. ____Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filtersil
   b. Volume added ____ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer ____
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐
    3/8" bentonite chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 12/16/2022

Signature [signature]

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

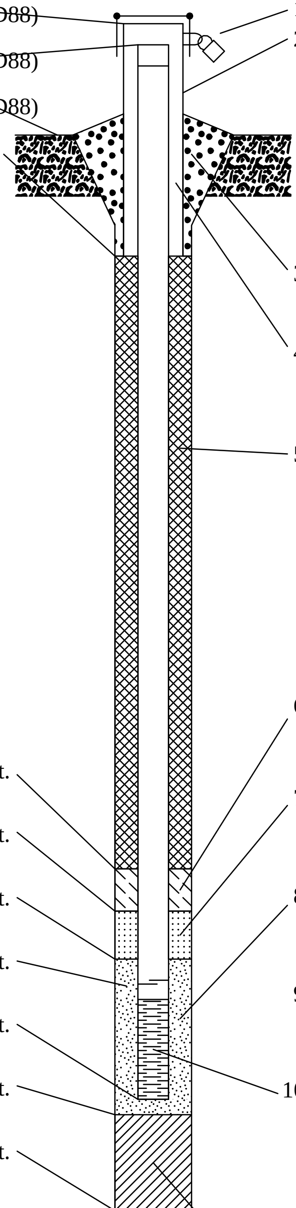
Facility/Project Name: Baldwin Power Plant	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 11' 46.4" Long. -89° 51' 44.5" or	XPW05
Facility ID	St. Plane 557,063 ft. N, 2,384,034 ft. E. E/W	Date Well Installed: 09/24/2022
Type of Well	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Arlen Little, Cascade Drilling
Distance from Waste/Source ft. | State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Gov. Lot Number	

A. Protective pipe, top elevation 437.57 ft. (NAVD88)

B. Well casing, top elevation 437.27 ft. (NAVD88)

C. Land surface elevation 434.12 ft. (NAVD88)

D. Surface seal, bottom 433.1 ft. (NAVD88) or 1.0 ft.



12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☐ SC ☐ ML ☒ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ Sonic Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required): ____

E. Bentonite seal, top 433.1 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top 418.1 ft. (NAVD88) or 16.0 ft.

G. Filter pack, top 417.1 ft. (NAVD88) or 17.0 ft.

H. Screen joint, top 416.1 ft. (NAVD88) or 18.0 ft.

I. Well bottom 406.1 ft. (NAVD88) or 28.0 ft.

J. Filter pack, bottom 405.1 ft. (NAVD88) or 29.0 ft.

K. Borehole, bottom 404.1 ft. (NAVD88) or 30.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ____
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. ____Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filtersil
   b. Volume added ____ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer ____
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐ 3/8" bentonite chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 12/16/2022

Signature	Firm
[signature]	Ramboll, 234 W Florida Street, 5th Floor, Milwaukee, WI 53204 Tel: (414)837-3607 Fax: (414)837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Baldwin Power Plant	____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒	XPW06
	Lat. 38° 11' 49.1" Long. -89° 52' 8.2" or	
Facility ID	St. Plane 557,324 ft. N, 2,382,140 ft. E. E /Ⓦ	Date Well Installed 09/22/2022
Type of Well	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm)
Distance from Waste/Source ____ ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	Arlen Little / Cascade Drilling

A. Protective pipe, top elevation 418.06 ft. (NAVD88)

B. Well casing, top elevation 417.72 ft. (NAVD88)

C. Land surface elevation 418.06 ft. (NAVD88)

D. Surface seal, bottom 417.1 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐; Hollow Stem Auger ☐; Sonic Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☐; Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 417.1 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top 415.1 ft. (NAVD88) or 3.0 ft.

G. Filter pack, top 414.1 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 413.1 ft. (NAVD88) or 5.0 ft.

I. Well bottom 408.1 ft. (NAVD88) or 10.0 ft.

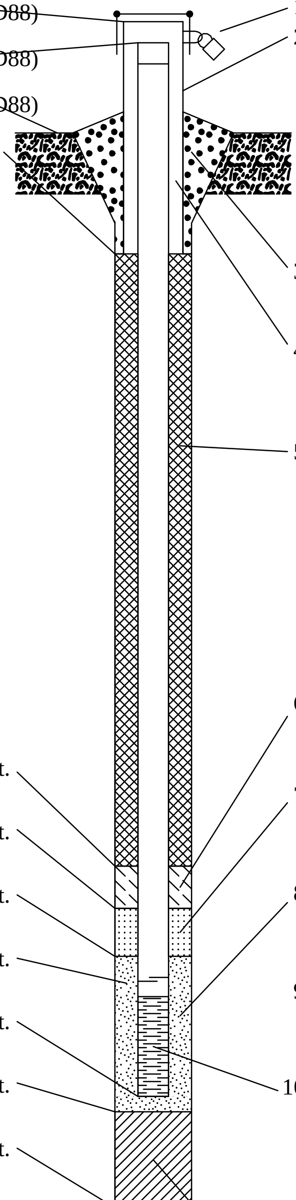
J. Filter pack, bottom 406.1 ft. (NAVD88) or 12.0 ft.

K. Borehole, bottom 402.1 ft. (NAVD88) or 16.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒; Other ☐
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe:

3. Surface seal: Bentonite ☐; Concrete ☒; Other ☐

4. Material between well casing and protective pipe: Bentonite ☒; bentonite chips Other ☒

5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____ % Bentonite . . . Bentonite-cement grout ☐
   e. ____ Ft^3 volume added for any of the above
   f. How installed: Tremie ☐; Tremie pumped ☐; Gravity ☒

6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
   a.
   b. Volume added ____ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
   a. Filtersil
   b. Volume added ____ ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒; Flush threaded PVC schedule 80 ☐; Other ☐

10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒; Continuous slot ☐; Other ☐
    b. Manufacturer
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.

11. Backfill material (below filter pack): None ☐; 3/8" bentonite chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 12/16/2022

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
Fax: (414)837-3608

ATTACHMENT 5
PCA Data Summary

ELECTRONIC PCA DATA FOR ATTACHMENT 5
35 I.A.C § 845.660: ALTERNATIVE SOURCE DEMONSTRATION
BALDWIN POWER PLANT
BOTTOM ASH POND
COLLINSVILLE, IL

Well	HSU	Date	Well Type	pH (SU)	Alkalinity, total (mg/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Lithium (mg/L)	Sulfate (mg/L)
MW-304	BU	03/28/2022	Background	7.78	843	0.0194	1.71	14.5	161	1.76	0.0829	198
MW-304	BU	09/29/2022	Background	7.72	836	0.0183	1.75	10.2	174	1.70	0.0861	199
MW-304	BU	10/26/2022	Background	7.89	825	0.0186	1.76	10.8	175	1.72	0.0869	193
MW-304	BU	11/17/2022	Background	7.87	818	0.0209	1.91	9.48	175	1.7	0.0635	218
MW-304	BU	12/14/2022	Background	7.82	833	0.0191	2.16	10	181	1.82	0.0756	216
MW-304	BU	01/11/2023	Background	7.83	844	0.0173	1.68	8.5	185	1.68	0.0819	209
MW-304	BU	02/20/2023	Background	7.75	854	0.0216	1.75	10.7	186	1.67	0.0818	228
MW-304	BU	03/15/2023	Background	7.77	814	0.0206	1.89	10.6	173	1.67	0.094	208
MW-304	BU	04/04/2023	Background	7.75	853	0.0324	1.69	8.9	168	1.81	0.0808	210
MW-304	BU	05/22/2023	Background	7.51	836	0.0199	1.7	9.63	162	1.72	0.0603	208
MW-304	BU	08/03/2023	Background	7.92	838	0.0201	1.6	11.4	160	1.70	0.0779	188
MW-304	BU	11/01/2023	Background	7.81	855	0.0199	1.7	12	166	1.91	0.0807	191
MW-304	BU	02/05/2024	Background	7.70	818	0.0295	1.5	12.4	155	1.77	0.0763	185
MW-304	BU	04/16/2024	Background	7.81	805	0.0199	1.7	13.0	161	1.69	0.0823	195
MW-304	BU	07/17/2024	Background	7.70	805	0.0175	1.5	10.0	169	1.69	0.075	201
MW-358	BU	10/27/2022	Background	7.93	633	0.0933	1.1	12.8	688	2.43	0.0621	108
MW-358	BU	11/17/2022	Background	7.83	758	0.172	1.25	16	992	2.36	0.0592	101
MW-358	BU	12/13/2022	Background	8.45	859	0.168	1.67	18.6	1120	2.1	0.0696	71
MW-358	BU	01/11/2023	Background	7.59	841	0.165	1.38	14.0	1200	2.73	0.0957	34
MW-358	BU	02/20/2023	Background	8.38	847	0.201	1.42	13.2	1330	2.87	0.102	16
MW-358	BU	03/13/2023	Background	7.73	856	0.166	1.51	10.9	1340	3.07	0.115	8
MW-358	BU	04/04/2023	Background	7.71	851	0.261	1.45	11.4	1370	3.13	0.105	31
MW-358	BU	05/19/2023	Background	7.62	835	0.192	1.6	12.5	1300	3.31	0.0778	10
MW-358	BU	08/07/2023	Background	8	843	0.235	1.6	9.9	1290	3.36	0.0961	9
MW-358	BU	11/01/2023	Background	7.89	840	0.162	1.38	11.3	1310	3.59	0.0921	11
MW-370	BU	03/29/2022	Downgradient	7.55	391	0.024	1.61	34.2	1470	3.15	0.223	270
MW-370	BU	09/30/2022	Downgradient	7.64	403	0.0589	2.7	51.4	1520	2.98	0.210	273
MW-370	BU	10/27/2022	Downgradient	6.88	389	0.038	1.84	39.6	1320	3.11	0.14	250
MW-370	BU	11/17/2022	Downgradient	7.79	388	0.0292	1.74	36.8	1450	3.06	0.110	278
MW-370	BU	12/14/2022	Downgradient	7.52	394	0.0325	2.34	44.7	1430	3.12	0.118	263
MW-370	BU	01/12/2023	Downgradient	7.50	393	0.0272	1.75	38.4	1470	3.07	0.133	253
MW-370	BU	02/21/2023	Downgradient	7.46	389	0.0303	1.95	40.6	1570	2.86	0.146	273
MW-370	BU	03/14/2023	Downgradient	7.45	402	0.0291	1.9	39.5	1340	2.96	0.16	251
MW-370	BU	04/03/2023	Downgradient	7.53	386	0.031	2.06	37	1280	3.16	0.158	253
MW-370	BU	05/16/2023	Downgradient	7.47	399	0.0321	1.9	37.0	1360	3.07	0.120	253
MW-370	BU	08/03/2023	Downgradient	7.79	399	0.033	1.73	41.4	1310	3.06	0.134	243
MW-370	BU	11/02/2023	Downgradient	7.61	413	0.0285	1.98	41.1	1420	3.7	0.124	273
MW-370	BU	02/06/2024	Downgradient	7.39	410	0.0417	1.7	40.1	1460	3.28	0.169	257
MW-370	BU	04/16/2024	Downgradient	7.59	393	0.0415	1.76	39.5	1460	3.33	0.17	247
MW-370	BU	07/18/2024	Downgradient	7.51	383	0.032	1.83	42.8	1320	3.13	0.14	254
MW-392	BU	10/27/2022	Downgradient	6.98	446	0.029	1.57	22.1	334	3.19	0.0474	149
MW-392	BU	11/16/2022	Downgradient	7.98	388	0.046	1.72	27.2	648	3.36	0.0512	83
MW-392	BU	12/13/2022	Downgradient	7.70	381	0.0462	2.33	30	918	3.98	0.0646	50
MW-392	BU	01/12/2023	Downgradient	7.63	413	0.042	1.66	47.1	888	3.96	0.076	47
MW-392	BU	02/20/2023	Downgradient	7.60	370	0.0399	1.97	30.4	909	3.69	0.0799	68
MW-392	BU	03/13/2023	Downgradient	7.67	381	0.0397	1.92	28.1	896	4.01	0.0767	57
MW-392	BU	04/03/2023	Downgradient	7.73	379	0.057	2.7	30.5	834	4.18	0.117	61
MW-392	BU	05/16/2023	Downgradient	7.54	372	0.0414	1.92	25.6	827	4.07	0.0675	63
MW-392	BU	08/03/2023	Downgradient	7.86	359	0.0407	1.82	26.0	878	4.07	0.0733	55
MW-392	BU	10/31/2023	Downgradient	7.65	384	0.0615	1.91	50.8	871	4.52	0.114	66
MW-392	BU	02/06/2024	Downgradient	7.64	378	0.0551	1.74	25.3	863	4.28	0.108	59
MW-392	BU	04/16/2024	Downgradient	7.67	371	0.0521	1.86	25.0	868	4.42	0.0746	42
MW-392	BU	07/17/2024	Downgradient	7.66	355	0.04	1.84	23	875	4.19	0.0779	60
MW-393	BU	10/27/2022	Downgradient	7.45	641	0.02	1.83	9	436	5.86	0.0767	285
MW-393	BU	11/16/2022	Downgradient	8.11	672	0.0284	1.53	11	475	5.95	0.0722	280
MW-393	BU	12/14/2022	Downgradient	8.64	666	0.0246	2.04	10.9	445	5.79	0.0603	263
MW-393	BU	01/12/2023	Downgradient	7.89	812	0.0288	1.61	15	633	8.02	0.0807	232
MW-393	BU	02/20/2023	Downgradient	7.95	822	0.0304	1.74	10.8	640	7.66	0.0853	214
MW-393	BU	03/13/2023	Downgradient	8.03	859	0.0273	1.79	7.9	606	8.21	0.0668	186
MW-393	BU	04/03/2023	Downgradient	8.12	833	0.0481	2.76	8.6	648	9.27	0.123	209
MW-393	BU	05/15/2023	Downgradient	8.28	914	0.0261	1.72	8.4	745	8.42	0.0442	123
MW-393	BU	08/03/2023	Downgradient	8.36	862	0.0269	1.66	6.0	610	7.32	0.0593	134
MW-393	BU	10/31/2023	Downgradient	8.19	827	0.06	1.59	7.9	723	9.63	0.0672	184
MW-393	BU	02/06/2024	Downgradient	8.12	831	0.06	1.63	6.4	741	9.27	0.1100	206
MW-393	BU	04/16/2024	Downgradient	8.16	816	0.04	1.83	7.1	779	9.22	0.0714	217
MW-393	BU	07/17/2024	Downgradient	8.41	813	0.03	1.74	5.6	775	9.93	0.0767	226
TPZ-164	CCR	03/29/2022	CCR	7.31	198	0.11	1.56	55.4	50	0.26	0.0167	227
TPZ-164	CCR	09/30/2022	CCR	7.14	206	0.17	2.04	68.5	52	0.24	0.0243	150
TPZ-164	CCR	10/28/2022	CCR	7.31	276	0.06	1.47	67.6	57	0.26	0.0140	127
TPZ-164	CCR	11/16/2022	CCR	7.56	250	0.06	1.38	62	46	0.26	0.0085	123
TPZ-164	CCR	12/14/2022	CCR	7.34	233	0.05	1.54	61	55	0.27	0.0114	120
TPZ-164	CCR	03/14/2023	CCR	7.21	283	0.06	1.30	70	43	0.22	0.0101	113
TPZ-164	CCR	08/07/2023	CCR	7.38	293	0.07	1.23	70	51	0.31	0.0151	109
TPZ-164	CCR	02/28/2024	CCR	7.13	285	0.07	0.92	74.8	52	0.25	0.0099	130
TPZ-164	CCR	04/18/2024	CCR	7.25	275	0.07	1.05	76.7	49	0.29	0.0115	118
TPZ-164	CCR	07/22/2024	CCR	7.39	265	0.08	1.15	66.9	54	0.30	0.0128	126
XPW-01	CCR	10/26/2022	CCR	7.03	203	0.10	0.93	65.4	21	0.61	0.0142	98
XPW-01	CCR	11/15/2022	CCR	6.98	205	0.108	1.03	72.5	22	0.5	0.0127	105
XPW-01	CCR	12/13/2022	CCR	6.57	204	0.272	0.942	81.5	25	0.5	0.0354	120
XPW-01	CCR	01/12/2023	CCR	6.86	212	0.105	0.881	67.5	26	0.51	0.0132	119
XPW-01	CCR	05/23/2023	CCR	7	163	0.0743	0.649	55.1	21	0.62	0.0083	62
XPW-01	CCR	08/03/2023	CCR	6.75	218	0.103	0.893	71.5	28	0.58	0.0117	82
XPW-01	CCR	02/08/2024	CCR	6.6	217	0.116	0.961	84.8	49	0.53	0.0116	126
XPW-01	CCR	04/18/2024	CCR	6.88	204	0.0952	0.563	70.2	46	0.55	0.01	112
XPW-01	CCR	07/22/2024	CCR	7.18	203	0.113	0.964	60	42	0.65	0.0167	78
XPW-02	CCR	10/26/2022	CCR	7.57	427	0.205	1.18	121	33	0.61	0.0233	22
XPW-02	CCR	11/15/2022	CCR	7.6	426	0.194	1.2	115	30	0.55	0.0194	20
XPW-02	CCR	12/12/2022	CCR	7.53	374	0.257	1.52	110	32	0.63	0.023	37
XPW-02	CCR	01/12/2023	CCR	7.32	337	0.125	0.87	88.5	29	0.46	0.0108	43
XPW-02	CCR	05/23/2023	CCR	7.05	359	0.185	1.08	101	36	0.5	0.0147	41
XPW-04	CCR	10/28/2022	CCR	8.31	222	0.161	1.28	47.9	55	0.44	0.0108	119
XPW-04	CCR	11/15/2022	CCR	8.4	226	0.171	1.15	53.2	56	0.4	0.0066	124
XPW-04	CCR	12/12/2022	CCR	8.04	217	0.196	1.38	51.1	55	0.42	0.0136	120
XPW-04	CCR	01/12/2023	CCR	7.96	226	0.156	0.835	49.6	54	0.4	0.009	119
XPW-04	CCR	05/23/2023	CCR	8.23	200	0.172	0.921	56.2	45	0.33	0.0056	173
XPW-05	CCR	10/26/2022	CCR	7.82	180	0.104	1.02	43.9	46	0.57	0.0053	123
XPW-05	CCR	11/15/2022	CCR	7.67	180	0.12	1.16	43.5	46	0.58	0.0039	132
XPW-05	CCR	12/12/2022	CCR	7.18	212	0.19	1.25	43.6	48	0.62	0.0093	137
XPW-05	CCR	01/24/2023	CCR	7.3	192	0.208	1.57	40.2	48	0.6	0.008	125
XPW-05	CCR	05/23/2023	CCR	7.16	218	0.212	1.08	45.8	47	0.54	0.0027	110
XPW-05	CCR	08/03/2023	CCR	7.17	229	0.223	0.928	49.1	46	0.55	0.0054	89
XPW-05	CCR	02/28/2024	CCR	7.19	238	0.284	0.977	56.2	47	0.53	0.0093	123
XPW-05	CCR	04/18/2024	CCR	7.03	267	0.294	0.87	60.4	51	0.49	0.0061	114
XPW-05	CCR	07/22/2024	CCR	7.21	258	0.278	0.828	54.7	49	0.57	0.0063	100
XPW-06	CCR	10/26/2022	CCR	7.22	370	0.274	2.29	130	25	0.58	0.0118	575
XPW-06	CCR	11/15/2022	CCR	7.27	372	0.198	4.64	164	18	0.61	0.0019	475
XPW-06	CCR	12/13/2022	CCR	7.04	371	0.246	3.86	174	18	0.59	0.0075	508
XPW-06	CCR	01/12/2023	CCR	7.25	278	0.1	3.38	112	10	0.5	0.0031	391
XPW-06	CCR	05/23/2023	CCR	7.23	247	0.161	2.11	75.9	6	0.32	0.0019	171
XPW-06	CCR	08/03/2023	CCR	6.96	195	0.142	1.55	61.6	2	0.37	0.006	117
XPW-06	CCR	02/06/2024	CCR	7.28	244	0.201	2.91	90.6	5	0.35	0.0057	315
XPW-06	CCR	04/18/2024	CCR	7.16	256	0.129	2.64	69.3	2	0.39	0.0058	103
XPW-06	CCR	07/22/2024	CCR	7.35	249	0.238	2.8	83.9	3	0.52	0.013	190

Notes:
mg/L = milligrams per liter
SU= standard units
HSU = hydrostratigraphic unit
CCR = coal combustion residual
BU = Bedrock Unit

ATTACHMENT 6

Lithium and Boron Isotope Ratio Laboratory Analytical Report

SiREM
Leading Science · Lasting Solutions

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results

SiREM File Reference: S-9990

Client: Geosyntec Consultants, Inc.
Client Project Number: GLP8063
Date Samples Received: August 24, 2023
Date Samples Analyzed: August/September 2023
IsoDetect Internal Project No: 23-71-GG

Client Sample ID	SiREM Reference ID	Isodetect Reference ID	Client Sample Date	δ^7Li [‰]	2SD [‰]	Lithium Concentration ug/L
Cooling Pond - 20230821	23-14918	23-71-GG-01	21-Aug-23	35.18	0.74	3.1
MW158R - 20230822	23-14919	23-71-GG-02	22-Aug-23	31.47	0.54	22.6
PZ170-20230821	23-14920	23-71-GG-03	21-Aug-23	16.95	0.73	44.0
TPZ164-20230821	23-14921	23-71-GG-04	21-Aug-23	17.07	0.75	27.6
MW370-20230821	23-14922	23-71-GG-05	21-Aug-23	20.65	0.73	227.0
MW358-20230822	23-14923	23-71-GG-06	22-Aug-23	26.04	0.70	185.0

Comments:
Method: Compound Specific Isotope Analysis (CSIA)
-- = not applicable
2SD= standard deviation, calculated from two independent consecutive measurements
ug/L = micrograms per liter
n.m. = not measured

Analyst:

Brooke Rapien

Brooke Rapien
Laboratory Technician II

Results approved:

Brent G. Paulter
Chemistry Services Manager

Date:
October 10, 2023

Isodetect
Umweltmonitoring GmbH

06th of October 2023

Analytical report

Ordering party:	SiREM 130 Stone Rd. West Guelph, Ontario, Canada N1G 3Z2
Contact person:	Ximena Druar Brent G. Pautler, Ph.D.
Contractor:	Isodetect GmbH Deutscher Platz 5b 04103 Leipzig Germany
Person in charge:	Kevin Kuntze, Ph.D. Phone: +49 341 35535851 Mail: kuntze@isodetect.de Anko Fischer, Ph.D. Phone: +49 341 35535855 Mail: fischer@isodetect.de
Samples received:	11.09.2023
Project ID/ Field site:	S-9990
Internal Project No.:	23-71-GG
Scope on analysis:	6 x isotope ratio of Li

....
Dr. Kevin Kuntze

....
Dr. Anko Fischer

Analysis results

Well/sample	Lab ID	**δ^7Li [‰]**	2SD [‰]	Li [µg/l]
Cooling Pond - 20230821	23-71-GG-01	35.18	0.74	3.1
MW158R-20230821	23-71-GG-02	31.47	0.54	22.6
PZ170-20230821	23-71-GG-03	16.95	0.73	44.0
TPT164-20230821	23-71-GG-04	17.07	0.75	27.6
MW370-20230821	23-71-GG-05	20.65	0.73	227.0
MW358-20230821	23-71-GG-06	26.04	0.70	185.0

The analyses were carried out by MC-ICP-MS using an internal standardization and external calibration with bracketing isotope standard reference materials (SRMs), for which Li delta value (δ^7Li) was calculated against LSVEC NIST 8545 RM. The standard deviation (2SD) was calculated from two independent consecutive measurements.

Chain of Custody for CSIA of organic pollutants

Isodetect
Umweltmonitoring GmbH

Contact information			
Company:	SiREM	Email:	xdruar@siremlab.com
Contact:	Ximena Druar	Address:	130 Stone Road W, Guelph, ON N1G 3Z2 Canada
Phone:	519-880-5424		

Project information			
Project ID:	Baldwin GW Compliance	Field site:	
Project description:			
Sampled by:		Company:	Geosyntec

Client Sample ID/ Sampling point	Sampling Date	Sampling Time	Matrix	Conditions (e.g. Temp., O_2, R_h, pH)	Sampling type[$]	Sample volume for CSIA	Fixative[#]	CSIA for*	Isotope ratio^	Other Notes (e.g. troubles, weather)
Cooling Pond - 20230821	8/21/2023	13:20	Water		2	2x500mL V V		Total & Stable Li Isotopes		S-9990
MW158R-20230822	8/22/2023	13:50	Water		2	2x500mL V V		Total & Stable Li Isotopes		S-9990
PZ170-20230821	8/21/2023	11:25	Water		2	2x500mL V V		Total & Stable Li Isotopes		S-9990
TPZ164-20230821	8/21/2023	10:45	Water		2	2x500mL V V		Total & Stable Li Isotopes		S-9990
MW370-20230821	8/21/2023	12:10	Water		~~2~~ 1 Sr	2x500mL V		Total & Stable Li Isotopes		S-9990
MW358-20230822	8/22/2023	12:15	Water		2	2x500mL V V		Total & Stable Li Isotopes		S-9990

[$] 1 – Submersible pump, 2 – Suction pump, 3 – Bailer, 4 – Tap/outlet, 5 – Trial pit, 6 – Percussion drilling, 7 – Direct push sampling, 8 – Hand excavation, 9 – others (give sampling type)

* 1 – BTEX, 2 – halogenated VOC, 3 – PAH, 4 – Fuel additives (MTBE, ETBE, TAME, TAEE etc.), 5 – Explosives (TNT, RDX, dinitrotoluene, nitrobenzenes etc.), 6 – Petroleum hydrocarbons (e.g. alkylated benzenes, alkanes etc.), 7 – Chlorobenzenes, 8 – Gas hydrocarbons (e.g. methane, ethane, propane, butane, etc.), 9 – Pesticides (HCH, DDT, phenoxy acids, atrazine, bromacil, etc.), 10 – others (give target compounds)

^ 1 – $^{13}C/^{12}C$, 2 – $^{2}H/^{1}H$, 3 – $^{37}Cl/^{35}Cl$, 4 – $^{15}N/^{14}N$, 5 – $^{81}Br/^{79}Br$, 6 – others (give target isotope ratio)

\# 1 – NaOH, 2 – $Na_3PO_4 \cdot 12H_2O$, 3 – HCl, 4 – H_2SO_4, 5 – none, 6 – others (give preservative)

	Relinquished by	Received by	Relinquished by	Received by
Signature:	Susan Thomas	[signature]		
Name:	Susan Thomas	Vazquez Ramos José		
Company:	SiREM	Isodetect GmbH		
Date/Time:	9-6-2023	11.09.2023		

Isodetect GmbH, Deutscher Platz 5b, 04103 Leipzig, Germany Phone: +49 (0)341-355-35851, Fax: +49 (0)341-355-35852, Email: kuntze@isodetect.de www.isodetect.de

Isodetect Umweltmonitoring GmbH

Boron isotope analysis results
Provided from SmartGas Sciences to Geosyntec Consultants via email April 21, 2023

Sample ID	***B Isotopic Composition***	d11B (per mil)	+/- (2SE)	B concentrations (ppb)
20230206 TPZ-164		**2.84**	1.2	**1116.4**
20230206 Cooling Pond		**5.73**	1.2	**240.5**
20230206 MW-370		**32.43**	1.2	**2061.1**
20230206 PZ-170		**43.18**	1.2	**326.3**
20230206 MW-158R		**17.98**	1.2	**85.9**
20230207 MW-358		**31.07**	1.2	**1777.7**
20230207 MW-258		**14.23**	1.2	**1248.1**

ATTACHMENT 7

Solid Phase Anions Laboratory Analytical Report

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19226-NOV22**
Reference: Baldwin Power Plant Drilling

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	**1: Analysis Start Date**	**2: Analysis Start Time**	**3: Analysis Completed Date**	**4: Analysis Completed Time**	**6: MW-358 (47-49)**	**7: MW-358 (86-88)**	**8: MW-392 (80-82)**	**12: MW-392 (66-68)**
Sample Date & Time					06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00	26-Sep-22 12:00
Cl [µg/g]	15-Dec-22	20:55	---	---	22	70	34	45
SO4 [µg/g]	15-Dec-22	20:55	29-Dec-22	13:45	50	620	280	100
F [%]	08-Dec-22	18:18	12-Dec-22	08:47	0.091	0.091	0.42	0.095
TKN [as N %]	30-Nov-22	09:28	02-Dec-22	11:00	0.06	0.05	< 0.01	0.05
Ra226 [Bq/g]	12-Dec-22	08:48	12-Dec-22	14:33	0.07	< 0.01	0.09	< 0.01

Catharine Arnold

CHARTERED
CATHARINE ARNOLD
CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003246129

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

NOV 19217 - 28

Rev. 02/2017

CHAIN OF CUSTODY

Page 1 of 1

Company: Ramboll
Project Contact: Evvan Plank
Telephone: 414-531-0142
Project Name: Baldwin
Project #:
Location:
Sampled By: Evvan Plank

[redacted]

Lab Use Only
Place Header Sticker Here:

Program:
QSM RCRA SDWA NPDES
Solid Waste Other ________

PO #

Report To:
EMAIL: Evvan.plank@ramboll.com
Company: Ramboll
Address: 234 W Florida St. Milwaukee, WI FL. 5

Invoice To:*
EMAIL:
Company:
Address:

[redacted]

Client Special Instructions Chem *: antimony, arsenic, barium beryllium, boron, cadmium, chromium, cobalt, lead, lithium, mercury, molybdenum, selenium, thallium. CEC, chloride and sulfate, fluoride, iron and manganese oxides, radium 226 + 228, total sulphur, total nitrogen.

Matrix:
GW – groundwater **SW** - surface water **WW** - wastewater **DW** - drinking water
S - soil/sediment **SL** - sludge **A** - air **M** - misc/waste

ANALYSES REQUESTED

Turnaround Time
Normal RUSH*
Date Needed: ________
[redacted]
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

Collection Date	Collection Time	Matrix	Grab/Comp	Sample #	Sample ID Description	Filtered? Y/N	XRD	XRF	Chem.*	Tessier Leach (SEP)	Total # Containers	Designated MS/MSD	CT Lab ID # (Lab use only)
10/5/22	14:05	S	G	1	MW-358 (13-15)	N	X	X		X			
10/6/22	15:00	BR.	G	2	MW-358 (47-49)	N	X	X	X	X			
10/8/22	18:00	BR	G	3	MW-358 (86-88)	N	X	X	X	X			
9/26/22	16:00	BR	G	4	MW-392 (80-82)	N	X	X	X	X			
9/27/22	09:00	S	G	5	MW-392 (32-33.5)	N	X	X		X			
10/4/22	16:00	S	G	6	MW-393 (24-25.5)	N	X	X		X			
9/25/22	16:00	S	G	7	MW-394 (20.5-22)	N	X	X		X			
9/26/22	12:00	BR	G	8	MW-392 (66-68)	N	X	X	X	X			

Fill in Spaces with Bottles per Test

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/24/22 1000		
Received by:	Date/Time	Received for Laboratory by:	Date/Time

Lab Use Only
Ice Present Yes No
Temp ________ IR Gun ______
Cooler # ____________

Custody Seals: 221024-001 + 002

ATTACHMENT 8

X-ray Diffraction Laboratory Analytical Report

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Environmental Services*
Project Number/ LIMS No.	*Custom XRD/MI4508-DEC22*
Sample Receipt:	*December 7, 2022*
Sample Analysis:	*December 15, 2022*
Reporting Date:	*April 24, 2023*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions (Bulk):	Co radiation, 35 kV, 40 mA; Detector: LYNXEYE Regular Scanning: Step: 0.02°, Step time: 0.75s, 2θ range: 6-80°
Test Conditions (Clay):	Co radiation, 35 kV, 40 mA; Detector: LYNXEYE Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80° Clay Section Scanning: Step: 0.01°, Step time:0.2s, 2θ range: 3-40°
Interpretations**:**	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit**:**	0.5-2%. Strongly dependent on crystallinity.

Contents:

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

SGS Natural Resources | P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
a division of SGS Canada Inc. | Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Natural Resources is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Clay Mineral Separation and Identification:

Clay minerals are typically fine-grained (<2 µm) phyllosilicates in sedimentary rock. Due to the poor crystallinity and fine size of clay minerals, separation of the clay fraction from bulk samples by centrifuge is required. A slide of the oriented clay fraction is prepared and scanned followed by a series of procedures (the addition of ethylene glycol and high temperature heating). Clay minerals are identified by their individual diffraction patterns and changes in their diffraction pattern after different treatments. Clay speciation and mineral identification of the bulk sample are performed using DIFFRACplus EVA (Bruker AXS).

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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a division of SGS Canada Inc. | Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

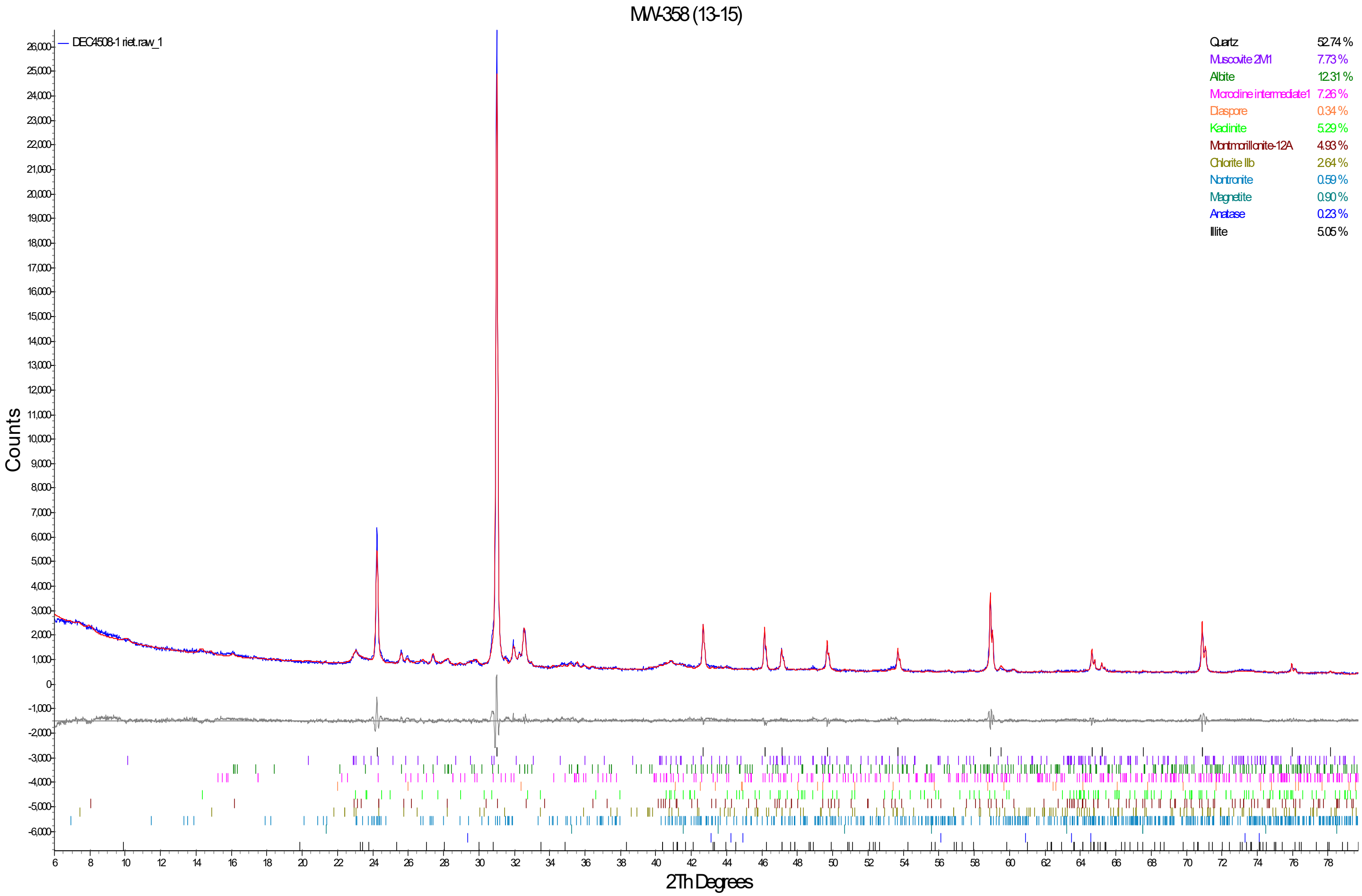
Mineral/Compound	MW-358 (13-15) DEC4508-1 (wt %)	MW-358 (47-49) DEC4508-2 (wt %)	MW-358 (86-88) DEC4508-3 (wt %)	MW-392 (80-82) DEC4508-4 (wt %)	MW-392 (32-33.5) DEC4508-5 (wt %)	MW-393 (24-25.5) DEC4508-6 (wt %)	MW-394 (20.5-22) DEC4508-7 (wt %)	MW-392 (66-68) DEC4508-8 (wt %)
Quartz	52.7	29.2	30.7	29.8	52.1	64.1	55.4	22.7
Muscovite	7.7	18.8	19.7	13.1	9.0	5.5	7.6	15.9
Albite	12.3	0.4	2.5	0.6	9.1	6.4	12.8	0.6
Microcline	7.3	8.6	5.9	1.0	6.5	10.1	7.3	5.1
Diaspore	0.3	-	-	-	-	0.2	0.5	2.8
Magnetite	0.9	0.5	0.3	1.4	0.1	0.0	0.1	0.1
Anatase	0.2	0.8	1.8	0.8	0.6	0.3	0.3	1.0
Calcite	-	0.5	1.0	28.1	0.0	0.0	0.2	14.9
Fluorapatite	-	-	-	2.7	0.3	-	0.2	0.2
Ankerite	-	-	-	-	1.4	0.9	0.5	0.8
Clay								
Kaolinite	5.3	4.8	15.0	5.5	6.8	3.2	4.2	3.6
Montmorillonite-12A	4.9	6.8	4.8	-	-	-	-	5.8
Montmorillonite-14A	-	-	-	3.5	3.3	3.5	3.6	-
Nontronite	0.6	4.6	4.3	4.2	1.6	1.4	0.5	3.3
Illite/Mont - 11A	-	8.8	2.7	3.6	2.7	2.1	3.0	7.1
Illite	5.0	15.0	9.2	4.1	0.7	1.0	0.6	10.4
Chlorite IIb	2.6	1.3	2.0	1.6	5.8	1.2	3.1	6.1
TOTAL	100	100	100	100	100	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

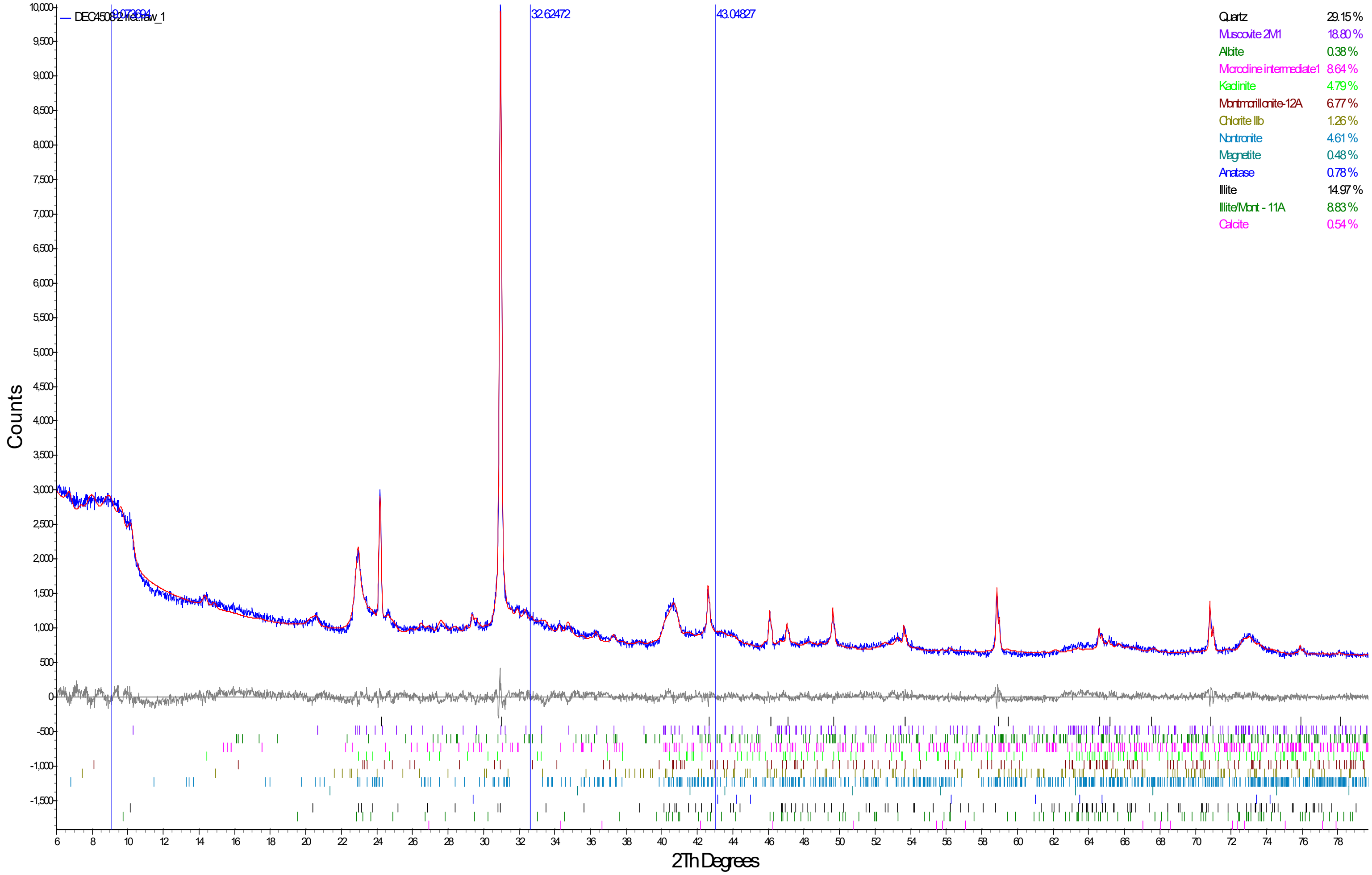
The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Mineral/Compound	Formula
Quartz	SiO_2
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Albite	$NaAlSi_3O_8$
Microcline	$KAlSi_3O_8$
Diaspore	aAlO.OH
Magnetite	Fe_3O_4
Anatase	TiO_2
Calcite	$CaCO_3$
Fluorapatite	$Ca_5(PO_4)_3F$
Ankerite	$CaFe(CO_3)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot 10H_2O$
Nontronite	$Fe_2(Al,Si)_4O_{10}(OH)_2Na_{0.3}(H_2O)_4$
Illite/Mont	$KAl_4(Si,Al)_8O_{10}(OH)_4 \cdot 4H_2O$
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$


MW-358 (13-15)
DEC4508-1 riet.raw_1
Counts
2Th Degrees
Quartz 52.74 %
Muscovite 2M1 7.73 %
Albite 12.31 %
Microcline intermediate1 7.26 %
Diaspore 0.34 %
Kaolinite 5.29 %
Montmorillonite-12A 4.93 %
Chlorite IIb 2.64 %
Nontronite 0.59 %
Magnetite 0.90 %
Anatase 0.23 %
Illite 5.05 %

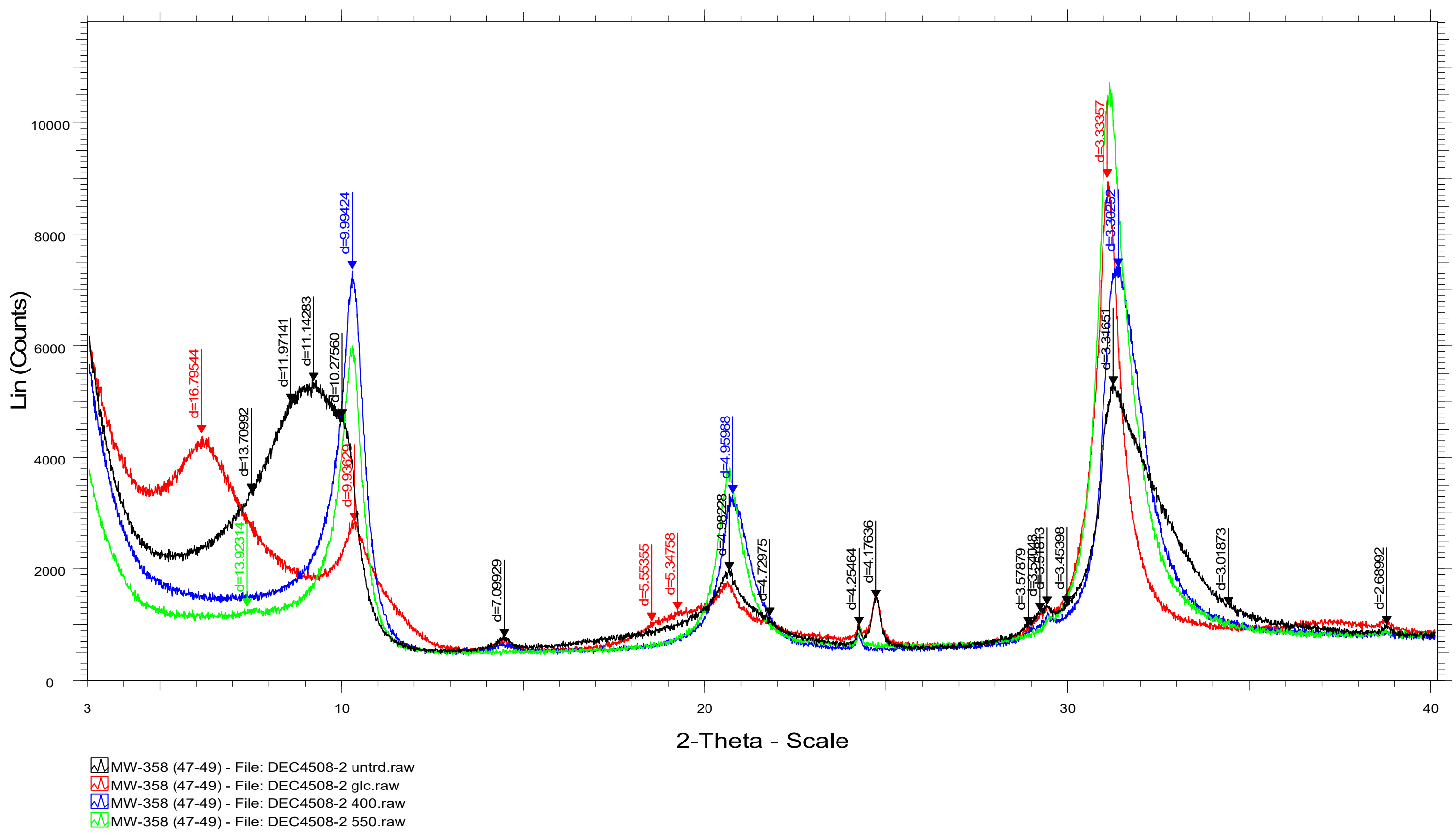
Environmental Services
Custom XRD/MI4508-DEC22
24-Apr-23

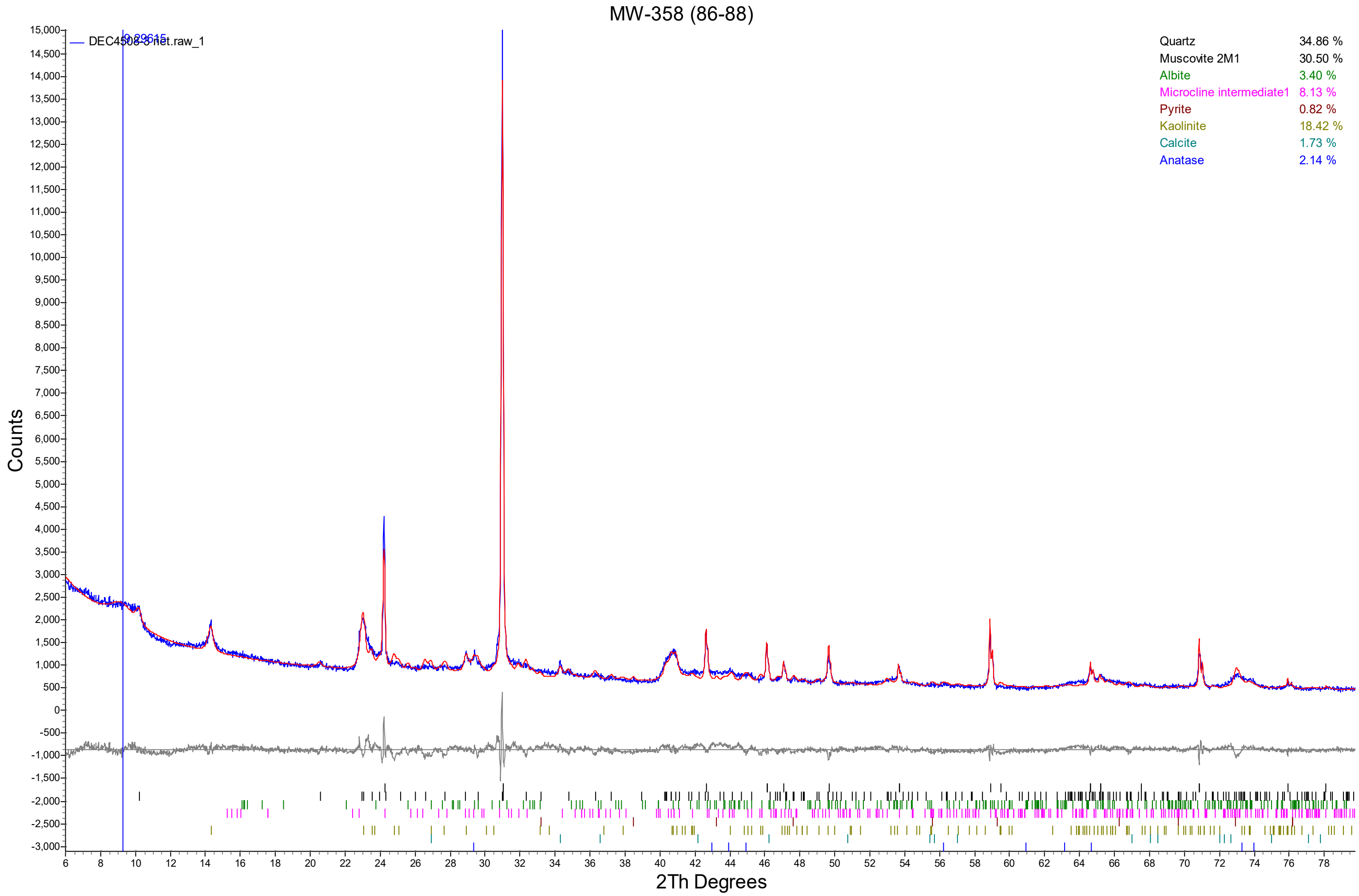
MW-358 (47-49)



Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

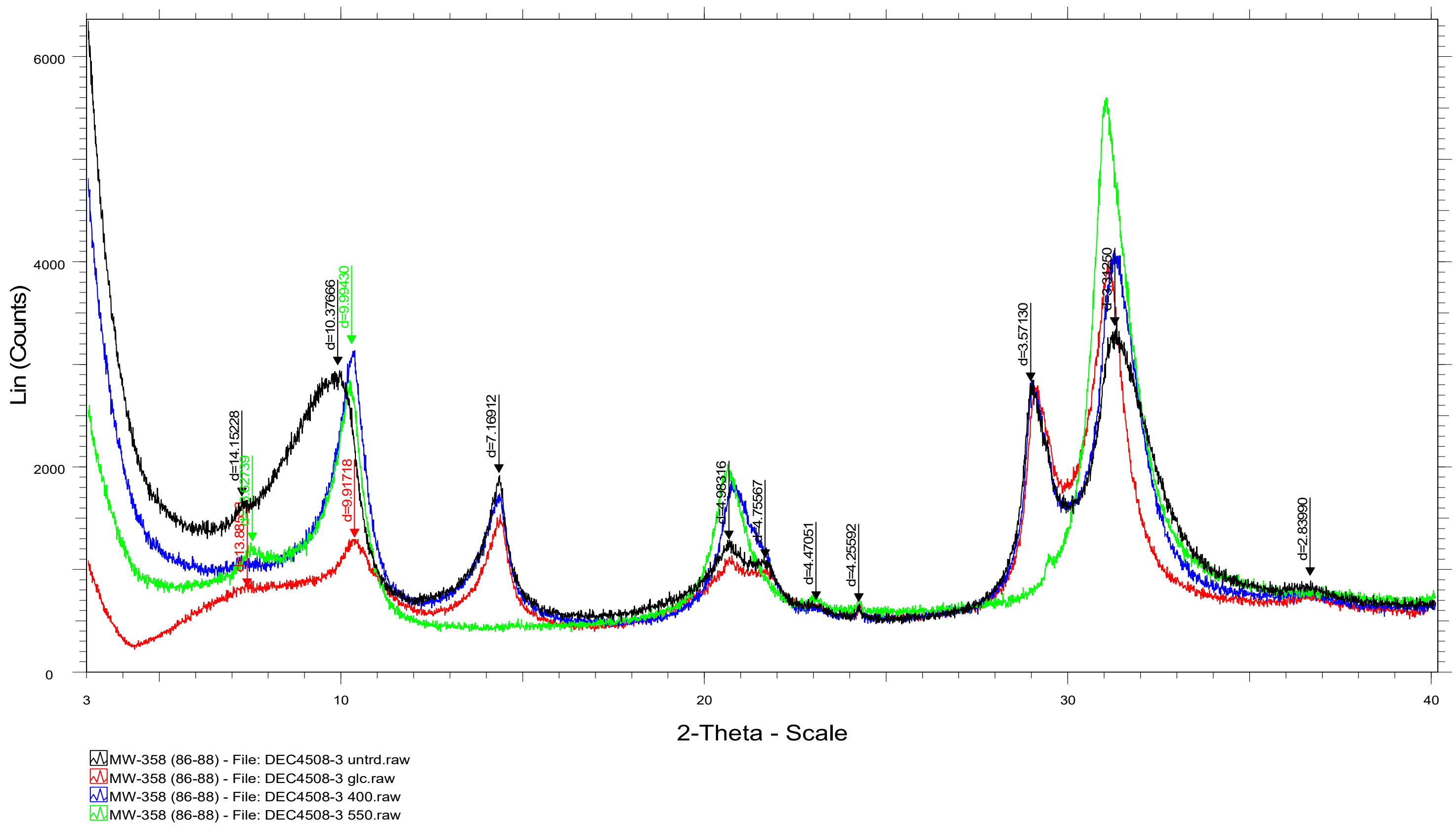
MW-358 (47-49)



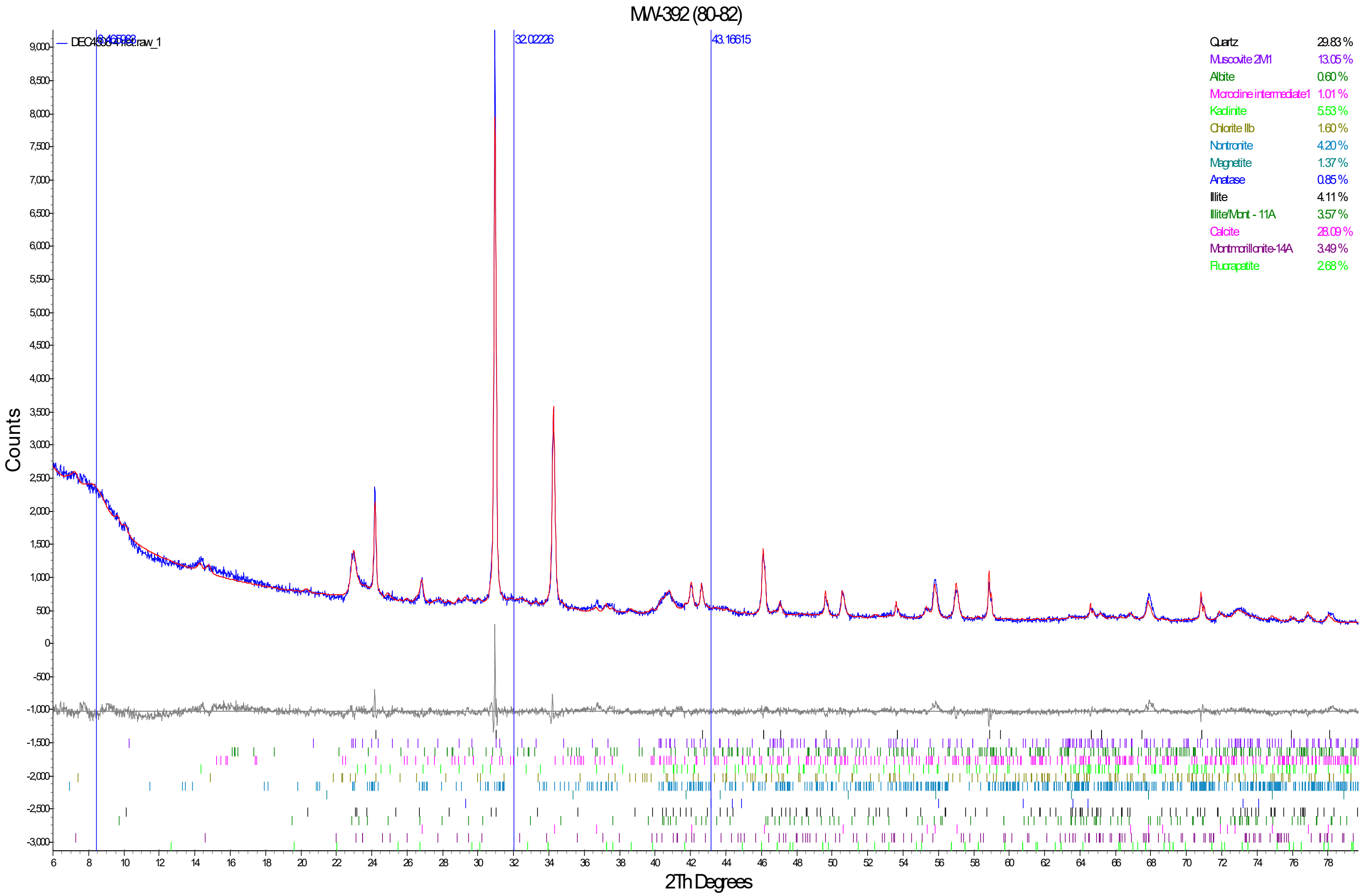

MW-358 (86-88)
DEC4508-3 net.raw_1
9.29615
Quartz 34.86 %
Muscovite 2M1 30.50 %
Albite 3.40 %
Microcline intermediate1 8.13 %
Pyrite 0.82 %
Kaolinite 18.42 %
Calcite 1.73 %
Anatase 2.14 %
Counts
2Th Degrees

Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

MW-358 (86-88)

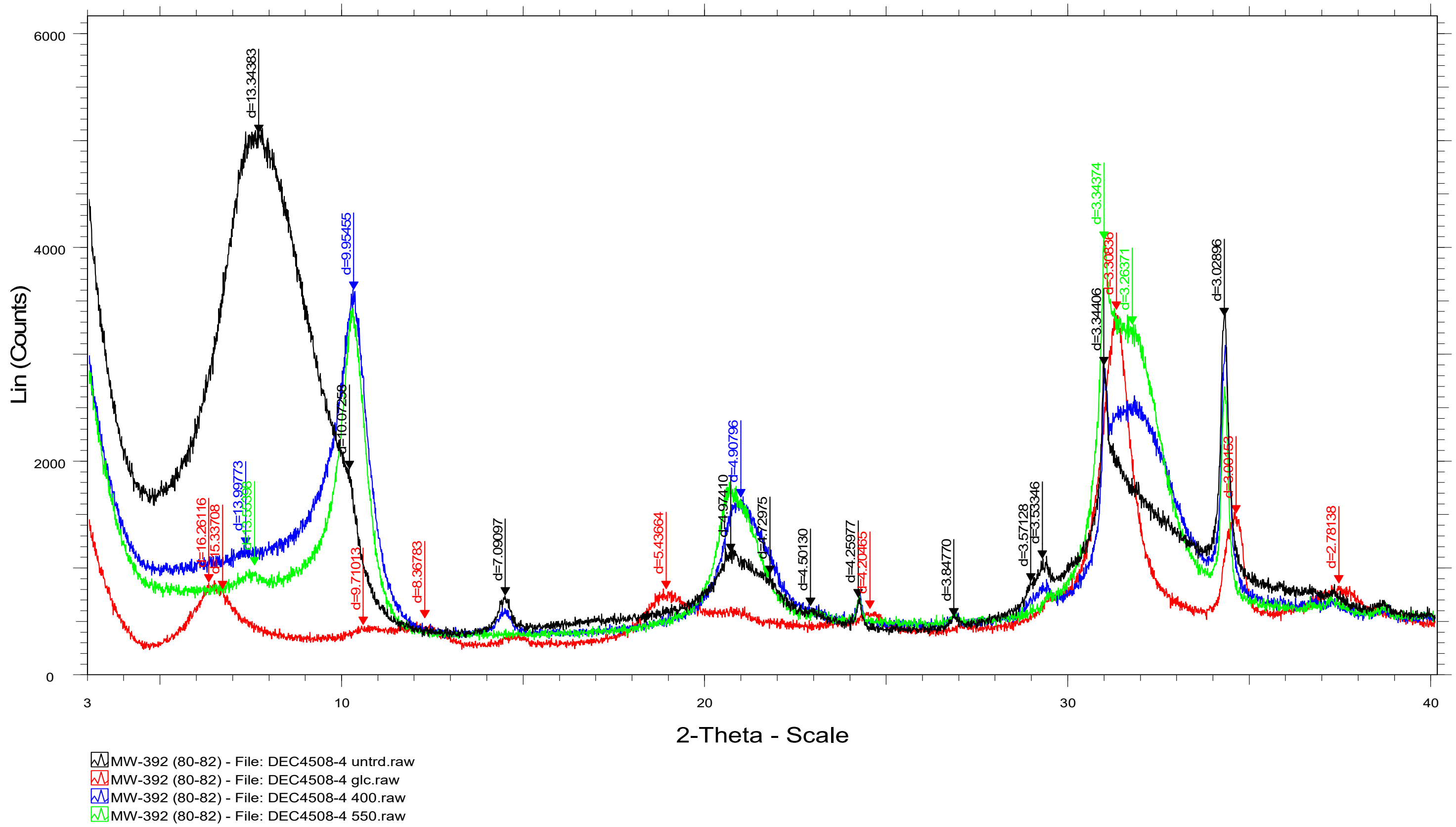


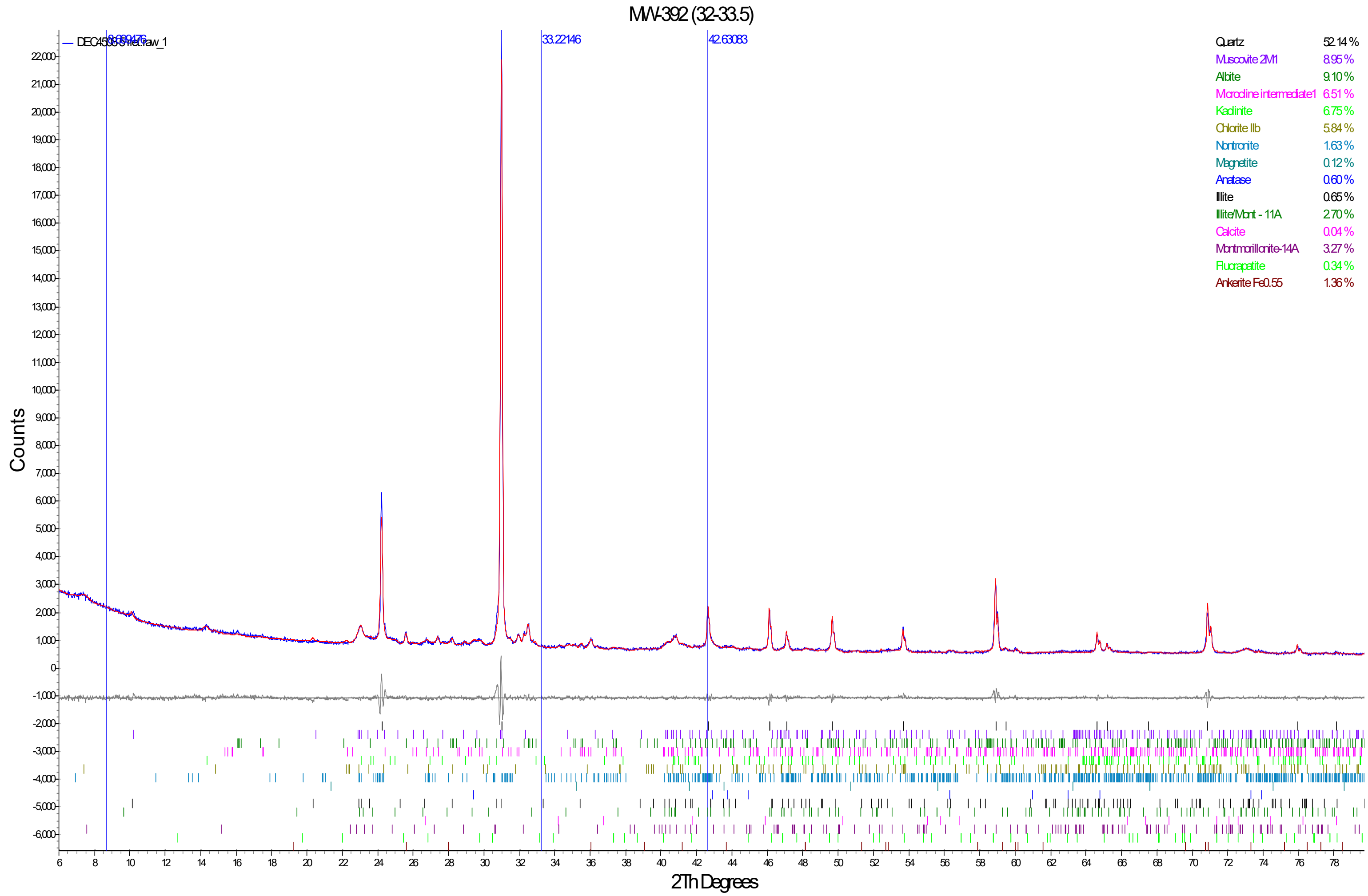
Environmental Services
Custom XRD/MI4508-DEC22
24-Apr-23



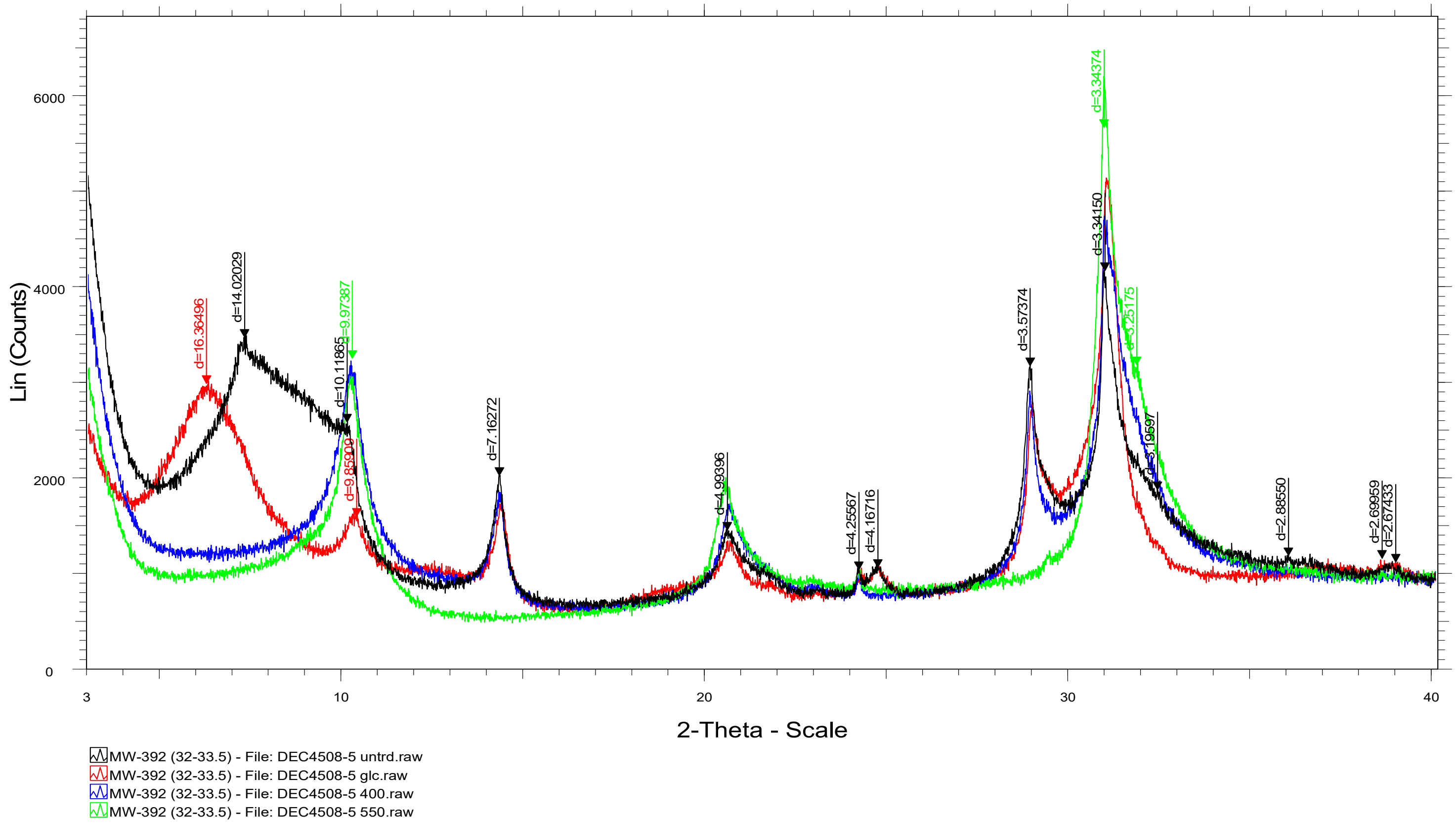
Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

MW-392 (80-82)




MW-392 (32-33.5)
DEC4508-5rfd.raw_1
8.689476
33.22146
42.63083
Counts
2Th Degrees
Quartz 52.14 %
Muscovite 2M1 8.95 %
Albite 9.10 %
Microcline intermediate1 6.51 %
Kaolinite 6.75 %
Chlorite IIb 5.84 %
Nontronite 1.63 %
Magnetite 0.12 %
Anatase 0.60 %
Illite 0.65 %
Illite/Mont - 11A 2.70 %
Calcite 0.04 %
Montmorillonite-14A 3.27 %
Fluorapatite 0.34 %
Ankerite Fe0.55 1.36 %

MW-392 (32-33.5)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d=9.85909
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d=4.25567
d=4.16716
d=3.57374
d=3.34374
d=3.34150
d=3.25175
d=3.19697
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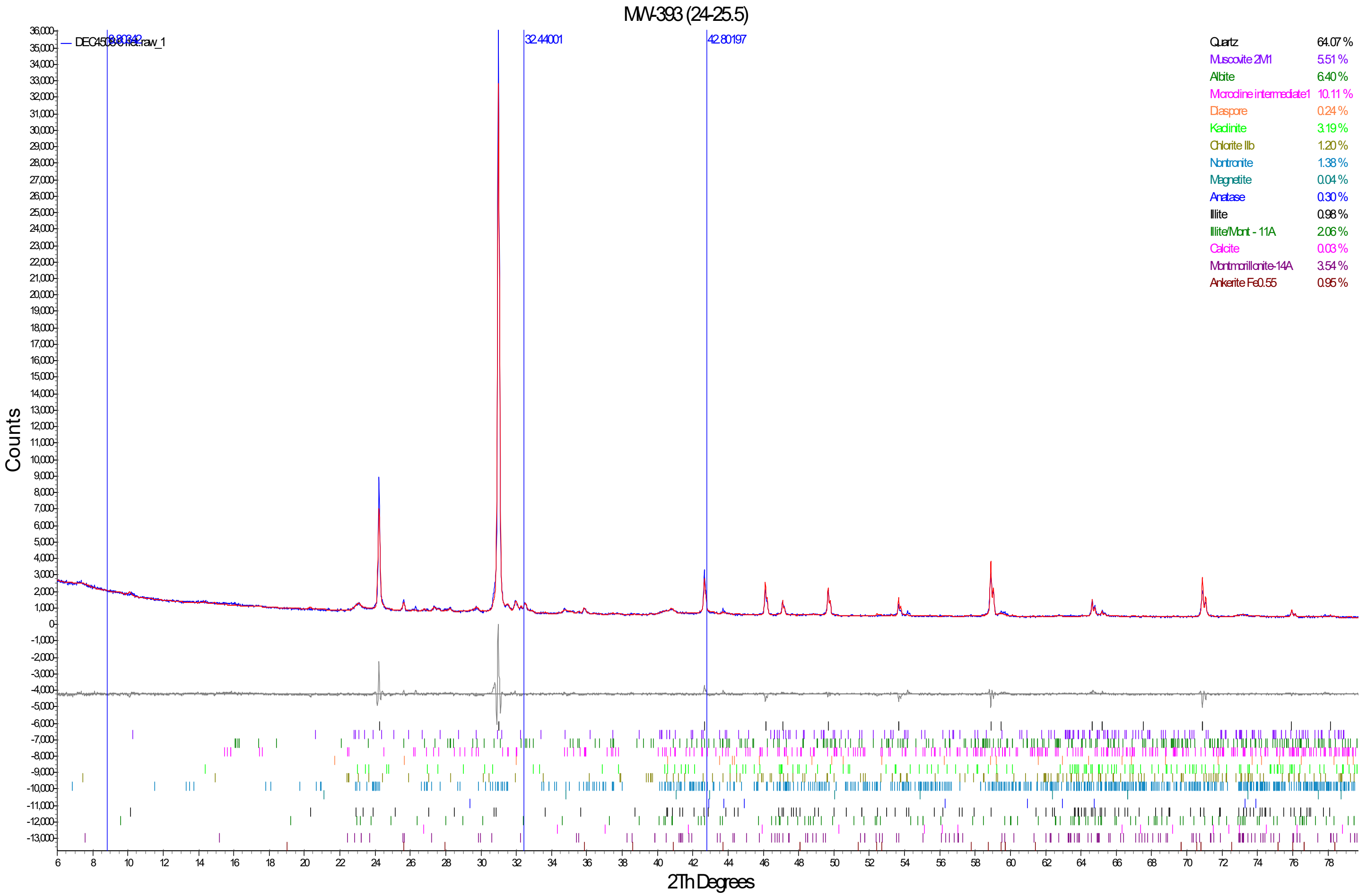
d=2.67433
MW-392 (32-33.5) - File: DEC4508-5 untrd.raw
MW-392 (32-33.5) - File: DEC4508-5 glc.raw
MW-392 (32-33.5) - File: DEC4508-5 400.raw
MW-392 (32-33.5) - File: DEC4508-5 550.raw


MW-393 (24-25.5)
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8.80742
32.44001
42.80197
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2Th Degrees
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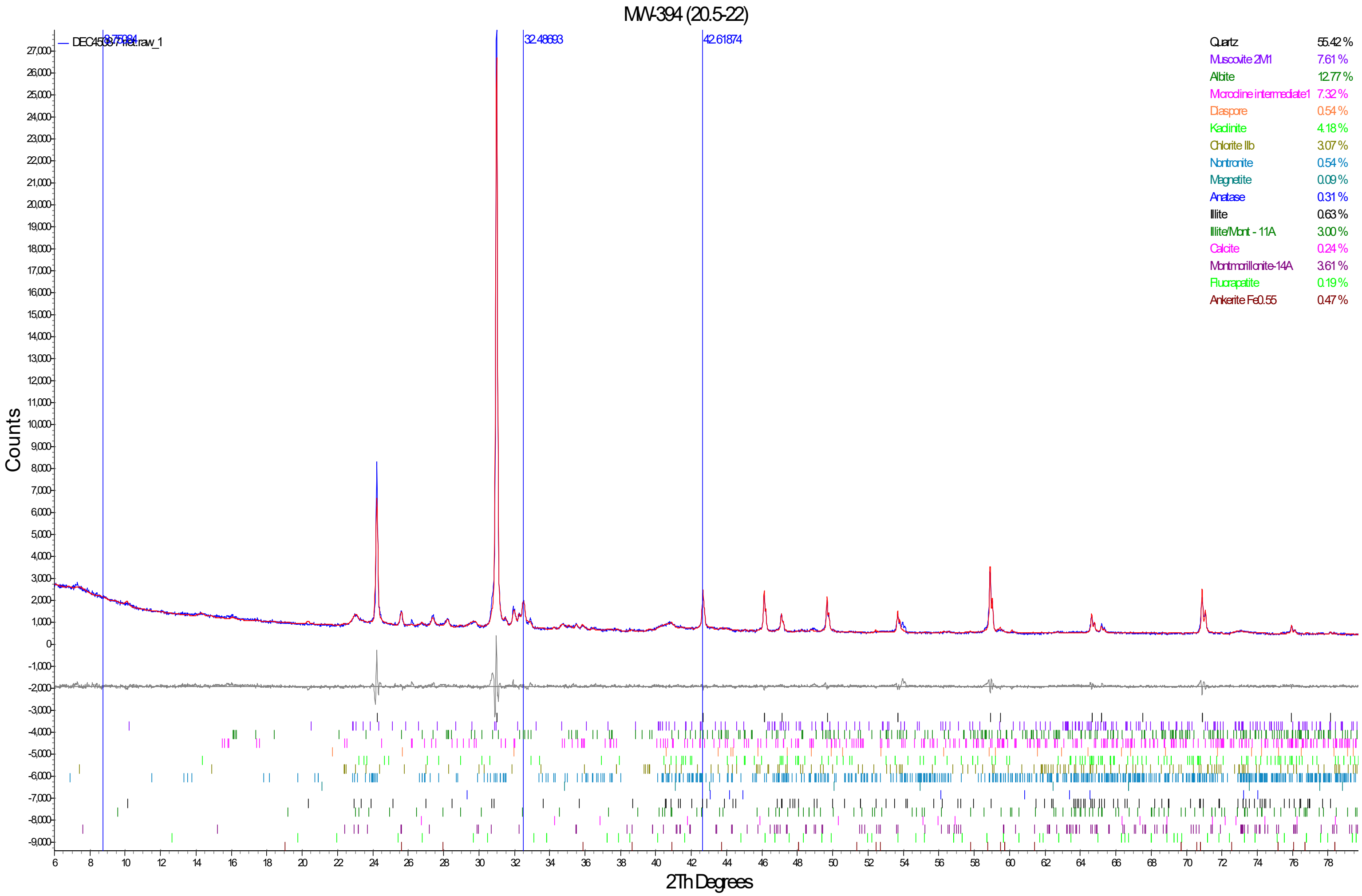
Muscovite 2M1 5.51 %
Albite 6.40 %
Microcline intermediate1 10.11 %
Diaspore 0.24 %
Kaolinite 3.19 %
Chlorite IIb 1.20 %
Nontronite 1.38 %
Magnetite 0.04 %
Anatase 0.30 %
Illite 0.98 %
Illite/Mont - 11A 2.06 %
Calcite 0.03 %
Montmorillonite-14A 3.54 %
Ankerite Fe0.55 0.95 %


MW-394 (20.5-22)
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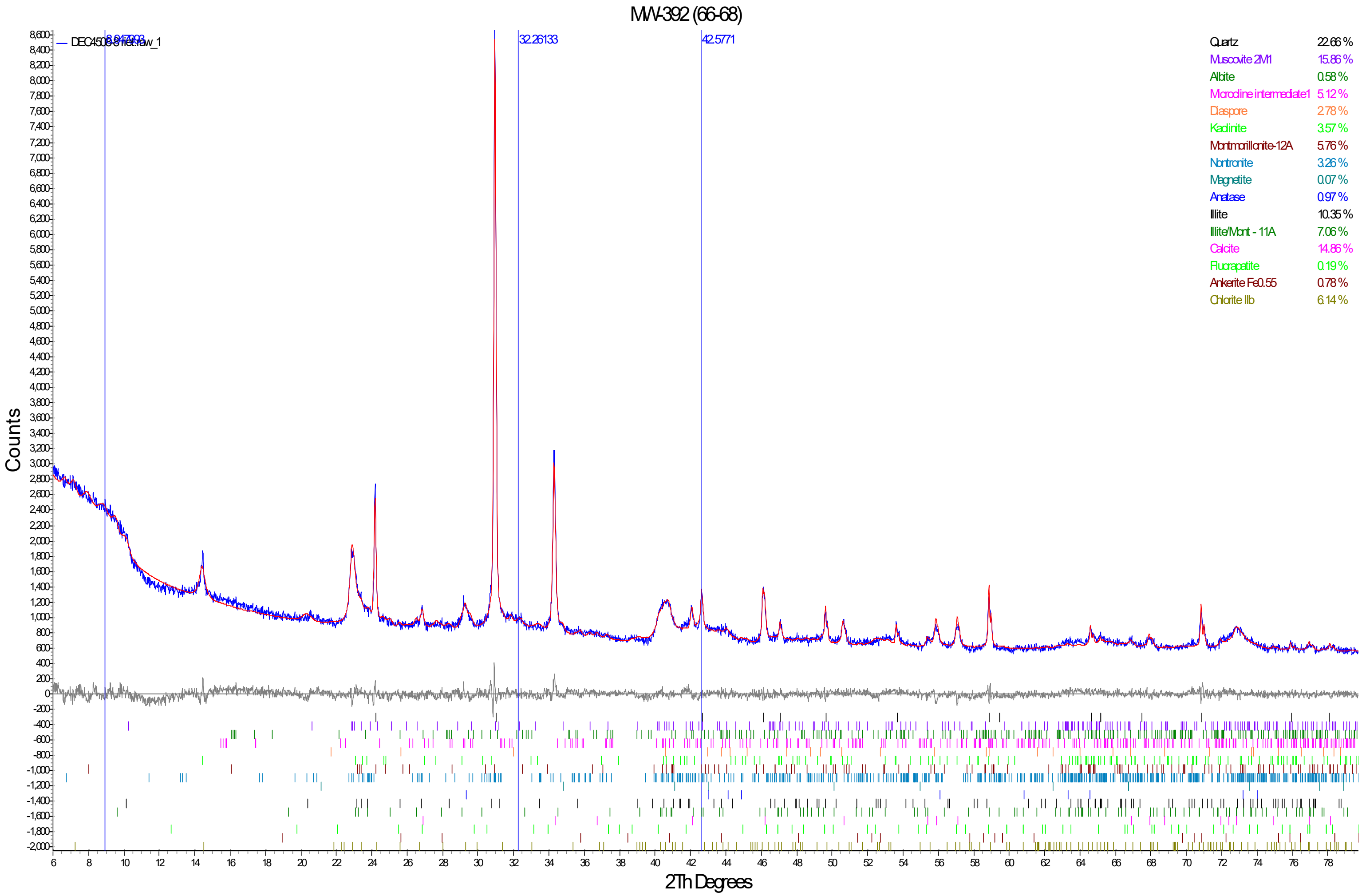
42.61874
Counts
2Th Degrees
Quartz 55.42 %
Muscovite 2M1 7.61 %
Albite 12.77 %
Microcline intermediate1 7.32 %
Diaspore 0.54 %
Kaolinite 4.18 %
Chlorite IIb 3.07 %
Nontronite 0.54 %
Magnetite 0.09 %
Anatase 0.31 %
Illite 0.63 %
Illite/Mont - 11A 3.00 %
Calcite 0.24 %
Montmorillonite-14A 3.61 %
Fluorapatite 0.19 %
Ankerite Fe0.55 0.47 %


MW-392 (66-68)
Counts
2Th Degrees
DEC4508-9 file.raw_1
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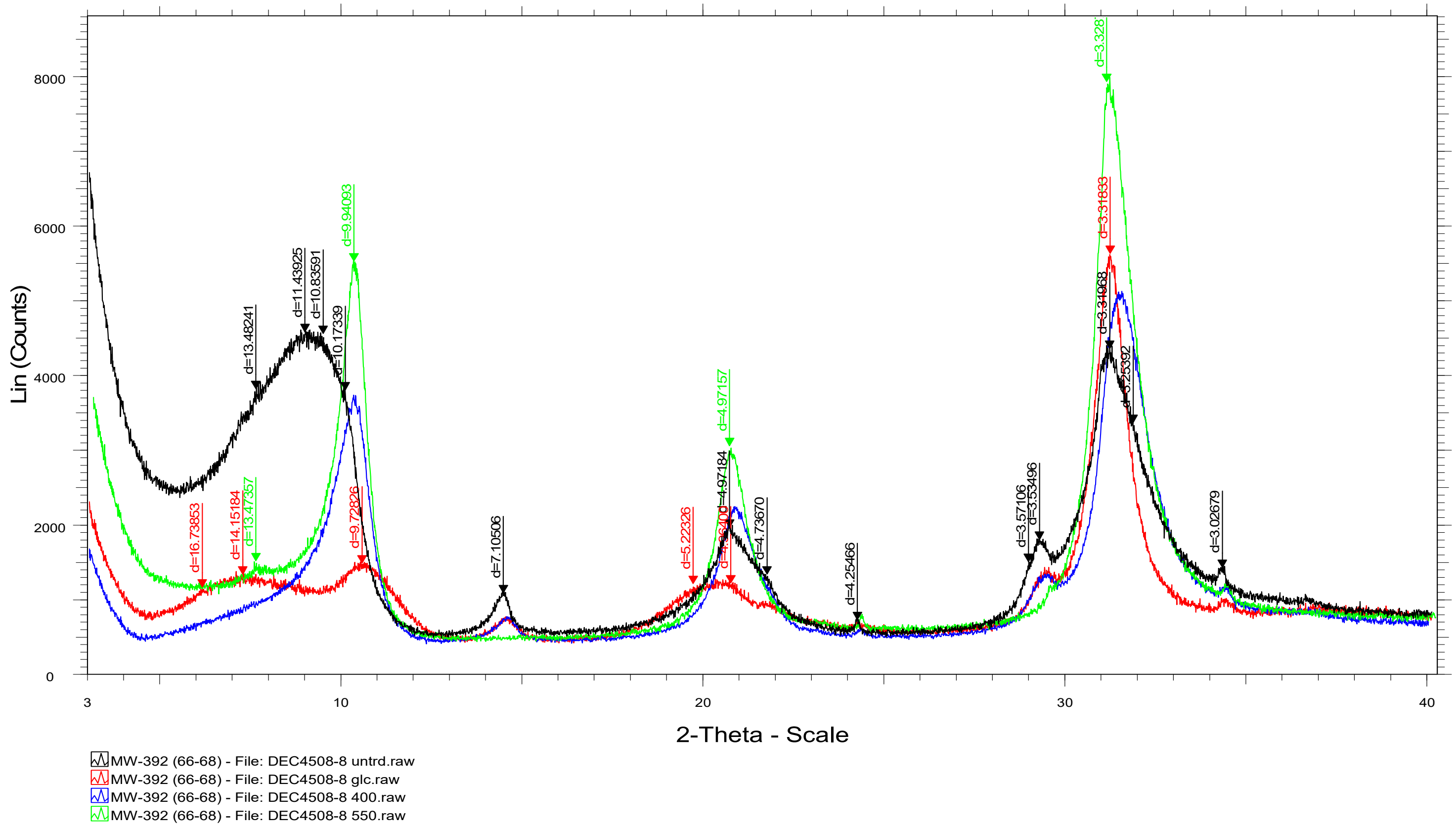
32.26133
42.5771
Quartz 22.66 %
Muscovite 2M1 15.86 %
Albite 0.58 %
Microcline intermediate1 5.12 %
Diaspore 2.78 %
Kaolinite 3.57 %
Montmorillonite-12A 5.76 %
Nontronite 3.26 %
Magnetite 0.07 %
Anatase 0.97 %
Illite 10.35 %
Illite/Mont - 11A 7.06 %
Calcite 14.86 %
Fluorapatite 0.19 %
Ankerite Fe0.55 0.78 %
Chlorite IIb 6.14 %

MW-392 (66-68)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MW-392 (66-68) - File: DEC4508-8 400.raw
MW-392 (66-68) - File: DEC4508-8 550.raw

ATTACHMENT 9
Referenced Documents

The following documents are included in Attachment 9:

Attachment 9-1: IEPA. 2016. "Dynegy Midwest Generation, Inc. – Baldwin Energy Complex: Baldwin Fly Ash Pond System Closure – NPDES Permit No. IL000043." Letter from William Buscher (Illinois Environmental Protection Agency) to Rick Diericx (Dynegy Operating Company). August 16.

Attachment 9-2: IEPA. 2023. "Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal." Letter from Michael Summers, P.G. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). November 28.

Attachment 9-3: IEPA. 2024a. "Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal." Letter from Darin LeCrone, P.E. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). August 8.

Attachment 9-4: IEPA. 2024b. "Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal." Letter from Darin LeCrone, P.E. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). October 3.

Attachment 9-5: NRT. 2014. *Groundwater Quality Assessment and Phase II Hydrogeologic Investigation, Baldwin Ash Pond System, Baldwin, Illinois*. Natural Resource Technology, Inc. Prepared for Dynegy Midwest Generation, LLC. June 11.

Attachment 9-6: NRT. 2016. *Supplemental Hydrogeologic Site Characterization and Groundwater Monitoring Plan. Baldwin Fly Ash Pond System. Baldwin Energy Complex, Baldwin, IL*. Natural Resource Technology, Inc.

Attachment 9-7: Ramboll. 2023a. *40 C.F.R. § 257.95(g)(3)(ii): Alternative Source Demonstration. Baldwin Power Plant. Baldwin Bottom Ash Pond, CCR Unit 601*. Ramboll Americas Engineering Solutions, Inc. April.

ATTACHMENT 9-1

IEPA. 2016. "Dynegy Midwest Generation, Inc. – Baldwin Energy Complex: Baldwin Fly Ash Pond System Closure – NPDES Permit No. IL000043." Letter from William Buscher (Illinois Environmental Protection Agency) to Rick Diericx (Dynegy Operating Company). August 16.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

BRUCE RAUNER, GOVERNOR ALEC MESSINA, ACTING DIRECTOR

August 16, 2016

Mr. Rick Diericx
Managing Director, Environmental Compliance
Dynegy Operating Company
1500 Eastport Plaza Drive
Collinsville, IL 62234

Re: Dynegy Midwest Generation, Inc. - Baldwin Energy Complex: Baldwin Fly Ash Pond System Closure - NPDES Permit No. IL0000043

Dear Mr. Diericx:

The Illinois Environmental Protection Agency (Agency) has completed the review of the Baldwin Fly Ash Pond System Closure Plan, Post Closure Plan and GMZ Application (Plan) dated April 7, 2016 and the technical memorandum dated August 8, 2016 which Dynegy submitted in response to Agency comments date July 13, 2016. The Plan was reviewed using both the 40 CFR Part 257 regulations and the 35 Ill. Adm. 620 regulations for reference.

The Agency finds that the Plan, in conjunction with the technical memorandum referenced above, represent an appropriate means by which to close the Baldwin Fly Ash Pond System which is comprised of the East Fly Ash Pond, the Old East Fly Ash Pond and the West Fly Ash Pond at the Baldwin Energy Complex.

If you have any questions or concerns, please contact Carl Kamp of my staff or me at the letterhead address or 217/785-4787.

Sincerely,

William E. Buscher

William E. Buscher, P.G.
Supervisor, Hydrogeology and Compliance Unit
Groundwater Section
Division of Public Water Supplies
Bureau of Water

CC: Rick Cobb Darin LeCrone Charles Gunnarson
Carl Kamp Records 06L

ATTACHMENT 9-2

IEPA. 2023. “Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal.” Letter from Michael Summers, P.G. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). November 28.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 · (217) 782-3397

JB Pritzker, Governor — John J. Kim, Director

217-782-1020

November 28, 2023

Phil Morris
Illinois Power Generating Company
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Re: Baldwin Power Plant Bottom Ash Pond; W1578510001-06
Alternative Source Demonstration (ASD) Submittal

Dear Mr. Morris:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) concurs with the Baldwin Power Plant Bottom Ash Pond Alternative Source Demonstration dated October 27, 2023, and the additional evidence provided on November 10, 2023.

Based on the provided evidence, the Illinois EPA concurs that the chloride and fluoride exceedances found in MW-370 and MW-393, respectively, do not come from the Baldwin Power Plant Bottom Ash Pond. The Illinois EPA also concurs that the likely source of the exceedances come from native bedrock. Therefore, the groundwater monitoring may continue in accordance with Section 845.650(e)(5). The ASD provided must be included in the annual groundwater monitoring report and the corrective action report as required by Section 845.610(e).

If you have any questions, please contact: **Heather Mullenax** Illinois EPA, Bureau of Water, Groundwater Section DPWS #13, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,

Michael Summers, P.G.
Manager, Groundwater Section
Division of Public Water Supplies
Bureau of Water

ATTACHMENT 9-3

IEPA. 2024a. "Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal." Letter from Darin LeCrone, P.E. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). August 8.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397
JB PRITZKER, GOVERNOR **JAMES JENNINGS**, INTERIM DIRECTOR

217-782-1020

August 8, 2024

Phil Morris
Illinois Power Generating Company
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Re: Baldwin Power Plant Bottom Ash Pond; W1578510001-06
Alternative Source Demonstration (ASD) Submittal

Dear Mr. Morris:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) concurs with the Baldwin Power Plant Bottom Ash Pond Alternative Source Demonstration dated July 8, 2024.

Based on the provided evidence, the Illinois EPA concurs that the lithium exceedance found in MW-370 does not come from the Baldwin Power Plant Bottom Ash Pond. The Illinois EPA also concurs that the likely source of the exceedance come from shale bedrock. Therefore, the groundwater monitoring may continue in accordance with Section 845.650(e)(5). The ASD provided must be included in the annual groundwater monitoring report and the corrective action report as required by Section 845.610(e).

If you have any questions, please contact: **Heather Mullenax** Illinois EPA, Bureau of Water, Groundwater Section DPWS #13, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,

Darin E. LeCrone, P.E.
Manager, Permit Section
Division of Water Pollution Control
Illinois Environmental Protection Agency

cc: Heather Mullenax
Anwar Azeem
Records Files 06M - W1578510001-06

ATTACHMENT 9-4

IEPA. 2024b. “Baldwin Power Plant Bottom Ash Pond; W1578510001-06 Alternative Source Demonstration (ASD) Submittal.” Letter from Darin LeCrone, P.E. (Illinois Environmental Protection Agency) to Phil Morris (Illinois Power Generating Company). October 3.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR **JAMES JENNINGS**, ACTING DIRECTOR

217-782-1020

October 3, 2024

Phil Morris
Illinois Power Generating Company
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Re: Baldwin Power Plant Bottom Ash Pond; W1578510001-06
Alternative Source Demonstration Submittal

Dear Mr. Morris:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) does not concur with the Baldwin Power Plant Bottom Ash Pond Alternative Source Demonstration (ASD) for arsenic on September 17, 2024. The Illinois EPA does not concur due to the following data gaps:

- Characterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with the ASD.
    - 35 IAC 845.640(a) requires evidence of field collection methods and field and laboratory quality control and quality assurance.
    - 35 IAC 845.650(e) requires alternative source data as evidence of the alternative source, see item 1(a)(i) above. SW846 chapter 1, incorporated by reference in 35 IAC 845, states that regulatory decisions must be made with environmental data.

If you have any questions, please contact: **Heather Mullenax** Illinois EPA, Bureau of Water, WPC #15, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,

Darin E. LeCrone, P.E.
Manager, Permit Section
Division of Water Pollution Control
Illinois Environmental Protection Agency

ATTACHMENT 9-5

NRT. 2014. *Groundwater Quality Assessment and Phase II Hydrogeologic Investigation, Baldwin Ash Pond System, Baldwin, Illinois*. Natural Resource Technology, Inc. Prepared for Dynegy Midwest Generation, LLC. June 11.

SMARTER SOLUTIONS

EXCEPTIONAL SERVICE

VALUE

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation

Baldwin Ash Pond System
Baldwin Energy Complex
Baldwin, Illinois
Dynegy Midwest Generation, LLC

Project No: 2189

June 11, 2014

NATURAL RESOURCE TECHNOLOGY

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GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION

BALDWIN ASH POND SYSTEM

Baldwin Energy Complex
Baldwin, Illinois
Dynegy Midwest Generation, LLC

Project No. 2189

Prepared For:

Dynegy Operating Company
1500 Eastport Plaza Drive
Collinsville, IL 62234

Prepared By:

Natural Resource Technology
2422 E. Washington Street, Suite 104
Bloomington, Illinois 61704

June 11, 2014

Stuart J. Cravens, PG
Senior Hydrogeologist

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APPENDICES

1 INTRODUCTION

1.1 Purpose

This groundwater quality assessment and Phase II hydrogeologic investigation has been prepared by Natural Resource Technology, Inc. (NRT) on behalf of Dynegy Operating Company (DOC) to further assess the hydrogeology and groundwater quality in the vicinity of the ash pond system at the Baldwin Energy Complex (BEC), which is owned by Dynegy Midwest Generation, LLC (DMG). This Phase II assessment follows the Proposed Scope of Work (DOC, March 22, 2013) which was approved, with clarifications, in a letter from the Illinois EPA to DMG dated June 18, 2013. In conjunction with the hydrogeologic investigation, a groundwater model has been developed to evaluate the effect of various ash pond closure scenarios on groundwater quality. The groundwater modeling report is being submitted under separate cover. These two reports will be utilized to identify potential corrective actions at the Ash Pond System to mitigate possible water quality impacts to the groundwater system.

The information presented in this report is comprehensive as it incorporates the data and evaluations from the prior hydrogeologic investigation report, Groundwater Quality Assessment and Initial Hydrogeologic Investigation – Baldwin Ash Pond System (Kelron Environmental, June 30, 2012). The earlier report assessed the hydrogeology and groundwater quality in the vicinity of the Ash Pond System (APS), but not beneath the ash ponds as does this latest study.

1.2 Overview of the Plant and Ash Pond System

The BEC (Figure 1) is a coal-fired electrical generating plant that began operation of its first unit in 1970, with two other generating units put into service in 1973 and 1975. The plant initially burned bituminous coal from Illinois, and switched to subbituminous coal in 1999. Total plant generating capacity is approximately 1,892 megawatts. Through 2011, the BEC utilized six active ash ponds with one out-of-service fly ash pond, located at the eastern end of the ash pond system. The former active ash ponds consisted of a bottom ash pond, primary fly ash pond, secondary fly ash pond, secondary pond, intermediate pond, and tertiary pond. There is one outfall from the ash pond system, with the outlet at the southwest corner of the tertiary pond into a tributary to the Kaskaskia River. The tributary discharges into the Kaskaskia River to the south of the Cooling Pond intake structure.

As of this report date, the following changes have been made to the handling of coal combustion residuals (CCRs) at the APS (Figure 2):

- Fly ash is no longer sluiced to the APS; dry fly ash from Units 1 and 2, conditioned with 10 to 12 percent water, is transported to the West Fly Ash Cell and dry fly ash from Unit 3 is marketed for off-site industrial use.
- Bottom ash from Units 1 and 2 at the northeast corner of the bottom ash pond of the APS is being actively mined and sold for off-site commercial/industrial use.
- Bottom ash from Unit 3 is being sluiced to the southeast corner of the Bottom Ash Pond of the APS.
- The Old East Fly Ash Pond and East Fly Ash Pond are both out of service, with the Old East Fly Ash Pond covered with top soil.
- The berm separating the Intermediate Pond from the Secondary Pond was removed and the Intermediate Pond joined with the Secondary Pond.

To summarize, the APS (Figure 2), currently consists of six cells:

- Bottom Ash Pond (176 acres, active)
- Old East Fly Ash Pond (119 acres, out of service)
- East Fly Ash Pond (77 acres, out of service)
- West Fly Ash Cell (55 acres, active)
- Secondary Pond, used for water clarification rather than direct management of CCRs, but does contain a small volume of CCR
- Tertiary Pond, used for final water clarification and may contain a very small volume of CCR

There is one outfall from the APS at the Tertiary Pond; it discharges to a tributary of the Kaskaskia River south of the Cooling Pond intake structure. All six cells of the Ash Pond System have been evaluated as part of the hydrogeologic investigation, groundwater quality assessment and modeling.

1.3 Previous Investigations and Monitoring Well Installations

The Illinois State Water Survey (ISWS) conducted a limited groundwater investigation of the BEC ash pond system in the early 1980's, including the installation of eight monitoring wells (Wehrmann, 1982). None of the eight ISWS wells are still in existence, having been abandoned and/or destroyed during continual development of the ash pond system between 1982 and 2010.

Five additional monitoring wells (BMW-9 to BMW-13) were installed by John Mathes & Associates, Inc. (Mathes) in 1984 along the south side of the ash pond system. Four of those wells (BMW-9, BMW-10, BMW-11, and BMW-12) were found during the 2010 to 2012 initial investigation, but due to their damaged condition were sealed and abandoned between September 10 and 21, 2010. Monitoring well BMW-13 is believed to have been destroyed. All well sealing documentation was submitted to the Illinois Department of Public Health (IDPH) as required. New monitoring wells were installed in the vicinity of each of the abandoned Mathes wells in late 2010.

Two wells situated upgradient (east) of the ash pond system were located in 2010 during the initial field reconnaissance and literature search. These wells were installed in November 1990 by Burlington Environmental, Inc. as part of an evaluation of potential landfill sites in the vicinity of the BEC. After evaluating and re-developing the wells, designated MW-104S and MW-104D, it was determined that they were suitable for incorporation into a new monitoring well network for the ash pond system. Subsequently, in June 2011 the two upgradient monitoring wells were accidentally destroyed. Both wells were replaced in July 2011 with almost identical monitoring wells, designated MW-104SR and MW-104DR. All documentation for the original and replacement monitoring wells is provided in Appendix A.

Five prior documents concerning the BEC's APS have been prepared and submitted to the Illinois EPA, specifically:

- *Hydrogeologic Assessment and Groundwater Monitoring Plan – Baldwin Ash Pond System*, dated May 26, 2010. A plan for initial evaluation of groundwater quality in the vicinity of the Ash Pond System along with an initial hydrogeologic characterization. This plan was accepted, with clarifications, in a letter from the Illinois EPA to DOC dated August 31, 2011.

- *Water Well Survey – Baldwin Ash Pond System*, dated June 7, 2010. A survey identifying water wells located within 2,500 feet of the BEC's Ash Pond System. The water well survey was prepared in accordance with the "Right to Know" Potable Water Well Survey procedures of 35 Illinois Administrative Code 1600.210(b)(1) and 1600.210(b)(2).

- *Groundwater Quality Assessment and Initial Hydrogeologic Investigation – Baldwin Ash Pond System*, dated June 30, 2012. This report assessed the hydrogeology and groundwater quality in the vicinity of the Ash Pond System, but not beneath the ash ponds. Thirteen monitoring wells were installed around the perimeter of the Ash Pond System to assess upgradient and downgradient groundwater quality. Six quarterly rounds of groundwater sampling and analysis were conducted for the full inorganic parameter list in IAC 35 Part 620.410.

- *Off-Site Groundwater Quality Results – Baldwin Energy Complex*, dated April 16, 2012. This report presented the results of an off-site groundwater quality investigation, south and southwest of the Ash Pond System, to assess shallow off-site groundwater quality for the presence of inorganic parameters related to CCRs.

- *Proposed Scope of Work – Baldwin Ash Impoundment System*, letter from DOC to Illinois EPA dated March 22, 2013. A plan for conducting a more comprehensive hydrogeologic investigation along with development of a groundwater model to evaluate various pond closure scenarios on groundwater quality in the vicinity of the APS. This plan was accepted, with clarifications, in a letter from the Illinois EPA to DOC dated August 31, 2011.

1.4 Site Description

The BEC is located in southwest Illinois in Randolph and St. Clair Counties. The Randolph County portion of the BEC is located within Sections 2, 3, 4, 9, 10, 11, 14, 15 and 16 of Township 4 South and Range 7 West. The St. Clair County portion of the property is located within Sections 33, 34, and 35 of Township 3 South and Range 7 West. The BEC ash pond system is approximately one-half mile west-northwest of the Village of Baldwin.

In general, the BEC property is bordered: on the west by the Kaskaskia River; on the east by Baldwin Road, farmland, and strip mining areas; on the southeast by the village of Baldwin; on the south by the Illinois Central Gulf (ICF) railroad tracks and State Route 154; and, on the north by the St. Clair/Randolph County Line. Although most of the operational area of the BEC is within Randolph County, the BEC's cooling pond (a.k.a. Baldwin Lake) extends to the north into St. Clair County. The entire BEC property encompasses approximately four square miles. However, the Baldwin cooling pond, which supplies the BEC with cooling water, occupies most of that area, covering approximately three square miles. Overflow from the Baldwin cooling pond discharges into the Kaskaskia River, with a spillway elevation of 430 feet NGVD (National Geodetic Vertical Datum).

In this report, the hydrogeologic investigation study area (referred to herein as the "Site") includes the APS and eastward several hundred feet, westward to the Kaskaskia River, and south to the BEC's southern property boundary along the ICF railroad tracks..

1.5 Climate

Historical climate data for temperature, precipitation, and snowfall is based on 30-year averages compiled from 1981 – 2010 for the Red Bud 5 SE, Illinois station (climatological station 117152) and the Sparta 1 W, Illinois station (climatological station 118147) by the NOAA National Climatic Data Center and accessed via the Midwestern Regional Climate Center in Champaign, Illinois (http://www.isws.uiuc.edu/atmos/statecli/newnormals.htm#stationlist). The Red Bud station (latitude 38.1853 degrees N, longitude 89.9283 degrees W) only has precipitation data but is just 2.7 miles west-southwest of the southwest corner of the BEC APS. The Sparta station (latitude 38.1167 degrees N, longitude 89.7167 degrees W) has both temperature and precipitation data but is located 9 miles southeast of the southeast corner of the APS.

The climate of the region is characterized by four distinct seasons (summer, fall, winter, and spring) without prolonged periods of extreme cold, extreme heat, or high humidity. Both warm air masses from the Gulf of Mexico and cold air masses from Canada influence local weather conditions. Precipitation is usually adequate though summer although drought periods are not uncommon. Because of its latitude, the area can experience abrupt temperature changes during all but the mid-summer season.

Temperature

Based on the Sparta climatological station data, the average annual temperature is 55.1 degrees Fahrenheit (ºF), which represents a range in temperature from January's mean temperature of 30.7 ºF to July's mean temperature of 77.2 ºF. Average 30-year (1981 – 2010) maximum, minimum and mean temperatures for each month of the year at the Sparta 1 W station are listed below.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Max °F	39.9	45.0	55.8	66.9	75.7	84.5	88.1	87.4	80.3	69.5	56.0	42.6	66.1
Min °F	21.5	25.1	33.1	43.3	53.0	62.4	66.3	64.2	55.2	44.4	35.4	24.9	44.2
Mean °F	30.7	35.1	44.5	55.1	64.3	73.4	77.2	75.8	67.8	57.0	45.7	33.8	55.1

The three winter months of December, January and February are the coldest months with average 30 year minimums and maximums ranging from 21.5 °F in January to 45.0 °F in February. The three summer months of June, July, and August are the warmest months with average 30-year minimums and maximums ranging from 62.4 °F in June to 88.1 °F in July.

Precipitation

Normal annual precipitation for the region, based on the 30-year average at the Red Bud 5 climatological station, is 42.48 inches. May is typically the wettest month with 5.11 inches and January and February are the driest months with 2.4 inches on average each month. The 30-year (1981 – 2010) mean precipitation for each month of the year at the Red Bud 5 station are listed below.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Precip (in)	2.37	2.40	3.50	3.92	5.11	3.99	3.62	3.02	3.39	3.58	4.26	3.32	42.48

Average annual snowfall is 13.1 inches. Measurable amounts of snow occurs six months out of the year from November through April, ranging from approximately 0.3 inches in both November and April to 4.4 inches in January, the month that has the greatest amount of average snowfall.

2 FIELD PROCEDURES

2.1 Borehole Drilling

2.1.1 2010 – 2012 Investigation

Thirteen monitoring wells (Table 1) were installed by TerraDrill, Inc. (Dupo, Illinois) during September 2010 at the BEC APS at locations shown on Figure 3. The boring were advanced using a CME-550 drilling rig with 4.25-inch inside diameter (I.D.) and 8.5-inch outside diameter (O.D.) hollow-stem augers (HSA) through unlithified materials and rotary drilling through lithified materials with a 3.875-inch diameter tri-cone bit. Soil samples of the unlithified materials at each location were collected continuously using a 60-inch long by 2 inch diameter MacroCore sampler. Following extraction of each MacroCore the boring was advanced to the next sampling interval within the unlithified materials using the HSA. Shelby tube samples were recovered using a 3-inch I.D. thin-walled tube sampler in accordance with ASTM D 1587. Bedrock drilling and sampling was performed with NX-size wire-line rock coring methods using a hollow coring bit. Rock cores were placed in waxed-cardboard core boxes for further classification and analysis.

Soil samples were logged in the field for sample interval and soil recovery, stratum thickness and depth, visual soil classification by the Unified Soil Classification System [(USCS); ASTM D 2487 and 2488], moisture content and presence of water, and horizontal compressive strength using a pocket penetrometer. Soil boring logs are provided in Appendix A.

Twenty-two grab samples of soil from MacroCores and three Shelby tube sample were collected for additional USCS visual classification and moisture analysis at Shively Geotechnical in Fairview Heights, Illinois. Thirteen of those samples were also analyzed for grain size distribution. Three Shelby tube samples were collected for more comprehensive analysis for USCS visual classification, grain size analysis, moisture analysis, and vertical permeability. The physical testing results for the soil samples are presented in Appendix D.

2.1.2 2013 – 2014 Investigation

Five monitoring wells and nine temporary piezometers (Table 1) were installed by Bulldog Drilling, Inc. (Dupo, Illinois) during August 2013 at locations shown on Figure 3. The borings were advanced using a CME-55LC track-mounted rig. All borings were continuously sampled unless they were located adjacent to another boring/well location that had been characterized during the 2010 – 2012 investigation. In such cases, only those soil intervals not previously characterized were sampled. Two methods were utilized to drill and obtain soil samples depending on the type of well being installed, the boring penetration depth, sampling interval, and to maximize sample recovery.

- Method 1: HSA with 4.25-inch ID and 8.5-inch OD. Soil samples were collected using 60-inch MacroCores and Shelby tube samplers. At some borings, split-spoon samplers were utilized instead of MacroCores if the sampling interval was not continuous, geologic materials were too hard, or if sample recovery with the MacroCores was poor.
- Method 2: Solid-stem augers (SSA) with 4-inch OD flights. Soil samples were collected using MacroCores and Shelby tube samplers.

Soil samples were collected and logged utilizing the same methods described in Section 2.1.1. Soil boring logs are provided in Appendix A.

Nine grab samples of soil from MacroCores or split-spoon samples, and eight Shelby tube samples, were collected for analysis at Geotechnology, Inc's. geotechnical laboratory in Fairview Heights, Illinois . All samples were classified using the USCS system. Ten samples were analyzed for grain size distribution and five samples underwent vertical permeability analysis.

Three of the eight Shelby tube samples and one split-spoon sample were collected from borings advanced into the ash ponds; these four samples underwent more comprehensive analysis for determination of total porosity, water-filled porosity, and air-filled porosity. The locations and depths of the samples were as follows:

- Sample ST163-3 at 1.5 to 3.5 feet BLS from boring TPZ-163 (Old East Fly Ash Pond)
- Sample ST164-5 at 3 to 5 feet BLS from boring TPZ-164 (Bottom Ash Pond)
- Sample SS167-30 at 29 to 30 feet BLS from boring TPZ-167 (West Fly Ash Cell)
- Sample ST168-5 at 3 to 5 feet BLS from boring TPZ-168 (East Fly Ash Pond)

The physical testing results for the soil samples are presented in Appendix D.

2.2 Monitoring Well Installation and Development

2.2.1 2010 – 2012 Investigation

The monitoring wells installed in September 2010 were constructed of flush-threaded, 2-inch ID Schedule 40 PVC riser with either five or ten feet of 0.010-inch pre-pack with 20-40 sand and filter sock. Monitoring wells installed across the uppermost unconfined water bearing unit (i.e., water table wells) were constructed with ten-foot well screens. Monitoring wells installed in deeper water bearing units within the unlithified materials or bedrock were constructed with five-foot well screens.

A granular sand pack was placed around each well screen and brought up one to two feet above the top of the screened interval. A minimum two-foot thick bentonite seal (bentonite chips or grout) was placed above the sand pack. The remainder of the borehole annulus was filled to the surface with bentonite chips or cement/bentonite grout using a 1.25-inch ID PVC tremie pipe which was placed down the inside of the augers as they were removed from the ground. The remaining one foot was backfilled with sand to allow the well protector to drain in the event of surface infiltration. The wells were all completed with an above-ground well protector to 2.5 to 3.2 feet above ground surface and set in a concrete pad. The top of the wells were capped with a waterproof locking cap and labeled. Monitoring well construction forms and diagrams are provided in Appendix A and the Illinois Department of Public Health (IDPH) Well Construction Reports in Appendix B.

At least 48-hours following well completion, the monitoring wells were developed to promote restoration of the natural hydraulic conductivity of the monitored formation and remove drilling-induced sediment to minimize turbidity in groundwater samples. Development was performed by surging and pumping using a submersible pump. Bailers were also used to surge and remove development water at some wells. The wells were developed until a minimum of five well volumes was removed and/or pH, specific conductance, and temperature of the groundwater had stabilized. Well development data sheets are provided in Appendix C.

In addition to the new monitoring wells installed in September 2010, two replacement wells MW-104SR and MW-104DR were installed for the damaged upgradient wells MW-104S and MW-104D in July 2011. Both of the damaged wells were sealed with notifications and documentation sent to the IDPH. Monitoring well MW-104SR was installed with a 10-foot screen across the water table with a total depth of 15 feet bgs, similar to the original well. Monitoring well MW-104DR was installed with a 5-foot screen with a total depth of 28.5 feet bgs, unlike the original well which had a 10-foot screen. The shorter screen in the replacement well was deemed more suitable for characterizing groundwater quality in a thin sand layer present between 24.5 and 27.25 feet bgs.

Monitoring and observation well depths and screened intervals are shown visually on Figure 4A, locations shown on Figure 3, and well depths and screened intervals are provided on Table 1.

2.2.2 2013 – 2014 Investigation

Wells installed in August 2013 had different types of materials and construction depending on if they were shallow or deep monitoring wells or temporary piezometers. The materials and construction for the wells were as follows:

- Wells MW-161, MW-162, and TPZ-166: 2-inch ID Schedule 40 PVC riser with 10-foot long, 2-inch ID screens
- Well MW-262: 2-inch ID Schedule 40 PVC riser with 5-foot long, 2-inch ID screens

- Wells OW-256, OW-257 and TPZ-164: 2-inch ID Schedule 40 PVC riser with 5-foot long pre-pack screens (2-inch ID and 3.5-inch OD
- TPZ -163, TPZ-167, and TPZ-168: 2-inch ID Schedule 40 PVC riser with 10-foot long pre-pack screens (2-inch ID and 3.5-inch OD
- TPZ-158, TPZ-159, TPZ-160, and TPZ-165: 1.25-inch ID Schedule 40 PVC riser with 10-foot long pre-pack screens (1.25-inch ID PVC with 2.0-inch OD poly filter fabric

All well screens were 0.010 inch slot size. Wells installed across the uppermost unconfined water bearing unit (i.e., water table wells) were constructed with ten-foot well screens. The only exception to this was piezometer TPZ-164, which was installed with a five-foot screen to 10.3 feet bgs due to the shallow depth of both the CCR materials and groundwater at this location. Wells installed in deeper water bearing units (i.e., wells OW-256, OW-257, and MW-262) within the unlithified materials were constructed with five-foot well screens.

A 20-40 granular sand pack was placed around each well screen and brought up one to two feet above the top of the screened interval. A minimum two-foot thick bentonite seal (bentonite chips or grout) was placed above the sand pack. The remainder of the borehole annulus was filled to the surface with bentonite chips or a high solids bentonite grout. The remaining one foot was backfilled with sand to allow the well protector to drain in the event of surface infiltration. The wells were all completed with an above-ground well protector to 2.3 to 3.0 feet above ground surface and set in a concrete pad. The top of the wells were capped with a waterproof locking cap and labeled. Monitoring well construction forms and diagrams are provided in Appendix A and the Illinois Department of Public Health (IDPH) Well Construction Reports in Appendix B.

At least 48-hours following well completion, the monitoring wells were developed to promote restoration of natural hydraulic conductivity of the monitored formation and remove drilling-induced sediment to minimize turbidity in groundwater samples. Development was performed by surging and pumping using a submersible pump. Bailers were also used to surge and remove development water at some wells. Wells were developed until a minimum of five well volumes was removed and/or pH, specific conductance, and temperature of the groundwater had stabilized. Well development data sheets are provided in Appendix C.

Well depths and screened intervals are shown visually on Figures 4A (monitoring and observation wells) and 4B (temporary piezometers), locations shown on Figure 3, and well depths and screened intervals are provided on Table 1.

It should be noted that a few months prior to the August 2013 well installation work, a truck transporting dry fly ash to the Active West Fly Ash Cell overturned, spilling fly ash onto the haul road and down the embankment, partially covering monitoring well OW-157 and the surrounding area. Although most of the spilled fly ash was removed, some remains around the well due to the steep nature of the embankment.

2.3 Site Surveying

Monitoring well and borehole locations were surveyed by an Illinois Professional Land Surveyor to an accuracy of 0.1-foot horizontal and 0.01-foot vertical relative to the state planar horizontal datum NAD83 and vertical datum NAVD88 Geoid 96, respectively. Measuring point and land surface elevations of all monitoring wells, observation wells, and temporary piezometers at the APS are provided in Tables 1 and 2.

2.4 Groundwater-Level Measurements

Prior to collecting groundwater samples, static water depth was measured to an accuracy of 0.01 foot in each monitoring well using a Solinst-101 electronic water-level indicator. The groundwater depths were measured relative to the top of the PVC riser and subsequently subtracted from the measuring point elevation to determine the groundwater elevation within the well.

Groundwater-level measurements for this report were conducted on the following dates:

- Initial Hydrogeologic Investigation:
  - November 15 – 16, 2010
  - March 22 – 23, 2011
  - June 6 – 8, 2011
  - September 12 – 14, 2011
  - December 6 – 8, 2011
  - March 6 – 8, 2012
- Phase II Hydrogeologic Investigation:
  - September 16 – 17, 2013
  - December 20 – 21, 2013
  - February 18 – 19, 2014

The measurements were used to develop potentiometric surface maps, determine vertical gradients, and evaluate groundwater levels in the hydrogeologic units at the Site. Groundwater elevations from the initial investigation (2010 – 2012) are provided in Table 4 along with groundwater quality data. Groundwater level measurements and elevations for the Phase II investigation (2013 – 2014) are provided in Table 2. Groundwater elevations for the Phase II investigation are also included with the groundwater quality data summary in Table 5.

2.5 Field Permeability Testing

In-situ hydraulic conductivity tests were performed on eight monitoring wells from September 28 to October 3, 2011 and seven monitoring and observation wells on October 16 to 17, 2013. The monitoring wells were tested by the variable head (“slug”) test method. The test methods utilized were modifications of the slug test method described by Cooper et al. (1967), whereby a solid slug is lowered or raised into the saturated portion of the well column, and the resulting change in water level measured with time.

The solid slug tests at the Site were conducted using two, three and four foot long by 1-1/4 inch diameter PVC slugs with rope and recorded using Aquistar PT2X Smart Sensors (PT2X) with 50 pounds per square inch (psi) transducers. The PT2X is a combination downhole transducer and datalogger. In most cases, multiple tests were performed on each well in order to provide corroborating data and because of the variability inherent in groundwater level recoveries when a slug is inserted versus removed from a well. However, not all wells had multiple tests and/or analyses either because of very low permeability or limitations associated with low groundwater levels and well construction. The field data collected and downloaded from the PT2X sensors is represented graphically in Appendix E.

A laptop computer was used to download the data from the dataloggers and analyze the data with the use of AQTESOLV™ for Windows (Version 4.50.002), an aquifer test analysis software package by HYDROSOLVE. The analytical solutions utilized on the data were the Bouwer-Rice method (1976) for unconfined and confined aquifers and the KGS Model (Hyder et al., 1994). The AQTESOLV™ for Windows output is included in Appendix E.

2.6 Groundwater Sampling and Chemical Analysis

2.6.1 2010 – 2012 Investigation

Quarterly monitoring of the new groundwater monitoring well network around the BEC APS was initiated in the 4th Quarter 2010. The groundwater elevation and quality data presented was collected during six consecutive quarters from the 4th Quarter of 2010 through the 1st Quarter of 2012. The Dynegy Operating Company (DOC) laboratory collected all samples following guidelines in their Standard Operating Procedure. Groundwater samples collected for metals analysis were filtered through a 0.45 micron filter at the time of collection.

Prior to purging and groundwater sampling an initial water level was measured with an electronic water level indicator to an accuracy of 0.01 foot. The water level gauging measurements were recorded in the field logbook. Groundwater at each monitoring well was purged and sampled using low flow sampling methods utilizing dedicated bladder pumps and a water quality meter with flow-through cell, specifically the Hydrolab® Minisonde Model 4a water quality analyzer connected directly to the discharge tubing of the pump. Temperature, conductivity, and pH of the groundwater at each well was monitored and recorded prior to and at the conclusion of groundwater sample collection. Groundwater samples were collected, placed in appropriate preserved containers, packed in a cooler with ice, and returned to the DOC laboratory.

Quality assurance/quality control (QA/QC) procedures were followed during the collection of groundwater samples. Field duplicates were collected for analysis of all parameters at the rate of one per ten (10%) samples of each analytical type.

Chemical analyses were performed by the DOC laboratory with the exception of the total cyanide analyses, which were analyzed by Teklab, Inc. (Collinsville, Illinois). During the first six quarters encompassing the initial groundwater characterization, the full list of inorganic parameters listed in IAC 35 Part 620.410 (a) and (d), (excluding Radium 226/228) were sampled and analyzed (Table 3). In addition, the supplemental parameters of alkalinity, calcium, magnesium, potassium, and sodium were analyzed in all four quarters of 2011 and the 1st Quarter of 2012 in order to fully characterize the groundwater as to type and cation-anion balance. Metals were analyzed by the total recoverable method. All analyses were performed in accordance with U.S. EPA SW-846, Standard Methods for the Examination of Water and Wastewater, 19th Edition and American Society of Testing and Materials (ASTM) methods (Table 3).

A summary of all field and laboratory parameter data for the 4th Quarter 2010 through the 1st Quarter 2012 sampling events are listed in Table 4.

2.6.2 2013 – 2014 Investigation

Three quarters of groundwater level data and two quarters of groundwater quality data were collected and utilized in this report as follows: 3rd Quarter 2013 (September) – water levels only;[1] 4th Quarter 2013 (December) - field parameters and water quality; and, 1st Quarter 2014 (February) – field parameters and water quality. All groundwater measurements, sampling, and analyses were performed by Teklab, Inc. The groundwater sampling was conducted using the same procedures and methods as outlined in Section 2.6.1 for all of the wells fitted with dedicated bladder pumps, which included all monitoring wells (i.e., MW-designation). Observation wells (OW-designation) and temporary piezometers (TPZ-designation) were sampled using a peristaltic pump with disposable low density polyethylene (LDPE)

[1] Water samples were obtained in September 2013; however, metals were inadvertently not filtered. As a result, parameters sensitive to turbidity (iron and manganese) had concentrations that are not representative of the filtered samples collected during the previous and subsequent sample events. Unfiltered boron results were representative of samples collected before and after this event. An extra sample event was added in February 2014 to replace the September 2013 values. All analytical results are provided in Appendix F.

tubing. Wells without dedicated pumps were purged until three stable readings were obtained for temperature, conductivity, and pH.

Quality assurance/quality control (QA/QC) procedures were followed during the collection of groundwater samples. Field duplicates and field blanks were collected for analysis of all parameters at the rate of one per day, which was equivalent to two field duplicates and blanks per sampling event.

Chemical analyses were performed by Teklab, Inc. for a subset of the inorganic parameters listed in IAC 35 Part 620.410 (a): dissolved chloride, dissolved sulfate, total dissolved solids (TDS), and the dissolved metals boron, iron, and manganese (Table 3).

A summary of all field and laboratory parameter data for the 4th Quarter 2013 and 1st Quarter 2014 sampling events are listed in Table 5. Laboratory analytical reports are provided in Appendix F.

2.7 Data Management

Field data were recorded on pre-printed forms including:

- Daily field reports
- Boring logs
- Monitoring well completion reports
- Well development reports
- Water sampling forms

Groundwater sample data, including water levels, field parameter analyses, and laboratory chemical analyses, were imported directly from laboratory-provided electronic files and stored on a proprietary groundwater data management software package (MANAGES^{TM} Version 3.2, Electric Power Research Institute).

3 REGIONAL GEOLOGY AND HYDROLOGY

3.1 Topography

Topography in the vicinity of the BEC APS (Figure 5) ranges from approximately 370 feet NGVD along the Kaskaskia River southwest of the APS to 450 feet NGVD towards the south and east. The principal surface drainage for the region is the Kaskaskia River, located west of APS. A USGS stream gage (USGS 05595240) is located on the Kaskaskia River at Illinois Route 154 to the southwest of the APS. As seen on the historic topographic map (Figure 6), which represents the site topography in 1968 prior to construction of the APS, the natural drainage at the Site was east to west where the current Bottom Ash Pond is located, with elevations ranging from approximately 400 to 435 feet. The drainage merged towards the west end of the future Bottom Ash Pond, becoming a defined intermittent stream running southwest through what is now the Secondary Pond and running to the southwest corner of the APS at the current locations of the Tertiary Pond.

Comparing the 1968 topography to the current site topography, the following are approximate land surface elevation changes observed at the ash ponds:

Pond or Cell Location	Approximate Range in Current Topographic Elevations (feet NGVD)	Approximate Range in 1968 Topographic Elevations (feet NGVD)	Approximate Change in Land Surface Elevation [1968 to Present] (feet)
Bottom Ash Pond	415 – 450	400 – 430	10 – 20
Out of Service Old East Fly Ash Pond	455 – 460	420 – 440	15 – 30
Out of Service East Fly Ash Pond	450 – 460	420 – 435	25 – 35
Active West Fly Ash Cell	430 – 440	410 – 415	20 – 30
Secondary Pond	395 – 430	390 – 425	5 – 10

The overall change in topography from pre-pond to current land surface ranges from 5 to 35 feet, with the greatest elevation changes, ranging from 15 to 35 feet, occurring in the three out of service fly ash ponds and the smallest elevation changes, ranging from 5 to 10 feet, occurring in the area now occupied by the Secondary Pond. The current drainage pattern at the APS is similar to that present prior to construction of the impoundment and the cooling pond.

3.2 Regional Geomorphology

Randolph County has an area of about 387,840 acres or 604 square miles. The county has about 41,800 acres of woodland, much of it along the Mississippi and Kaskaskia Rivers. Surface water features in the form of streams and lakes greater than 40 acres in size occupy approximately 7,800 acres, of which 2,018 acres are occupied by the Baldwin Cooling Pond.

The physiographic division in the region of the Site is the Mt. Vernon Hill Country of the Till Plains Section, Central Lowland Province. Within the Mt. Vernon Hill Country, the topography is controlled largely by the underlying bedrock, which has been extensively eroded in some areas, resulting in a surface expression of gently rolling hills and valleys. Most streams have broad valleys with low gradients. Topographic relief seldom exceeds 30 feet. Ground surface slopes in the area range from 0 to 10 percent and lie on broad drainage divides, ridges, and side slopes.

The geomorphology of the area has been shaped by periods of glaciations and erosion. The glaciers that advanced into the region carried abundant rock debris which was deposited as the ice melted, forming an irregular layer that thinly covers much of the bedrock north of the glacial boundary. Outwash and finer deposits were carried by the meltwater from the glaciers and deposited in valleys. Exposed glacial deposits were subject to wind erosion, and silts and fine-grained sands were deposited on the uplands adjacent to the valleys as loess. Erosion of these loess deposits overlying glacial till has been one of the processes that developed the gently rolling hills and ridges in the southern Illinois uplands.

Approximately 2.5 miles east of the BEC APS, the topography has been altered through reclamation of strip-mined (i.e., surface mined) land. This reclaimed mining area is hummocky and has numerous man-made ponds and lakes with linear to irregular shapes.

3.3 Regional Geology

Based on regional and local information available from the Illinois State Geological Survey (ISGS), the geology in the vicinity of the BEC APS consists of less than 25 to 75 feet of glacial drift deposits resting on top of Pennsylvanian and Mississippian age bedrock. There are three general geologic sequences found in the vicinity of the BEC, depending on proximity relative to the Kaskaskia River. The general sequences of geologic materials at the BEC based on stack-unit mapping by the ISGS and geologic quadrangle maps (Berg and Kempton, 1988; Devera, 2004; and Grimley and Webb, 2010) are presented for the following areas: Ash Pond System and Cooling Pond; Kaskaskia River Bottomlands; and, Southern and Eastern Upland Areas.

Ash Pond System and Cooling Pond

From the surficial deposits downward, there are four primary geologic materials in the vicinity of the ash pond system and cooling pond, consisting of:

- Equality Formation of the Wisconsinan Episode of glaciation of the Pleistocene Epoch (approximately 75,000 to 12,000 years before present (B.P.): consist of lake deposits and/or fine-grained alluvium (silt loam to silty clay loam to silty clay) deposited as slackwater sediment during peak glacial sedimentation periods of the Mississippi River; terraces generally occur at 400 to 425 feet NGVD; this formation may include some interbeds of fine sand or coarse silt, is generally light olive-brown to grayish brown to dark gray, stratified, secondary carbonate concretions may occur along bedding planes, may contain small (<1 centimeter) aquatic gastropod shells, bivalves, or conifer wood in unoxidized portions, soft to medium stiffness when moist; up to 50 feet thick; may include approximately 3 feet of loess cover and is underlain by any of the following: Henry Formation, Pearl Formation, or Petersburg Silt.
- Pearl Formation (Mascoutah Facies) of the Illinois Episode of glaciations (approximately 200,000 to 130,000 years B.P.), which consists of outwash sand and some gravel deposited from glacial meltwater rivers; generally greater than 20 feet and increasing in thickness up to 55 feet towards the west as the Kaskaskia Valley is approached; the sand is predominantly fine to medium, yellowish brown, stratified below the weathered zone, typically more weathered or more clayey in upper portions, moderately to well sorted; may be overlain by the Berry Clay Member (silty clay to clay loam) in some areas.
- Vandalia Till Member of the Glasford Formation, of the Illinois Episode, is the predominant till unit in the region. It is a loamy and sandy compact diamicton deposited as till and ice-marginal sediment with the following lithologic description: pebbles mainly less than 2-inches in diameter, includes silt, sand and gravel lenses up to several feet thick, massive to crudely stratified; yellowish brown, olive brown, grayish brown to dark gray with iron and manganese oxide staining along fracture faces; leached to calcareous; stiff to very stiff; and, up to 120 feet thick (Willman et al., 1970; Berg and Kempton, 1988; Philips, 2008). The Vandalia Till Member has been mapped by the ISGS with thicknesses between 20 and 50 feet in the area surrounding the Site. The Vandalia Till Member has a lower and upper portion, with the lower portion a dense basal till layer, stiff to very hard, low moisture content, and calcareous. The upper portion is a weaker and moister supraglacial till, deposited off the surface of an inactive melting glacier (i.e., ablation till), and may include lenses of silt, sand or gravel up to 10 feet thick and tens of feet wide, is weathered brown, softer, more clay rich, and relatively moist (Philips, 2008).
- Pennsylvanian and Mississippian bedrock, mainly limestone and shale with some sandstone occurs within 50 feet of the ground surface; the uppermost Pennsylvanian bedrock is the Tradewater Formation of the Desmoinesian Series and ranges from 0 to 40 feet in thickness; the uppermost Mississippian bedrock is the Upper Okaw Formation, which includes the Tar Springs, Vienna, and Waltersburg units of the Chesterian Series and is generally 20 to 30 feet thick; the Upper Okaw consists of shale, limestone, and sandstone; the Tradewater Formation predominates under the APS and Baldwin Cooling Pond, as the Carbondale Formation pinches out to the east and the Tradewater pinches out to the west towards the Kaskaskia River.

Kaskaskia River Bottomlands

From the surficial deposits downward, there are three primary geologic materials along the Kaskaskia River bottomlands, consisting of:

- Cahokia Formation: alluvium (river deposits) in floodplains of tributaries to the Kaskaskia River from the Hudson Episode (approximately 12,000 years B.P. to today); consists of silt loam to silty clay loam which may contain thin sandy, gravelly or loamy zones; there are three principal facies of the Cahokia in the Kaskaskia River bottomlands west of the APS:
    - Clayey facies: silt loam, silty clay loam, and silty clay deposits within abandoned channel fills and backswamps; within frequent flood areas and only differentiated within the modern floodplain of the Kaskaskia River; olive-gray to grayish brown to gray, massive to stratified, noncalcareous, contains weak soil development without a B horizon; up to 20 feet thick.
    - Sandy Facies: fine to medium sand within point bar and channel deposits of the modern floodplain of the Kaskaskia River (near surface) as well as in early to middle Holocene terraces (subsurface); interstratified with the clayey facies; may include beds of sandy loam and silty clay loam, dark yellowish brown to brownish gray, moderately to well sorted, stratified, noncalcareous, soft; up to 25 feet thick.
    - Clayey facies (high level): occurs within the early to middle Holocene terrace at elevations of approximately 395 to 400 feet above mean sea level (NGVD); a silty clay loam to silt loam of river overbank alluvial deposit that is generally less than 20 feet in thickness but may be up to 30 feet thick; brown to yellowish brown to grayish brown, noncalcareous, upper 5 feet may exhibit a relatively weak modern soil profile.
- Henry Formation of the Wisconsinan Episode of glaciation, consisting of glacial outwash deposits (glacial meltwater river deposits) or nonglacial alluvium up to 20 feet in thickness; the outwash is dominated by fine to medium sand, moderately to well sorted, stratified, and tan to grayish brown; may contain interbeds of fine-grained silty deposits; can be intertongued with the Equality Formation.
- Pennsylvanian and Mississippian bedrock, mainly limestone and shale with some sandstone occurs within 50 feet of the ground surface; the uppermost Pennsylvanian bedrock is the Tradewater Formation of the Desmoinesian Series and ranges from 0 to 40 feet in thickness; the uppermost Mississippian bedrock is the Upper Okaw Formation, which includes the Tar Springs, Vienna, and Waltersburg units of the Chesterian Series and is generally 20 to 30 feet thick; the Upper Okaw consists of shale, limestone, and sandstone; the Mississippian bedrock predominates in the Kaskaskia River bottomlands as the Tradewater Formation pinches out towards the west end of the APS.

Southern and Eastern Upland Areas

Areas south and east of the BEC, where higher topographic elevations occur, are characterized by unlithified glacial deposits above shallow to medium depth bedrock. The three principal materials found to the south, eastern portions of the BEC, and east of the BEC, from the surface downward, are:

- Peoria Loess and Roxana Silt consists of loess (windblown silt) of the Wisconsinan Episode; the loess is a silt loam to silty clay loam that is up to 12 feet thick and typically underlain by the Glasford Formation at surface elevations greater than 440 feet NGVD; generally brown to yellowish brown to grayish brown to slightly pinkish brown, leached of carbonates, massive but with strong soil structure in the upper 5 feet, and soft to moderately stiff.

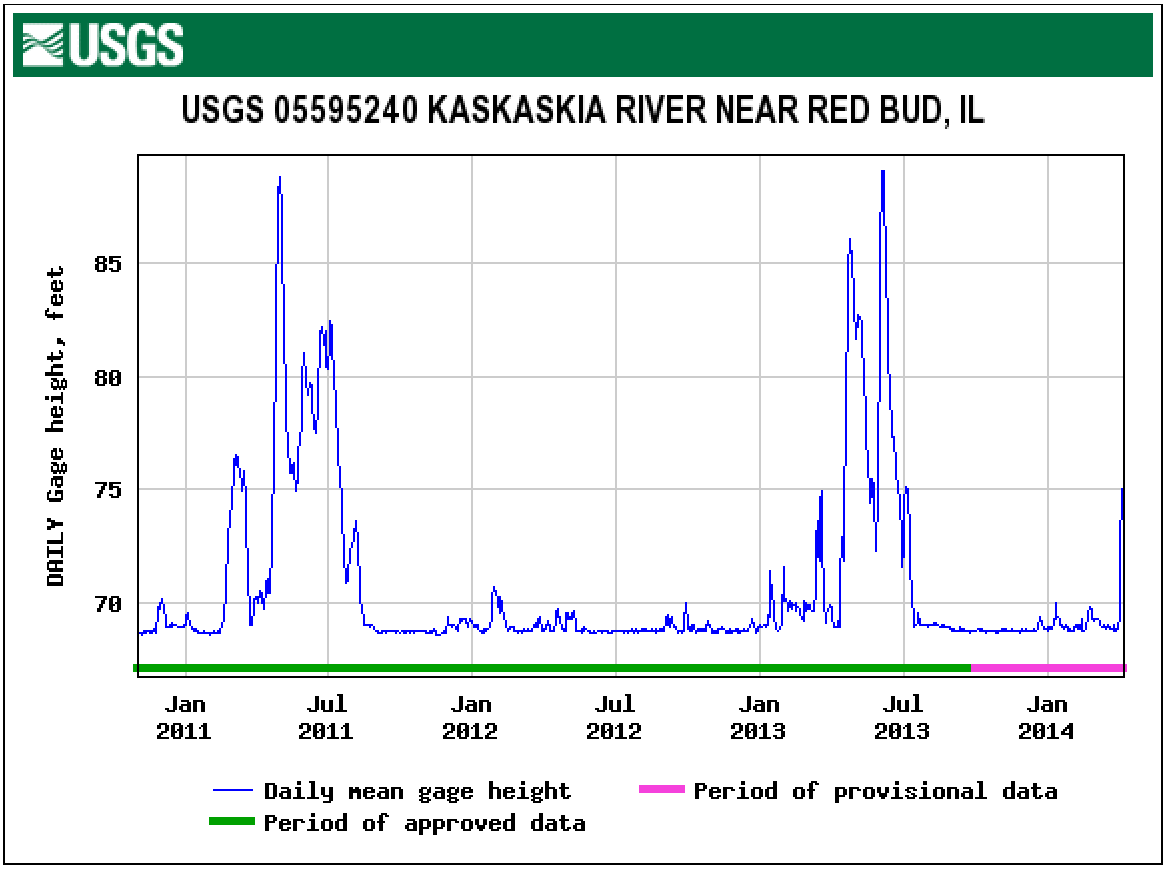
- Vandalia Till Member of the Glasford Formation – see earlier description under “Ash Pond System and Cooling Pond”.
- Pennsylvanian bedrock, mainly undifferentiated shale and limestone of either the Tradewater Formation or the Carbondale Formation of the Desmoinesian Series, generally occurs within 30 feet of the ground surface; areas to the east of the APS are immediately underlain by the Carbondale Formation, which pinches out towards the west.

3.4 Surface Water Hydrology

The predominant surface water bodies in the regional study area include the Mississippi River, Kaskaskia River, and Baldwin Cooling Pond. The Mississippi River is located approximately 25 miles west of the APS. The Kaskaskia River borders the BEC property to the west, and the Baldwin Cooling Pond borders the APS to the north (Figure 1). The regional drainage features of the Kaskaskia River exhibit a predominantly dendritic drainage pattern.

The Baldwin Cooling Pond is 2,018 acres and was constructed with an 8-mile levee around the Kaskaskia River bottomland. The cooling pond was begun in 1967, and completed and filled in 1970. It is a perched cooling pond in that it is semi-isolated hydrologically from the natural drainage features – surface water and groundwater – of the area. The average depth of the cooling pond is approximately 8 feet; however, old creek channels and ponds provide areas of 20 to 50 feet in depth. The lake is filled by water pumped from the Kaskaskia River, supplemented by natural precipitation onto the surface of the lake. The pond level is generally maintained at approximately 429 to 430 feet NGVD. Excess water from the cooling pond flows via a 3,250 foot long man-made channel from its southwest corner to the Kaskaskia River. Discharge from the Baldwin Cooling Pond to the Kaskaskia River is regulated as part of the BEC’s NPDES discharge permit.

A USGS stream gage (#05595240) for the Kaskaskia River is located ½-mile directly west the BEC APS at latitude 38.1942 degrees N, longitude 89.8881 degrees W. Daily gage heights for the period of November 2010 through February 2014 are provided in the graph below.



3.5 Unlithified Deposits Hydrology

The extent of sand and gravel aquifers in the region are primarily found along the Kaskaskia River Valley where sand and gravel deposits are highly permeable, thick, and extensive. Outside of the Kaskaskia River Valley, the unlithified materials in upland areas are predominantly clay deposits associated with the Equality Formation or the Glasford Formation, which generally provide a low probability of encountering sand and gravel layers for dependable groundwater supply. Although some thin sand seams and layers occur intermittently within the Vandalia Till Member of the Glasford Formation in localized areas around the BEC, most groundwater supplies in upland areas are obtained from large diameter shallow bored wells. Typical water wells in the vicinity of the BEC are between 25 and 55 feet deep, 36 to 48-inches in diameter, and collect groundwater through slow percolation into the wells, which are large diameter to allow for greater water storage to compensate for the low rate of groundwater infiltration. Some of these bored wells do not intercept sand and gravel seams, but rely on obtaining groundwater from sandy clay deposits.

The effective porosities for the types of sediments (diamictons) found in the vicinity of the study site range from 10 to 20 percent (Fetter, 1980). Effective porosity, which is a measure of the pore space thorough which saturated flow can occur, typically ranges from 5 to 20 percent for diamictons (Walton, 1988).

Horizontal hydraulic conductivity for silt, clay, and mixtures of sand, silt, and clay typically have horizontal permeability ranging from 10^{-4} to 10^{-7} cm/s (USDI, 1981; Fetter, 1980).

3.6 Bedrock Hydrology

The Mississippian and Pennsylvanian rocks in the vicinity of the BEC yield small amounts of water to wells from interconnected pores, cracks, fractures, crevices, joints, and bedding planes. Water-bearing openings are variable from place to place and are best developed near the surface in thin limestones and sandstones. Shallow sandstone and creviced limestone may yield small supplies in some areas, but water quality becomes poorer (i.e., highly mineralized) with increasing depth. The Pennsylvanian and Mississippian rocks generally have low porosities and permeabilities, are not a reliable source of groundwater, and the quality varies considerably (Pryor, 1956). No bedrock water wells have been identified in the vicinity of the APS.

Groundwater in the Pennsylvanian- and Mississippian-age rocks mainly occurs under semi-confined to confined conditions. Water moves primarily through secondary openings such as fractures and joints or secondary solution channels in limestones. Recharge takes place through the overlying Quaternary deposits (Student, 1981; Lloyd and Lyke, 1995). The regional direction of groundwater flow in these rocks is not known directly, but is assumed to be towards a regional discharge area within the Kaskaskia River Valley, with groundwater moving upward from the Pennsylvanian and Mississippian rocks to the surficial unlithified deposits and the Kaskaskia River.

The porosity of shale typically ranges from 1 to 20 percent (Walton, 1988). Representative horizontal field hydraulic conductivity (permeability) for shale typically ranges from 5×10^{-10} to 5×10^{-6} centimeters per second (cm/s). Representative aquitard field permeability ranges for shale, which is defined as the rate of vertical flow of water through a unit horizontal cross-sectional area of the aquitard, are 5×10^{-12} to 5×10^{-8} cm/s. The porosity of limestone is much more variable than shale, ranging from 5 to 55 percent. Representative horizontal field hydraulic conductivity for limestone also has a wide range as a result of secondary openings, with values ranging from 9×10^{-7} to 9×10^{-1} cm/s (Walton, 1988).

3.7 Water Well Survey

A comprehensive water well survey was conducted by Kelron and NRT (2010b) for a 2,500-foot radius around the BEC APS. According to database records of the ISGS, ISWS, and Illinois EPA, there are 10 water wells (assumed potable) owned by private residences within a 2,500 feet radius of the BEC ash pond system. None of these 10 wells has been field verified as to their existence, location, or current use. Two additional undocumented private wells were identified at residences located northeast of the APS during a visual (windshield) survey; subsequently, one of those wells was destroyed during a house demolition sometime between January and April 2010.

There are two Community Water Supply (CWS) wells utilized by the City of Red Bud as a raw water supply that lie outside a 2,500 foot radius of the APS. Both these wells are installed into the sand and gravel deposits along the west side of the Kaskaskia River. However, both the Phase I and II Wellhead Protection Areas (WHPAs) for these CWS wells extend eastward across the Kaskaskia River into the Facility's 2,500 foot search radius.

The Village of Baldwin neither owns nor operates any water wells or treatment system. It distributes treated water for its CWS from the City of Sparta's CWS, with treated water from Sparta conveyed via pipeline by Egyptian Water. Baldwin's two public water supply wells were sealed and abandoned (date unknown). The BEC also obtains its water supply from the Sparta CWS via Egyptian Water distribution pipeline.

Based on interviews and field observations conducted by Kelron and NRT (2010b), it is suspected there may be undocumented water wells within 2,500 feet of the Facility, both within the Village of Baldwin CWS distribution area and outside of the distribution area. It is not known if these wells are utilized for potable or non-potable use.

4 GEOLOGY AND HYDROGELOGY

The information used to describe the geology and hydrogeology in the vicinity of the APS is based primarily on the field data collected during the course of the study from 2010 to 2014. The field data and analyses are summarized in the accompanying tables, figures, and appendices. A summary of the lithologic layers and corresponding hydrogeologic unit designations encountered at the Site is provided in Table 6.

4.1 Geology

The two types of materials present at the Site consist of unlithified deposits (alluvium and glacial deposits) and bedrock. Each of these materials will be discussed in detail in order to establish a framework with which to understand the hydrogeology, and in later sections the geochemistry, of the Site. Figure 3 shows the locations of all of the borings used in describing the geology of the Site. Figure 7 shows the locations of the east-west (Figures 8A and 8B) and north-south (Figures 8C, 8D, and 8E) geologic cross-sections.

The five principal types of unlithified materials present above the bedrock in the vicinity of APS consist of the following in descending order (Table 6):

- Fill, predominantly coal ash (fly ash, bottom ash, and slag) within the APS, but also including constructed levees around the Baldwin Cooling Pond, constructed berms around the APS, and constructed railroad embankment south of the APS
- Alluvial clay, sandy clay, and clayey sand of the Cahokia Formation
- Silt and silty clay of the Peoria Loess
- Clay and sandy clay of the Equality Formation, with occasional sand seams and lenses
- Clay and sandy clay diamictons of the Vandalia Till Member with intermittent and discontinuous sand lenses

Fill and CCRs

CCRs in the central portion of the former east and west fly ash ponds range in thickness from 18 to 32 feet (borings TPZ-163, TPZ-167, and TPZ-168). Approximately 9 feet of bottom ash was intercepted towards the center of the bottom ash pond (boring TPZ-164) and 5.5 feet of silt, clay and fly ash was encountered in the Secondary Pond (TPZ-165). Geotechnical analysis results of four ash samples (Table 7) provided USCS soil classifications of silty sand, sandy silt, and silt. The three shallow samples, collected at depths between 1.5 and 5 feet bgs, had moisture contents of 22 to 56 percent, dry bulk densities ranging from 63 to 92 pounds per cubic foot (pcf), specific gravities of 2.6 to 2.9, and calculated total porosities of 45 to 65 percent.

The deepest sample, collected at 29 to 30 feet bgs from boring TPZ-167 at the former Secondary Fly Ash Pond, had a moisture content of 18.8 percent, dry bulk density of 99.9 pcf, specific gravity of 2.6, and calculated total porosity of approximately 38 percent.

Cahokia Formation

The Cahokia Formation (Cahokia) is the uppermost unlithified unit between the APS and the Kaskaskia River and along the south side of the western third of the APS. The Cahokia was identified at four boring/well locations. The Cahokia, an alluvial deposit of the Kaskaskia River and its tributaries, consists of predominantly clay with some clayey sand and sandy clay intervals. The color of the Cahokia was described for different intervals as black, dark gray to very dark gray-brown, brown, light olive-brown, and dark yellow-brown. At the four boring/well locations at the Site the Cahokia ranged in thickness from 13 to 27 feet with average and median thicknesses of 20 and 22 feet, respectively. The lowermost and uppermost observed elevations of the Cahokia ranged from 368 to 394 feet NGVD, with the lowermost elevation observed at boring/well location MW-154, which is located just east of the Kaskaskia River and lies within 13 feet of bedrock.

Although the lithology of the Cahokia is described as a lean to fat clay under the USCS, the percent clay for nine samples that underwent physical testing (Appendix D) ranged from 18 to 76%, silt ranged from 18 to 47%, and sand/gravel ranged from 1 to 54%. Average and median percentages of sand/gravel, silt, and clay for the Cahokia samples are listed below.

Cahokia Formation (n = 9)

Grain Size	Sand/Gravel	Silt	Clay
Range	1 – 54%	18 – 47%	18 – 76%
Average	21%	32%	49%
Median	8%	29%	52%

Peoria Loess

The Peoria Loess occurs in topographically higher areas and bedrock upland areas and is typically underlain by the Vandalia Till Member of the Glasford Formation at surface elevations greater than 440 feet NGVD. The Peoria Loess was identified at seven boring/well locations. It was categorized as silt and silty clay with a light brown to light gray color and ranged from 2 to 23 feet in thickness with lowermost and uppermost elevations ranging from 406 to 453 feet NGVD. Based on locations where it was encountered, the average and median thicknesses of the Peoria Loess were 10 and 9 feet, respectively. No physical testing was conducted on this lithologic layer.

Equality Formation

The Equality Formation (Equality) occupies different stratigraphic positions relative to the other lithologic units based on areal location within the Site. Generally, it is the lowermost unlithified geologic layer along the southwestern portion of the APS, where it lies between the Cahokia and bedrock; the uppermost layer at the south-central portion of the APS where the Cahokia pinches out; or, the middle or uppermost unlithified layer in the central portion of the APS, where it is either the uppermost unit above the Vandalia Till Member or lies between the Vandalia Till Member and either the Peoria Loess or CCRs and fill material.

The Equality was deposited in a slackwater lake formed as a result of backflooding of the Kaskaskia River during flooding events of the Mississippi River. Based on its identification at 11 boring/well locations, the Equality consists of predominantly clay with silt and sand, and occasional sand lenses. The color of the Equality was typically described as dark yellow-brown, dark gray-brown, dark brown, and gray. At the locations where it was identified at the Site, the Equality ranged in thickness from 8 to 20 feet with average and median thicknesses of 13 and 12 feet, respectively. The lowermost and uppermost observed elevations of the Equality ranged from 396 to 443 feet NGVD, with the lowermost elevation observed at boring/well locations MW-150/MW-350, which is located near the southeast corner of the APS, and the highest elevation observed at boring/well locations MW-153/MW-253.

The lithology of the Equality is described as a lean to fat clay and sandy clay under the USCS. The percent clay for two samples that underwent physical testing ranged from 29 to 31%, silt ranged from 36 to 62%, and sand/gravel ranged from 7 to 34%. Average and median percentages of sand/gravel, silty, and clay for the samples are listed below.

Equality Formation (n = 2)

Grain Size	Sand/Gravel	Silt	Clay
Range	7 – 34%	36 – 62%	29 – 31%
Average	21%	49%	30%
Median	21%	49%	30%

Vandalia Till Member

The Vandalia Till Member of the Glasford Formation (Vandalia Till) is the lowermost and oldest unlithified geologic material in the vicinity of the APS. The Vandalia Till is a diamicton and occurs beneath the Equality in the central portion of the APS as the Cahokia pinches out and as the topographic and bedrock uplands are approached. At the higher topographic elevations (i.e., bedrock uplands) to the east of the APS and southeast of the APS the Vandalia Till is the principal unlithified geologic material but may be mantled in some areas by four to six feet of the Peoria Loess.

The Vandalia Till was identified at 15 boring/well locations, and consists of predominantly clay and silty clay with sand and trace gravel. However, in the vicinity of the APS there are some intermittent and discontinuous sand lenses at depths below 20 feet bgs, as observed at boring MW-104DR where approximately four feet of a fine to medium sand was intercepted at approximately 25 feet bgs. The lowermost portion of the Vandalia Till may become shaley within a few feet of the top of bedrock.

The color of the Vandalia Till has been variously described in the boring logs as light to dark yellow-brown, light to dark gray-brown, olive-brown, light to dark gray, and greenish gray. At the 15 locations where it was identified at the Site, the Vandalia Till ranged in thickness from 11 to 37 feet with average and median thicknesses of 21 and 18 feet, respectively. The lowermost and uppermost observed elevations of the Vandalia Till ranged from 369 to 451 feet NGVD, with the lowermost elevation observed at boring/well locations MW-152/MW-252/MW-352 southeast of the APS, and the highest elevation observed at TPZ-158 to the east of the APS.

Although the lithology of the Vandalia Till is typically described as a lean to fat clay with sand under the USCS, the percent clay for 10 samples that underwent physical testing ranged from 30 to 87%, silt ranged from 38 to 40%, and sand/gravel ranged from 2 to 44%. Average and median percentages of sand/gravel, silty, and clay for the samples are listed below.

Vandalia Till Member (n = 10)

Grain Size	Sand/Gravel	Silt	Clay
Range	2 – 44%	38 – 40%	30 – 87%
Average	15%	38%	47%
Median	13%	40%	40%

The amount of clay observed and analyzed in the Vandalia Till samples is greater than in the Equality samples and the amount of silt is lower.

Bedrock

The uppermost bedrock at the Site consists of Pennsylvanian and Mississippian bedrock, mainly limestone and shale. Bedrock was intercepted at 22 boring/well locations, the data from which was used to create a bedrock topographic map (Figure 9). Depth to bedrock at the Site ranges from 12.5 feet at well MW-154 near the Kaskaskia River to approximately 54 feet at well MW-352, located south of the central portion of the APS.

The bedrock surface reflects the pre-development site topography as shown on the historic topographic map from 1968 (Figure 6). As evident on Figure 9, a bedrock low is present at the southwest corner of the APS and extends northeastward. Similarly, the historic topographic map has a stream channel which overlays this bedrock valley. The locations of the Secondary and Tertiary ponds, as shown on the modern topographic map from 2012 (Figure 5), overlay the former stream channel and the bedrock valley. The location of the Tertiary Pond at the extreme southwest corner of the APS corresponds to the lowest observed bedrock surface elevation. Bedrock is within a few feet of ground surface in this area and most likely outcropped prior to development of the adjacent railroad embankment to the south, county road to the west, and APS.

The bedrock elevation rises from west to east across the Site, with elevations increasing from less than 375 feet to the west and southwest to 415 feet at the east end of the APS and 429 feet at the easternmost boring (TPZ-158). The average westward slope of the bedrock surface across the entire Site, from the bedrock high at TPZ-158 to the westernmost borings along the Kaskaskia River (MW-154 and MW-355), is approximately 0.006 foot per foot (ft/ft) [32 feet per mile (ft/mi)]. The average westward slope of the bedrock surface at the eastern end of the APS, in the area east of the relatively flat bedrock surface around boring OW-257, is 0.010 ft/ft (53 ft/mi).

The eastern area of higher bedrock elevations is a bedrock and topographic upland area which borders the lower topography and lower bedrock elevations of the Kaskaskia River valley. The APS lies above this transition zone from the river valley to the upland, which is characterized by a distinct change in topographic elevation, bedrock elevation, unlithified geology, and bedrock geology.

The shallow bedrock transitions from Mississippian age limestone and shale beneath the western portion of the Site to Pennsylvanian age limestone and shale beneath the eastern portion of the Site (Willman, 1967). The change from Mississippian bedrock to Pennsylvanian bedrock occurs beneath the central portion of the APS, although the two formations were not distinguished based on the samples collected for the current study. The shallow bedrock is composed of interbedded and undifferentiated limestone and shale.

Limestones intercepted at the Site are generally light to dark gray, fine-grained, thin bedded, banded, argillaceous, and competent except where weathered. Weathering of the limestone produces a calcareous clay. Limestone layers are often interbedded with thin shale layers and are sometimes fossiliferous or sandy. The shale layers are generally weathered, competent, silty, slightly micaceous, fissile and dark gray. Where highly weathered shale was encountered the shale was non-fissile and resembled an unlithified stiff clay with medium to high plasticity.

4.2 Hydrogeology

4.2.1 Hydraulic Conductivity

Fill and Coal Ash

The vertical hydraulic conductivity of four ash samples (three fly ash and one bottom ash) based on laboratory measurement ranges from 9.7×10^{-6} cm/s to 6.5×10^{-4} cm/s with a geometric mean for all four samples of 1.6×10^{-4} cm/s (Table 8). However, the ash sample collected from boring TPZ-167 at 29 to 30 feet bgs, which was remolded in the laboratory, had the lowest hydraulic conductivity measurement with a value of 9.7×10^{-6} cm/s. Excluding the one deeper fly ash sample that was remolded, the three shallow ash samples (two fly ash and one bottom ash) had a median permeability of 4.1×10^{-4} cm/s. The ash samples had particle sizes equivalent to silt, sandy silt, and silty sand. The ash sample from TPZ-167 was the only deeper sample and also had the smallest particle size range, which would correlate to the lower hydraulic conductivity value.

Cahokia Formation

The shallow hydrogeology beneath the southwestern portion of the APS and along the Kaskaskia River is controlled by the fine grained materials (i.e., clay and sandy clay) of the Cahokia Formation. In the vicinity of the Site this predominantly clay material rests directly above the limestone and shale bedrock. Both horizontal and vertical hydraulic conductivity have been determined for this unit (Table 8; Appendices D and E). Field measured horizontal hydraulic conductivity at well MW-151, screened within clay to sandy clay materials, was 1.1×10^{-5} cm/s. Laboratory measured vertical hydraulic conductivity for two samples, one sandy clay with gravel and one clay, was 7.8×10^{-6} and 3.4×10^{-7} cm/s, respectively. The geometric mean vertical hydraulic conductivity for the two Cahokia Formation samples was 1.6×10^{-6} cm/s, or approximately 7 times lower permeability than the horizontal hydraulic conductivity.

Equality Formation

The Equality occupies different stratigraphic positions relative to the other lithologic units based on areal location within the Site. The Equality occurs under most of the western and central portion of the APS, but pinches out towards the eastern end of the APS. Four wells installed within the Equality had horizontal hydraulic conductivities ranging from 4.3×10^{-5} to 1.3×10^{-4} cm/s, with a geometric mean value of 7.5×10^{-5} cm/s. The tested wells had screened intervals predominantly within clay materials, although a portion of the screened interval of one well (MW-161) penetrated into a sand with silt layer.

The laboratory vertical hydraulic conductivity for one clay sample of the Equality from 10 to 12 feet bgs at boring TPZ-164 was 1.3×10^{-6} cm/s, or approximately 1.8 orders of magnitude (factor of 58) lower than the horizontal hydraulic conductivity.

Vandalia Till Member

The Vandalia Till Member is the principal unlithified geologic material on the eastern side of the APS, east of the APS and southeast of the APS. It is the lowermost and oldest geologic unit above bedrock in the eastern portion of the Site. The horizontal hydraulic conductivity of the Vandalia Till, based on five wells screened predominantly in clay and two wells in sand, silt and clay, ranged from 3.5×10^{-7} to 6.8×10^{-4} cm/s with a geometric mean of 2.3×10^{-5} cm/s. The two wells screened in sand, silt, and clay (MW-104DR and MW-262) had hydraulic conductivities of 6.8×10^{-4} and 6.0×10^{-4} cm/s. The geometric mean horizontal hydraulic conductivity of the five wells screened within clay, and excluding the two wells screened in predominantly sandy materials, was 6.2×10^{-6} cm/s

The laboratory vertical hydraulic conductivities for five samples of the Vandalia Till ranged from 6.3×10^{-9} to 4.2×10^{-4} cm/s, with a geometric mean value of 6.1×10^{-7} cm/s. The geometric mean permeability of the five samples is 1.6 orders of magnitude lower than the horizontal permeability of the seven wells screened within the Vandalia Till.

Bedrock

With the exception of the southwest corner of the APS, most of the groundwater in the Mississippian and Pennsylvanian bedrock underlying the Site is under confined conditions. The shallow bedrock is composed primarily of low permeability limestone and shale that is overlain by fine grained unlithified materials, principally clay of the overlying Cahokia, Equality, and Vandalia Till units. The bedrock was hydraulically tested for field permeability at three well locations (MW-350, MW-352, and MW-355), with hydraulic conductivity ranging from 1.7×10^{-6} to 3.5×10^{-5} cm/s with a geometric mean of 5.0×10^{-6} cm/s.

Summary

Based on 12 wells installed within the unlithified deposits (excluding fill) at the Site, the overall geometric mean horizontal hydraulic conductivity is 3.2×10^{-5} cm/s.

The geometric mean of the limestone and shale bedrock is 5.0×10^{-6} cm/s, which is approximately 6 times lower than the overlying unlithified materials.

4.2.2 Potentiometric Surface Maps

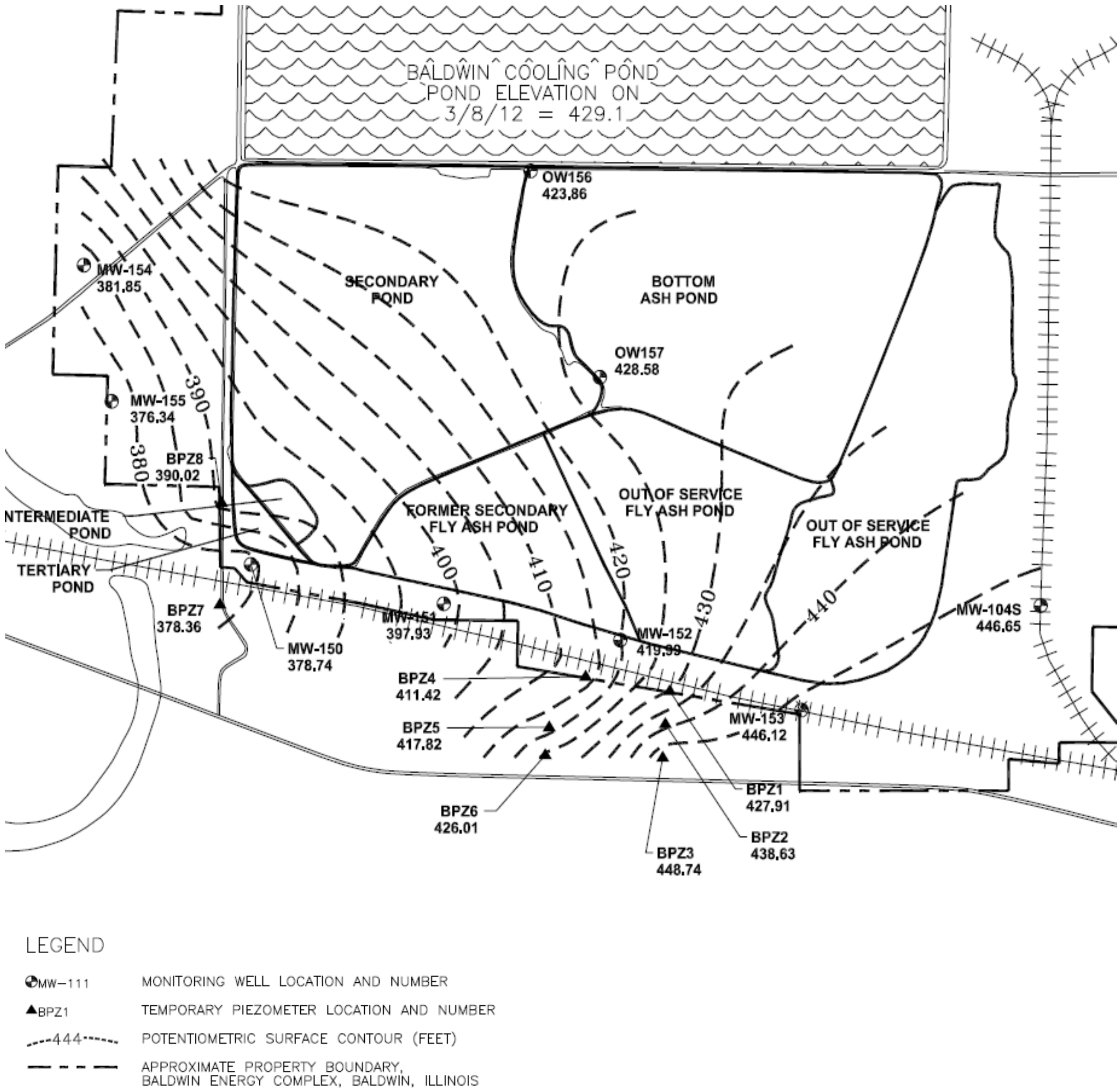
Potentiometric surface maps of the unlithified deposits (Figures 10A, 10B, and 10C) – water table maps - were prepared using quarterly groundwater elevation data measured on: September 16 – 17, 2013; November 20 – 21, 2013; and, February 18 – 19, 2014. Groundwater level and elevation data is provided in Table 2. The groundwater levels utilized in preparing the potentiometric surface maps were primarily from wells screened across the water table, although a few wells used in creating the contour maps were screened below the water table. The deeper wells installed within the ash ponds, deep unlithified deposits, and bedrock were not used in contouring groundwater elevations. However, the groundwater elevations of the deeper wells are shown on the contour maps to highlight the differences in groundwater elevations between the water table wells, deeper wells, and leachate wells.

During the three quarters of groundwater-level observations conducted as part of the current investigation, the horizontal groundwater flow direction was consistently from east to west across the Site, from the higher topographic area along the eastern boundary at wells TPZ-158 and MW-104S to the lowest topographic areas at the southwestern-most corner of the APS (i.e., near Well MW-150) and along the Kaskaskia River (wells MW-154 and MW-155). Overall groundwater flow from the central portion of the APS is towards the southwest with eventual discharge into the Kaskaskia River. In the area of the Secondary and Tertiary ponds the groundwater elevation contours on the three potentiometric surface maps all reflect the land surface topography and underlying bedrock surface topography.

Horizontal groundwater gradients across the APS were consistent in terms of magnitude and direction during the three quarterly groundwater measurements, and were similar to those measured in the 1½ years (6 quarters) of measurement from November 2010 to March 2012. Groundwater gradients were approximately 0.01 ft/ft in a westerly direction across the eastern and central portions of the APS; 0.01 ft/ft in a southwesterly direction from the central APS towards the southwest corner at Well MW-150; and 0.02 ft/ft in a southwesterly direction from the northwest area of the Site (near the southwest end of Baldwin Cooling Pond) towards the Kaskaskia River at Well MW-154.

Although there are currently no piezometers or monitoring wells located south of the Site, eight off-site temporary piezometers (later sealed and abandoned) were measured for groundwater levels in March 2012 as part of an earlier investigation. Six of the eight piezometers were located south of the ICF railroad tracks. A groundwater elevation map created from the off-site temporary piezometers and on-site wells, shown in the figure below, was included in the initial hydrogeologic investigation report for the APS (Kelron, 2012b).

At the time of measurement in March 2012, groundwater elevations at temporary piezometers BPZ1 through BPZ6 decreased from south to north towards the BEC property and from east to west. Shallow groundwater flow direction south of the Site was towards the northwest, with groundwater flow in the vicinity of the south-central property boundary converging towards an earthen drainage channel that is present north of the railroad tracks and south of the APS. The groundwater elevation data from March 2012 suggests that the drainage channel and low lying area south of the ash ponds and adjacent to the railroad tracks is a localized groundwater capture zone for topographically higher areas south of the railroad tracks and to the north (i.e., ash ponds).



Potentiometric Surface in the Unlithified Deposits – March 6 - 15, 2012 (Figure 6F from *Groundwater Quality Assessment and Initial Hydrogeologic Investigation – Baldwin Ash Pond System*. June 30, 2012.

4.2.3 Saturated Ash

The amount of saturated ash within the ash ponds is variable both laterally and temporally within the various APS units. The maximum thickness of saturated CCRs, ranging from 19.1 to 29.2 feet, was measured at the active West Fly Ash Cell. The minimum thickness of saturated CCRs (including clay and silt fill material) was measured at the Secondary Pond. All of the CCR units had some degree of saturated materials, although the lowest observed levels occurred in September 2013 and the highest observed levels occurred in February 2014. Variability in saturated ash thicknesses in the out of service Old East and East fly ash ponds are related to precipitation while the saturated ash thickness in the active West Fly Ash Cell, Bottom Ash Pond, and Secondary Pond are related to both precipitation and plant operation.

Leachate Piezometer	CCR Unit Designation	Ash / Fill Thickness (feet)	Leachate Level above Base of CCR Unit (feet)		
			9/16-17/13	11/20-21/13	2/18-19/14
TPZ-163	Old East Fly Ash Pond (Inactive)	18.3	9.1	10.3	14.2
TPZ-164	Bottom Ash Pond	8.7	6.7	6.8	7.0
TPZ-165	Secondary Pond	5.2	0.0	3.1	3.4
TPZ-167	West Fly Ash Cell (Active)	31.5	19.1	26.9	29.2
TPZ-168	East Fly Ash Pond (Inactive)	28.5	13.5	17.3	23.3

4.2.4 Vertical Hydraulic Gradients

Vertical hydraulic gradients are a measure of the change in total head with a change in vertical distance. The vertical hydraulic gradient measures the potential for groundwater to move upward or downward through and between geologic layers. Gradients were computed by dividing the difference in the potentiometric head in the nested wells (i.e., dh) by the difference in the midpoint of the screened elevations (i.e., dl). A positive (+) vertical gradient indicates a downward potential for groundwater movement and a negative (-) gradient indicates an upward potential for groundwater movement.

Vertical hydraulic gradients were calculated based on groundwater-level measurements at nested well pairs both within the unlithified deposits and between the unlithified deposits and bedrock (Table 9). Within the unlithified deposits of the Vandalia Till Member upgradient from the APS, as measured at nested wells MW-104SR/MW-104DR, the average gradient was downward at +0.02 ft/ft during September 2011 through February 2014. However, during November 2013 and February 2014 the vertical gradient was slightly upward at -0.006 and -0.005 ft/ft, respectively. Groundwater within the deeper Vandalia Till at this location is under confined to semi-confined conditions.

Southeast of the APS at nested well pair MW-153/MW-253 within the Vandalia Till, the average gradient was upward at -0.07 ft/ft. Gradients were slightly downward in two of seven quarters and upward in five quarters. The maximum downward and upward gradients at this well pair were +0.032 ft/ft and -0.236 ft/ft, respectively. The upward gradients observed for three consecutive quarters from September 2013 to February 2014 correspond to a period of lower observed groundwater levels, lower precipitation, and higher evapotranspiration. Groundwater within the deeper Vandalia Till at this location is under confined to semi-confined conditions.

South of the central portion of the APS the vertical gradients observed in nested wells MW-152/MW-252, screened within the Equality Formation and the Vandalia Till, respectively, were consistently upward and ranged from -0.037 to -0.183 ft/ft with an average gradient of -0.13 ft/ft. No correlation between magnitude of the vertical gradients and time of year, or periods of lower versus higher precipitation, were evident. However, the groundwater levels observed in Well MW-252, screened within the Vandalia Till, have been under flowing artesian conditions (i.e., groundwater levels above ground surface) during both the current and prior investigations. Groundwater within the Vandalia Till at this location is under confined conditions.

Within unlithified materials in the central portion of the APS, at nested wells OW-156/OW-256 and OW-157/OW-257, the groundwater gradients were consistently downward at average gradients of +0.14 and +0.05 ft/ft, respectively.

The remaining three pairs of nested wells for which vertical gradients were calculated (Table 9) are all screened within the unlithified deposits and the underlying bedrock. Nested well pairs MW-150/MW-350, MW-155/MW-355, and MW-252/MW-352 had average downward gradients of +0.08, +0.13, and +0.03 ft/ft, respectively, between November 2010 and February 2014. Well pairs MW-150/MW-350 and MW-155/MW-355, screened within the Cahokia Formation and bedrock, had gradients that were consistently downward over eight quarters of measurement. Well pair MW-252/MW-352, screened within the Vandalia Till and bedrock, had both upward and downward gradients, with downward gradients measured in five quarters and upward gradients in two quarters. Groundwater within the bedrock at this location is under confined conditions.

4.2.5 Hydrogeologic Unit Designations

Three distinct water-bearing layers have been identified at the Site based on stratigraphic relationships and common hydrogeologic characteristics.

- Unit 1 – Fill Unit: CCRs, consisting primarily of fly ash, bottom ash and boiler slag. Also includes earthen fill deposits of predominantly clay and silt materials from on-site excavations that were used to construct berms and roads surrounding the various impoundments across the Site. The overall (geometric mean) hydraulic conductivity for the Fill Unit is $1.6\text{x}10^{-4}$ cm/s.
- Unit 2 – Upper Groundwater Unit: Predominantly clay with some silt and minor sand, silt layers, and occasional sand lenses. Includes the lithologic layers identified as the Cahokia Alluvium, Peoria Loess, Equality Formation, and Vandalia Till Member. This unit is composed of unlithified natural geologic materials and extends from the water table to the bedrock. The overall horizontal and vertical hydraulic conductivities for this unit are $3.2\text{x}10^{-5}$ cm/s and $8.6\text{x}10^{-7}$ cm/s, respectively.
- Unit 3 – Bedrock Confining Unit: This unit is composed of interbedded shale and limestone bedrock and underlies the entire Site. The horizontal hydraulic conductivity for this unit is $5.0\text{x}10^{-6}$ cm/s.

4.2.6 Groundwater Classification

Field hydraulic conductivity tests performed on the unlithified geologic materials of Unit 2 (i.e., Cahokia Alluvium, Equality Formation, and Vandalia Till Member) and lithified materials of Unit 3 (Mississippian and Pennsylvanian bedrock) at the BEC APS had geometric mean hydraulic conductivities of approximately $3x10^{-5}$ cm/s and $5x10^{-6}$ cm/s, respectively.

As set forth in 35 Ill. Adm. Code 620, any geologic material with a hydraulic conductivity of less than $1x10^{-4}$ cm/s, and which does not meet the provisions of Section 620.210 (Class I), Section 620.230 (Class III), or Section 620.240 (Class IV), meets the definition of a Class II – General Resource Groundwater. Based on the detailed geologic information provided for the unlithified materials and bedrock intercepted at the BEC APS along with the hydrogeologic data, the groundwater in both the Upper Groundwater Unit (i.e., unlithified deposits) and the Confined Bedrock Unit at the Site can be classified as Class II groundwater and the groundwater quality standards set forth in Section 620.420 are the applicable groundwater quality standards for groundwater at the BEC APS.

5 GROUNDWATER QUALITY

The initial six quarters of sampling and analysis of groundwater from monitoring wells at the BEC APS was conducted from November 2010 through March 2012. The purpose of the initial groundwater sampling was to assess background and downgradient groundwater quality; to determine whether or not concentrations exceeded Class I groundwater standards;[2] and to identify primary factors potentially influencing groundwater quality spatially and temporally. All of the groundwater quality data collected and analyzed for both field and laboratory parameters from 2010 through 2012, including the full list of inorganic parameters listed in IAC 35 Part 620 Section 410 except for Radium 224/226, are provided in Table 4.

Based on the results of the initial 2010–2012 (Phase I) investigation, additional monitoring wells and piezometers were installed upgradient, downgradient, and within the ash pond system as part of the Phase II investigation. A subset of monitoring parameters, those that had exceedances of groundwater standards in the initial investigation, were sampled and analyzed for two quarters in November 2013 and February 2014. Boron, iron, manganese, chloride, sulfate, TDS, and pH were sampled and analyzed and compared to Class II (General Resource) groundwater quality standards. The Phase II water quality data are summarized in Table 5.

5.1 Major Anions and Cations

Groundwater quality can be grouped based on major ion concentrations into identifiable categories to assist in interpreting the distribution of principal types of groundwater. Two methods of segregating water quality data with respect to sources of dissolved constituents in groundwater are the Piper (trilinear) diagram and Stiff diagram.

A Piper diagram, also called a hydrochemical facies diagram, is a graphical representation of relative major ion composition, and can be used for a variety of purposes such as categorizing water facies, characterization of source waters, and determining whether or not samples are mixtures of different source waters. Figure 11 shows the position of groundwater samples obtained in December 2011 from the 13 monitoring wells that were part of the initial investigation. The triangular plots show the relative percentages of cations and anions for each water sample, the central diamond-shaped field is used to

[2] Class II had not been established as the applicable groundwater quality standard at the time these samples were collected.

show the overall chemical character of the groundwater,[3] and the diameter of the circle at each point is equal to the sum of the major ions (i.e., TDS). The order of monitoring wells listed in the legend of Figure 11 is generally from east to west across the Site.

Groundwater samples with similar facies that group together on the Piper plot have been color coded for ease of identification. Not all of the groundwater samples collected from monitoring wells at the Site could be grouped, as two of the samples – MW-352 (orange symbol) and MW-350 (green symbol) – had relatively unique water quality signatures. All of the groundwater sample groups and independent values shown on the Piper plot are discussed below. For reference, leachate from the subbituminous coal ash currently generated at the plant is typically dominated by sulfate and sodium, while leachate from the bituminous coal ash historically generated at the plant is typically dominated by sulfate and calcium. Coal ash leachate from this site is expected to plot along the upper right axis of the diamond.

Group 1 – Moderate Bicarbonate to Calcium-Bicarbonate Dominated Facies of the Glacial Materials:

Groundwater from monitoring wells MW-104S, MW-104D, MW-153, MW-151 has moderately high bicarbonate as the dominant anion and either calcium as the semi-dominant cation (i.e., wells MW-104S, MW-104D, and MW-151) or no dominant cation (i.e., well MW-153). Other than nested deep well MW-104D (installed to 28 feet bgs), these wells are screened in shallower unlithified deposits within 20 feet of the ground surface.

Groundwater at these locations is not measurably impacted by leachate from coal combustion residuals, with the CCR indicator parameters of boron (<0.02 to 0.25 mg/L) and sulfate (43 to 250 mg/L) well below their Class I groundwater standards (Tables 4 and 5). The upgradient monitoring well MW-104S has high iron concentrations and both wells MW-104S and MW-104D have high manganese concentrations; iron and manganese commonly can have naturally high concentration when groundwater is in a reduced redox state.

Based on geochemical grouping and low CCR indicator parameter concentrations, groundwater in Group 1 wells is representative of upgradient and/or background groundwater for the glacial materials. The high nitrate concentrations of greater than 10 mg/L observed in groundwater at well MW-153 are a result of this well location being at the downgradient edge of cultivated corn and soybean fields.

[3] The triangle plots are created by plotting the relative percentage of each constituent as expressed in meq/L. The central diamond plot is created from the triangular plots by projecting rays parallel to the outer axes and plotting the point at the intersection of the rays.

Group 2 – Sulfate to Calcium-Sulfate Dominated Facies of the Glacial Materials:

Groundwater from monitoring wells MW-152 and MW-252, nested wells located south (downgradient) of the central portion of the APS, can be classified as a calcium-sulfate type facies; and groundwater from wells MW-150 and MW-253, located at the southwest (downgradient) and southeast (sidegradient) corners of the APS, respectively, can be classified as a sulfate type facies with no dominant cation. Wells MW-150 and MW-152 are shallow wells screened within the Cahokia Alluvium and Equality Formation, respectively, and wells MW-252 and MW-253 are deeper wells screened within the Vandalia Till Member.

Groundwater at these locations exhibits varying degrees of impact from CCR leachate. Downgradient well MW-150, near the southeast corner of the APS, has sulfate concentrations ranging from 507 to 696 mg/L and TDS concentrations ranging from 1,090 to 1,396 mg/L. However, boron concentrations are only slightly elevated at 0.31 to 0.80 mg/L (Tables 4 and 5). The other shallow well, MW-152, has sulfate concentrations ranging from 700 to 1,030 mg/L, boron concentrations ranging from 3.6 to 18 mg/L, and TDS concentrations ranging from 1,511 to 1,983 mg/L. Groundwater sampled from deeper monitoring well MW-252 has low to moderate boron (0.19 to 1.5 mg/L) and sulfate ranging from 463 to 578 mg/L), while the other deeper monitoring well, MW-253, has low to moderate boron (<0.05 to 0.24 mg/L) and variable sulfate concentrations ranging from 262 to 806 mg/L.

CCR indicator concentrations and geochemical grouping indicate that Group 2 wells MW-150, MW152, and MW-252 represent a mixture of CCR leachate and background groundwater. Group 2 well MW-253 exhibits evidence of mixing with CCR leachate based on geochemistry; however, due to relatively low boron concentrations, this is not a definitive assessment.

Group 3 – Calcium-High Bicarbonate Dominated Facies of the Cahokia Alluvium and Bedrock:

Groundwater from the three most downgradient monitoring wells at the Site (MW-154, MW-155, and MW-355), which are located at the westernmost property boundary of the BEC and are closest to the Kaskaskia River, is characterized by a higher proportion of bicarbonate relative to all of the other monitoring wells at the Site with the exception of well MW-350, to be discussed under Group 4. Monitoring wells MW-154 and MW-155 are both screened in the shallow Cahokia Alluvium along the eastern floodplain of the Kaskaskia River; and well MW-355 is screened in the shallow bedrock as a nested well below MW-155.

Groundwater at these downgradient wells within the alluvial deposits and shallow bedrock at the westernmost edge of the BEC property is very similar to the Group 1 facies but with slightly greater dominance of the bicarbonate anion. Groundwater at these locations shows no indication of impact by CCRs, with sulfate concentrations ranging from 29 to 94 mg/L and boron ranging from <0.02 to 0.030 mg/L (Tables 4 and 5). The only elevated concentration of any inorganic parameters relative to Class I groundwater standards is manganese, which ranges from <0.005 to 0.87 mg/L. The elevated manganese concentrations are unrelated to the APS, and are indicative of reductive dissolution of naturally occurring manganese oxides or oxyhydroxides present in the alluvial deposits and underlying shale.

The geochemistry data and CCR indicator concentrations indicate that groundwater in the Group 3 wells is similar to Group 1, and representative of background conditions.

Group 4 – High Calcium-High Bicarbonate Dominated Facies of the Bedrock:

Groundwater in Group 4 is represented by one well –bedrock monitoring well MW-350, which is nested below shallow well MW-150 at the southwest (downgradient) corner of the APS and BEC property. Groundwater at well MW-350 is similar to the Group 3 facies in terms of its position on the anion triangle of the Piper plot except that it has significantly higher bicarbonate concentrations; however, it differs on the cation plot and central plot due to very low (<5 mg/L) magnesium concentrations (see Figure 11).

CCR indicator concentrations at MW-350 are low, with boron ranging from 0.030 to 0.60 mg/L, and sulfate from <10 to 62 mg/L.

TDS ranges from 375 to 1,709 mg/L. The high TDS reflects naturally occurring elevated concentrations of the bicarbonate anion and the calcium, sodium, and potassium cations, and not sulfate. Groundwater sampled from well MW-350 also has a high pH ranging from 11.67 to 12.94 S.U. The very basic groundwater at well MW-350 is not representative of the groundwater sampled from most other wells at the Site, which have pH's ranging from 6.36 to 8.07 S.U. (Tables 4 and 5) with the exception of wells MW-253 and MW-352, nor is it due to CCR leachate (see Section 5.2.7).

Based on its major ion geochemistry and low concentrations of CCR indicator constituents, Group 4 groundwater does not exhibit signs of mixing with CCR leachate.

Group 5 – Sodium-Potassium-Chloride Dominated Facies of Bedrock:

Groundwater in Group 5 is also represented by one well –bedrock monitoring well MW-352. This well is nested in bedrock below wells MW-152/MW-252 and is located near the southern (downgradient) BEC property line to the south of the central portion of the APS. Groundwater at this location has high concentrations of the chloride anion and the sodium and potassium cations, unlike any other groundwater sampled at the Site. The geochemistry of groundwater observed at this location is characteristic of Pennsylvanian bedrock of the Illinois Basin. Groundwater from shallower Pennsylvanian rocks is typically moderately hard and is a sodium-bicarbonate type with median dissolved solids concentrations greater than 500 mg/L. Increases in TDS, such as occurs in the groundwater at well MW-352, are due to increases in the concentrations of sodium and chloride that may occur with only small changes in depth (Lloyd and Lyke, 1995) or towards the end of regional groundwater flow paths within the bedrock.

NATURAL RESOURCE TECHNOLOGY

Sulfate concentrations in groundwater at well MW-352 are low and range from <10 to 18 mg/L. Boron concentrations are moderate, ranging from 0.76 to 1.5 mg/L. Manganese and iron concentrations were all below the method detection limit, indicating that the groundwater at this monitoring well is not reduced. As indicated earlier, and unique to this location, the chloride concentrations are very high at 514 to 642 mg/L. pH is also high, ranging from 10.16 to 11.55 S.U., similar to the high pH observed at bedrock monitoring well MW-350.

The major ion geochemistry and low sulfate concentration at MW-352 indicate that the groundwater is not mixed with CCR leachate. Moderate boron concentrations are not indicative of a CCR release in this case, and rather reflect naturally-occurring boron concentrations within Pennsylvanian bedrock.

5.2 Parameters of Concern

Based on the original 2010 – 2012 investigation, parameters measured in groundwater from the initial set of monitoring wells that were of concern were the coal ash indicator parameters (boron and sulfate) and those parameters exceeding Class I groundwater quality standards in at least one monitoring well (antimony, boron, chloride, iron, manganese, nitrate, sulfate, TDS, and pH). Table 4 displays those parameters exceeding Class I groundwater standards and their concentrations for the six monitoring events from November 2010 through March 2012. Antimony was not included because it was only detected in groundwater from MW-350, which is unique to the site and is not affected by CCR leachate, and nitrate was not included because the exceedances were only observed in MW-153 and are attributed to nearby agricultural activity.

Arsenic warrants special mention because while there were no exceedances of the Class I standard of 0.05 mg/L in effect at the time of sampling, there would be exceedances based on the current standard of 0.01 mg/L. Concentrations higher than the current arsenic standard of 0.01 mg/L were only observed in Group 1 (background) monitoring well MW-104S and Group 5 monitoring well MW-350, neither of which are influenced by CCR leachate. Therefore, it is appropriate that arsenic is not included as a parameter of concern.

Each of the parameters of concern are discussed in the following subsections. Parameters that exceeded the Class I standard but met the Class II standard are noted.

5.2.1 Boron

Boron is a primary indicator parameter of CCR leachate. Its median concentration in CCR leachate was 2.2 mg/L in the bottom ash pond and 37 to 83 mg/L in the fly ash ponds.

Figures 12A and 12B show the areal groundwater distribution of boron in November 2013 and February 2014, respectively, along with those concentrations exceeding Class I/II groundwater standards. Only one downgradient monitoring well, MW-152, has a boron exceedance, with concentrations of 9.9 and 12.7 mg/L during the two quarterly monitoring events. In addition to the exceedances at MW-152, located south of the central portion of the APS, elevated concentrations of boron were observed at downgradient wells MW-252 and MW-352, nested below MW-152, and at nested wells MW-150 and MW-350. However, as previously noted the major ion chemistry in bedrock wells MW-350 and MW-352 is significantly different than the wells impacted by coal ash leachate, and the observed boron concentrations represent natural conditions for the bedrock at these locations.

Mid-gradient wells OW-157 and OW-257, located in the center of the APS near the junction of three ash ponds (East Fly Ash Pond, Bottom Ash Pond, and Secondary Pond), had elevated boron concentrations, as did all of the leachate wells screened within CCRs. The high boron concentration observed in groundwater at shallow well OW-157 is attributed partially to a localized spill from a truck carrying fly ash.

Boron, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	0.09	0.06	0.22	<0.050	25
MW-104D/DR	8	0.02	0.02	0.025	<0.050	63
TW-158	2	0.01	0.01	<0.020	<0.020	100
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	**37.5**	**37.5**	**37.8**	**37.2**	0
TPZ-164	2	**2.20**	**2.20**	**2.64**	1.76	0
TPZ-165	2	1.59	1.59	1.35	0.24	0
TPZ-167	2	**53.8**	**53.8**	**54.5**	**53.0**	0
TPZ-168	2	**83.0**	**83.0**	**87.2**	**78.8**	0
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	0.02	0.02	0.030	<0.020	50
OW-256	2	0.16	0.16	0.160	0.150	0
OW-157*	2	**45.2**	**45.2**	**45.3**	**45.2**	0
OW-257	2	**3.1**	**3.1**	**3.28**	**2.88**	0
TPZ-159	2	0.04	0.04	0.060	<0.020	50
TPZ-160	2	0.23	0.23	0.240	0.210	0
TPZ-166	2	0.08	0.08	0.100	0.060	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	0.50	0.47	0.80	0.31	0
MW-151	7	0.23	0.23	0.25	0.22	0
MW-152	8	**9.6**	**9.4**	**18**	**3.6**	0
MW-153	8	0.02	0.01	0.025	<0.020	88
MW-154	5	0.02	0.03	0.026	<0.050	40
MW-155	7	0.02	0.01	0.025	<0.020	86
MW-252	8	0.50	0.30	1.47	0.190	0
MW-253	7	0.10	0.09	0.24	<0.050	14
MW-161	2	0.01	0.01	<0.020	<0.020	100
MW-262	2	0.01	0.01	<0.020	<0.020	100
Downgradient Wells (Bedrock)						
MW-350	8	0.22	0.17	0.60	0.030	0
MW-352	8	0.91	0.85	1.47	0.760	0
MW-355	8	0.03	0.03	0.03	<0.050	38

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Non-detects have been replaced by ½ the detection limit. * = Impacted by localized fly ash spill in early 2013.
Class I and II Groundwater Standard = 2.0 mg/L; exceedances are highlighted. Leachate concentrations higher than 2 mg/L are shown in bold.

5.2.2 Sulfate

Sulfate is also an indicator parameter for CCR leachate. Its median concentration in CCR leachate was 196 mg/L in the bottom ash pond, and 618 to 2,790 mg/L in the fly ash ponds.

Sulfate concentrations exceeded the Class I/II standard of 400 mg/L at mid-gradient well OW-157, shallow downgradient monitoring wells MW-150 and MW-152, and at deeper nested wells MW-252 and MW-253 (Figures 13A and 13B). There are no exceedances at the westernmost monitoring wells MW-154 and MW-155 or within the bedrock wells. As discussed for boron in Section 5.2.1, the high sulfate concentration observed in groundwater at shallow well OW-157 is attributed partially to a fly ash spill.

The sulfate exceedance at MW-253 may be related to CCR leachate. As explained in Section 5.2.7, hydraulic gradient in this monitoring well is generally upward, causing discharge of high pH and low boron water from the bedrock that is not related to CCR leachate. However, the sulfate exceedances combined with the position of well MW-253 in the Group 2 geochemical facies (Section 5.1) is indicative of mixing of natural groundwater with CCR leachate.

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Sulfate, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	155	144	237	114	0
MW-104D/DR	8	221	224	250	175	0
TW-158	2	42	42	44	39	0
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	**618**	**618**	**626**	**610**	0
TPZ-164	2	196	196	218	173	0
TPZ-165	2	**706**	**706**	**1,070**	342	0
TPZ-167	2	**1,845**	**1,845**	**1,850**	**1,840**	0
TPZ-168	2	**2,790**	**2,790**	**2,820**	**2,760**	0
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	91	91	93	88	0
OW-256	2	89	89	90	88	0
OW-157*	2	**1,960**	**1,960**	**2,050**	**1,870**	0
OW-257	2	311	311	312	310	0
TPZ-159	2	97	97	98	96	0
TPZ-160	2	62	62	63	60	0
TPZ-166	2	47	47	56	38	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	**558**	**538**	**696**	**502**	0
MW-151	7	78	77	82	74	0
MW-152	8	**879**	**879**	**1,030**	**700**	0
MW-153	8	88	86	98	81	0
MW-154	5	56	48	94	29	0
MW-155	7	53	51	62	49	0
MW-252	8	**523**	**519**	**578**	**463**	0
MW-253	7	**451**	**411**	**806**	262	0
MW-161	2	44	44	44	44	0
MW-262	2	32	32	40	24	0
Downgradient Wells (Bedrock)						
MW-350	8	36	42	62	<10	13
MW-352	8	14	14	18	11	0
MW-355	8	52	52	65	36	0

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Non-detects have been replaced by ½ the detection limit. * = Impacted by localized fly ash spill in early 2013.
Class I and II Groundwater Standard = 400 mg/L; exceedances are highlighted. Leachate concentrations higher than 400 mg/L are shown in bold.

5.2.3 Manganese

Manganese is not an indicator constituent for CCR leachate due to its redox-sensitivity in water. It was not detected in the three wells screened in the fly ash ponds, and had a median concentration of 0.57 mg/L in the bottom ash pond. Manganese had relatively high median concentration of 6.9 mg/L in TPZ-165, a monitoring well partially screened in coal ash in the secondary pond where boron concentrations were lower than the other CCR leachate sample points, demonstrating the effect that redox conditions have on this constituent.

Manganese concentrations have not exceeded the Class II groundwater standard (10 mg/L) in groundwater. Manganese concentrations greater than the Class I standard (0.15 mg/L) have been observed in all three upgradient wells, two of five leachate wells, three of seven mid-gradient wells, four of ten downgradient wells, and one of three bedrock wells.

There is no apparent correlation between manganese exceedances in the shallow unlithified wells and boron or sulfate exceedances. The highest manganese concentrations in groundwater were observed in upgradient wells at the Site and some of the lowest concentrations were observed in leachate wells and downgradient wells. Elevated manganese concentrations in groundwater reflect geochemical conditions and are unrelated to CCR leachate.

Manganese, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	**2.6**	**2.1**	**6.8**	**0.95**	0
MW-104D/DR	8	**0.16**	0.13	**0.42**	0.013	0
TW-158	2	**0.18**	**0.18**	**0.35**	<0.005	0
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	0.003	0.003	<0.005	<0.005	100
TPZ-164	2	*0.57*	*0.57*	*0.58*	*0.56*	0
TPZ-165	2	*6.9*	*6.9*	***12.7***	1.09	0
TPZ-167	2	0.003	0.003	<0.005	<0.005	100
TPZ-168	2	0.003	0.003	<0.005	<0.005	100
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	0.03	0.03	0.05	<0.005	50
OW-256	2	0.07	0.07	0.13	<0.005	50
OW-157	2	0.14	0.14	0.14	0.13	0
OW-257	2	**0.39**	**0.39**	**0.68**	0.10	0
TPZ-159	2	**0.60**	**0.60**	**0.68**	**0.51**	0
TPZ-160	2	0.14	0.14	0.16	0.12	0
TPZ-166	2	0.15	0.15	**0.28**	0.02	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	0.003	0.003	<0.005	<0.005	100
MW-151	7	0.05	0.03	0.14	<0.005	29
MW-152	8	0.02	0.02	0.07	<0.005	12.5
MW-153	8	0.01	0.01	0.03	<0.005	25
MW-154	5	0.04	0.003	**0.18**	<0.005	60
MW-155	7	**0.20**	**0.18**	**0.37**	0.04	0
MW-252	8	**0.75**	**0.77**	**1.7**	0.01	0
MW-253	7	0.06	0.003	0.14	<0.005	71
MW-161	2	**1.0**	**1.0**	**1.2**	**0.83**	0
MW-262	2	0.02	0.02	0.02	0.01	0
Downgradient Wells (Bedrock)						
MW-350	8	0.003	0.003	<0.005	<0.005	100
MW-352	8	0.003	0.003	<0.005	<0.005	100
MW-355	8	**0.32**	**0.27**	**0.87**	0.05	0

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells). Non-detects have been replaced by ½ the detection limit. Class I Groundwater Standard = 0.15 mg/L; Class II = 10 mg/L. Class I exceedances are bold; Class II exceedances highlighted as tan box. Leachate concentrations greater than 0.15 mg/L are shown using italics; greater than 10 mg/L as bold italics.

5.2.4 Iron

Iron is not an indicator constituent for CCR leachate due to its redox-sensitivity in water. It was usually not detected in the three wells screened in the fly ash ponds, and had a median concentration of 6.2 mg/L in the bottom ash pond.

Iron concentrations exceeded the Class I and II standard (5 mg/L) at upgradient monitoring well MW-104SR. No other groundwater monitoring wells at the Site had an exceedance.

Iron, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	4.5	1.0	**18**	<0.02	13
MW-104D/DR	8	0.02	0.01	0.07	<0.02	50
TW-158	2	0.72	0.72	1.43	<0.02	50
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	0.01	0.01	<0.02	<0.02	100
TPZ-164	2	**6.2**	**6.2**	**6.86**	**5.52**	0
TPZ-165	2	2.0	2.0	3.89	<0.02	50
TPZ-167	2	0.01	0.01	<0.02	<0.02	100
TPZ-168	2	0.04	0.04	0.06	<0.02	50
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	0.04	0.04	0.06	<0.02	50
OW-256	2	0.02	0.02	0.02	<0.02	50
OW-157	2	0.03	0.03	0.05	<0.02	50
OW-257	2	0.02	0.02	0.02	<0.02	50
TPZ-159	2	0.04	0.04	0.06	<0.02	50
TPZ-160	2	0.22	0.22	0.39	0.05	0
TPZ-166	2	0.15	0.15	0.28	0.02	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	0.01	0.01	0.07	<0.01	88
MW-151	7	0.01	0.01	0.01	<0.01	86
MW-152	8	0.03	0.02	0.07	<0.01	25
MW-153	8	0.01	0.01	<0.02	<0.01	100
MW-154	5	0.01	0.01	0.02	<0.01	80
MW-155	7	0.08	0.01	0.48	<0.01	43
MW-252	8	0.02	0.01	0.07	<0.01	75
MW-253	7	0.01	0.01	0.01	<0.01	71
MW-161	2	0.05	0.05	0.09	<0.02	50
MW-262	2	0.07	0.07	0.12	0.02	0
Downgradient Wells (Bedrock)						
MW-350	8	0.01	0.01	0.01	<0.01	88
MW-352	8	0.01	0.01	<0.02	<0.01	100
MW-355	8	0.58	0.57	1.6	0.13	0

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Non-detects have been replaced by ½ the detection limit. Class I and II Groundwater Standard = 5.0 mg/L; exceedances are highlighted. Leachate concentrations higher than 5 mg/L are shown in bold.

5.2.5 Total Dissolved Solids

TDS is not a direct indicator for CCR leachate. It can indirectly indicate CCR leachate because sulfate contributes to TDS concentrations; however, other major ions in croundwater, such as chloride, can also affect TDS concentrations. Its median leachate concentration at the site was 548 mg/L in the bottom ash pond, and 1,145 to 4,500 mg/l in the fly ash ponds.

TDS concentrations regularly exceeded the Class I / II standard of 1,200 mg/L at shallow downgradient monitoring wells MW-150 and MW-152, at deeper nested well MW-252, and on one occasion at MW-253 (Figures 12E and 12F). Bedrock well MW-350 also had TDS exceedances unrelated to CCR impacts to groundwater. The high TDS observed in groundwater at well OW-157 is attributed partially to the fly ash spill.

The three downgradient wells in the unlithified materials with median TDS concentrations above the groundwater standard (MW-150, MW-152, and MW-252) also had corresponding sulfate exceedances, indicating that these exceedances are a result of mising with CCR leachate. The single exceedance at MW-253 occurred in the same sample as a sulfate concentration of 806 mg/L, and may be related to CCR leachate. Conversely, groundwater at bedrock well MW-350 had low boron and sulfate concentrations. Elevated TDS concentrations at well MW-350 reflect naturally occurring concentrations of the bicarbonate anion and the calcium, sodium, and potassium cations.

Total Dissolved Solids (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	854	855	965	742	0
MW-104D/DR	8	734	754	801	630	0
TW-158	2	678	678	976	380	0
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	1,145	1,145	1,160	1,130	0
TPZ-164	2	548	548	592	504	0
TPZ-165	2	**1,855**	**1,855**	**2,290**	**1,420**	0
TPZ-167	2	**3,025**	**3,025**	**3,040**	**3,010**	0
TPZ-168	2	**4,400**	**4,400**	**5,120**	**3,680**	0
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	468	468	470	466	0
OW-256	2	498	498	508	488	0
OW-157*	2	**3,170**	**3,170**	**3,180**	**3,160**	0
OW-257	2	929	929	958	900	0
TPZ-159	2	464	464	480	448	0
TPZ-160	2	482	482	510	454	0
TPZ-166	2	305	305	306	304	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	**1,225**	**1,203**	**1,396**	1,090	0
MW-151	7	561	568	587	538	0
MW-152	8	**1,719**	**1,739**	**1,983**	**1,511**	0
MW-153	8	430	438	462	384	0
MW-154	5	469	476	559	346	0
MW-155	7	551	470	1,080	446	0
MW-252	8	**1,296**	**1,306**	**1,341**	**1,224**	0
MW-253	7	792	698	**1,441**	564	0
MW-161	2	593	593	756	430	0
MW-262	2	208	208	228	188	0
Downgradient Wells (Bedrock)						
MW-350	8	**1,204**	**1,314**	**1,709**	375	0
MW-352	8	815	781	996	706	0
MW-355	8	480	486	532	447	0

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Non-detects have been replaced by ½ the detection limit. * = Impacted by localized fly ash spill in early 2013.
Class I and II Groundwater Standard = 1,200 mg/L; wells and parameters with exceedances are highlighted.
Leachate concentrations higher than 1,200 mg/L are shown in bold.

5.2.6 Chloride

Chloride is usually not an indicator for coal ash leachate. Median concentrations in coal ash leachate at the Site ranged from 17 to 106 mg/L.

Chloride concentrations in groundwater exceeded the Class I / II standard of 200 mg/L at only one well location, bedrock monitoring well MW-352. The high chloride concentration observed in groundwater at this well is naturally occurring and endemic of Pennsylvanian bedrock of the Illinois Basin. No other monitoring wells at the Site had significantly elevated concentration of chloride, or Class I / II exceedances, during the two to eight quarters of sampling.

Chloride (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	8	35	33	59	18	0
MW-104D/DR	8	18	18	24	16	0
TW-158	2	73	73	81	65	0
Leachate Wells (Screened in Fill/CCRs)						
TPZ-163	2	17	17	19	15	0
TPZ-164	2	74	74	81	67	0
TPZ-165	2	81	81	91	71	0
TPZ-167	2	100	100	100	100	0
TPZ-168	2	106	106	109	103	0
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)						
OW-156	2	58	58	60	55	0
OW-256	2	61	61	65	57	0
OW-157*	2	123	123	124	121	0
OW-257	2	20	20	21	18	0
TPZ-159	2	35	35	35	35	0
TPZ-160	2	43	43	44	42	0
TPZ-166	2	12	12	12	12	0
Downgradient Wells (Unlithified Materials)						
MW-150	8	63	65	77	51	0
MW-151	7	39	40	44	35	0
MW-152	8	73	63	140	52	0
MW-153	8	30	31	34	22	0
MW-154	5	8	8	12	4	0
MW-155	7	9	9	11	7	0
MW-252	8	51	51	61	41	0
MW-253	7	23	23	27	16	0
MW-161	2	6	6	6	5	0
MW-262	2	3	3	<5	<5	100
Downgradient Wells (Bedrock)						
MW-350	8	30	32	34	21	0
MW-352	8	**550**	**559**	**642**	**390**	0
MW-355	8	13	13	14	11	0

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Non-detects have been replaced by ½ the detection limit. * = Impacted by localized fly ash spill in early 2013.
Class I and II Groundwater Standard = 200 mg/L; wells and parameters with exceedances are highlighted.

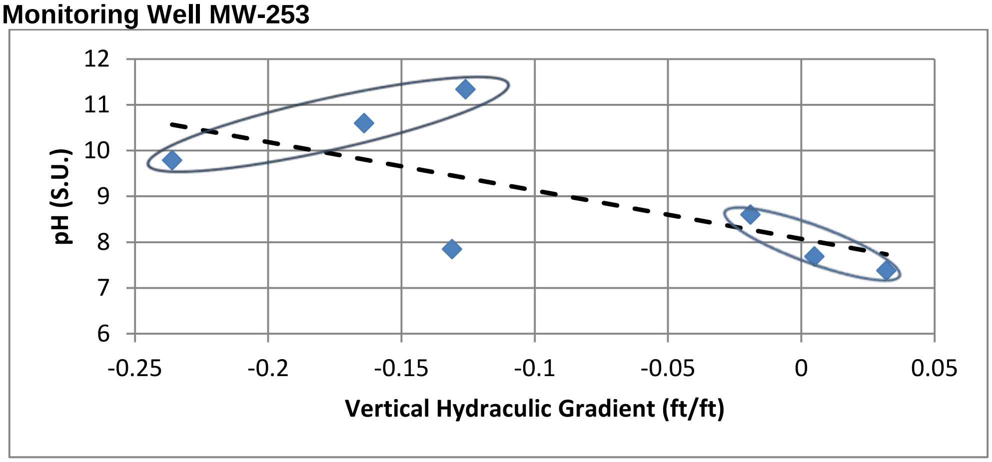
5.2.7 pH

Values for pH in leachate were neutral in the bottom ash pond and slightly alkaline in the fly ash ponds. The highest pH value observed in leachate was 9.17 at TPZ-168.

The lowest pH readings in groundwater at the APS occurred in the shallow unlithified deposits at upgradient well MW-104SR, mid-gradient wells OW-157 and TPZ-159, and downgradient well MW-152. Three of these four wells had a single pH reading below the Class I standard of 6.50 S.U., but otherwise had higher pH values similar to other shallow wells at the Site. Well MW-152 had two pH readings below 6.50 S.U., but the median pH over eight quarters was near neutral at 6.96 S.U. No wells monitored at the Site had an average or median pH value below the lower pH limit of 6.50 S.U. The exceedances of the lower pH limit are not attributed to CCR leachate, because leachate in the APS is neutral to slightly alkaline.

The highest pH readings were observed at three wells, one screened just above bedrock (MW-253) and two bedrock wells (MW-350 and MW-352). The two bedrock wells MW-350 and MW-352 had consistently high pH values, with median pH values of 12.17 and 10.65 S.U., respectively. The other high pH readings occurred at well MW-253, screened in the Vandalia Till just above bedrock. The three highest pH readings at well MW-253 (see figure below) occurred when there was a correspondingly strong upward vertical hydraulic gradient (Table 9) from the bedrock to the overlying unlithified materials. Three of the four lowest pH values from 7.38 to 8.60 S.U. were recorded during the three monitoring events where the vertical hydraulic gradient was downward or near zero.

Monitoring Well MW-253



Based on the location, depth, and formations in which high pH readings were recorded in groundwater, it is surmised that the very basic pH's may be related to weathered limestone near the top of bedrock. High pH values are typical of areas with limestone bedrock. Another reason for the high pH, combined with the high TDS and upward hydraulic gradient, is possible upwelling of connate saline groundwater. Since the area around the APS has inter-bedded limestone and shale, the geochemistry as it relates to pH is complex, but the weathered limestone, combined with an upward hydraulic gradient within bedrock, may be causing higher pH values in groundwater.

Field pH (Standard Units)

Well Number	Number Samples	Average	Median	Maximum	Minimum
Upgradient Wells (Unlithified Materials)					
MW-104S/SR	6	6.66	6.65	6.90	**6.44**
MW-104D/DR	6	6.95	6.85	7.65	6.71
TW-158	2	7.00	7.00	7.27	6.73
Leachate Wells (Screened in Fill/CCRs)					
TPZ-163	2	8.20	8.20	8.81	7.59
TPZ-164	2	7.39	7.39	7.46	7.32
TPZ-165	2	6.82	6.82	7.18	**6.45**
TPZ-167	2	7.93	7.93	8.15	7.70
TPZ-168	2	8.63	8.63	**9.17**	8.08
Mid-Gradient Wells (Unlithified Materials;Within Ash Pond System)					
OW-156	2	6.72	6.72	6.82	6.61
OW-256	2	6.70	6.70	6.77	6.63
OW-157*	2	6.50	6.50	6.63	**6.37**
OW-257	2	7.10	7.10	7.12	7.07
TPZ-159	2	6.51	6.51	6.55	**6.47**
TPZ-160	2	7.16	7.16	7.30	7.02
TPZ-166	2	7.51	7.51	7.77	7.24
Downgradient Wells (Unlithified Materials)					
MW-150	8	7.18	7.17	7.34	6.99
MW-151	7	7.11	7.11	7.84	6.77
MW-152	8	6.96	7.12	7.37	**6.36**
MW-153	8	7.13	7.15	7.50	6.58
MW-154	5	7.11	7.10	7.40	6.71
MW-155	7	6.99	7.02	7.10	6.82
MW-252	8	7.37	7.28	8.05	6.80
MW-253	7	8.51	7.85	**11.34**	6.89
MW-161	2	7.02	7.02	7.08	6.95
MW-262	2	7.32	7.32	7.48	7.15
Downgradient Wells (Bedrock)					
MW-350	8	**11.71**	**12.17**	**12.94**	8.08
MW-352	8	**9.88**	**10.65**	**11.55**	6.51
MW-355	8	6.97	7.00	7.24	6.70

Notes: Statistical evaluation for 8 quarters from November 2010 - March 2012 and November 2013 – February 2014 for original wells; and for 2 quarters from November 2013 – February 2014 for Phase II wells. Some wells have fewer samples due to insufficient groundwater for sampling (i.e., dry wells).
Class I and II Groundwater Upper / Lower Standards = 9.0 / 6.5 Standard Units (S.U.); wells and parameters with exceedances are highlighted. pH values lower than 6.5 or higher than 9.0 SU in leachate are indicated by bold. * = Impacted by localized fly ash spill in early 2013.

5.2.8 Other Inorganic Parameters

Antimony

Antimony concentrations in groundwater exceeded the Class I standard of 0.006 mg/L at only one monitoring well location, bedrock monitoring well MW-350. The Class II standard for antimony of 0.024 mg/L was not exceeded. Antimony concentrations at this well ranged from below the detection limit of 0.006 mg/L to a maximum concentration of 0.008 mg/L. The antimony detected in groundwater at this one bedrock well is naturally occurring and unrelated to impacts of CCR leachate to groundwater. No other monitoring wells at the Site had a detected concentration of antimony during the six quarters of sampling.

Antimony, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	6	0.003	0.003	<0.006	<0.006	100
MW-104D/DR	6	0.003	0.003	<0.006	<0.006	100
Downgradient Wells (Unlithified Materials)						
MW-150	6	0.003	0.003	<0.006	<0.006	100
MW-151	6	0.003	0.003	<0.006	<0.006	100
MW-152	6	0.003	0.003	<0.006	<0.006	100
MW-153	6	0.003	0.003	<0.006	<0.006	100
MW-154	4	0.003	0.003	<0.006	<0.006	100
MW-155	6	0.003	0.003	<0.006	<0.006	100
MW-252	6	0.003	0.003	<0.006	<0.006	100
MW-253	6	0.003	0.003	<0.006	<0.006	100
Downgradient Wells (Bedrock)						
MW-350	6	0.005	0.005	**0.008**	<0.006	50
MW-352	6	0.003	0.003	<0.006	<0.006	100
MW-355	6	0.003	0.003	<0.006	<0.006	100

Notes: Statistical evaluation for six quarters of November 2010 to March 2012 with exception of Well MW-154, which was only sampled four times due to low groundwater levels. Parameter not sampled in 2013-2014.
Non-detects have been replaced by ½ the detection limit.
Class 1 Groundwater Standard = 0.006 mg/L; Class II = 0.024 mg/L. Class I exceedances are bold; Class II exceedances highlighted as tan box.

Nitrate

Nitrate concentrations in groundwater exceeded the Class I standard of 10 mg/L at only one well location, shallow monitoring well MW-153, which is located at the downgradient edge of cultivated corn and soybean fields. The Class II standard for nitrate of 100 mg/L was not exceeded. Nitrate concentrations observed in groundwater at this well ranged from 12 to 18 mg/L and are not related to impacts from CCR leachate. No other monitoring wells at the Site had elevated concentration of nitrate during the six quarters of sampling with the exception of bedrock well MW-355 and water table wells MW-154 and MW-155, which are relatively shallow and also adjacent to and downgradient from cultivated corn and soybean fields.

Nitrate, dissolved (mg/L)

Well Number	Number Samples	Average	Median	Maximum	Minimum	Percent Non-Detects
Upgradient Wells (Unlithified Materials)						
MW-104S/SR	6	0.119	0.078	0.37	<0.050	33
MW-104D/DR	6	0.141	0.068	0.554	<0.050	17
Downgradient Wells (Unlithified Materials)						
MW-150	6	0.041	0.040	0.058	<0.050	50
MW-151	6	0.036	0.025	0.093	<0.050	83
MW-152	6	0.182	0.206	0.310	<0.050	17
MW-153	6	**14.3**	**14.1**	**18**	**12**	0
MW-154	4	1.6	0.90	4.5	0.25	0
MW-155	6	2.3	2.0	4.5	1.4	0
MW-252	6	0.035	0.025	0.059	<0.050	67
MW-253	6	0.116	0.070	0.383	<0.050	33
Downgradient Wells (Bedrock)						
MW-350	6	0.025	0.025	<0.050	<0.050	100
MW-352	6	0.030	0.025	0.056	<0.050	83
MW-355	6	1.0	0.88	2.0	0.21	0

Notes: Statistical evaluation for six quarters of November 2010 to March 2012 with exception of Well MW-154, which was only sampled four times due to low groundwater levels. Parameter not sampled in 2013-2014.
Non-detects have been replaced by ½ the detection limit.
Class 1 Groundwater Standard = 10 mg/L; Class II = 100 mg/L. Class I exceedances are bold; Class II exceedances highlighted as tan box.

Fluoride

Fluoride concentrations at the 13 monitored wells at the BEC APS ranged from 0.119 to 0.865 mg/L. The Class I groundwater standard for fluoride is 4 mg/L. The highest concentrations were observed in MW-150, MW-352, and MW-104S. The concentrations observed in MW-150 may be related to CCR leachate, while the concentrations in MW-104S and MW-352 are not related to CCR leachate.

Cyanide (Total)

All cyanide concentrations measured in groundwater samples during the six quarters of November 2010 to March 2012 were below the detection limits of 0.007 to 0.008 mg/L. The Class I groundwater standard for cyanide is 0.2 mg/L.

Arsenic

Arsenic concentrations at the 13 monitored wells ranged from below the detection limit of 0.005 mg/L to 0.032 mg/L. The highest concentrations occurred in upgradient monitoring well MW-104S. The Class I groundwater standard for arsenic was 0.05 mg/L at the time of sampling. Median concentrations at the 13 wells range from less than 0.005 mg/L to a maximum of 0.006 mg/L.

Barium

Barium concentrations ranged from 0.009 to 1.6 mg/L versus a Class I groundwater standard of 2.0 mg/L. Median barium concentrations at the 13 wells ranged from 0.01 to 0.82 mg/L with no statistical pattern or elevated concentrations attributable to CCRs. The highest barium concentrations were measured in groundwater at the three bedrock monitoring wells. Wells MW-350, MW-352, and MW-355 had median barium concentrations of 0.82, 0.19, and 0.11 mg/L, respectively. The nine monitoring wells in the unlithified deposits had median barium concentrations ranging from 0.01 to 0.08 mg/L.

Beryllium

Beryllium concentrations measured in all groundwater samples were below the detection limits of 0.004 to 0.005 mg/L. The Class I groundwater standard for beryllium is 0.004 mg/L.

Cadmium

Cadmium concentrations measured in all groundwater samples were below the detection limit of 0.002 mg/L. The Class I groundwater standard for cadmium is 0.005 mg/L.

Chromium

Chromium concentrations measured in all groundwater samples were below the detection limit of 0.005 mg/L. The Class I groundwater standard for chromium is 0.10 mg/L.

Cobalt

Cobalt concentrations measured in all groundwater samples were below the detection limit of 0.005 mg/L with the exception of one detected concentration of 0.010 mg/L at well MW-252. The Class I groundwater standard for cobalt is 1.0 mg/L.

Copper

Copper concentrations measured in all groundwater samples were below the detection limit of 0.005 mg/L with the exception of two detected concentrations of 0.016 and 0.007 mg/L, respectively, at wells MW-155 and MW-252. The Class I groundwater standard for copper is 0.65 mg/L, and these two detections were 40 and 92 times below the standard.

Lead

Lead concentrations measured in all groundwater samples were below the detection limit of 0.005 mg/L with the exception of one detected concentration of 0.0051 mg/L at well MW-253. The Class I groundwater standard for lead is 0.0075 mg/L.

Mercury

All mercury concentrations measured in groundwater samples from all 13 wells during the six quarters of monitoring were below the detection limit and Class I groundwater standard of 0.002 mg/L.

Nickel

Nickel concentrations measured in all groundwater samples were below the detection limit of 0.005 mg/L with the exception of one detected concentration of 0.007 mg/L at bedrock well MW-355. The Class I groundwater standard for nickel is 0.1 mg/L.

Selenium

Selenium concentrations measured in groundwater samples were below the detection limit of 0.010 mg/L at all of the monitoring wells with the exception of wells MW-150 and MW-154. Well MW-150 had one selenium detection at a concentration of 0.010 mg/L and well MW-154 had one detection at a concentration of 0.016 mg/L. The Class I groundwater standard for selenium is 0.050 mg/L.

Silver

Silver concentrations measured in groundwater samples were below the detection limit of 0.005 mg/L in 10 of the 13 monitoring wells. Silver was detected at concentrations ranging from 0.006 to 0.010 mg/L in bedrock wells MW-350 and MW-352 and in well MW-253, screened just above the bedrock and at a location with an upward vertical hydraulic gradient during part of the study. All three of these wells had the maximum pH values recorded during the six quarters of monitoring. The Class I groundwater standard for silver is 0.05 mg/L.

Thallium

All thallium concentrations measured in groundwater samples from all 13 wells during the study were below the detection limit and Class I groundwater standard of 0.002 mg/L.

Zinc

Zinc was detected in five of the 13 monitoring wells at concentrations ranging from 0.0066 to 0.014 mg/L versus a Class I groundwater standard for zinc of 5.0 mg/L. The remaining eight monitoring wells had all zinc concentrations below the detection limit of 0.005 mg/L during all six quarters of monitoring. The highest measured zinc concentration, 0.014 mg/L at wells MW-154 and MW-155, was 357 times below the Class I groundwater standard.

6 CONCLUSIONS

The hydrogeology and groundwater quality in the vicinity of the ash pond system at the Baldwin Energy Complex has been investigated during two phases of investigation over a period of four years (2010 – 2014) with the installation of 29 wells, eight quarters of groundwater sample collection and analysis, field and laboratory permeability testing, and groundwater mapping. In conjunction with the hydrogeologic investigation, a groundwater model has been developed to predict the effect of various ash pond closure scenarios on groundwater quality. The Groundwater Model Report (GMR) is being submitted under separate cover.

The primary conclusions from hydrogeologic investigations and groundwater quality assessments at the ash pond system are:

1. Three distinct water-bearing layers have been identified based on stratigraphic relationships and common hydrogeologic characteristics.

   - Unit 1 – Fill Unit: CCRs, consisting primarily of fly ash, bottom ash and minor slag. Also includes earthen fill deposits of predominantly clay and silt materials forming berms and roads within the site. The overall (geometric mean) hydraulic conductivity for the Fill Unit is $1.6x10^{-4}$ cm/s.

   - Unit 2 – Upper Groundwater Unit: Predominantly clay with some silt and minor sand, silt layers, and occasional sand lenses. Includes the lithologic layers identified as the Cahokia Alluvium, Peoria Loess, Equality Formation, and Vandalia Till Member. This unit is composed of unlithified natural geologic materials and extends from the water table to the bedrock. The overall horizontal and vertical hydraulic conductivities for this unit are $3.2x10^{-5}$ cm/s and $8.6x10^{-7}$ cm/s, respectively.

   - Unit 3 – Bedrock Confining Unit: This unit is composed of interbedded shale and limestone bedrock and underlies the entire Site. The horizontal hydraulic conductivity for this unit is $5.0x10^{-6}$ cm/s.

2. The amount of saturated ash within the APS is variable both laterally and temporally within the various units. The maximum thickness of saturated CCRs, ranging from 19.1 to 29.2 feet, was measured at the active West Fly Ash Cell. The minimum thickness of saturated CCRs (including clay and silt fill material) was measured at the Secondary Pond. All of the CCR units had some degree of saturated materials.

3. The APS is underlain by clay deposits that are 12 to 41 feet or more thick, which in turn are underlain by relatively impermeable Pennsylvanian and Mississippian inter-bedded shale and limestone bedrock. These deposits restrict migration of leachate from the impoundment to surrounding groundwater.

4. The horizontal groundwater flow direction is from east to west across the Site, from the higher topographic area along the eastern boundary to the lowest topographic areas at the southwestern-most corner of the APS and along the Kaskaskia River. Overall groundwater flow from the central portion of the APS is towards the southwest with eventual discharge into

the Kaskaskia River. In the area of the Secondary and Tertiary ponds the groundwater elevation contours on the three potentiometric surface maps all reflect the land surface topography and underlying bedrock surface topography.

5. Horizontal groundwater gradients across the APS typically range from 0.01 to 0.02 ft/ft.

6. Based on the detailed geologic information provided for the unlithified materials and bedrock intercepted at the APS along with the hydrogeologic data, the groundwater in both the unlithified deposits and the bedrock at the Site can be classified as Class II groundwater and the groundwater quality standards set forth in IAC Section 620.420 are the applicable groundwater quality standards.

7. The parameters of concern in groundwater which are related to CCRs found in leachate, and which have an exceedance of Class I or II groundwater quality standards are: boron, sulfate, and TDS.

8. The Class II standards for boron, chloride, iron, sulfate, TDS, and pH are the same as Class I, so exceedances of these constituents are not affected by the groundwater class.

9. Only one downgradient location and well (MW-152) has had a boron exceedance during 8 quarters of sampling. Four wells at three downgradient well locations (MW-150, MW-152/MW-252, and MW-253) have had sulfate exceedances that can be attributed to groundwater impacted by CCRs. Nested wells at two downgradient locations (MW-150/MW-350 and MW-152/MW-252) have had TDS exceedances that are related to CCRs.

10. Class I or II groundwater quality exceedances of other constituents are due to either natural conditions (antimony, chloride, iron, manganese, pH) or off-site anthropogenic effects (nitrates).

    All of the elevated iron and manganese concentrations in upgradient, mid-gradient and downgradient wells are naturally occurring and unrelated to CCR impacts. Nitrate was detected at high concentrations in one shallow well (MW-153) at the edge of a cultivated corn and soybean field. Antimony and chloride both had elevated groundwater concentrations from naturally occurring water geochemistry within the bedrock and not from an anthropogenic source.

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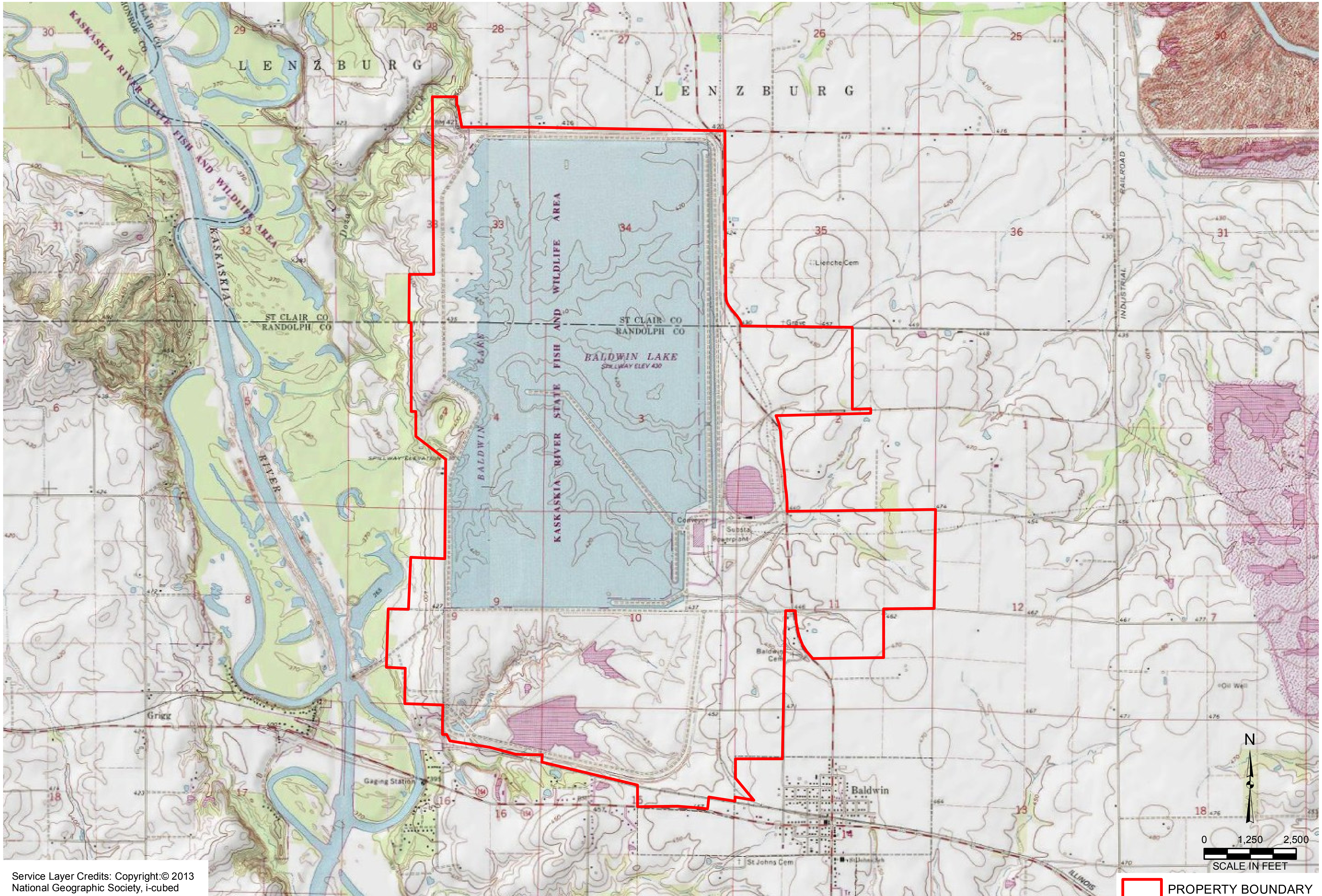
FIGURES



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SITE LOCATION MAP

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 1

NATURAL RESOURCE TECHNOLOGY

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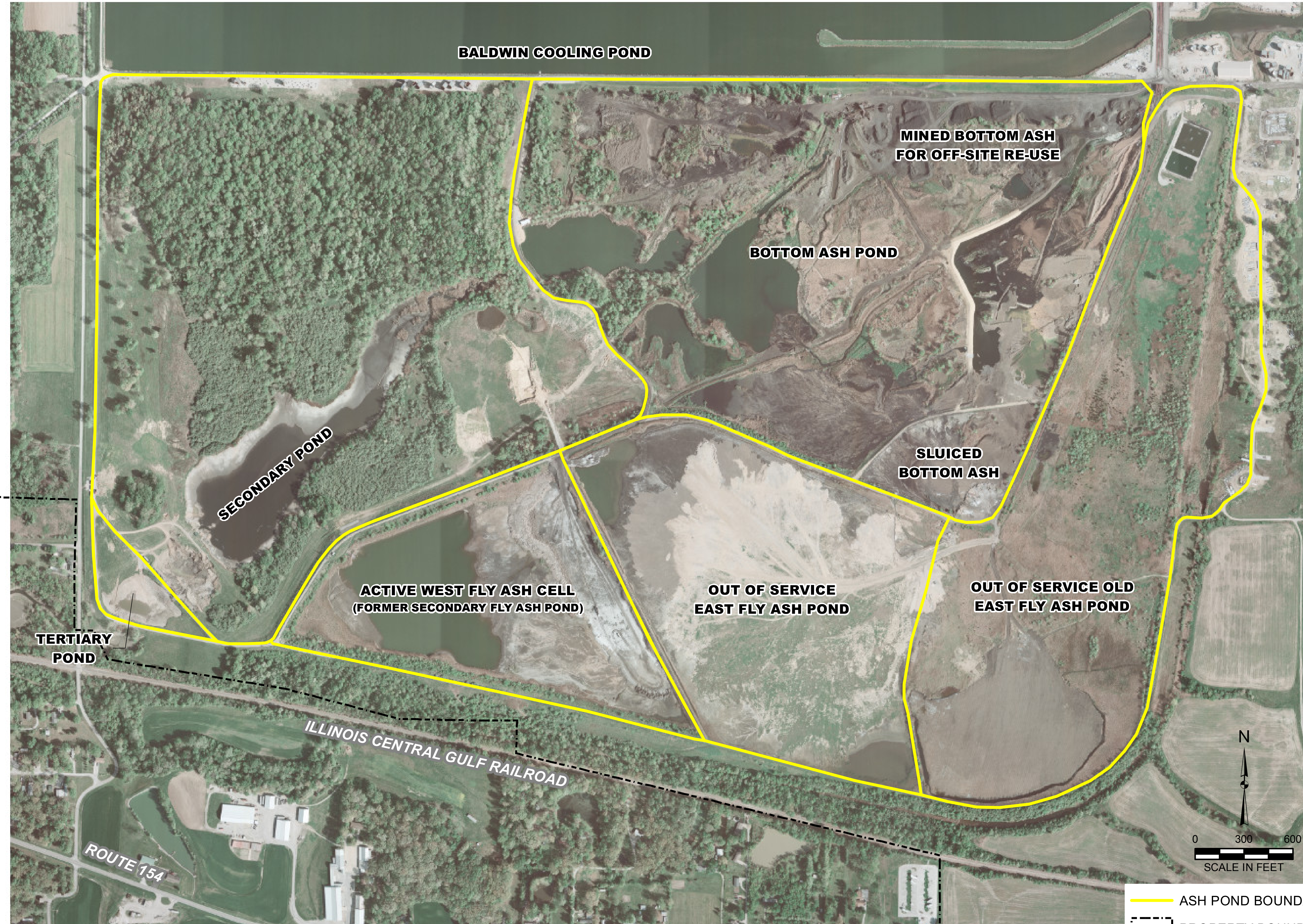

ASH POND BOUNDARIES
PROPERTY BOUNDARY

AERIAL PHOTO SOURCE: HENDERSON AERIAL SURVEYS (4/2/2012).

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TDC 4/30/14
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SJC 6/9/14

AERIAL PHOTOGRAPH OF SITE AND ASH POND SYSTEM

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 2

NATURAL RESOURCE TECHNOLOGY

DRAWN BY/DATE: TDC 4/30/14
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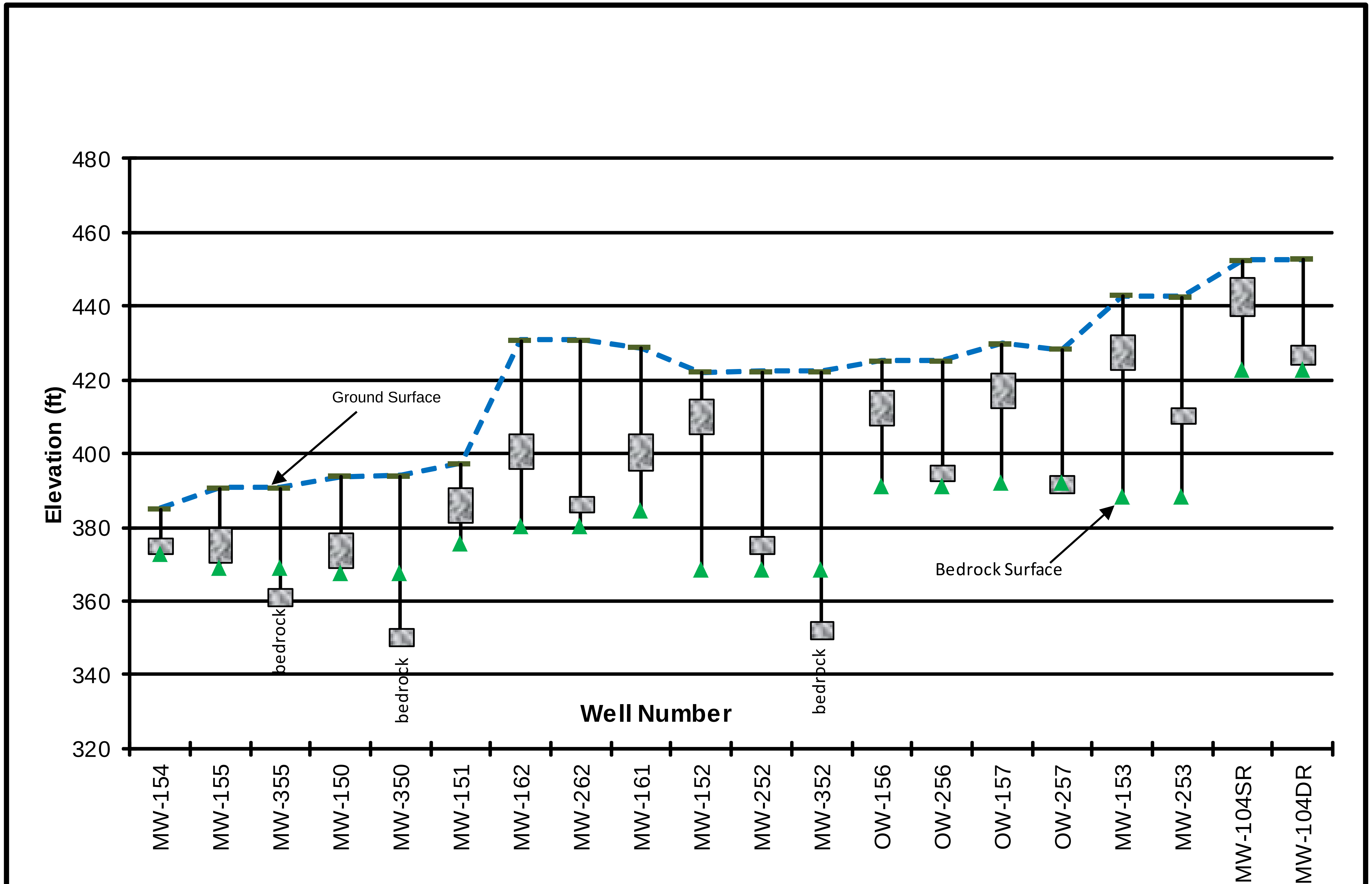
MONITORING, OBSERVATION, AND PIEZOMETER WELL LOCATIONS

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 3

NATURAL RESOURCE TECHNOLOGY



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TDC 4/30/14
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SJC 4/27/14
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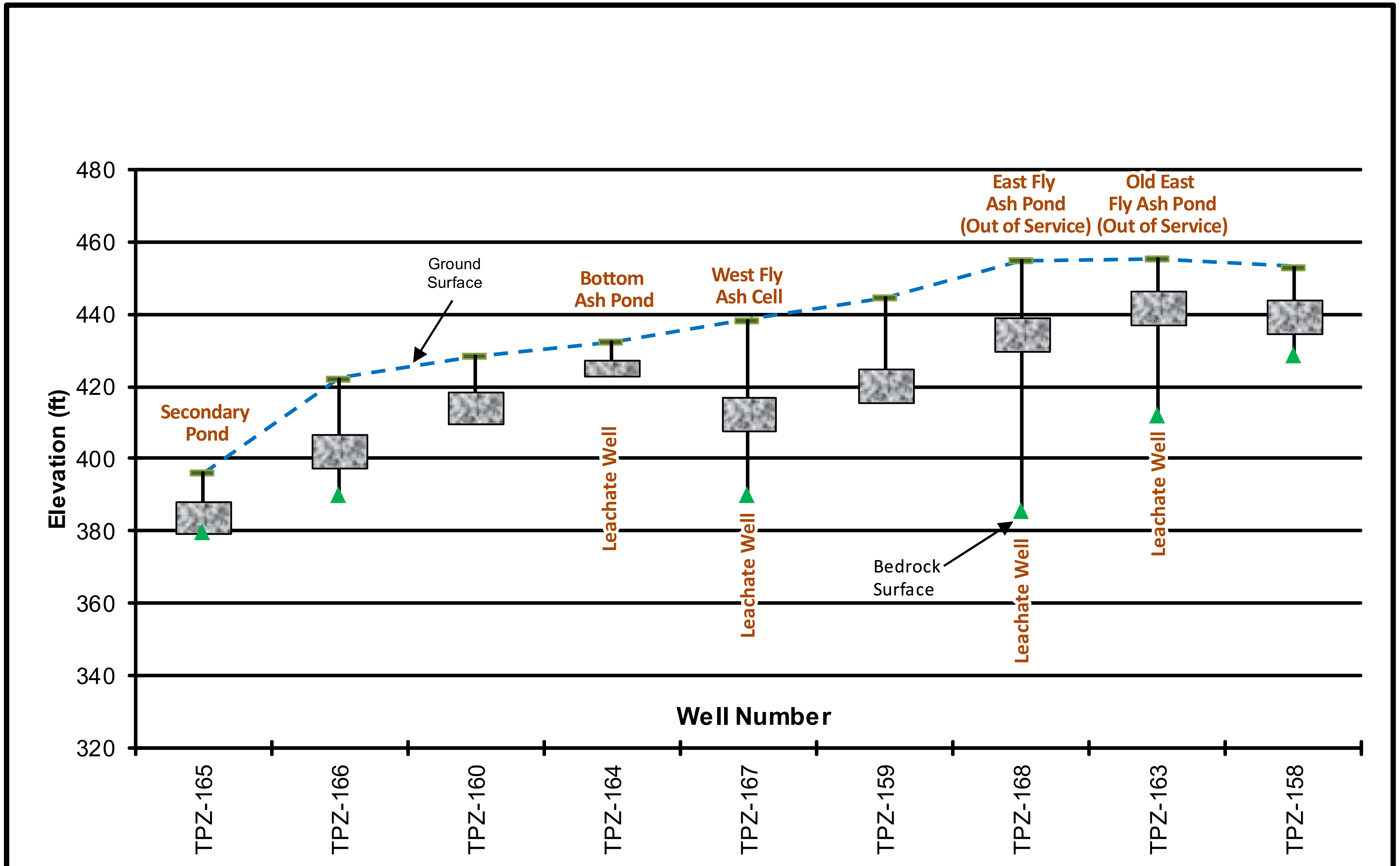
MONITORING AND OBSERVATION WELL SCREEN ELEVATIONS

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 4A

NATURAL RESOURCE TECHNOLOGY



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APPROVED BY/DATE: SJC 6/9/14

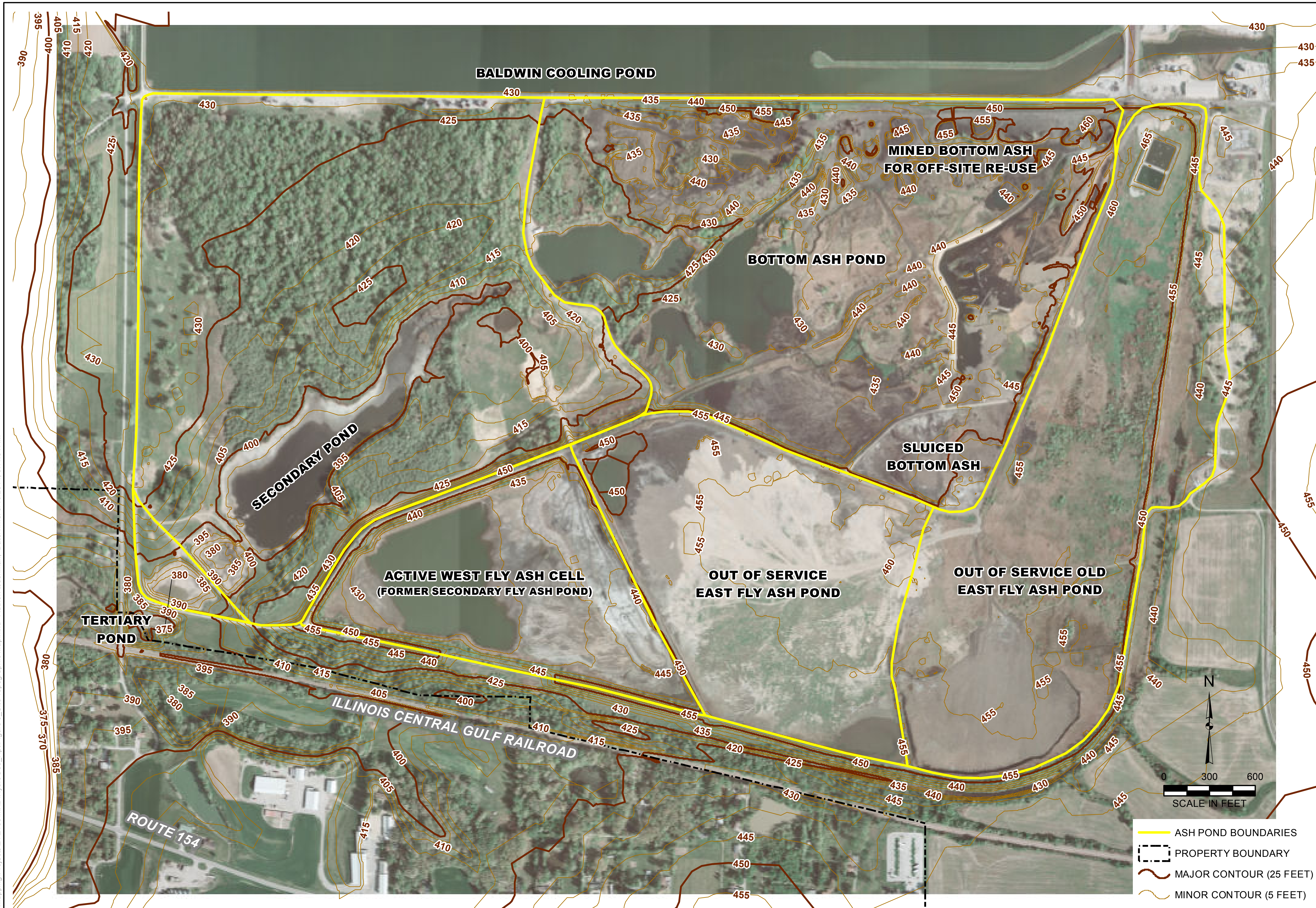
TEMPORARY PIEZOMETER SCREEN ELEVATIONS

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 4B

NATURAL RESOURCE TECHNOLOGY



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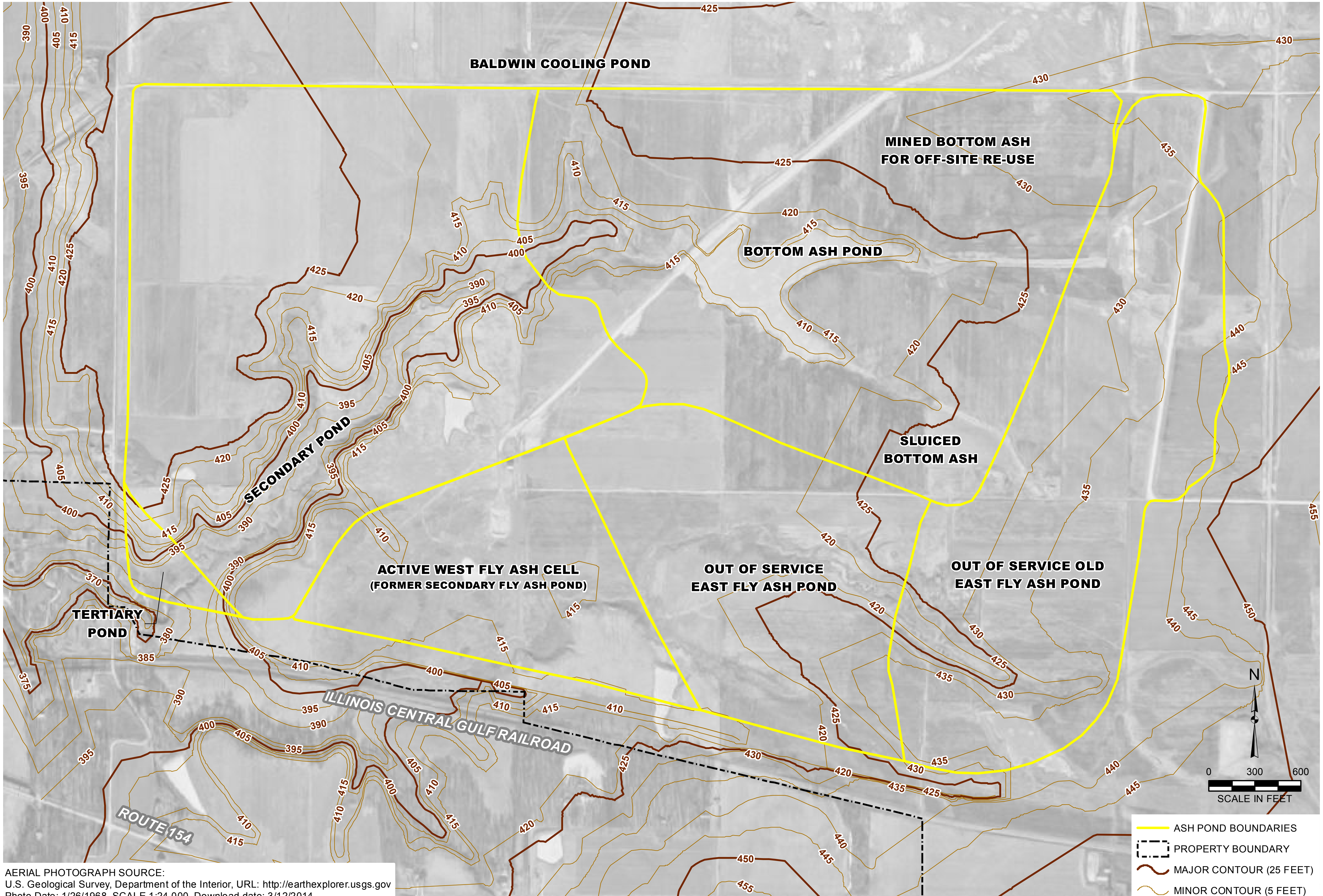
SITE TOPOGRAPHIC MAP

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 5

NATURAL RESOURCE TECHNOLOGY



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APPROVED BY/DATE: SJC 6/9/14

HISTORIC TOPOGRAPHIC MAP

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 6

NATURAL RESOURCE TECHNOLOGY

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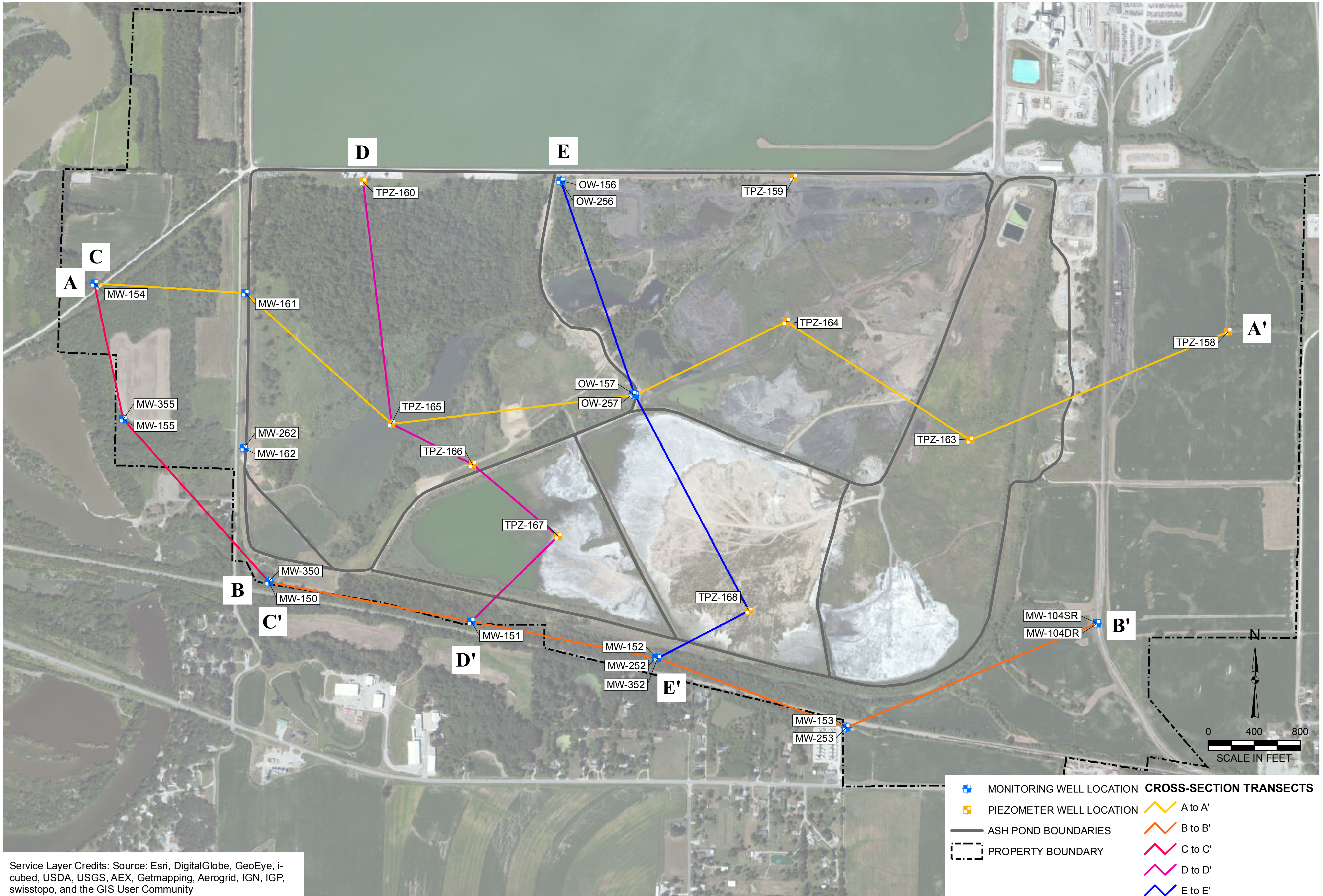

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APPROVED BY/DATE: SJC 6/9/14

CROSS SECTION LOCATION MAP

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 7

NATURAL RESOURCE TECHNOLOGY

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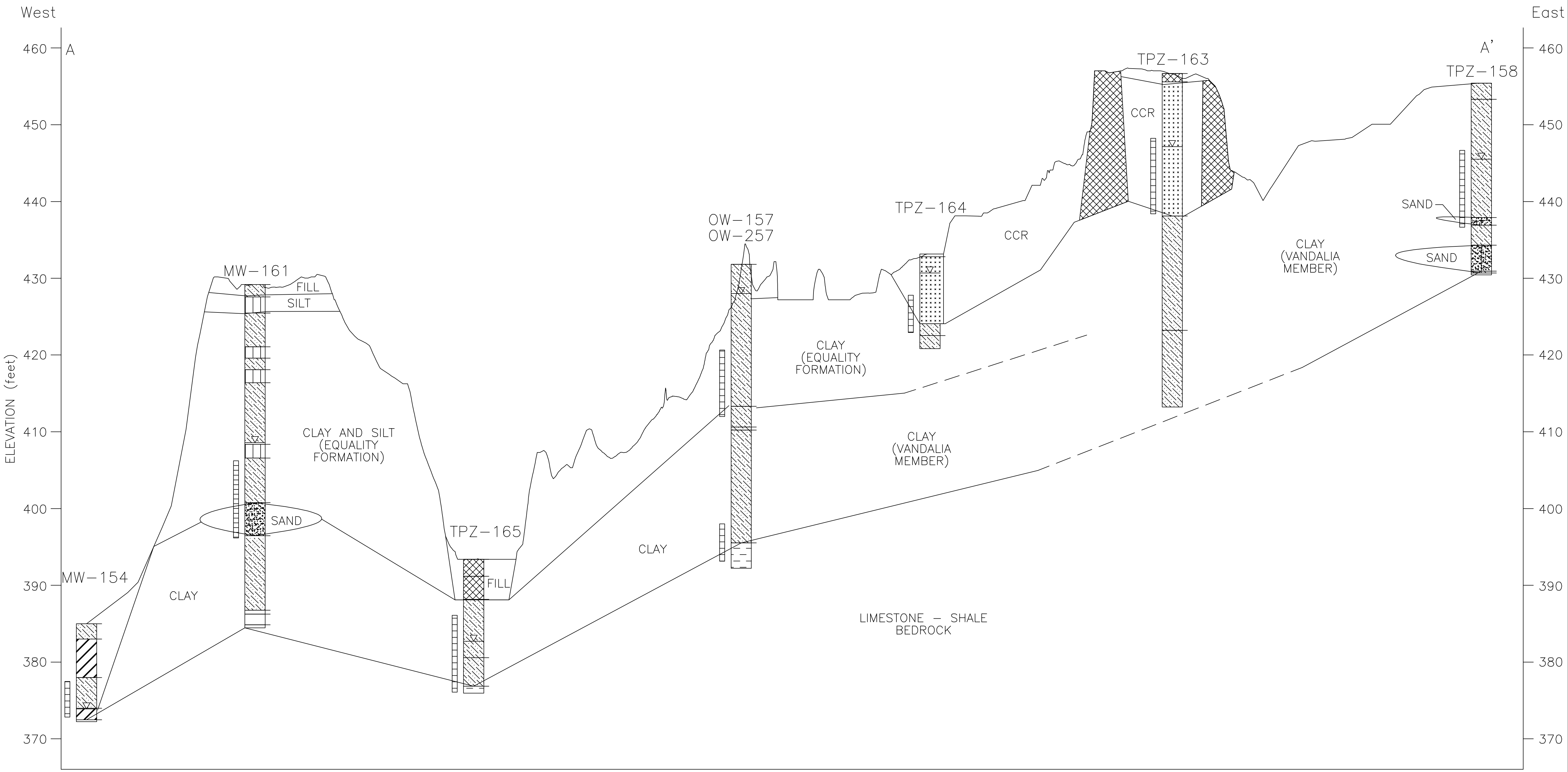


LEGEND

WELL SCREEN INTERVAL

FILL

CLAY, CL

CLAY, CH

SAND, SP/SM/SW

SHALE

SILT, ML

COAL COMBUSTION RESIDUALS, CCRs

NOTE: This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

0 400 800
FEET
(HORIZONTAL SCALE IS APPROXIMATE)

DRAWN BY/DATE: TDC 5/15/14
REVIEWED BY/DATE: SJC 5/16/14
APPROVED BY/DATE: SJC 6/9/14

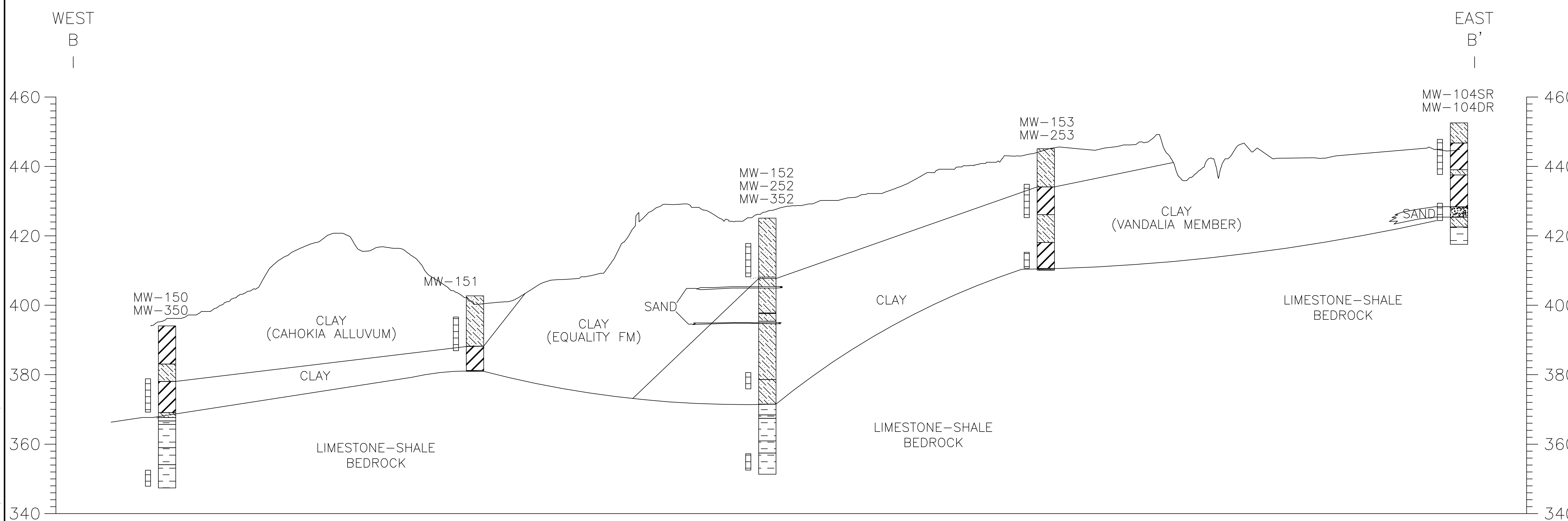
GEOLOGIC CROSS SECTION A-A'

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 8A

NATURAL RESOURCE TECHNOLOGY



LEGEND

WELL SCREEN INTERVAL

FILL

CLAY, CL

CLAY, CH

SAND, SP/SM/SW

SHALE

SILT, ML

COAL COMBUSTION RESIDUALS, CCRs

NOTE: This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

0 300 600
FEET
(HORIZONTAL SCALE IS APPROXIMATE)

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TDC 5/15/14
REVIEWED BY/DATE:
SJC 5/16/14
APPROVED BY/DATE:
SJC 6/9/14

GEOLOGIC CROSS SECTION B-B'

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 8B

NATURAL RESOURCE TECHNOLOGY

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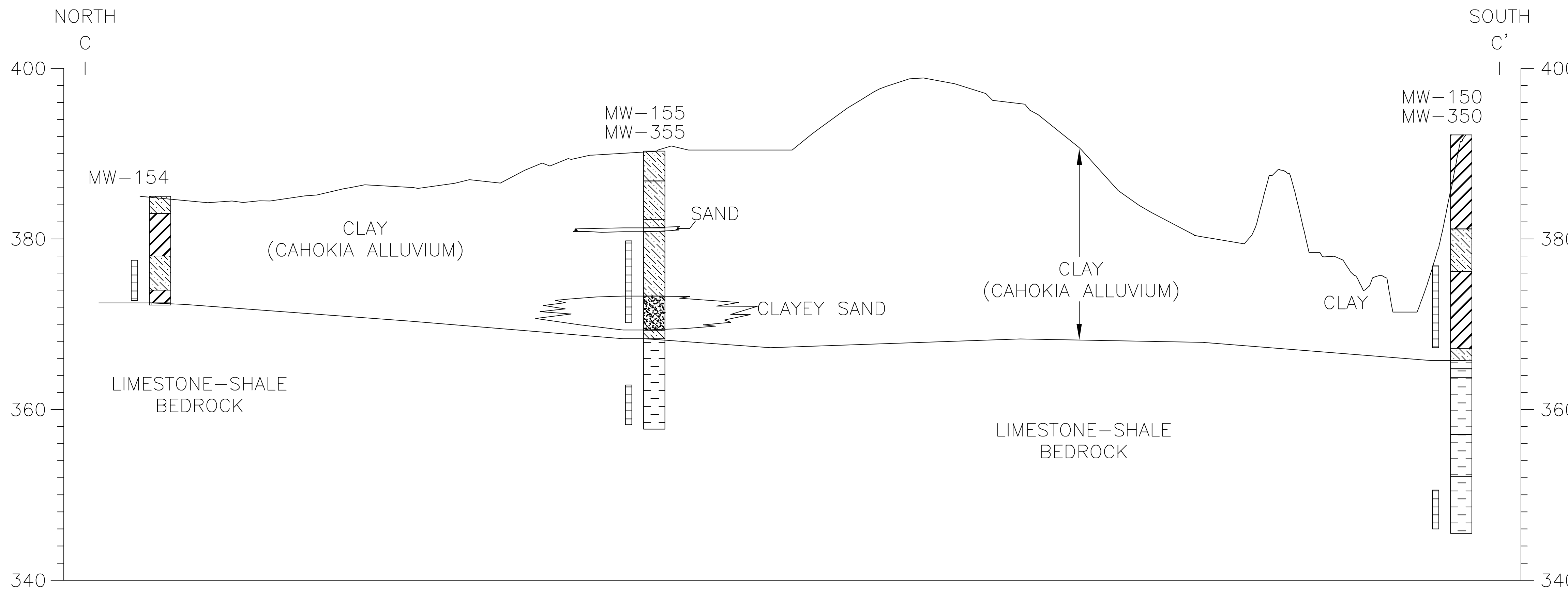

LEGEND

WELL SCREEN INTERVAL

FILL

CLAY, CL

CLAY, CH

SAND, SP/SM/SW

SHALE

SILT, ML

COAL COMBUSTION RESIDUALS, CCRs

NOTE: This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

0 150 300
FEET
(HORIZONTAL SCALE IS APPROXIMATE)

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TDC 5/15/14
REVIEWED BY/DATE:
SJC 5/16/14
APPROVED BY/DATE:
SJC 6/9/14

GEOLOGIC CROSS SECTION C-C'

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 8C

NATURAL RESOURCE TECHNOLOGY

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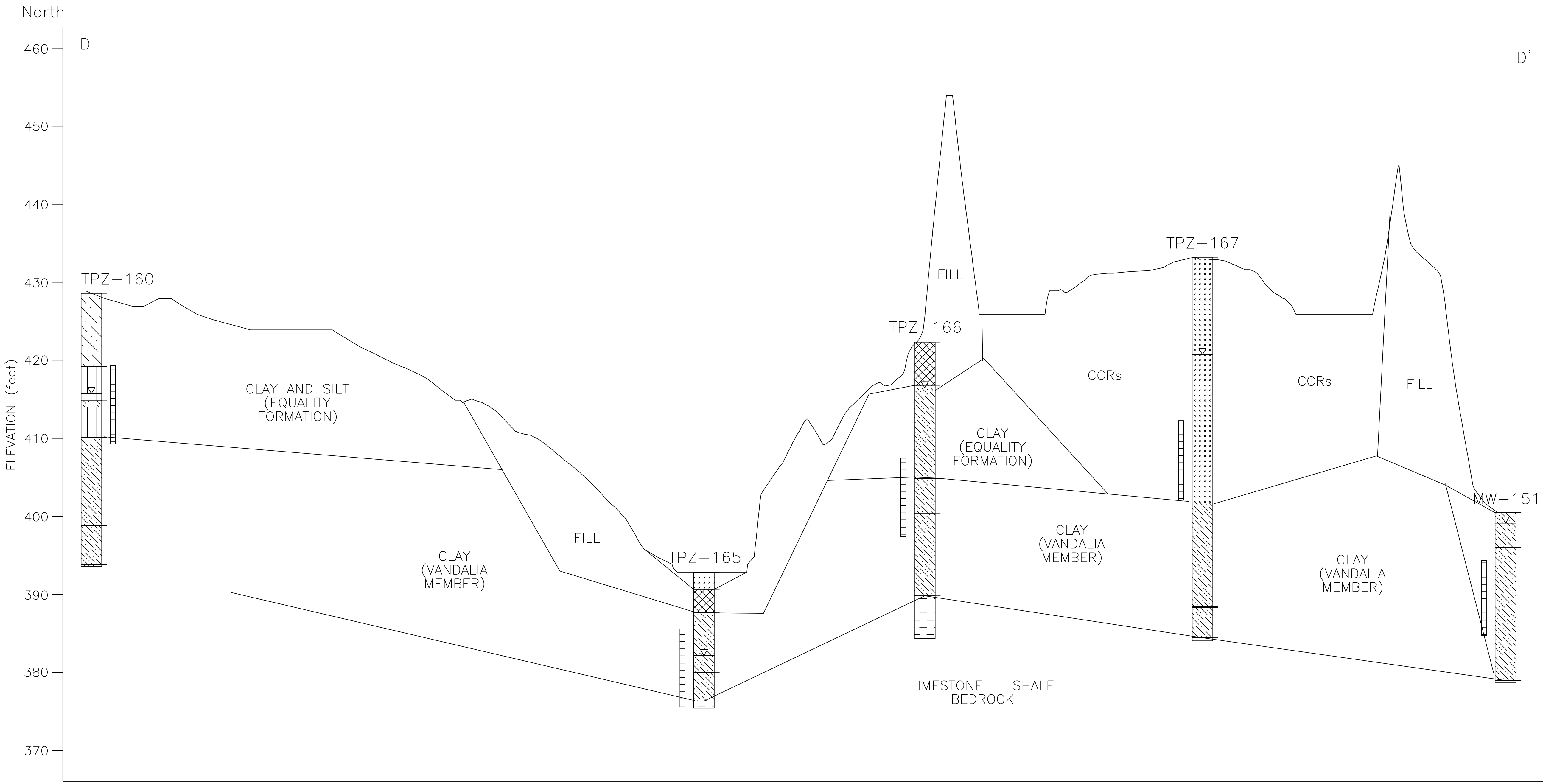

LEGEND

WELL SCREEN INTERVAL

FILL

CLAY, CL

CLAY, CH

SAND, SP/SM/SW

SHALE

SILT, ML

COAL COMBUSTION RESIDUALS, CCRs

NOTE: This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

0 200 400

FEET

(HORIZONTAL SCALE IS APPROXIMATE)

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APPROVED BY/DATE: SJC 6/9/14

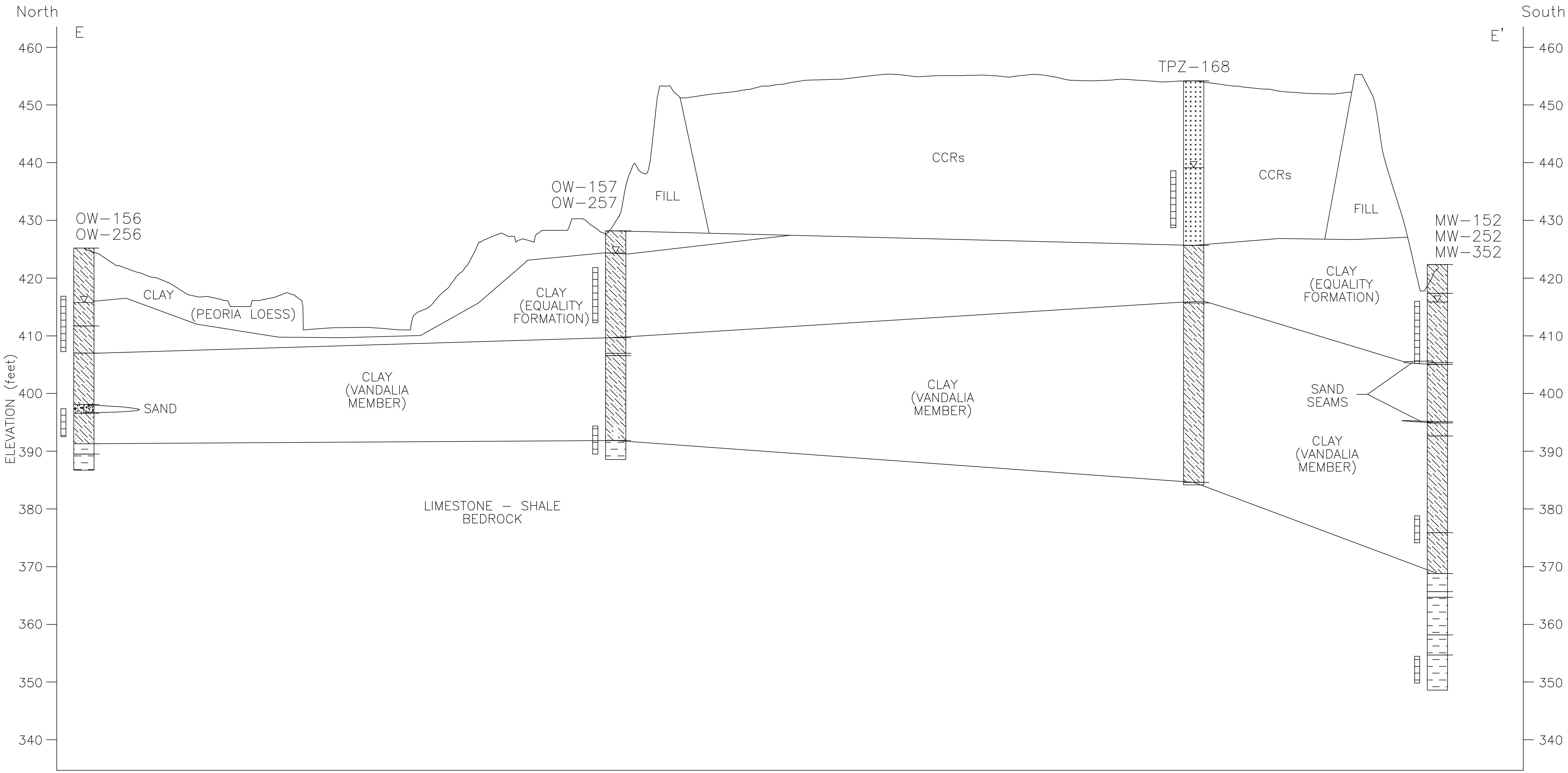
GEOLOGIC CROSS SECTION D-D'

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 8D

NATURAL RESOURCE TECHNOLOGY



LEGEND

- WELL SCREEN INTERVAL
- FILL
- SAND, SP/SM/SW
- COAL COMBUSTION RESIDUALS, CCRs
- CLAY, CL
- SHALE
- CLAY, CH
- SILT, ML

NOTE: This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

0 200 400
FEET
(HORIZONTAL SCALE IS APPROXIMATE)

DRAWN BY/DATE: TDC 5/15/14
REVIEWED BY/DATE: SJC 5/16/14
APPROVED BY/DATE: SJC 6/9/14

GEOLOGIC CROSS SECTION E-E'

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 8E

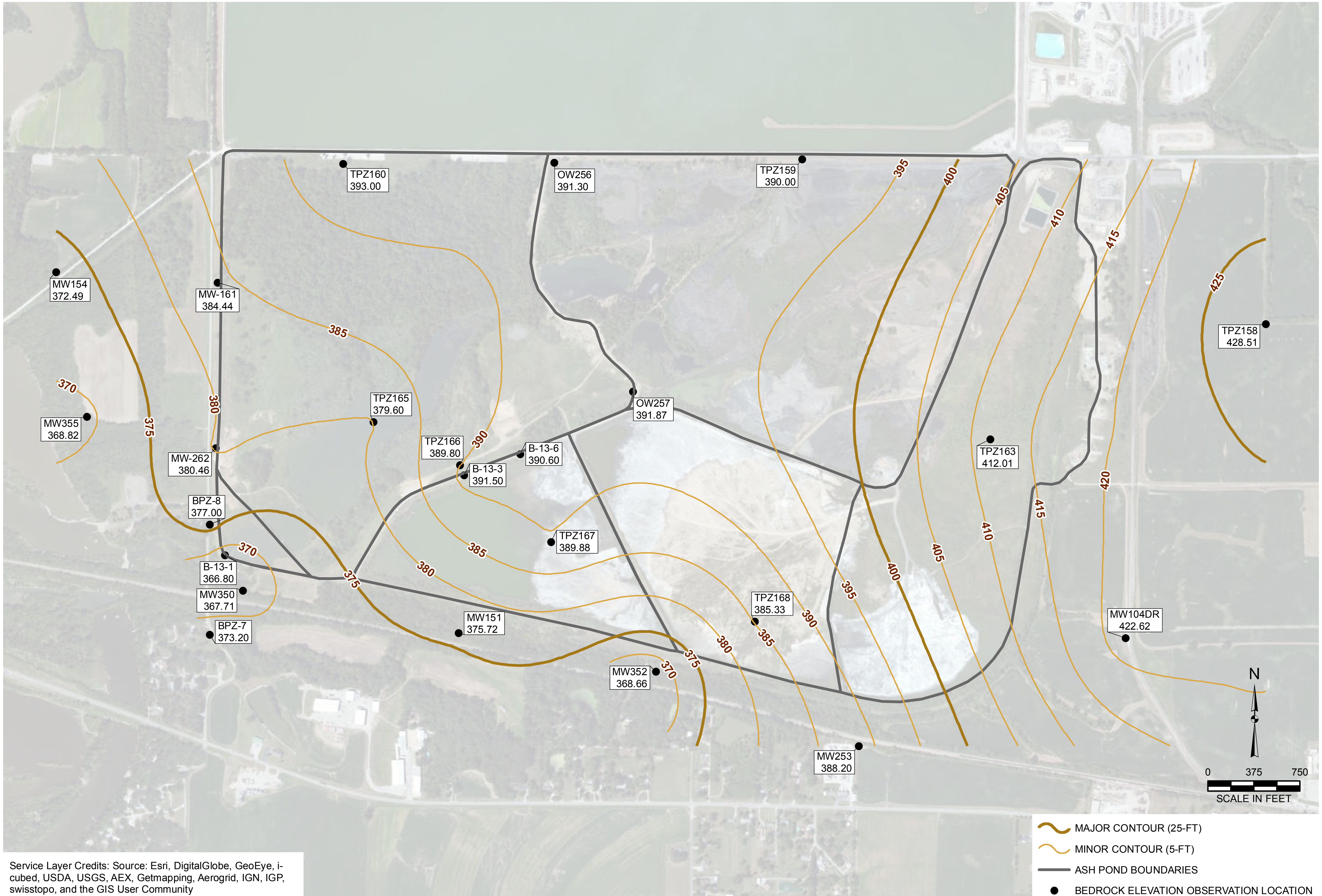
NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 8_Geologic Cross Section.mxd Author: tcushman; Date/Time: 5/16/2014, 10:18:13 AM

BEDROCK TOPOGRAPHY

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

DRAWN BY/DATE:
TDC 4/10/14
REVIEWED BY/DATE:
SJC 4/27/14
APPROVED BY/DATE:
SJC 6/9/14



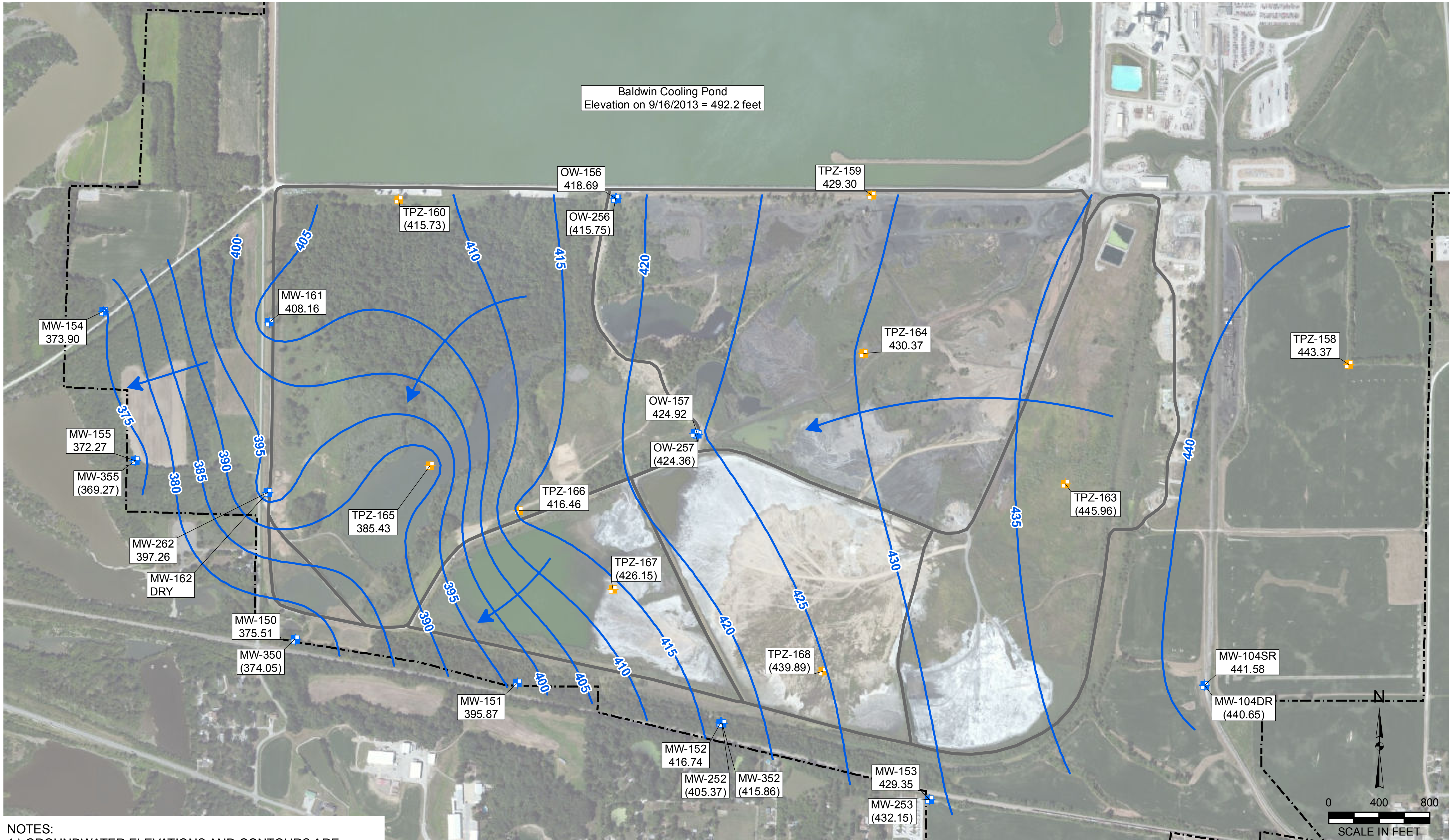
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

PROJECT NO: 2189

FIGURE NO: 9

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 9_Bedrock Topography.mxd Author: tcushman; Date/Time: 6/10/2014, 9:23:44 AM



NOTES:
1.) GROUNDWATER ELEVATIONS AND CONTOURS ARE MEASURED IN FEET RELATIVE TO NAVD88.
2.) GROUNDWATER ELEVATIONS ARE BASED ON WATER LEVELS MEASURED ON SEPTEMBER 16-17, 2013.
3.) GROUNDWATER ELEVATIONS ENCLOSED IN PARENTHESES WERE NOT USED FOR CONTOURING.

SERVICE LAYER CREDITS: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
MONITORING WELL LOCATION
PIEZOMETER WELL LOCATION
ASH POND BOUNDARIES
PROPERTY BOUNDARY

DRAWN BY/DATE: TDC 5/1/14
REVIEWED BY/DATE: SJC 5/13/14
APPROVED BY/DATE: SJC 6/9/14

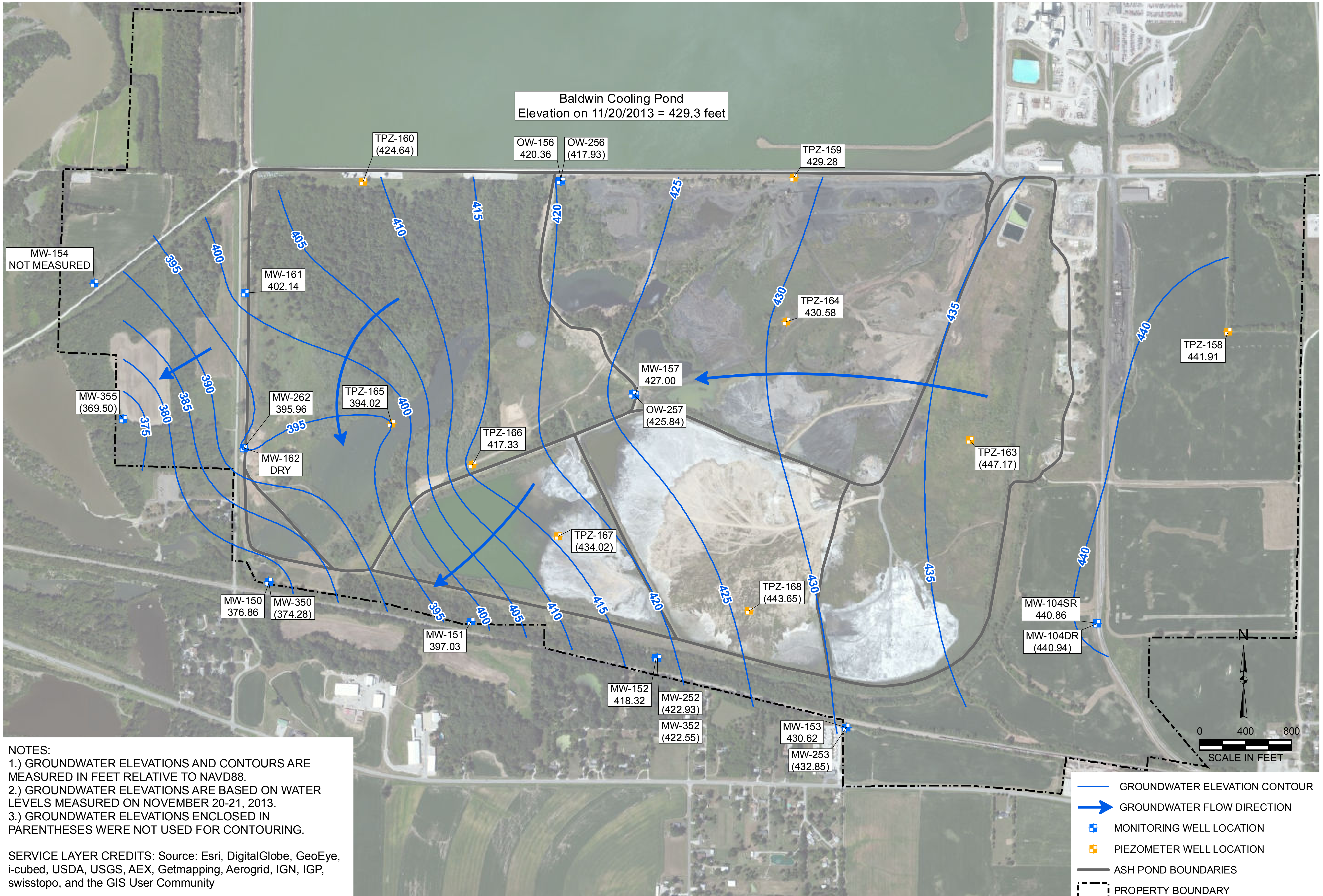
POTENTIOMETRIC SURFACE IN THE UNLITHIFIED DEPOSITS – SEPTEMBER 2013

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 10A

NATURAL RESOURCE TECHNOLOGY



NOTES:
1.) GROUNDWATER ELEVATIONS AND CONTOURS ARE MEASURED IN FEET RELATIVE TO NAVD88.
2.) GROUNDWATER ELEVATIONS ARE BASED ON WATER LEVELS MEASURED ON NOVEMBER 20-21, 2013.
3.) GROUNDWATER ELEVATIONS ENCLOSED IN PARENTHESES WERE NOT USED FOR CONTOURING.

SERVICE LAYER CREDITS: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DRAWN BY/DATE:
TDC 5/1/14
REVIEWED BY/DATE:
SJC 5/13/14
APPROVED BY/DATE:
SJC 6/9/14

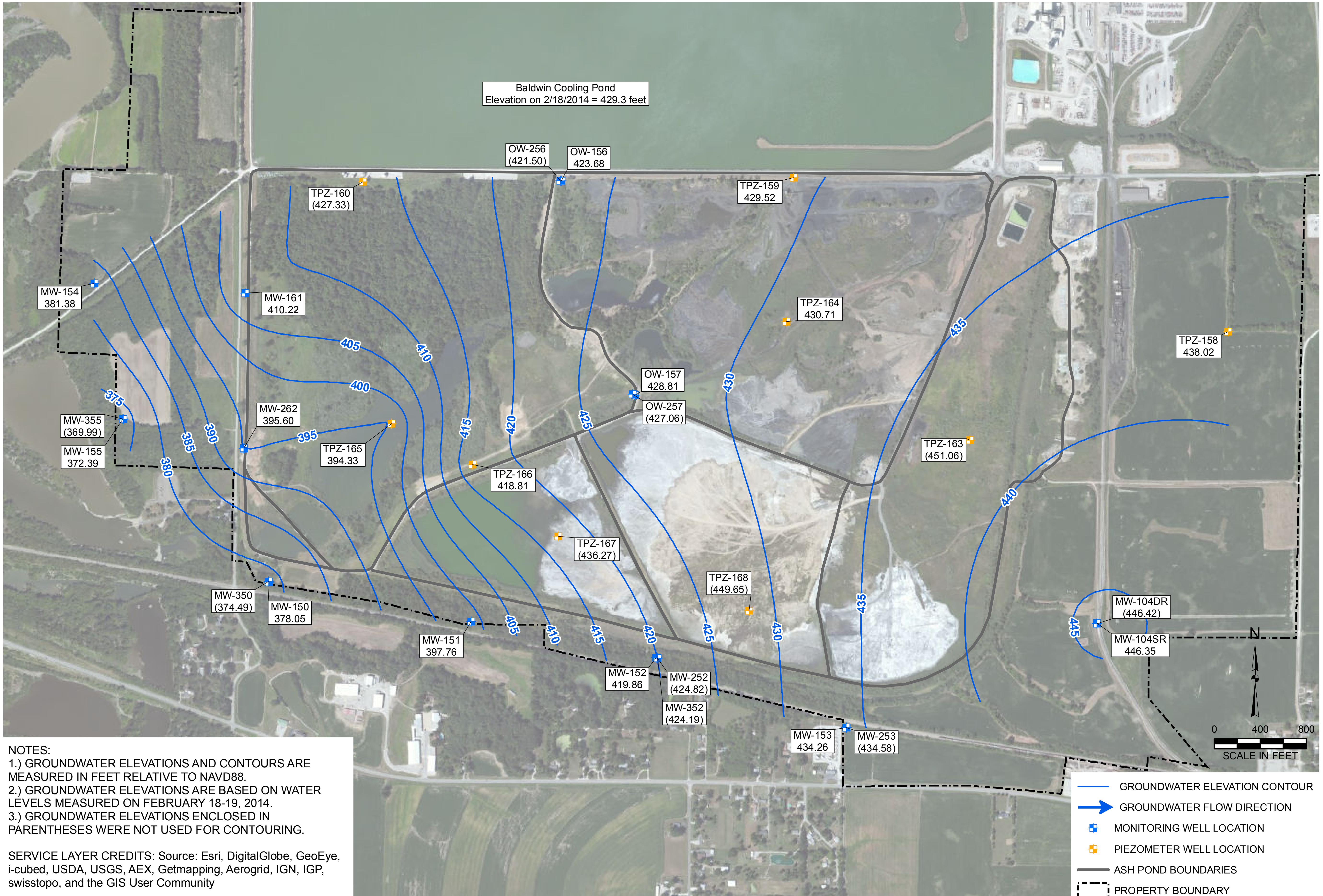
POTENTIOMETRIC SURFACE IN THE UNLITHIFIED DEPOSITS – NOVEMBER 2013

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 10B

NATURAL RESOURCE TECHNOLOGY



NOTES:
1.) GROUNDWATER ELEVATIONS AND CONTOURS ARE MEASURED IN FEET RELATIVE TO NAVD88.
2.) GROUNDWATER ELEVATIONS ARE BASED ON WATER LEVELS MEASURED ON FEBRUARY 18-19, 2014.
3.) GROUNDWATER ELEVATIONS ENCLOSED IN PARENTHESES WERE NOT USED FOR CONTOURING.

SERVICE LAYER CREDITS: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DRAWN BY/DATE: TDC 5/1/14
REVIEWED BY/DATE: SJC 5/13/14
APPROVED BY/DATE: SJC 6/9/14

POTENTIOMETRIC SURFACE IN THE UNLITHIFIED DEPOSITS – FEBRUARY 2014

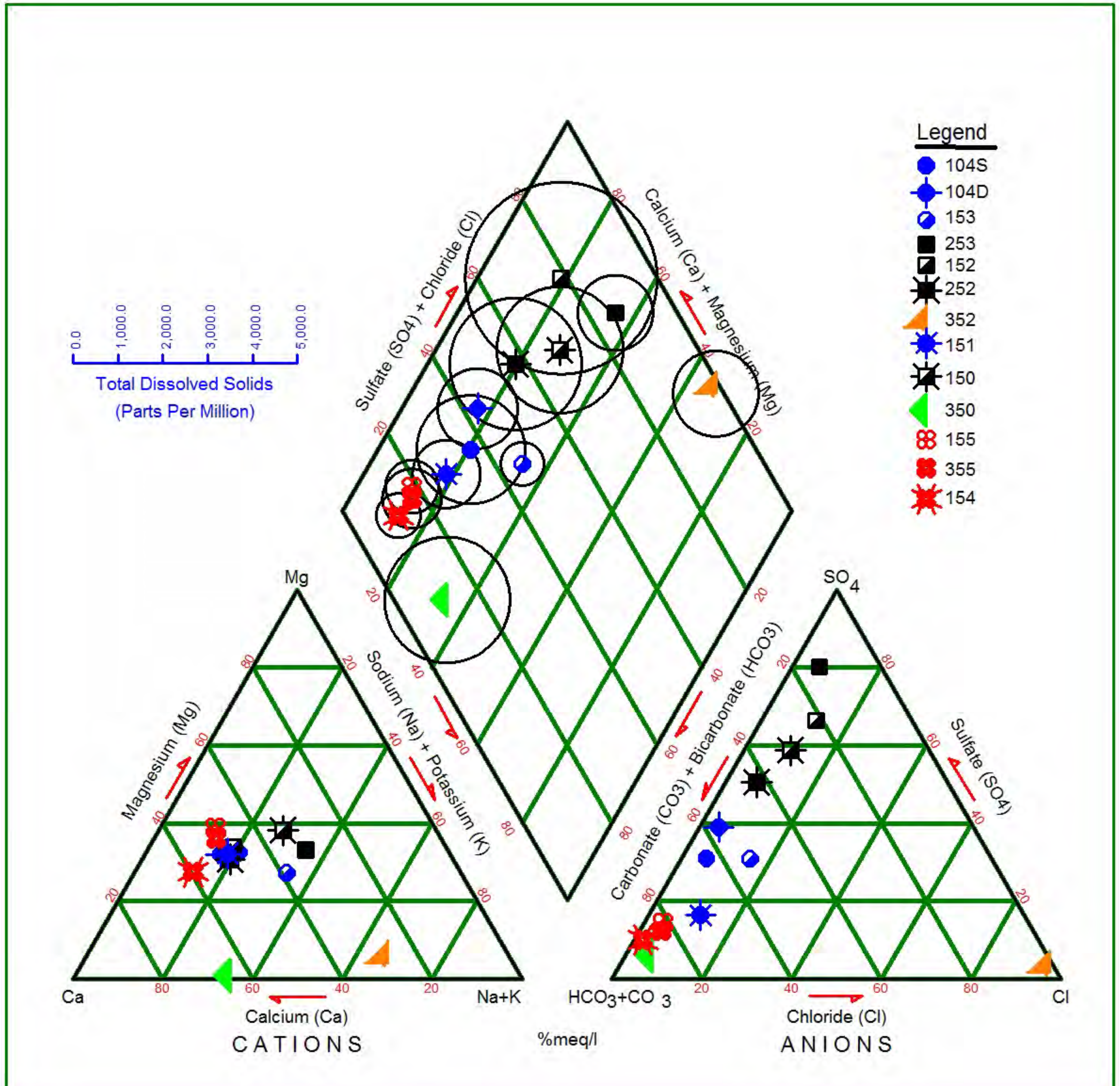
GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 10C

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 10C_Potentiometric Surface in the Unlithified Deposits_Feb 2014.mxd Author: tcushman; Date/Time: 6/10/2014, 9:36:53 AM



DRAWN BY/DATE: TDC 4/30/14
REVIEWED BY/DATE: SJC 4/27/14
APPROVED BY/DATE: SJC 6/9/14

PIPER DIAGRAM OF MAJOR ION CHEMISTRY IN GROUNDWATER

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 11

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 11-12_Piper-Stiff Diagrams.mxd Author: tcushman; Date/Time: 5/15/2014, 9:47:11 AM

mg/L = Milligrams per Liter

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DRAWN BY/DATE:
MDM 5/12/14
REVIEWED BY/DATE:
SJC 5/13/14
APPROVED BY/DATE:
SJC 6/9/14

BORON CONCENTRATION MAP - NOVEMBER 2013

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 12A

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12A_Boron Concentration Map Nov 2013.mxd Author: tcushman; Date/Time: 6/10/2014 9:40:41 AM

mg/L = Milligrams per Liter

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

- LOCATION WITH NO BORON ANALYTICAL EXCEEDANCE
- LOCATION WITH BORON ANALYTICAL EXCEEDANCE
- LEACHATE WELL
- ASH POND BOUNDARIES
- PROPERTY BOUNDARY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12B_Boron Concentration Map Feb 2014.mxd Author: tcushman; Date/Time: 6/10/2014, 9:41:35 AM

DRAWN BY/DATE:
MDM 5/12/14
REVIEWED BY/DATE:
SJC 5/13/14
APPROVED BY/DATE:
SJC 6/9/14

BORON CONCENTRATION MAP - FEBRUARY 2014

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 12B

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12C_Sulfate Concentration Map Dec 2013.mxd Author: tcushman; Date/Time: 6/10/2014, 9:42:32 AM

DRAWN BY/DATE:
MDM 5/12/14
REVIEWED BY/DATE:
SJC 5/13/14
APPROVED BY/DATE:
SJC 6/9/14

SULFATE CONCENTRATION MAP - NOVEMBER 2013

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 12C

NATURAL RESOURCE TECHNOLOGY

SULFATE CONCENTRATION MAP - FEBRUARY 2014

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

DRAWN BY/DATE:
MDM 5/12/14
REVIEWED BY/DATE:
SJC 5/13/14
APPROVED BY/DATE:
SJC 6/9/14

PROJECT NO: 2189

FIGURE NO: 12D

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12D_Sulfate Concentration Map Feb 2014.mxd Author: tcushman; Date/Time: 6/10/2014, 9:43:16 AM

mg/L = Milligrams per Liter

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REVIEWED BY/DATE: SJC 5/13/14
APPROVED BY/DATE: SJC 6/9/14

TDS CONCENTRATION MAP - NOVEMBER 2013

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 12E

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12E_TDS Concentration Map nOV 2013.mxd Author: tcushman; Date/Time: 6/10/2014, 9:44:02 AM

mg/L = Milligrams per Liter

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DRAWN BY/DATE: MDM 5/12/14
REVIEWED BY/DATE: SJC 5/13/14
APPROVED BY/DATE: SJC 6/9/14

TDS CONCENTRATION MAP - FEBRUARY 2014

GROUNDWATER QUALITY ASSESSMENT AND PHASE II HYDROGEOLOGIC INVESTIGATION
BALDWIN ASH POND SYSTEM, BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD BALDWIN, ILLINOIS 62217

PROJECT NO: 2189

FIGURE NO: 12F

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\21\2189\MXD\HydroGeo_Rpt\Figure 12F_TDS Concentration Map Feb 2014.mxd Author: toushman; Date/Time: 6/10/2014, 9:44:39 AM

TABLES

Table 1. Monitoring Well Construction Details

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, IL

Well Number	Year Constructed	Driller	Gradient Position[1]	Well Top Elevation	Ground Elevation	Screen Top Depth (BGS)	Screen Bottom Depth (BGS)	Screen Top Elevation	Screen Bottom Elevation	Bottom of Boring Elevation	Slotted Screen Length	Screen Diameter (Inches)	Well Depth from Ground Surface	Well Depth from Top of Casing	Total Boring Depth	Monitored Hydrogeologic Unit
MW-104S[A]	Nov 1990	Burlington	u	455.27	452.69	4.86	14.86	447.83	437.83	438	10.00	2.0	14.86	17.44	15.0	2
MW-104D[A]	Nov 1990	Burlington	u	455.29	452.85	19.38	29.38	433.47	423.47	418	10.00	2.0	29.38	31.85	35.0	2
MW-154	Sept 2010	Terra Drill	d	387.76	384.99	7.52	12.15	377.47	372.84	372.24	4.63	2.0	12.66	15.43	12.8	2
MW-155	Sept 2010	Terra Drill	d	393.55	390.62	10.30	19.94	380.32	370.68	370.17	9.64	2.0	20.45	23.38	20.5	2
MW-355	Sept 2010	Terra Drill	d	393.69	390.82	27.40	32.03	363.42	358.79	358.28	4.63	2.0	32.54	35.41	32.6	3
MW-150	Sept 2010	Terra Drill	d	396.54	393.84	15.02	24.66	378.82	369.18	368.67	9.64	2.0	25.17	27.87	25.2	2
MW-350	Sept 2010	Terra Drill	d	396.80	394.11	41.59	46.22	352.52	347.89	347.38	4.63	2.0	46.62	49.31	46.7	3
MW-151	Sept 2010	Terra Drill	d	399.96	397.22	6.14	15.78	391.08	381.44	375.72	9.64	2.0	16.29	19.03	21.5	2
MW-152	Sept 2010	Terra Drill	d	424.99	422.18	7.46	16.71	415.11	405.47	404.48	9.64	2.0	17.22	20.03	17.7	2
MW-252	Sept 2010	Terra Drill	d	425.07	422.27	44.40	49.03	377.87	373.24	372.73	4.63	2.0	49.54	52.34	49.5	3
MW-352	Sept 2010	Terra Drill	d	425.04	422.36	67.90	72.53	354.46	349.83	348.56	4.63	2.0	73.04	75.72	73.8	3
MW-153	Sept 2010	Terra Drill	d	445.67	442.77	10.35	19.99	432.42	422.78	422.27	9.64	2.0	20.50	23.40	20.5	2
MW-253	Sept 2010	Terra Drill	d	445.84	442.70	29.86	34.49	412.84	408.21	407.70	4.63	2.0	35.04	38.18	35.0	2
MW-104SR	July 2011	Terra Drill	u	455.54	452.52	4.76	14.78	447.76	437.74	437.52	9.40	2.0	15.00	18.02	15.0	2
MW-104DR	July 2011	Terra Drill	u	455.62	452.62	23.18	28.23	429.44	424.39	417.62	4.52	2.0	28.45	31.45	35.0	2
OW-156	Sept 2010	Terra Drill	m	427.87	425.14	7.88	17.21	417.26	407.93	407.42	9.33	2.0	17.70	20.43	17.7	2
OW-157	Sept 2010	Terra Drill	m	432.64	429.90	7.80	17.13	422.10	412.77	412.26	9.33	2.0	17.64	20.38	17.6	2
MW-161	Aug 2013	Bulldog Drilling	d	431.27	428.74	23.33	32.78	405.41	395.96	384.0	9.45	2.0	33.35	35.88	44.7	2
MW-162	Aug 2013	Bulldog Drilling	d	433.20	430.83	15.88	25.33	414.95	405.50	404.9	9.45	2.0	25.90	28.27	25.9	2
MW-262	Aug 2013	Bulldog Drilling	d	433.21	430.86	42.13	46.63	388.73	384.23	379.9	4.50	2.0	47.21	49.56	51.0	2
OW-256	Aug 2013	Bulldog Drilling	m	427.70	425.20	27.99	32.49	397.21	392.71	389.2	4.50	2.0	33.07	35.57	36.0	2
OW-257	Aug 2013	Bulldog Drilling	m	431.02	428.17	33.98	38.48	394.19	389.69	388.6	4.50	2.0	39.06	41.91	39.6	2
TPZ-158	Aug 2013	Bulldog Drilling	u	456.26	453.26	9.22	18.28	444.04	434.98	434.3	9.06	1.25	18.86	21.86	19.0	2
TPZ-159	Aug 2013	Bulldog Drilling	m	447.64	444.69	19.95	29.01	424.74	415.68	394.7	9.06	1.25	29.59	32.54	50.0	2
TPZ-160	Aug 2013	Bulldog Drilling	m	431.49	428.59	9.76	18.82	418.83	409.77	393.6	9.06	1.25	19.40	22.30	35.0	2
TPZ-163	Aug 2013	Bulldog Drilling	m	458.41	455.51	8.63	18.13	446.88	437.38	410.5	9.50	2.0	18.68	21.58	45.0	1
TPZ-164	Aug 2013	Bulldog Drilling	m	435.10	432.50	5.18	9.68	427.32	422.82	422.2	4.50	2.0	10.26	12.86	10.3	1
TPZ-165	Aug 2013	Bulldog Drilling	m	398.85	396.10	7.76	16.82	388.34	379.28	378.7	9.06	1.25	17.40	20.15	17.4	1 / 2
TPZ-166	Aug 2013	Bulldog Drilling	m	425.18	422.33	15.25	24.70	407.08	397.63	396.8	9.45	2.0	25.27	28.12	25.5	2
TPZ-167	Aug 2013	Bulldog Drilling	m	441.38	438.63	21.44	30.94	417.19	407.69	389.9	9.50	2.0	31.51	34.26	48.8	1
TPZ-168	Aug 2013	Bulldog Drilling	m	457.53	454.93	15.76	25.26	439.17	429.67	384.9	9.50	2.0	25.81	28.41	70.0	1

Notes:

All depth and elevation measurements are in feet. Elevations as measured at time of installation.

[1] u = upgradient, d = downgradient, m = midgradient, L = leachate well screened within coal combustion waste

[A] Sealed and abandoned on 7/26/11 in accordance with regulations of the Illinois Department of Public Health (IDPH).

All wells constructed with 10-slot pre-pack screens except for OW156, OW157, MW-161, MW-162, and TPZ-166.

Bulldog Drilling — Bulldog Drilling, LLC
Burlington — Burlington Environmental, Inc.
Terra Drill — Terra Drill, Inc.

Table 2. Groundwater, Leachate, and Surface-Water Levels and Elevations

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex, Baldwin, Illinois

Monitoring Well, Piezometer and Surface Water Points	Ground Surface Elevation (feet NGVD)	Measuring Point Elevation (feet NGVD)	Gradient Position[1]	State Planar Coordinate Location (feet)		Location		Groundwater or Leachate Depth (feet below LS)			Groundwater or Leachate Elevation (feet NGVD)		
				Lambert X	Lambert Y	Latitude	Longitude	9/16-17/2013	11/20-21/2013	02/18-19/2014	9/16-17/2013	11/20-21/2013	02/18-19/2014
MW-104SR	452.52	455.54	u	2386609	554205	38°11'18.07"N	89°51'12.37"W	10.94	11.66	6.17	441.58	440.86	446.35
MW-104DR	452.62	455.62	u	2386609	554201	38°11'18.03"N	89°51'12.37"W	11.97	11.68	6.20	440.65	440.94	446.42
MW-150	393.84	396.54	d	2379413	554563	38°11'21.85"N	89°52'42.49"W	18.33	16.98	15.79	375.51	376.86	378.05
MW-350	394.11	396.80	d	2379410	554568	38°11'21.90"N	89°52'42.52"W	20.06	19.83	19.62	374.05	374.28	374.49
MW-151	397.22	399.96	d	2381171	554221	38°11'18.42"N	89°52'20.47"W	1.35	0.19	-0.54	395.87	397.03	397.76
MW-152	422.18	424.99	d	2382779	553906	38°11'15.25"N	89°52'00.35"W	5.44	3.86	2.32	416.74	418.32	419.86
MW-252	422.27	425.07	d	2382784	553904	38°11'15.23"N	89°52'00.28"W	16.90	-0.66	-2.55	405.37	422.93	424.82
MW-352	422.36	425.04	d	2382789	553901	38°11'15.19"N	89°52'00.23"W	6.50	-0.19	-1.83	415.86	422.55	424.19
MW-153	442.77	445.67	d	2384435	553298	38°11'09.18"N	89°51'39.64"W	13.42	12.15	8.51	429.35	430.62	434.26
MW-253	442.70	445.84	d	2384430	553298	38°11'09.19"N	89°51'39.69"W	10.55	9.85	8.12	432.15	432.85	434.58
MW-154	384.99	387.76	d	2377892	557163	38°11'47.60"N	89°53'01.44"W	11.09	>15.43 (dry)	3.61	373.90	below 372.33	381.38
MW-155	390.62	393.55	d	2378141	555983	38°11'35.93"N	89°52'58.36"W	18.35	>23.38 (dry)	18.23	372.27	below 370.17	372.39
MW-355	390.82	393.69	d	2378145	555980	38°11'35.91"N	89°52'58.33"W	21.55	21.32	20.83	369.27	369.50	369.99
OW-156	425.14	427.87	m	2381953	558055	38°11'56.29"N	89°52'10.53"W	6.45	4.78	1.46	418.69	420.36	423.68
OW-256	425.20	427.70	m	2381947	558054	38°11'56.28"N	89°52'10.60"W	9.45	7.27	3.70	415.75	417.93	421.50
OW-157	429.90	432.64	m	2382593	556189	38°11'37.82"N	89°52'02.58"W	4.98	2.90	1.09	424.92	427.00	428.81
OW-257	428.17	431.02	m	2382572	556198	38°11'37.91"N	89°52'02.84"W	3.81	2.33	1.11	424.36	425.84	427.06
MW-161	428.74	431.27	d	2379206	557078	38°11'46.71"N	89°52'44.97"W	20.58	26.60	18.52	408.16	402.14	410.22
MW-162	430.83	433.20	d	2379193	555725	38°11'33.34"N	89°52'45.19"W	>25.90 (dry)	>25.90 (dry)	>25.90 (dry)	below 404.93	below 404.93	below 404.93
MW-262	430.86	433.21	d	2379193	555729	38°11'33.38"N	89°52'45.19"W	33.60	34.90	35.26	397.26	395.96	395.60
TPZ-158	453.26	456.26	u	2387752	556741	38°11'43.11"N	89°50'57.95"W	9.89	11.35	15.24	443.37	441.91	438.02
TPZ-159	444.69	447.64	m	2383974	558081	38°11'56.48"N	89°51'45.21"W	15.39	15.41	15.17	429.30	429.28	429.52
TPZ-160	428.59	431.49	m	2380230	558046	38°11'56.26"N	89°52'32.11"W	12.86	3.95	1.26	415.73	424.64	427.33
TPZ-163 [L]	455.51	458.41	m	2385507	555798	38°11'33.86"N	89°51'26.10"W	9.55	8.34	4.45	445.96	447.17	451.06
TPZ-164 [L]	432.50	435.10	m	2383909	556829	38°11'44.11"N	89°51'46.07"W	2.13	1.92	1.79	430.37	430.58	430.71
TPZ-165 [L]	396.10	398.85	m	2380478	555940	38°11'35.43"N	89°52'29.08"W	10.67	2.08	1.77	385.43	394.02	394.33
TPZ-166	422.33	425.18	m	2381183	555587	38°11'31.92"N	89°52'20.27"W	5.87	5.00	3.52	416.46	417.33	418.81
TPZ-167 [L]	438.63	441.38	m	2381925	554963	38°11'25.72"N	89°52'11.00"W	12.48	4.61	2.36	426.15	434.02	436.27
TPZ-168 [L]	454.93	457.53	m	2383585	554314	38°11'19.25"N	89°51'50.24"W	15.04	11.28	5.28	439.89	443.65	449.65
Baldwin Lake	na	na	na	na	na	na	na	na	na	na	429.2[2]	429.3[3]	429.3[4]

Notes:
All depth and elevation measurements are in feet.

1	u = upgradient, d = downgradient, m = midgradient
2, 3, 4	As measured on September 16, 2013; November 20, 2013; February 18, 2014.
L	Piezometers measuring leachate depths and elevations.
na	Not Applicable.
LS	Land Surface.
- (negative)	Indicates groundwater level is above ground surface.
(shaded box)	Reported water level either not static, erroneously measured, or mis-transcribed.

Table 3. Field and Laboratory Groundwater Monitoring Parameters

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Field Parameters			**Analysis Method Phase I**	**Analysis Method Phase II**
Groundwater Elevation		in-situ	Electronic Water Level Indicator	Electronic Water Level Indicator
pH, Field	1	in-situ	SM 21st ed. 4500-H^+	SW-846 9040B
Specific Conductance, Field		in-situ	SM 21st ed. 2520-B	SW-846-9050A
Temperature, Field		in-situ	SM 21st ed. 2550 B	SM 21st ed. 2550 B
General Chemistry Parameters			**Analysis Method Phase I**	**Analysis Method Phase II**
Alkalinity, total (CaCO3)	2	dissolved	EPA 310.1	- -
Chloride	1	dissolved	ASTM 4500-D	SW-846 9251
Total Cyanide	1	total	SW-846 9012A	- -
Fluoride	1	dissolved	EPA Method 74	- -
Nitrate as N	1	dissolved	SM 21st ed. 4500-NO_3 E	- -
Sulfate	1	dissolved	SM 21st ed. 4500-SO_4 E	SW-846 9036
Total Dissolved Solids	1	dissolved	SM 21st ed 2540 C	SM 21st ed 2540 C
METALS[3]			**Analysis Method Phase I**	**Analysis Method Phase II**
Antimony	1	dissolved	EPA Method 200.7	- -
Arsenic	1	dissolved	EPA Method 200.7	- -
Barium	1	dissolved	EPA Method 200.7	- -
Beryllium	1	dissolved	EPA Method 200.7	- -
Boron	1	dissolved	EPA Method 200.7	SW-846 3005A, 6010B by ICP
Cadmium	1	dissolved	EPA Method 200.7	- -
Calcium	2	dissolved	EPA Method 200.7	- -
Chromium	1	dissolved	EPA Method 200.7	- -
Cobalt	1	dissolved	EPA Method 200.7	- -
Copper	1	dissolved	EPA Method 200.7	- -
Iron	1	dissolved	EPA Method 200.7	SW-846 3005A, 6010B by ICP
Lead	1	dissolved	EPA Method 200.7	- -
Magnesium	2	dissolved	EPA Method 200.7	- -
Manganese	1	dissolved	EPA Method 200.7	SW-846 3005A, 6010B by ICP
Mercury	1	dissolved	EPA Method 200.7	- -
Nickel	1	dissolved	EPA Method 200.7	- -
Potassium	2	dissolved	EPA Method 200.7	- -
Selenium	1	dissolved	EPA Method 200.7	- -
Silver	1	dissolved	EPA Method 200.7	- -
Sodium	2	dissolved	EPA Method 200.7	- -
Thallium	1	dissolved	EPA Method 200.7	- -
Zinc	1	dissolved	EPA Method 200.7	- -

Notes:
- - parameter not analyzed for the Phase II groundwater quality assessment and hydrogeologic investigation.
[1] Groundwater quality parameters for Class I: Potable Resource Groundwater
(IAC 35 Part 620 Section 410).
[2] Supplemental groundwater parameters for major anion and cation analyses.
Quarter 1, 2011 - Q4, 2012.
[3] Samples field filtered through a 0.45 micron filter.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW104S/SR						MW104D/DR					
Date				11/16/10	03/23/11	06/07/11	09/13/11	12/08/11	03/08/12	11/16/10	03/23/11	06/07/11	09/13/11	12/08/11	03/08/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	6.58	6.55	6.50	**6.44**	6.90	6.88	6.98	7.01	6.88	6.71	6.79	7.65
Elevation		ft.	- -	441.47	448.10	446.22	441.89	447.06	446.65	441.54	448.04	446.24	441.66	446.78	446.36
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	1,550	1,142	1,290	1,286	1,405	1,521	1,226	1,176	1,213	1,164	1,127	1,094
Temp-field	SM 21st ed. 2550	C°	ns	11.79	15.9	21.8	19.9	12.28	10.1	14.96	16.7	16.8	16.0	13.74	11.3
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	148	169	114	164	237	140	245	241	250	225	222	214
Chloride (d)	ASTM D512-04 C	mg/L	200.0	33.7	56	59	32	31	34	15.7	17	19	18	18	24
Fluoride (d)	EPA method 74	mg/L	4.0	0.629	0.40	0.56	0.54	0.523	0.549	0.469	0.422	0.379	0.370	0.400	0.310
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	<0.050	<0.050	0.067	0.37	0.14	0.09	0.0697	0.067	<0.050	0.071	0.060	0.550
TDS	SM 21st ed 2540 C	mg/L	1200	943	742	824	909	965	886	785	801	776	768	739	724
Alkalinity (t)	EPA 375.4	mg/L	ns	------	446	550	654	616	700	------	406	404	418	410	416
Cyanide (t)	SW-846 9012A	mg/L	0.2	<0.007	<0.007	<0.008	<0.007	<0.007	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.008
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	0.032	0.0082	0.012	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.15	0.090	0.24	0.059	0.076	0.097	0.03	0.031	0.033	0.042	0.038	0.035
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	0.16	0.15	0.22	<0.050	<0.050	0.060	<0.02	0.021	0.019	<0.050	<0.050	<0.050
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	106	121	157	167	168	------	143	134	134	137	145
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	**18**	1.9	**14**	0.080	0.19	0.61	<0.010	<0.010	<0.010	0.024	0.025	0.011
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	42	46	65	70	77	------	58	58	49	52	58
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	**6.8**	**3.0**	**4.0**	**1.2**	**1.1**	**1.9**	0.02	0.040	0.013	**0.42**	**0.28**	**0.21**
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	<1.0	1.8	<1.0	<1.0	<1.0	------	<1.0	<1.0	2.2	1.5	1.3
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	104	105	92	84	85	------	63	58	58	51	56
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	0.009	<0.005	0.0093	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. Available upon request.

(d) dissolved
(t) total
- - Not applicable.
- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.
ns No standard.

[shaded] Major Ion Parameter for geochemical analysis.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW150						MW350					
Date				11/15/10	03/22/11	06/07/11	09/13/11	12/07/11	03/07/12	11/15/10	03/22/11	06/07/11	09/13/11	12/07/11	03/07/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	7.27	7.34	7.11	7.22	7.07	7.33	12.24	11.67	12.19	12.14	12.59	12.94
Elevation		ft.	- -	337.11	380.04	380.44	376.01	379.00	378.74	372.52	375.84	379.37	374.3	374.62	374.40
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	1,467	1,681	1,910	1,620	1,744	1,704	629	1,268	5,144	4,508	5,529	7,057
Temp-field	SM 21st ed. 2550	C°	ns	13.52	15.3	16.7	14.4	13.11	16.1	11.43	18.7	16.4	18.4	7.02	14.0
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	507	555	696	513	585	584	53.7	30	43	46	41	62
Chloride (d)	ASTM D512-04 C	mg/L	200.0	65.4	65	58	66	77	69	21.4	27	26	34	31	32
Fluoride (d)	EPA method 74	mg/L	4.0	0.826	0.841	0.791	0.860	0.865	0.798	0.510	0.460	0.365	0.330	0.289	0.174
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	<0.050	0.057	0.058	0.054	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TDS	SM 21st ed 2540 C	mg/L	1200	1,133	1,205	1,396	1,162	1,278	1,334	375	885	1,257	1,196	1,423	1,709
Alkalinity (t)	EPA 375.4	mg/L	ns	------	378	370	376	390	388	------	307	561	505	778	808
Cyanide (t)	SW-846 9012A	mg/L	0.2	<0.007	<0.008	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.008	<0.007	<0.007	<0.007
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.007	0.008
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	0.005	0.0060	<0.005	<0.005	0.005	<0.005	<0.005	0.0079	<0.005	0.0060	0.011	0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.02	0.016	0.017	0.017	0.019	0.015	0.23	0.46	0.87	0.76	1.2	1.6
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	0.31	0.47	0.40	0.36	0.47	0.56	0.60	0.42	0.26	0.21	0.13	0.056
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	132	138	135	136	128	------	108	218	202	323	533
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	95	105	82	92	108	------	<5.0	<5.0	<5.0	<5.0	<5.0
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	<1.0	<1.0	1.0	<1.0	<1.0	------	84	89	70	57	43
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0085	0.0073	0.0051	0.006	0.010
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	131	134	123	126	134	------	182	207	200	166	149
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. Available upon request.

[shaded box] Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW151						MW152					
Date				11/15/10	03/22/11	06/08/11	09/13/11	12/08/11	03/07/12	11/15/10	03/22/11	06/08/11	09/13/11	12/06/11	03/07/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	7.11	6.93	6.87	6.77	7.84	8.07	7.05	7.37	7.30	7.18	**6.48**	6.72
Elevation		ft.	- -	398.71	398.45	398.19	396.86	398.79	397.93	417.77	420.04	418.70	416.79	420.17	419.99
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	1,022	974	1,001	1,010	953	941	2,030	2,128	2,103	2,052	2,299	2,092
Temp-field	SM 21st ed. 2550	C°	ns	15.26	13.2	15.0	22.8	9.23	13.2	15.02	11.2	15.5	17.6	10.80	13.7
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	76.5	77	82	78	77	75	**859**	**914**	**772**	**763**	**1,030**	**700**
Chloride (d)	ASTM D512-04 C	mg/L	200.0	39.9	40	39	44	40	38	84.1	75	54	69	140	52
Fluoride (d)	EPA method 74	mg/L	4.0	0.536	0.531	0.483	0.530	0.540	0.479	0.348	0.268	0.274	0.300	0.281	0.258
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	<0.050	<0.050	<0.050	<0.050	<0.050	0.09	0.172	0.31	0.24	0.094	<0.050	0.25
TDS	SM 21st ed 2540 C	mg/L	1200	580	568	539	587	576	569	**1,759**	**1,768**	**1,634**	**1,607**	**1,983**	**1,511**
Alkalinity (t)	EPA 375.4	mg/L	ns	------	414	410	442	430	446	------	360	408	420	420	420
Cyanide (t)	SW-846 9012A	mg/L	0.2	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	0.007	<0.005	<0.005	<0.005	0.006	<0.005	0.008	0.007265	<0.005	<0.005	0.008	<0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.05	0.040	0.040	0.041	0.049	0.039	0.01	0.011	0.010	0.010	0.014	0.009
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	0.25	0.23	0.22	0.22	0.25	0.22	**12**	**9.0**	**3.6**	**7.8**	**18**	**3.7**
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	117	97	109	114	119	------	249	205	212	289	190
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	0.040	0.026	<0.010	0.012	0.020
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	46	45	42	45	48	------	104	100	97	126	91
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	0.14	0.064	0.032	0.059	0.021	0.01	0.05	0.021	0.013	0.072	0.018	0.009
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	1.1	1.0	1.3	1.0	<1.0	------	1.4	1.0	1.1	<1.0	<1.0
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	46	45	52	48	48	------	131	148	146	131	130
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. Available upon request.

(d) dissolved

- - Not applicable.

ns No standard.

[shaded box] Major Ion Parameter for geochemical analysis.

(t) total

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW252						MW352					
Date				11/15/10	03/22/11	06/08/11	09/13/11	12/06/11	03/07/12	11/15/10	03/22/11	06/08/11	09/13/11	12/08/11	03/07/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	7.79	7.00	7.78	7.48	6.80	7.00	**10.63**	**11.55**	**11.20**	**10.96**	**10.66**	**10.16**
Elevation		ft.	- -	419.07	425.07	425.07	422.82	425.07	423.13	362.98	419.06	421.29	422.84	422.14	423.54
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	1,730	1,845	1,833	1,806	1,745	1,910	1,102	1,877	1,922	1,704	1,426	1,381
Temp-field	SM 21st ed. 2550	C°	ns	13.79	15.3	14.0	14.9	9.75	21.6	13.21	16.8	23.8	28.1	5.85	20.1
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	**528**	**559**	**578**	**510**	**490**	**576**	12.6	14	15	16	14	11
Chloride (d)	ASTM D512-04 C	mg/L	200.0	52.8	61	61	52	50	49	**521**	**535**	**514**	**603**	**642**	**611**
Fluoride (d)	EPA method 74	mg/L	4.0	0.233	0.250	0.224	0.220	0.232	0.210	0.692	0.696	0.698	0.700	0.652	0.756
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	<0.050	0.059	0.053	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.056	<0.050	<0.050
TDS	SM 21st ed 2540 C	mg/L	1200	**1,318**	**1,335**	**1,341**	**1,301**	**1,224**	**1,286**	779	783	862	735	706	891
Alkalinity (t)	EPA 375.4	mg/L	ns	------	534	524	526	524	528	------	102	70	39	20	16
Cyanide (t)	SW-846 9012A	mg/L	0.2	<0.007	<0.007	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	0.008	0.0060	<0.005	0.0060	0.007	<0.005	0.005	0.0066	<0.005	0.0080	0.009	<0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.04	0.039	0.040	0.029	0.040	0.022	0.18	0.27	0.29	0.19	0.19	0.11
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	0.97	1.5	0.31	0.32	0.29	0.19	0.90	0.87	0.84	0.76	0.76	0.86
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	232	210	206	221	225	------	93	79	60	70	45
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	0.007154	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	90	84	78	83	91	------	<5.0	<5.0	2.1	6.2	22
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	**1.7**	**0.93**	**0.61**	**0.97**	**1.2**	**0.44**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	5.3	2.1	3.0	1.9	1.4	------	19	15	12	9.6	6.3
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0070	<0.005	<0.005	<0.005	<0.005
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	100	99	104	99	99	------	182	180	185	190	200
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.005	<0.005	<0.005	0.00659	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. Available upon request.

(shaded) Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW153						MW253					
Date				11/16/10	03/23/11	06/07/11	09/14/11	12/08/11	03/08/12	11/16/10	03/23/11	06/07/11	09/14/11	12/08/11	03/08/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	7.14	7.36	7.50	6.94	7.02	7.34	6.89	7.69	**11.34**	**9.79**	7.38	**10.97**
Elevation		ft.	- -	429.29	437.07	433.82	429.47	435.68	446.12	422.40	436.99	435.97	433.15	435.13	435.61
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	730	736	732	718	789	669	765	1,971	1,564	958	908	1,142
Temp-field	SM 21st ed. 2550	C°	ns	14.79	21.2	20.2	16.2	5.45	11.9	13.40	25.9	27.5	17.5	2.04	9.6
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	88.5	93	83	83	93	81	**806**	262	**411**	**424**	**483**	**406**
Chloride (d)	ASTM D512-04 C	mg/L	200.0	34.4	30	32	33	34	29	27.4	26	22	23	27	22
Fluoride (d)	EPA method 74	mg/L	4.0	0.440	0.383	0.388	0.400	0.410	0.394	0.408	0.119	0.369	0.290	0.349	0.246
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	**13.2**	**14.9**	**12**	**18**	**15**	**12.9**	0.3830	0.084	0.057	0.12	<0.050	<0.050
TDS	SM 21st ed 2540 C	mg/L	1200	462	430	449	446	451	416	**1,441**	854	698	639	744	634
Alkalinity (t)	EPA 375.4	mg/L	ns	------	192	200	194	206	200	------	580	187	46	105	115
Cyanide (t)	SW-846 9012A	mg/L	0.2	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.008	<0.007	<0.007	<0.007	<0.007
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.0063	<0.005	<0.005	0.006	<0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.03	0.025	0.025	0.025	0.028	0.024	0.02	0.066	0.054	0.031	0.026	0.036
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	<0.02	<0.02	0.014	<0.050	<0.050	<0.050	0.24	0.12	0.064	<0.050	0.11	0.076
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	58	56	55	61	57	------	54	104	61	76	110
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.014	<0.010
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0051	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	24	24	23	26	24	------	1.0	<5.0	15	48	2.8
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	<0.005	0.0091	0.0053	0.011	0.015	0.008	**0.37**	<0.005	<0.005	<0.005	0.007	<0.005
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	<1.0	<1.0	<1.0	<1.0	<1.0	------	78	18	9.1	4.9	6.4
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0062	<0.005	<0.005	<0.005	<0.005
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	59	56	65	61	57	------	168	108	95	94	86
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. Available upon request.

(shaded box) Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW154						MW155					
Date				11/16/10	03/23/11	06/06/11	09/12/11	12/07/11	03/06/12	11/16/10	03/23/11	06/06/11	09/12/11	12/07/11	03/06/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	------	7.25	7.09	------	6.71	7.09	7.1	7.08	7.10	6.82	6.90	6.90
Elevation		ft.	- -	------	382.78	379.4	373.38	382.25	381.85	372.85	376.54	379.85	373.66	374.13	376.34
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	------	911	874	------	665	861	600	763	806	526	528	774
Temp-field	SM 21st ed. 2550	C°	ns	------	11.5	14.5	------	13.81	12.9	13.80	15.5	16.1	19.3	8.31	16.3
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	------	94	72	------	29	38	61.8	53	50	50	51	49
Chloride (d)	ASTM D512-04 C	mg/L	200.0	------	12	10	------	4	6	6.55	10	9	9.3	11	9
Fluoride (d)	EPA method 74	mg/L	4.0	------	0.623	0.501	------	0.525	0.516	0.390	0.398	0.385	0.380	0.417	0.401
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	------	1.28	0.53	------	0.25	4.49	4.46	2.0	1.4	2.1	2.0	1.85
TDS	SM 21st ed 2540 C	mg/L	1200	------	559	508	------	346	476	470	455	487	470	450	446
Alkalinity (t)	EPA 375.4	mg/L	ns		424	384	------	324	406	------	360	400	376	366	392
Cyanide (t)	SW-846 9012A	mg/L	0.2	------	<0.007	<0.007	------	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.008
Antimony (d)	SW-846 3020A	mg/L	0.006	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	------	0.00566	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	------	0.073	0.076	------	0.100	0.080	0.03	0.024	0.024	0.022	0.023	0.019
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	------	<0.005	<0.005	------	<0.004	<0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	------	0.026	0.026	------	<0.050	<0.050	<0.02	<0.02	0.012	<0.050	<0.050	<0.050
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	------	<0.002	<0.002	------	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns		110	106	------	89	114	------	88	86	86	91	93
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.016
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	------	<0.010	0.018	------	<0.010	<0.010	<0.010	<0.010	0.016	0.013	0.015	<0.010
Lead (d)	SW-846 3020A	mg/L	0.0075	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	40	38	------	25	40	------	45	46	42	44	49
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	------	<0.005	**0.18**	------	0.006	<0.005	0.038	**0.28**	0.062	**0.37**	**0.18**	0.081
Mercury (d)	SW-846 7470A	mg/L	0.002	------	<0.002	<0.002	------	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns		1.2	<1.0	------	<1.0	<1.0	------	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium (d)	SW-846 3020A	mg/L	0.05	------	0.016	<0.010	------	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	------	<0.005	<0.005	------	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	53	28	------	22	20	------	24	25	28	26	28
Thallium (d)	SW-846 3020A	mg/L	0.002	------	<0.002	<0.002	------	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	------	<0.005	0.014	------	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.014

Notes:

Data do not include Field Replicates. Available upon request.

Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	MW355						OW156					
Date				11/16/10	03/23/11	06/06/11	09/12/11	12/07/11	03/06/12	11/15/10	03/23/11	06/06/11	09/12/11	12/08/11	03/06/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	6.95	7.06	7.17	6.70	6.78	6.83	------	------	------	------	------	------
Elevation		ft.	- -	369.97	372.70	379.09	370.03	370.66	371.08	420.57	424.75	422.21	419.56	424.29	423.86
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	934	848	841	824	812	879	------	------	------	------	------	------
Temp-field	SM 21st ed. 2550	C°	ns	13.64	15.5	17.0	17.0	8.16	16.3	------	------	------	------	------	------
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	56	36	46	53	48	50	------	------	------	------	------	------
Chloride (d)	ASTM D512-04 C	mg/L	200.0	14	14	13	12	14	12	------	------	------	------	------	------
Fluoride (d)	EPA method 74	mg/L	4.0	0.403	0.405	0.397	0.410	0.412	0.420	------	------	------	------	------	------
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	0.947	0.56	0.21	1.6	0.82	2.05	------	------	------	------	------	------
TDS	SM 21st ed 2540 C	mg/L	1200	532	486	491	490	486	447	------	------	------	------	------	------
Alkalinity (t)	EPA 375.4	mg/L	ns	------	432	404	396	412	396	------	------	------	------	------	------
Cyanide (t)	SW-846 9012A	mg/L	0.2	------	<0.007	<0.007	<0.007	<0.007	<0.008	------	------	------	------	------	------
Antimony (d)	SW-846 3020A	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	<0.005	0.006147	<0.005	0.007	<0.005	<0.005	------	------	------	------	------	------
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	0.10	0.10	0.12	0.11	0.14	0.098	------	------	------	------	------	------
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	<0.005	<0.005	<0.005	<0.001	<0.004	<0.004	------	------	------	------	------	------
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	0.02	0.021	0.030	<0.050	<0.050	<0.050	------	------	------	------	------	------
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	------	------	------	------	------	------
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	96	85	87	105	88	------	------	------	------	------	------
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	1.6	0.60	0.41	0.55	0.59	0.26	------	------	------	------	------	------
Lead (d)	SW-846 3020A	mg/L	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	45	43	41	46	46	------	------	------	------	------	------
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	------	**0.45**	**0.20**	**0.34**	**0.43**	0.13	------	------	------	------	------	------
Mercury (d)	SW-846 7470A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	------	------	------	------	------	------
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	<1.0	<1.0	<1.0	<1.0	<1.0	------	------	------	------	------	------
Selenium (d)	SW-846 3020A	mg/L	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	------	------	------	------	------	------
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	------	------	------	------	------	------
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	32	30	34	33	29	------	------	------	------	------	------
Thallium (d)	SW-846 3020A	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	------	------	------	------	------	------
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	------	------	------	------	------	------

Notes:

Data do not include Field Replicates. Available upon request.

(shaded) Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 4. Groundwater Quality Data Summary from Initial Hydrogeologic Investigation: 2010 - 2012

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Method Used	Units	Class I Standard	OW157					
Date				06/06/11	03/23/11	06/06/11	09/12/11	12/08/11	03/06/12
pH-field	SM 21st ed. 4500-H^+	s.u.	6.5-9.0	------	------	------	------	------	------
Elevation		ft.	- -	427.61	428.83	428.23	427.29	429.04	428.58
Spec Cond-field	SM 21st ed. 2520-B	micromhos/cm	ns	------	------	------	------	------	------
Temp-field	SM 21st ed. 2550	C°	ns	------	------	------	------	------	------
Sulfate (t)	SM 21st ed. 4500-SO_4 E	mg/L	400.0	------	------	------	------	------	------
Chloride (d)	ASTM D512-04 C	mg/L	200.0	------	------	------	------	------	------
Fluoride (d)	EPA method 74	mg/L	4.0	------	------	------	------	------	------
Nitrate (d)	SM 21st ed. 4500-NO_3 D	mg/L	10.0	------	------	------	------	------	------
TDS	SM 21st ed 2540 C	mg/L	1200	------	------	------	------	------	------
Alkalinity (t)	EPA 375.4	mg/L	ns	------	------	------	------	------	------
Cyanide (t)	SW-846 9012A	mg/L	0.2	------	------	------	------	------	------
Antimony (d)	SW-846 3020A	mg/L	0.006	------	------	------	------	------	------
Arsenic (d)	SW-846 3005A, 6010B	mg/L	0.05*	------	------	------	------	------	------
Barium (d)	SW-846 3005A, 6010B	mg/L	2.0	------	------	------	------	------	------
Beryllium (d)	SW-846 3005A, 6010B	mg/L	0.004	------	------	------	------	------	------
Boron (d)	SW-846 3005A, 6010B	mg/L	2.0	------	------	------	------	------	------
Cadmium (d)	SW-846 3005A, 6010B	mg/L	0.005	------	------	------	------	------	------
Calcium (d)	SW-846 3005A, 6010B	mg/L	ns	------	------	------	------	------	------
Chromium (d)	SW-846 3005A, 6010B	mg/L	0.1	------	------	------	------	------	------
Cobalt (d)	SW-846 3005A, 6010B	mg/L	1.0	------	------	------	------	------	------
Copper (d)	SW-846 3005A, 6010B	mg/L	0.65	------	------	------	------	------	------
Iron (d)	SW-846 3005A, 6010B	mg/L	5.0	------	------	------	------	------	------
Lead (d)	SW-846 3020A	mg/L	0.0075	------	------	------	------	------	------
Magnesium (d)	SW-846 3005A, 6010B	mg/L	ns	------	------	------	------	------	------
Manganese (d)	SW-846 3005A, 6010B	mg/L	0.15	------	------	------	------	------	------
Mercury (d)	SW-846 7470A	mg/L	0.002	------	------	------	------	------	------
Nickel (d)	SW-846 3005A, 6010B	mg/L	0.1	------	------	------	------	------	------
Potassium (d)	SW-846 3005A, 6010B	mg/L	ns	------	------	------	------	------	------
Selenium (d)	SW-846 3020A	mg/L	0.05	------	------	------	------	------	------
Silver (d)	SW-846 3005A, 6010B	mg/L	0.05	------	------	------	------	------	------
Sodium (d)	SW-846 3005A, 6010B	mg/L	ns	------	------	------	------	------	------
Thallium (d)	SW-846 3020A	mg/L	0.002	------	------	------	------	------	------
Zinc (d)	SW-846 3005A, 6010B	mg/L	5.0	------	------	------	------	------	------

Notes:

Data do not include Field Replicates. Available upon request.

(shaded) Major Ion Parameter for geochemical analysis.

(d) dissolved

(t) total

- - Not applicable.

- - - - Not sampled or insufficient groundwater for sampling and/or anlalysis.

ns No standard.

0.42 Parameter concentration exceeds Class I groundwater standard (IAC Part 620 Section 410).

* The Class I standard for arsenic was changed to 0.01 mg/L after these sample events were completed.

Table 5. Groundwater Quality Data Summary: December 2013 and February 2014

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Parameter	Class II Standard	MW104SR		MW104DR		MW150		MW350		MW151		MW152	
Date		11/20/13	02/18/14	11/20/13	02/18/14	11/20/13	02/19/14	11/20/13	02/19/14	11/20/13	02/19/14	11/20/13	02/19/14
Groundwater Elevation		440.86	446.35	440.94	446.42	376.86	378.05	374.28	374.49	397.03	397.76	418.32	419.86
pH	6.5-9.0	6.71	6.73	6.82	6.75	7.07	6.99	**11.80**	8.08	7.13	7.12	7.22	**6.36**
Sulfate (d)	400	134	138	194	175	**502**	**521**	11	<10	78	74	**857**	**898**
Chloride (d)	200	19	18	16	18	51	51	34	33	36	35	55	56
Total Dissoved Solids	1200	770	792	630	652	1,090	1,200	**1,370**	**1,420**	542	538	**1,720**	**1,770**
Boron (d)	2.0	0.04	0.05	0.02	<0.02	0.65	0.80	0.03	0.03	0.24	0.23	**9.92**	**12.7**
Iron (d)	5.0	1.44	<0.02	0.07	<0.02	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.05
Manganese (d)	10	2.20	0.59	0.29	0.04	0.03	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005

Parameter	Class II Standard	MW252		MW352		MW153		MW253		MW154		MW155	
Date		11/20/13	02/19/14	11/20/13	02/19/14	11/21/13	02/19/14	11/21/13	02/19/14	11/21/13	02/19/14	11/21/13	02/19/14
Elevation		422.93	424.82	422.55	424.19	430.62	434.26	432.85	434.58	<372.33	381.38	<370.17	372.39
pH	6.5-9.0	7.07	8.05	7.34	6.51	6.58	7.16	8.60	7.85	------	7.40	------	7.02
Sulfate (t)	400	**463**	**480**	11	18	98	81	**405**	368	------	48	------	54
Chloride (t)	200	41	41	**583**	**390**	28	22	18	16	------	8	------	8
Total Dissoved Solids	1200	**1,250**	**1,310**	996	768	384	402	602	564	------	454	------	1,080
Boron (d)	2.0	0.23	0.23	1.47	0.82	<0.02	<0.02	0.09	0.06	------	0.02	------	<0.02
Iron (d)	5.0	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	------	<0.02	------	0.48
Manganese (d)	10	0.11	0.01	<0.005	<0.005	0.03	<0.005	<0.005	<0.005	------	<0.005	------	0.35

Parameter	Class II Standard	MW355		OW156		OW157		MW161		MW162		MW262	
Date		11/21/13	02/19/14	11/20/13	02/18/14	11/20/13	02/18/14	11/21/13	02/18/14	11/21/13	02/19/14	11/21/13	02/19/14
Elevation		369.50	369.99	420.36	423.68	427.00	428.81	402.14	410.22	<404.93	<404.93	395.96	395.60
pH	6.5-9.0	7.24	7.05	6.61	6.82	**6.37**	6.63	7.08	6.95	------	------	7.15	7.48
Sulfate (t)	400	61	65	93	88	**1,870**	**2,050**	44	44	------	------	40	24
Chloride (t)	200	11	11	60	55	121	124	6	5	------	------	<5	<5
Total Dissoved Solids	1200	450	458	466	470	**3,160**	**3,180**	756	430	------	------	228	188
Boron (d)	2.0	0.03	0.02	<0.02	0.03	**45.2**	**45.3**	<0.02	<0.02	------	------	<0.02	<0.02
Iron (d)	5.0	0.62	0.03	0.06	<0.02	0.05	<0.02	0.09	<0.02	------	------	0.12	0.02
Manganese (d)	10	0.06	0.05	0.05	<0.005	0.14	0.13	1.28	0.83	------	------	0.01	0.020

Parameter	Class II Standard	OW256		OW257		TPZ158		TPZ159		TPZ160		TPZ166	
Date		11/21/13	02/18/14	11/21/13	02/18/14	11/20/13	02/18/14	11/21/13	02/18/14	11/21/13	02/18/14	11/20/13	02/18/14
Elevation		417.93	421.50	425.84	427.06	441.91	438.02	429.28	429.52	424.64	427.33	417.33	418.81
pH	6.5-9.0	6.63	6.77	7.07	7.12	7.27	6.73	**6.47**	6.55	7.30	7.02	7.77	7.24
Sulfate (t)	400	88	90	312	310	39	44	96	98	60	63	56	38
Chloride (t)	200	65	57	21	18	81	65	35	35	42	44	12	12
Total Dissoved Solids	1200	488	508	958	900	976	380	448	480	454	510	304	306
Boron (d)	2.0	0.16	0.15	**3.28**	**2.88**	<0.02	<0.02	0.11	0.12	0.24	0.21	0.10	0.06
Iron (d)	5.0	0.02	<0.02	0.02	<0.02	1.43	<0.02	0.06	<0.02	0.05	0.39	<0.02	<0.02
Manganese (d)	10	0.13	<0.005	0.68	0.01	0.35	<0.005	0.68	0.51	0.12	0.16	0.02	0.28

Parameter	Class II Standard	TPZ163[L]		TPZ164[L]		TPZ165[L]		TPZ167[L]		TPZ168[L]	
Date		11/20/13	02/18/14	11/20/13	02/18/14	11/20/13	02/18/14	11/20/13	02/18/14	11/20/13	02/18/14
Elevation		447.17	451.06	430.58	430.71	394.02	394.33	434.02	436.27	443.65	449.65
pH	not applicable	8.81	7.59	7.46	7.32	7.18	6.45	8.15	7.70	9.17	8.08
Sulfate (t)	not applicable	626	610	218	173	342	1,070	1,850	1,840	2,760	2,820
Chloride (t)	not applicable	19	15	81	67	71	91	100	100	109	103
Total Dissoved Solids	not applicable	1,130	1,160	592	504	1,420	2,290	3,010	3,040	3,680	5,120
Boron (d)	not applicable	37.2	37.8	2.64	1.76	0.24	1.35	53.0	54.5	87.2	78.8
Iron (d)	not applicable	<0.02	<0.02	6.86	5.52	<0.02	3.89	<0.02	<0.02	<0.02	0.06
Manganese (d)	not applicable	<0.005	<0.005	0.56	0.58	1.09	12.7	<0.005	<0.005	<0.005	<0.005

Notes:

Data do not include Field Replicates. See laboratory analytical reports in appendix for all QA/QC data.

---- Water quality data not available on the date indicated. Water level was below bottom of well screen or well was dry.

(d) dissolved

(t) total

L Leachate well; fully or partially screened within coal combustion residuals. Class II standards not compared to leachate wells.

ns No standard.

0.42 Parameter concentration exceeds Class II groundwater standard (IAC Part 620 Section 420).

Table 6. Geologic Layers and Hydrogeologic Unit Designations

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

<table>
<tr><th colspan="7">Lithologic Layers</th><th colspan="3">Hydrogeologic Unit Designations</th></tr>
<tr><th>ID</th><th>General Description</th><th>Borings where Layer Identified</th><th>Top Elevation (feet asl)</th><th>Lowest Elevation (feet asl)</th><th>Thickness Range (feet)</th><th>Thickness Average and Median (feet)</th><th>ID</th><th>Name</th><th>Description: Materials</th></tr>
<tr><td>1</td><td>Ash Pond System: Out of Service Old East Fly Ash Pond, Out of Service East Fly Ash Pond, Active West Fly Ash Cell, Bottom Ash Pond. Miscellaneous fill - roads and berms</td><td>TPZ-163, TPZ-164, TPZ-167, TPZ-168
(note: TPZ-165 intercepted fill and ash within Secondary Pond; data from this boring not included in calculating elevations or thicknesses of ash)</td><td>455</td><td>407</td><td>8 - 32</td><td>Avg = 21.5
Median = 22.9</td><td>1</td><td>Fill Unit</td><td>Coal combustion residuals: Fly ash, Bottom ash, minor Slag. Fill deposits - clay and silt</td></tr>
<tr><td>2</td><td>Cahokia Alluvium
Alluvial clay, sandy clay, and clayey sand</td><td>MW-151, MW-154, MW-155, MW-350,</td><td>394</td><td>368</td><td>13 - 27</td><td>Avg = 20.6
Median = 21.6</td><td rowspan="4">2</td><td rowspan="4">Upper Groundwater Unit</td><td rowspan="4">Predominantly Clay with Silt and Sand; Silt Layers; Occasional Sand Lenses</td></tr>
<tr><td>3</td><td>Peoria Loess
Silt and Silty Clay, minor fine sand</td><td>MW-104SR, MW-154, OW-156/256, OW-157,
TPZ-158, MW-161, MW-162/262</td><td>453</td><td>406</td><td>2 - 23</td><td>Avg = 10.1
Median = 8.8</td></tr>
<tr><td>4</td><td>Equality Formation
Clay, sandy clay, and occasional sand seams and lenses</td><td>MW-153/253, OW-157/257, TPZ-159, TPZ-160,
MW-161, MW-162/262, TPZ-163, TPZ-166, TPZ-168, OW-256, MW-352</td><td>443</td><td>396</td><td>8 - 20</td><td>Avg = 13.1
Median = 12.2</td></tr>
<tr><td>5</td><td>Vandalia Till Member of Glasford Formation
Clay, clay with sand, and occasional sand seams and lenses</td><td>MW-104DR, TPZ-158, TPZ-159, TPZ-160, MW-161, TPZ-163, TPZ-165, TPZ-166, TPZ-167,
TPZ-168, MW-253, OW-256, OW-257, MW-262, MW-352</td><td>451</td><td>369</td><td>11 - 37</td><td>Avg = 20.6
Median = 18.0</td></tr>
<tr><td>6</td><td>Pennsylvanian and Mississippian Bedrock
Interbedded and undifferentiated limestone and shale</td><td>MW-104DR, MW-151, MW-154, TPZ-158, MW-161, TPZ-163, TPZ-165, TPZ-166, TPZ-167, TPZ-168, MW-253, OW-256, OW-257, MW-262, MW-350, MW-352, MW-355,</td><td>429</td><td>347</td><td>- -</td><td>- -</td><td>3</td><td>Bedrock Confining Unit</td><td>Shale and Limestone</td></tr>
</table>

Notes:
ASL = above mean sea level (i.e., National Geodetic Vertical Datum).

Table 7. Geotechnical Analysis Summary of Ash Pond Deposits

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex;
Baldwin, Illinois

Boring Number	Sample Depth BGS (feet)	USCS Soil Classification	Moisture Content (%)	Dry Bulk Density (pcf)	Hydraulic Conductivity (cm/sec)	Range of Hydraulic Gradient	Specific Gravity	Calculation from Soil-Mass Relationships: Total Porosity (%)	Calculation from Soil-Mass Relationships: Water Filled Porosity (%)	Calculation from Soil-Mass Relationships: Air Filled Porosity (%)
TPZ-163	1.5 - 3.5	ASH - Silty SAND (SM), fine grained, very dark brown	49.3	63.7	2.5E-04	0.4 - 3.5	2.66	61.7	50.2	11.5
TPZ-164	3.0 - 5.0	ASH - Sandy SILT (ML), fine grained sand, very dark brown	22.5	91.7	6.5E-04	0.2 - 1.7	2.68	45.2	33.0	12.2
TPZ-167	29.0 - 30.0	ASH - SILT (ML), very dark gray-brown	18.8**	99.9	9.7E-06	0.2 - 2.9	2.59	38.2	30.2	8.0
TPZ-168	3.0 - 5.0	ASH - Sandy SILT (ML), fine-medium grained sand, olive-brown	56.0	63.0	4.2E-04	0.1 - 2.3	2.88	64.9	56.5	8.4
		Average Value*	**42.6**	**79.6**	**1.6E-04**	**- -**	**2.70**	**52.5**	**42.5**	**10.0**

Notes:

All geotechnical data obtained from Geotechnology, Inc. report dated October 18, 2013 (Appendix X).

USCS Soil Classification based on both visual, and particle size analysis with sieve and hydrometer.

*	Hydraulic conductivity is calculated as geometric mean and not an average.
**	Sample remolded in laboratory. As received moisture content = 31.1%
BGS	below ground surface
cm/sec	centimeters per second
pcf	pounds per cubic foot
%	percent

Table 8. Summary of Horizontal and Vertical Permeability Test Results

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Horizontal Hydraulic Conductivity: Field Test Results

Monitoring Well Number	Depth Interval Tested (feet)	Analysis Method	Lithologic Layer	Primary Lithologies within Screened Well Interval	Horizontal Hydraulic Conductivity (cm/sec)
Hydrogeologic Unit 2: Unlithified Deposits					
MW-104DR	23.2 - 28.2	Bouwer-Rice	Vandalia Till Member	Sand (fine-medium), Sandy Clay, and Silty Clay	6.8E-04
MW-151	6.1 - 15.8	Bouwer-Rice	Cahokia Formation	Sandy Clay, Silty Clay and Clay	1.1E-05
MW-152	7.5 - 16.7	Bouwer-Rice	Equality Formation	Clay	7.0E-05
OW-156	7.9 - 17.2	Bouwer-Rice	Equality Formation	Clay and Silty Clay	4.3E-05
OW-157	7.8 - 17.1	Bouwer-Rice	Equality Formation	Clay and Silty Clay	1.3E-04
MW-161	23.3 - 32.8	Bouwer-Rice	Equality Formation	Silty Clay, Sand with Silt	8.1E-05
TPZ-166	15.3 - 24.7	Bouwer-Rice	Vandalia Till Member	Silty Clay	1.9E-05
MW-252	44.4 - 49.0	Bouwer-Rice	Vandalia Till Member	Clay	1.9E-06
MW-253	29.9 - 34.5	Bouwer-Rice	Vandalia Till Member	Clay, shaley	3.5E-07
OW-256	28.0 - 32.5	Bouwer-Rice	Vandalia Till Member	Silty Clay, Sand (fine-medium)	2.2E-04
OW-257	34.0 - 38.5	Bouwer-Rice / KGS Model	Vandalia Till Member	Silty Clay	3.3E-06
MW-262	42.1 - 46.6	Bouwer-Rice	Vandalia Till Member	Sand with Silt, Sand, Silty Clay	6.0E-04
				Geometric Mean Hydraulic Conductivity	**3.2E-05**
Hydrogeologic Unit 3: Upper Bedrock					
MW-350	41.6 - 46.2	Bouwer-Rice	Mississippian Bedrock	Limestone, massive, hard to very hard; RQD = 96% (Excellent)	2.1E-06
MW-352	67.9 - 72.5	Bouwer-Rice	Pennsylvanian or Mississippian Bedrock	Limestone, medium hard to hard; RQD = 57% (Fair)	1.7E-06
MW-355	27.4 - 32.0	Bouwer-Rice	Mississippian Bedrock	Limestone, medium soft, fossiliferous; RQD = 57% (Fair)	3.5E-05
				Geometric Mean Hydraulic Conductivity	**5.0E-06**

Vertical Hydraulic Conductivity: Laboratory Test Results

Boring ID	Depth Interval Tested (feet)	Geotechnical Laboratory (Analysis Date)	Lithologic Layer	Primary Lithologies within Screened Well Interval	Vertical Hydraulic Conductivity (cm/sec)
Hydrogeologic Unit 1: Fill Unit					
TPZ-163	1.5 - 3.5	Geotechnology (2013)	Ash Pond System: Fly Ash / Bottom Ash	Ash (USCS classification: Silty Sand, fine grained)	2.5E-04
TPZ-164	3.0 - 5.0	Geotechnology (2013)	Ash Pond System: Bottom Ash	Ash (USCS classification: Sandy Silt, fine grained sand)	6.5E-04
TPZ-167	29.0 - 30.0	Geotechnology (2013)	Ash Pond System: Fly Ash	Ash (USCS classification: Silt)	9.7E-06
TPZ-168	3.0 - 5.0	Geotechnology (2013)	Ash Pond System: Fly Ash	Ash (USCS classification: Sandy Silt, fine-medium grained sand)	4.2E-04
				Geometric Mean Hydraulic Conductivity	**1.6E-04**
Hydrogeologic Unit 2: Unlithified Deposits					
MW-154	8.0 - 9.2	Shively Geotechnical (2010)	Cahokia Formation	Sandy Clay with gravel	7.8E-06
MW-350	18.0 - 20.0	Shively Geotechnical (2010)	Cahokia Formation	Clay	3.4E-07
TPZ-164	10.0 - 12.0	Geotechnology (2013)	Equality Formation	Clay	1.3E-06
MW-252	44.0 - 46.0	Shively Geotechnical (2010)	Vandalia Member	Clay	6.3E-09
MW-262	33.5 - 35.5	Geotechnology (2013)	Vandalia Member	Clay	9.9E-09
TPZ-163	28.0 - 30.0	Geotechnology (2013)	Vandalia Member	Clay, trace fine sand	4.2E-04
TPZ-165	8.0 - 10.0	Geotechnology (2013)	Vandalia Member	Clay, trace sand	5.3E-06
TPZ-167	32.0 - 34.0	Geotechnology (2013)	Vandalia Member	Clay with sand	6.2E-07
				Geometric Mean Hydraulic Conductivity	**8.6E-07**

Notes:
cm/sec centimeters per second.

Reference:
Bouwer-Rice Bouwer and Rice Analytical Method for Unconfined Aquifers, 1976. (note: also used for Confined Aquifers).
KGS Model KGS overdamped slug test analysis model (Hyder et al., 1994).
Shively Geotechnical (2010): see Appendix D
Geotechnology (2013): see Appendix D

Table 9. Vertical Hydraulic Gradients

Groundwater Quality Assessment and Phase II Hydrogeologic Investigation - Baldwin Ash Pond System
Baldwin Energy Complex; Baldwin, Illinois

Monitoring Wells for Gradient Calculations across Screened Hydrogeologic Units		Screen Midpoint Elevations (feet)		Groundwater Level Measurements (Elevation in Feet)																	
				11/15-16/2010		3/22-23/2011		6/6-8/2011		9/12-14/2011		12/6-8/2011		3/6-8/2012		9/16-17/2013		11/20-21/2013		02/18-19/2014	
Shallow	**Deep**	**Shallow**	**Deep**	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep
MW-104SR	MW-104DR	442.83	428.47	441.54	441.54	448.10	448.04	446.22	446.24	- -	- -	- -	- -	- -	- -	441.58	440.65	440.86	440.94	446.35	446.42
MW-153	MW-253	427.60	410.53	429.29	- -	437.07	436.99	433.82	435.97	429.47	433.15	435.68	435.13	- -	- -	429.35	432.15	430.62	432.85	434.26	434.58
MW-152	MW-252	410.29	375.56	417.77	419.07	420.04	425.07	418.70	425.07	416.79	422.82	420.17	425.07	419.99	423.13	416.74	- -	418.32	422.93	419.86	424.82
MW-252	MW-352	375.56	352.15	419.07	- -	425.07	419.06	425.07	421.29	422.82	422.84	425.07	422.14	423.13	423.54	- -	415.86	422.93	422.55	424.82	424.19
MW-150	MW-350	374.00	350.21	377.11	372.52	380.04	375.84	380.44	379.37	376.01	374.30	379.00	374.62	378.74	374.40	375.51	374.05	376.86	374.28	378.05	374.49
MW-155	MW-355	375.50	361.11	372.85	369.97	376.54	372.70	379.85	379.09	373.66	370.03	374.13	370.66	376.34	371.08	372.27	369.27	- -	369.50	372.39	369.99
OW-156	OW-256	412.60	394.96	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	418.69	415.75	420.36	417.93	423.68	421.50
OW-157	OW-257	417.44	391.94	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	424.92	424.36	427.00	425.84	428.81	427.06

Monitoring Wells for Gradient Calculations across Screened Hydrogeologic Units		Monitored Geologic Unit**		Hydrogeologic Unit***		Vertical Groundwater Gradient Between Designated Units (feet/feet)									**Average Groundwater Gradient (feet/feet)**
						11/15-16/10	03/22-23/11	06/6-8/11	09/12-14/11	12/6-8/11	03/6-8/12	9/16-17/2013	11/20-21/2013	2/18-19/2014	
Shallow	**Deep**	**Shallow**	**Deep**	**Shallow**	**Deep**										
MW-104SR	MW-104DR	Vandalia	Vandalia	2	2	- -	- -	- -	0.015	0.018	0.018	0.065	**-0.006**	**-0.005**	0.02
MW-153	MW-253	Vandalia	Vandalia	2	2	- -	0.005	**-0.126**	**-0.236***	0.032	- -	**-0.164**	**-0.131**	**-0.019**	**-0.07**
MW-152	MW-252	Equality	Vandalia	2	2	**-0.037**	**-0.145**	**-0.183**	**-0.174**	**-0.141**	**-0.090**	- -	**-0.133**	**-0.143**	**-0.13**
MW-252	MW-352	Vandalia	Bedrock	2	3	- -	0.027	0.017	**-0.001**	0.125	**-0.018**	- -	0.016	0.027	0.03
MW-150	MW-350	Cahokia	Bedrock	2	3	0.012*	0.177	0.045	0.076*	0.184	0.183*	0.004*	0.007*	0.010*	0.08
MW-155	MW-355	Cahokia	Bedrock	2	3	0.008*	0.010*	0.002*	0.276*	0.307*	0.424*	0.008*	- -	0.006*	0.13
OW-156	OW-256	Equality	Vandalia	2	2	- - -	- - -	- - -	- - -	- - -	- - -	0.167	0.138	0.124	0.14
OW-157	OW-257	Equality	Vandalia	2	2	- - -	- - -	- - -	- - -	- - -	- - -	0.022	0.045	0.069	0.05

Notes:

-0.02 Vertical gradient is upwards between the screened well intervals and formations indicated.
0.04 Vertical gradient is downwards between the screened well intervals and formations indicated.
* Water level in shallow well was below top of screen. Midpoint elevation calculated based on water level elevation and bottom of screen.
\- - No data collected on date, water level not static, or incorrectly measured/transcribed.
\- - - Deep wells OW-256 and OW-257 not constructed until August 2014.

** Monitored Geologic Unit Designations
Bedrock Pennsylvanian or Mississippian age limestone and shale.
Cahokia Cahokia Formation.
Equality Equality Formation.
Vandalia Vandalia Till Member.

*** Hydrogeologic Unit Designations
2 Upper Groundwater Unit
3 Bedrock Confining Unit

APPENDIX A

BORING AND WELL CONSTRUCTION LOGS: 1990-2013

KELRON ENVIRONMENTAL
INCORPORATED

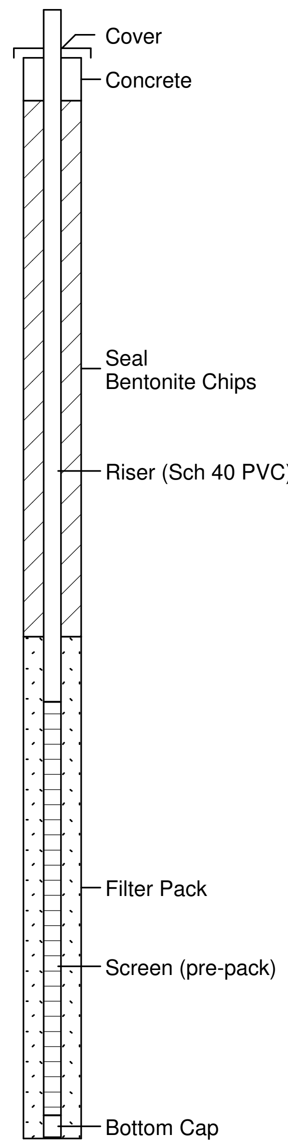
LOG OF BORING MW-150

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/08/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 393.84
Sampling Method	: MacroCore (60")	Top of Casing Elevation	396.54
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2379413, 554563

Depth in Feet	DESCRIPTION	Surf. Elev. 393.84	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continous boring - no soil sampling conducted. Refer to boring log for adjacent nested well MW-350 for a description of subsurface materials	393					
5		388					
10		383					
15		378					
20		373					
25	END BOREHOLE AT 25.2 FEET BLS	368					
30							

Well: MW-150
Elev.: 396.54



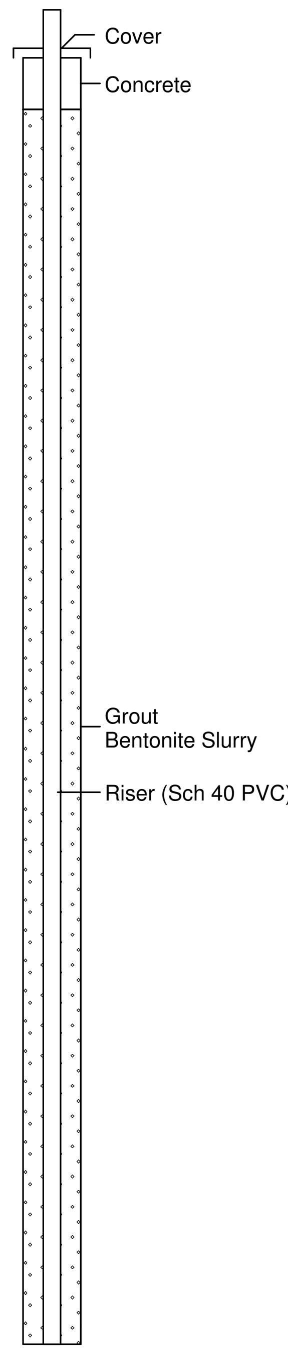
KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-350

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/07/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 394.11
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	396.80
Drilling Company	: PSC	X,Y Coordinates	: 2379410, 554568

Depth in Feet	DESCRIPTION	Surf. Elev. 394.11	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	CLAY, very stiff to hard, brown, grayish-brown (10YR 5/2) mottled yellowish brown (10YR 5/8), dry	394	1	19/54	4.5	CH	
			2		2.25		
			3				
5		389	4	47/60	4.5		
	- grain size analysis @ 5 - 6 ft: 2.3% sand, 42.4% silt, 55.3% clay		5		3.5		
			6		3.25		
			7		4.0		
10		384	8	60/60	2.75		
	CLAY, brown to olive brown, moist		9		2.75	CL/CH	
	- grain size analysis @ 11 - 12 ft: 8.4% sand, 39.3% silt, 52.3% clay		10		2.75		
			11		1.75		
			12		2.0		
15		379					
	CLAY, soft, high plasticity, dark yellow brown, moist; 1-2" sand seams at 17' and 19'		13	45/60		CH	
	- grain size analysis @ 18 - 20 ft: 1.8% sand, 21.9% silt, 76.3% clay						
	- very stiff to hard, high plasticity						
20		374					
			14	60/60			
25			15	23/23			



KELRON ENVIRONMENTAL
INCORPORATED

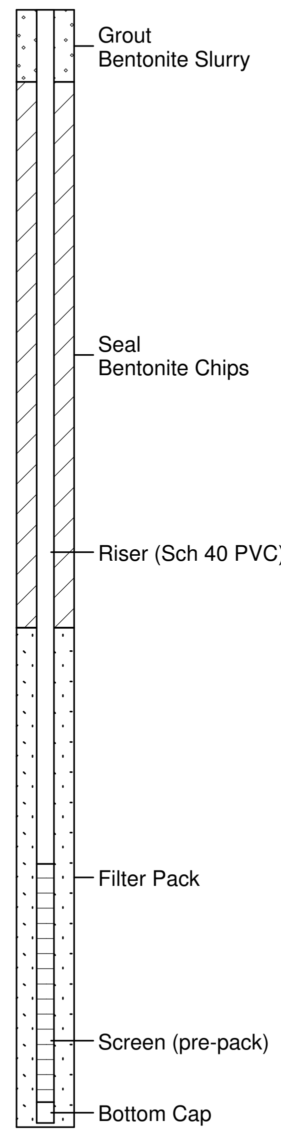
LOG OF BORING MW-350

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/07/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 394.11
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	396.80
Drilling Company	: PSC	X,Y Coordinates	: 2379410, 554568

Well: MW-350
Elev.: 396.80

Depth in Feet	DESCRIPTION	Surf. Elev. 394.11	Samples	Recovery inches	Qp TSF	USCS
25	- Auger refusal at 26.4 feet bgs	369	15	23/23		CL
	LIMESTONE and SHALE, interbedded, banded, solid, very soft, light to dark gray; slightly weathered					LS/SH
	LIMESTONE, banded, medium bedded, solid, hard, medium gray; unweathered					LS
30	LIMESTONE and SHALE, interbedded; limestone is banded, medium bedded, hard, medium gray; shale is very soft to medium soft, dark gray Borehole diameter from 26.4 to 46.7 feet bgs = 3 7/8" RQD for 26.4 - 36.4' = 72% (Fair) Recovery = 116/120"	364	16	116/120		LS/SH
35	SHALE, banded, medium bedded, solid, soft to medium soft, dark gray	359				SH
40	LIMESTONE, banded, massive, solid, hard to very hard, light to medium gray	354	17	118/120		LS
45	RQD for 36.4 - 46.4' = 96% (Excellent) Recovery = 118/120"	349				
	END BOREHOLE AT 46.7 FEET BLS					
50						



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KELRON
ENVIRONMENTAL
INCORPORATED

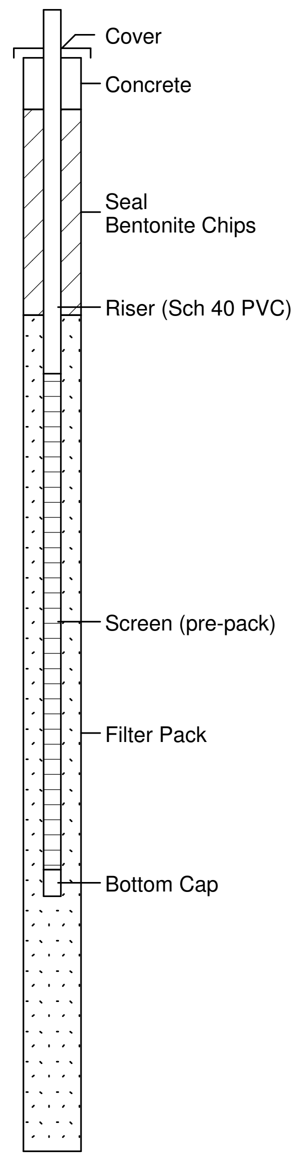
LOG OF BORING MW-151

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/21/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 397.22
Sampling Method	: MacroCore (60")	Top of Casing Elevation	399.96
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2381171, 554221

Depth in Feet	DESCRIPTION	Surf. Elev. 397.22	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, light brown, dry	397	1	31/48		CL
			2		1.5	
			3		1.0	
			4		1.5	
			5	32/60		
5	SANDY CLAY, dark gray (10YR 4/1)	392	6		1.0	CL
	- moist		7		0.5	
	- moist to wet					
	- very dark gray-brown; grain size analysis @7.5-8 ft: 39% sand, 41.8% silt, 19.2% clay		8		1.0	
			9		2.5	
			10	46/60	2.5	
10	SILTY CLAY, yellowish-brown (10YR 5/1)	387	11		3.0	CL
			12		2.75	
	- two small light gray sandy seams		13		2.5	
			14		2.75	
	- 2-inch layer of dusky red CLAY (10R 3/2)		15	58/60	2.5	
15	CLAY, low plasticity, medium soft	382	16		2.5	CH
	- shaley, light olive brown (2.5Y 5/4) grading to olive gray; grain size analysis @16-17 ft:: 1%sand, 28.5% silt, 70.5% clay		17		3.5	
	- platy/laminated		18		2.75	
			19		2.75	
			20	24/27	2.5	
20	Refusal in bedrock at 21.5 feet BLS END BOREHOLE AT 21.5 FEET BLS	377	21		4.5+	
			22			
	LIMESTONE, no recovery					LS
	Drove split-spoon to 21.75 feet BLS - no recovery					
25						

Well: MW-151
Elev.: 399.96

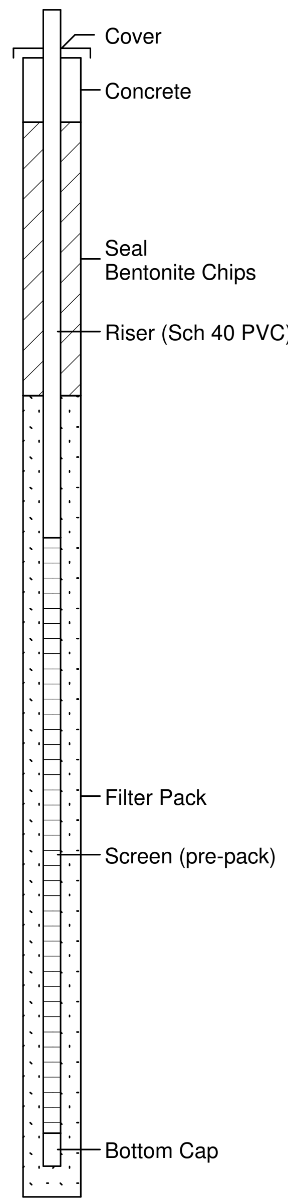


KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-152 (Page 1 of 1)

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 16 SE, NE, NE	Date Completed : 09/22/10 Hole Diameter : 8 1/2"OD / 4 1/4" ID Drilling Method : Hollow-Stem/Rotary (CME-550) Sampling Method : MacroCore (60") Drilling Company : PSC	Driller : Matt Cooper Geologist : Brendon Wilder (PSC) Land Surface Elevation: 422.18 Top of Casing Elevation 424.99 X,Y Coordinates : 2382779, 553906	

Depth in Feet	DESCRIPTION	Surf. Elev. 422.18	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted. Refer to boring log for adjacent nested well MW-352 for a description of subsurface materials.	422					
5		417					
10		412					
15		407					
	END BOREHOLE AT 17.7 FEET BLS						
20							

Well: MW-152
Elev.: 424.99

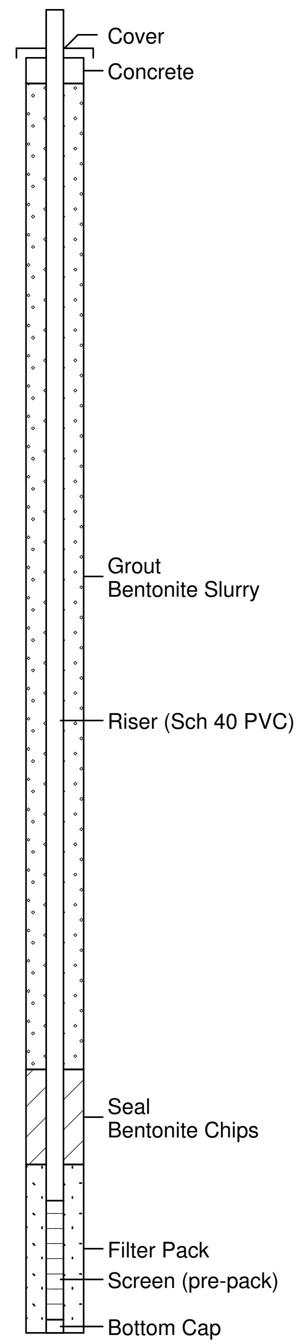


KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-252 (Page 1 of 1)

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 16 SE, NE, NE	Date Completed : 09/22/10 Hole Diameter : 8 1/2"OD / 4 1/4" ID Drilling Method : Hollow-Stem/Rotary (CME-550) Sampling Method : MacroCore (60") Drilling Company : PSC	Driller : Matt Cooper Geologist : Brendon Wilder (PSC) Land Surface Elevation: 422.27 Top of Casing Elevation 425.07 X,Y Coordinates : 2382784, 553904	

Depth in Feet	DESCRIPTION	Surf. Elev. 422.27	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted. Refer to boring log for adjacent nested well MW-352 for a description of subsurface materials.	422					
5		417					
10		412					
15		407					
20		402					
25		397					
30		392					
35		387					
40		382					
45		377					
50	END BOREHOLE AT 49.54 FEET BLS						

Well: MW-252
Elev.: 425.07



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KELRON ENVIRONMENTAL INCORPORATED	**LOG OF BORING MW-352** (Page 1 of 3)

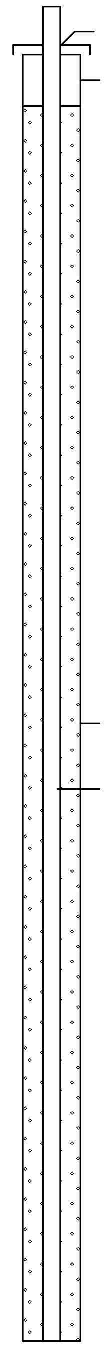
Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/16/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.36
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	425.04
Drilling Company	: PSC	X,Y Coordinates	: 2382789, 553901

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36	USCS
0	SILTY CLAY, very stiff to hard, yellow brown (10YR 5/6), dry	422	CL
5	CLAY, trace sand and fine gravel, very stiff, high plasticity, few black organic material	417	CL
10	- medium hard	412	
	- soft		
15		407	
	- medium hard		
	SAND, poorly graded, loose, wet (4-inch thick)		SP
	SANDY CLAY, trace fine gravel, yellow brown to olive brown (2.5Y 5/3)		CL
20		402	
25			

Samples	Recovery inches	Qp TSF
1	46/48	4.5+
2	60/60	3.5
3		4.0
4		2.75
5		3.0
6	60/60	2.75
7		2.0
8		1.0
9		1.25
10	60/60	1.5
11		2.5
12		2.75
13		3.5
14	60/60	4.5+
15		2.5
16		2.5
17		2.75
18	48/60	2.5

Well: MW-352
Elev.: 425.04



KELRON ENVIRONMENTAL INCORPORATED

LOG OF BORING MW-352

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/16/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.36
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	425.04
Drilling Company	: PSC	X,Y Coordinates	: 2382789, 553901

Well: MW-352
Elev.: 425.04

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36	Samples	Recovery inches	Qp TSF	USCS
25		397				CL
	- grain size analysis @ 26.5 - 27.5 ft: 33.7% sand, 27.1% silt, 39.2% clay		18	48/60	2.5	
	SAND with few gravel, yellow brown					SP
	CLAY, some sand and fine gravel, hard to very hard, high plasticity, dark yellow brown (10YR 4/6)					CL
			19	60/60	3.0	
30	CLAY, lean to fat	392	20		3.0	CL/CH
	- grain size analysis @ 32 - 33 ft: 13.2% sand, 43.9% silt, 42.8% clay		21		3.5	
			22		3.0	
35		387	23	48/60	1.5	
	- medium hard, high plasticity, gray brown to light olive brown (2.5Y 5/2-5/3)		24		1.5	
	- trace silt, dark yellow brown (10YR 4/4)		25		1.75	
			26		1.5	
40		382	27	54/60	1.75	
			28		2.0	
			29		2.5	
			30		2.5	
			31	57/60	2.0	
45		377	32		1.75	
			33		1.75	
	CLAY, medium hard, low plasticity, olive brown (2.5Y 5/4)		34		2.5	CL
			35		1.75	
			36	3/3		
50						

Grout
Bentonite Slurry

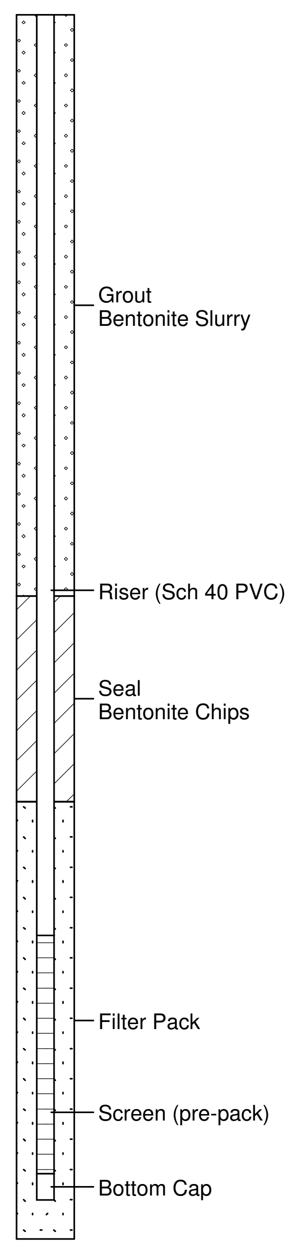
Riser (Sch 40 PVC)

KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-352

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 16 SE, NE, NE	Date Completed : 09/16/2010 Hole Diameter : 8 1/2"OD / 4 1/4" ID: 3 7/8" rock Drilling Method : Hollow-Stem/Rotary (CME-550) Sampling Method : MacroCore (60")/NX Core Drilling Company : PSC	Driller : Matt Cooper Geologist : Brendon Wilder (PSC) Land Surface Elevation: 422.36 Top of Casing Elevation 425.04 X,Y Coordinates : 2382789, 553901

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36	Samples	Recovery inches	Qp TSF	USCS
50		372				CL
	- Auger refusal at 53.7 feet bgs					
	LIMESTONE, weathered, thinly laminated, medium hard to hard, gray		37	5/5		LS
55		367	38	8/27		
	SHALE, clayey, gray					SH
	LIMESTONE, occasional shale partings		39	19/60		LS
60		362				
	- laminated, fossiliferous, medium gray		40	54/60		
	SHALE, soft, dark gray					SH
65		357				
	LIMESTONE, medium hard to hard, light gray		41	59/60		LS
70	Borehole diameter from 53.7 to 73.8 feet bgs = 3 7/8"	352				
	RQD for 53.8 - 73.8' = 57% (Fair) Recovery = 173/240"		42	33/34		
	END BOREHOLE AT 73.8 FEET BLS					
75						

Well: MW-352
Elev.: 425.04



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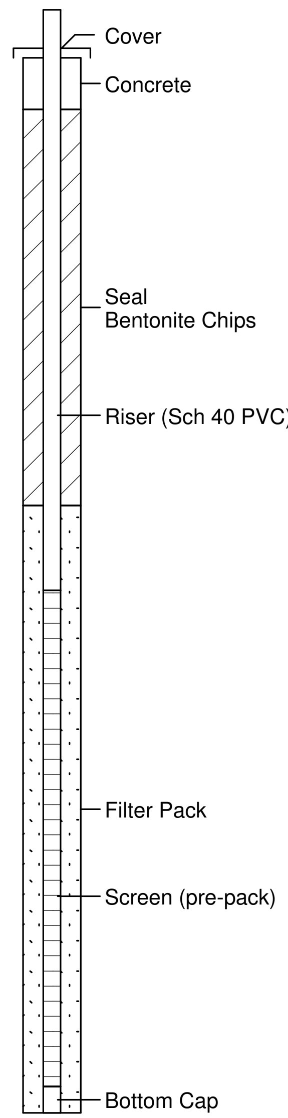
KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-153 (Page 1 of 1)

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 15 SW, SW, NE	Date Completed : 09/22/2010 Hole Diameter : 8 1/2"OD / 4 1/4" ID Drilling Method : Hollow-Stem/Rotary (CME-550) Sampling Method : MacroCore (60") Drilling Company : PSC	Driller : Matt Cooper Geologist : Brendon Wilder (PSC) Land Surface Elevation: 442.77 Top of Casing Elevation 445.67 X,Y Coordinates : 2384435, 553298	

Depth in Feet	DESCRIPTION	Surf. Elev. 442.77	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted Refer to boring log for adjacent nested well MW-253 for a description of subsurface materials	442					
5		437					
10		432					
15		427					
20	END BOREHOLE AT 20.5 FEET BLS	422					
25							

Well: MW-153
Elev.: 445.67



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KELRON ENVIRONMENTAL
INCORPORATED

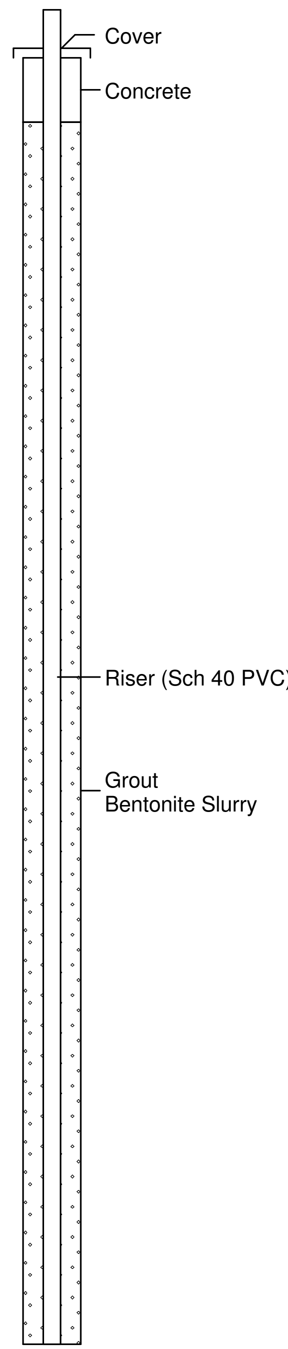
LOG OF BORING MW-253

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 15 SW, SW, NE

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 442.70
Sampling Method	: MacroCore (60")	Top of Casing Elevation	445.84
Drilling Company	: PSC	X,Y Coordinates	: 2384430, 553298

Depth in Feet	DESCRIPTION	Surf. Elev. 442.70	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	SILTY CLAY, trace gravel, hard, light brown, dry	442	1	25/48	4.5+	CL	
			2		4.5+		
5	- hard, medium plasticity, gray (2.5Y 6/1) with yellow-brown mottling (10YR 5/6), moist	437	3	47/60	4.5		
			4		4.5		
			5		4.5		
10		432	6	53/60	4.5		
	CLAY (fat) with SAND, trace gravel, dark yellow brown with light gray mottling, mottling decreases with depth - grain size analysis @ 11 - 12 ft: 0.7% gravel, 16.4% sand, 41.4% silt, 41.4% clay		7		4.0	CH	
			8		4.0		
			9		3.0		
15		427	10	52/60	4.5		
			11		3.5		
			12		3.5		
	- soft		13		2.0		
	CLAY (lean) with SAND, trace gravel, stiff to hard, medium plasticity, dark yellow brown		14	60/60		CL	
20							

Well: MW-253
Elev.: 445.84



KELRON ENVIRONMENTAL INCORPORATED

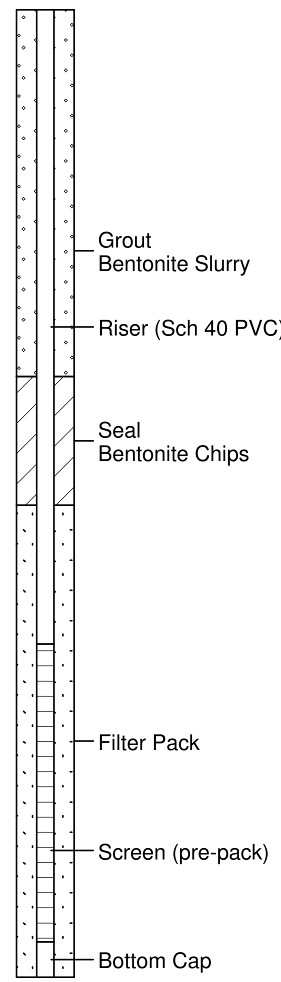
LOG OF BORING MW-253

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 15 SW, SW, NE

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 442.70
Sampling Method	: MacroCore (60")	Top of Casing Elevation	445.84
Drilling Company	: PSC	X,Y Coordinates	: 2384430, 553298

Depth in Feet	DESCRIPTION	Surf. Elev. 442.70	Samples	Recovery inches	Qp TSF	USCS
20	- grain size analysis @ 19 - 19.5 ft: 0.7% gravel, 26.9% sand, 38.1% silt, 34.3% clay	422	14	60/60		CL
25	- small fine sand seams from 25 to 27 feet	417	15	60/60		
	CLAY (fat), shaley, platy/laminated, soft, low plasticity, light yellow brown (10YR 6/4)		16		3.5	CH
	- stiff to very stiff, light olive brown (2.5Y 5/4) - grain size analysis @ 29 - 30 ft: 6.7% sand, 21.6% silt, 71.7% clay		17		3.0	
30		412	18	60/60	4.5	
			19		3.5	
	- Drove split-spoon 2-inches into bedrock: 34.5 to 34.7 feet bls		20		3.0	
	LIMESTONE with SHALE		21	2/2		LS/SH
35	Auger refusal at 35.0 feet END BOREHOLE AT 35.0 FEET BLS	407				
40						

Well: MW-253
Elev.: 445.84



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KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-154

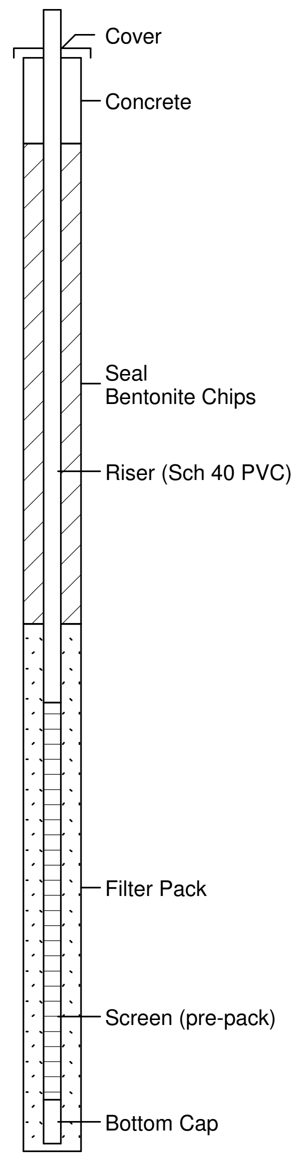
Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, NE, SW

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 384.99
Sampling Method	: MacroCore (60")	Top of Casing Elevation	387.76
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2377892, 557163

Depth in Feet	DESCRIPTION	Surf. Elev. 384.99	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, hard, very dark gray (10YR 3/1), dry	384	1	35/48		CL
	CLAY, black, moist					CH
5		379	2	44/60		
	SANDY CLAY with gravel, very stiff to hard, low plasticity, dark gray with yellow-brown mottling, dry - grain size analysis @ 8-9.2 ft: 17.4% gravel, 30.5 %sand, 18.8% silt, 33.4% clay					CL
10		374	3	24/42		
	CLAY, shaley, gray with light olive-brown mottling - grain size analysis @ 11-12 ft: 12.5% sand, 23% silt, 64.5% clay Refusal in bedrock at 12.5 feet BLS					CH
	LIMESTONE		4	1/6		LS
	Drove split-spoon to 12.75 feet BLS - 1-inch recovery END BOREHOLE AT 12.75 FEET BLS					
15						

GRAPHIC

Well: MW-154
Elev.: 387.76



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KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-155

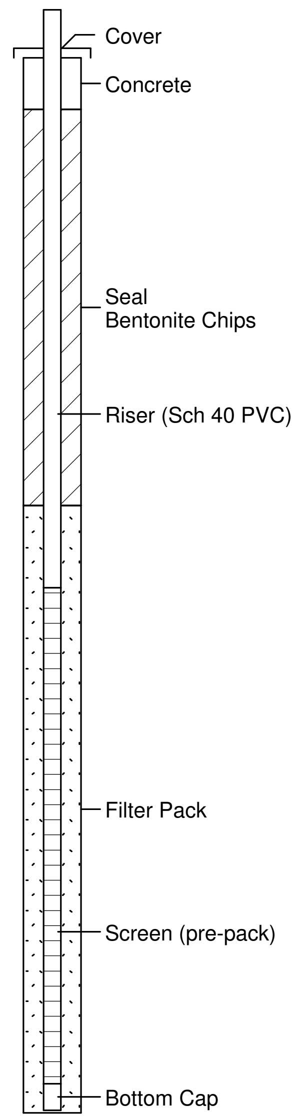
(Page 1 of 1)

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, SE, SW

Date Completed	: 09/10/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 390.62
Sampling Method	: MacroCore (60")	Top of Casing Elevation	393.55
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378141, 555983

Depth in Feet	DESCRIPTION	Surf. Elev. 390.62	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, hard, reddish brown, dry	390	1, 2, 3, 4	40/48	4.5	CL
5	CLAY (lean), hard, low plasticity, pale brown (10YR 6/3), grading to Fat CLAY - grain size analysis @ 7 - 8 ft: 2.5% sand, 47.2% silt, 50.3% clay	385	5, 6, 7, 8	53/60	4.5+	CL/CH
	SANDY CLAY, dry		9		0.75	CL
	SAND, 4-inch seam, poorly graded, loose					SP
10	CLAY with sand grading to SANDY CLAY, very soft, moist	380	10, 11, 12, 13, 14, 15, 16, 17	44/60 50/60	1.5 1.5 0.5	CL
15		375				
	CLAYEY SAND, poorly graded, dark yellow brown - grain size analysis @ 18.5 - 19.5 ft: 53.9 %sand, 28.1% silt, 18.0% clay		18, 19, 20		1.5	SC
20	END BOREHOLE AT 20.5 FEET BLS	370				
25						

Well: MW-155
Elev.: 393.55



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KELRON ENVIRONMENTAL INCORPORATED

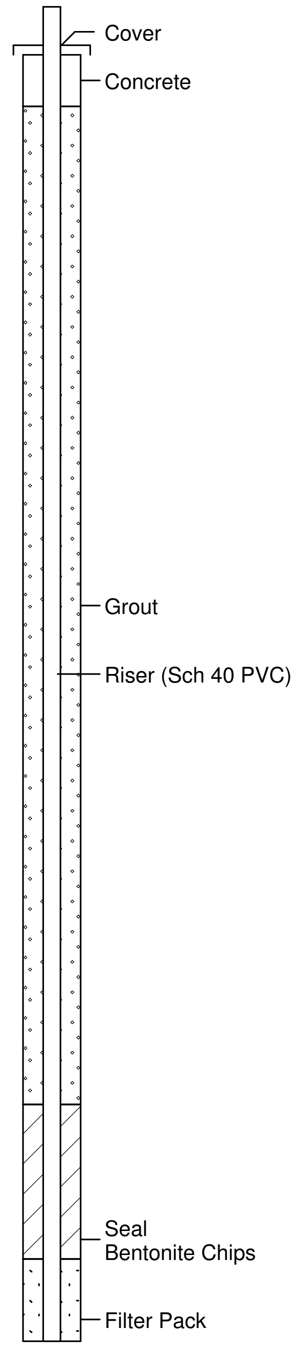
LOG OF BORING MW-355

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, SE, SW

Date Completed	: 09/14/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID; 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 390.82
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	393.69
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378145, 555980

Depth in Feet	DESCRIPTION	Surf. Elev. 390.82	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring to 20 feet below ground surface. Refer to boring log for adjacent well MW-155 for description of subsurface materials to 20 feet.	390					
5		385					
10		380					
15		375					
20	CLAYEY SAND, poorly graded, dark yellow brown, wet	370	1	23/23	3.5	SC	
	CLAY, lean, very stiff, gray with yellow-brown mottling - Auger refusal at 22.1 feet bgs					CL	
	LIMESTONE, lightly weathered, fine grained, slightly fossiliferous, medium soft, light gray banded with light red staining along horizontal fractures; three small shale lenses within 31 inch interval - coarse grained, medium soft to hard		2	108/124		LS	
25							

Well: MW-355
Elev.: 393.69



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KELRON ENVIRONMENTAL INCORPORATED

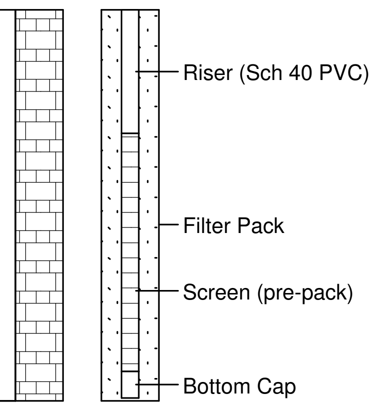
LOG OF BORING MW-355

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, SE, SW

Date Completed	: 09/14/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID; 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 390.82
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	393.69
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378145, 555980

Depth in Feet	DESCRIPTION	Surf. Elev. 390.82	Samples	Recovery inches	Qp TSF	USCS
25	- fine grained, slightly fossiliferous, light gray Borehole diameter from 22.1 to 32.6 feet bls = 3 7/8" RQD for 22.1 - 32.6' = 57% (Fair)	365	2	108/124		LS
30		360				
	END BOREHOLE AT 32.6 FEET BLS					
35		355				
40		350				
45		345				
50						

GRAPHIC



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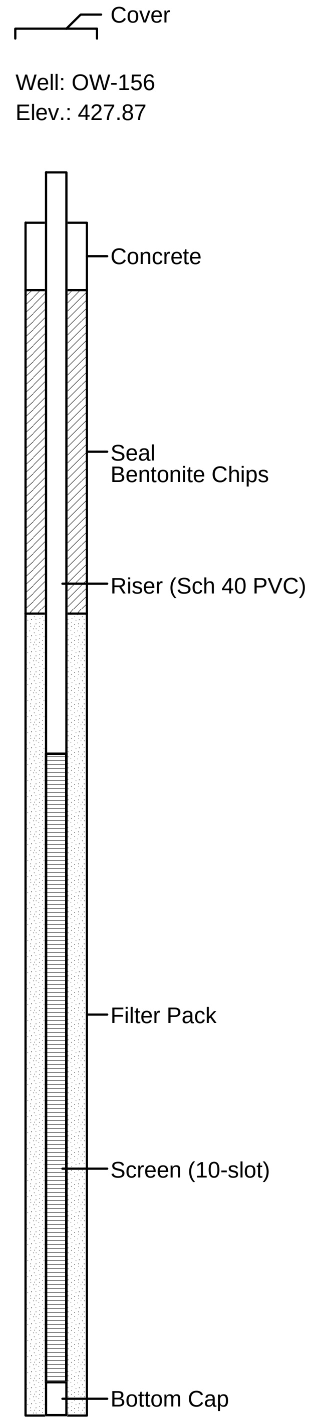
KELRON ENVIRONMENTAL
Incorporated

LOG OF BORING OW-156

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 NW, NW, SW

Date Completed	: 09/10/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation:	425.14
Sampling Method	: MacroCore (60")	Top of Casing Elevation:	427.87
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378141, 555983

Depth in Feet	DESCRIPTION	Surf. Elev.425.15	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, stiff, medium brown, dry	425				
			1	32/48	2.5	
			2		1.5	
			3		3.5	
			4		1.75	
5	- stiff to very stiff, low plasticity	420	5	56/60	2.0	
			6		1.75	
	- dark gray-brown (10YR 3/3) with light brown mottling (10YR 6/3)		7		1.75	
			8		1.75	
			9		2.25	CL
10	CLAY (lean) with Sand, soft to medium, light brown (10YR 6/3) with brown-yellow mottling (10YR 6/6), moist	415	10	60/60	1.0	
			11		1.5	
			12		1.75	
			13		1.75	
			14		1.5	
15		410	15	50/60	2.25	
			16		2.0	
			17		2.5	
	END BOREHOLE AT 17.7 FEET BLS		18		1.25	
	Terminated probing with MacroCore at 19.5 feet bls		19			
20						



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KELRON
ENVIRONMENTAL
INCORPORATED

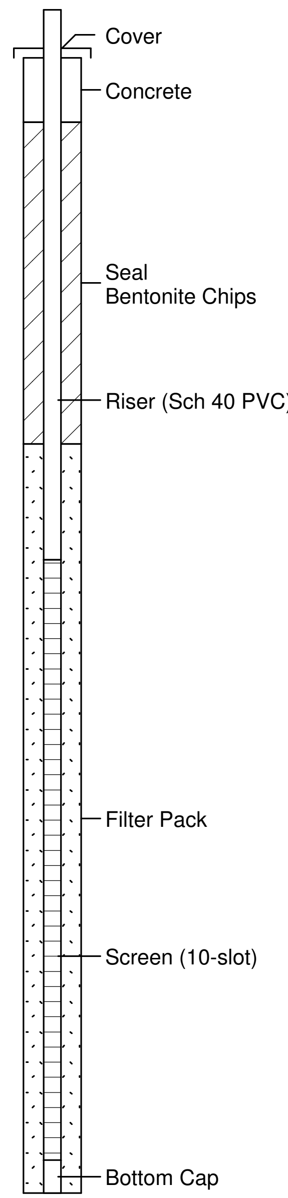
LOG OF BORING OW-157

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SW, SW

Date Completed	: 09/9/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 432.64
Sampling Method	: MacroCore (60")	Top of Casing Elevation	429.90
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2382593, 556189

Depth in Feet	DESCRIPTION	Surf. Elev. 429.90	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY with Fly Ash, dark gray-brown, dry	429	1	48/48		CL/FL
5	CLAY with Silt, hard, medium plasticity, light olive brown, moist	424	2	60/60		CH
10	CLAY with Sand, stiff, wet	419	3	60/60		CL
	CLAY, trace to some Sand, very stiff to hard, medium to high plasticity					CL/CH
15	END BOREHOLE AT 17.5 FEET BLS	414	4	60/60		
20	Terminated probing with MacroCore at 19.5 feet bls					

Well: OW-157
Elev.: 432.64



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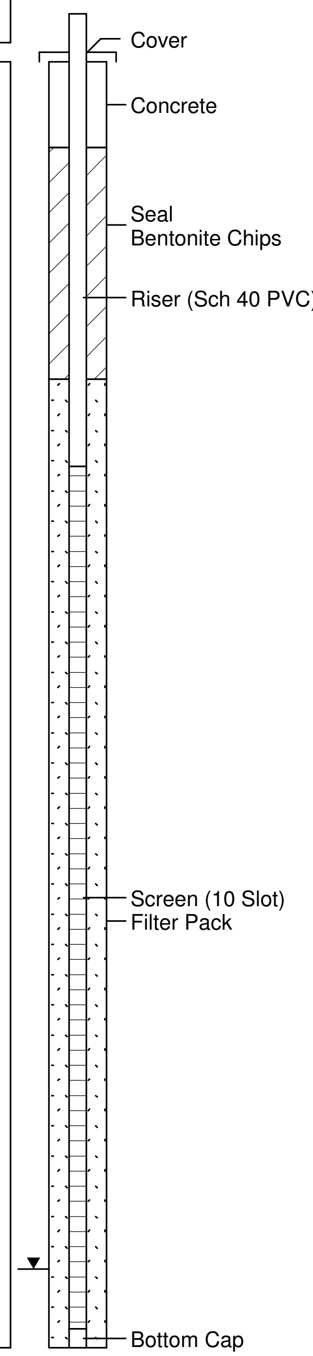
KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-104SR (Page 1 of 1)

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 10 SE, SE, SE	Date Completed : 07/26/11 Hole Diameter : 7 3/4"OD; 3 3/4" ID Drilling Method : Hollow-Stem (CME-550) Sampling Method : MacroCore (60") Drilling Company : Terra Drill, Inc.	Driller : Matt Cooper Geologist : Stu Cravens (Kelron) Land Surface Elevation: 452.52 Top of Casing Elevation 455.54 X,Y Coordinates : 2386609, 554205

Depth in Feet	DESCRIPTION	Surf. Elev. 452.52	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted Refer to boring log for adjacent nested well MW-104DR for a descriptionof subsurface materials						
		450					
5							
		445					
10	(Slotted screen interval = 9.40 ft)						
		440					
	- groundwater level at completion = 14.06' bls						
15	END BOREHOLE AT 15 FEET BLS						

Well: MW-104SR
Elev.: 455.54



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KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-104DR

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SE, SE

Date Completed	: 07/25/11	Driller	: Matt Cooper
Hole Diameter	: 7 3/4"OD; 3 3/4" ID	Geologist	: Stu Cravens (Kelron)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 452.62
Sampling Method	: MacroCore (60")	Top of Casing Elevation	455.62
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2386609, 554201

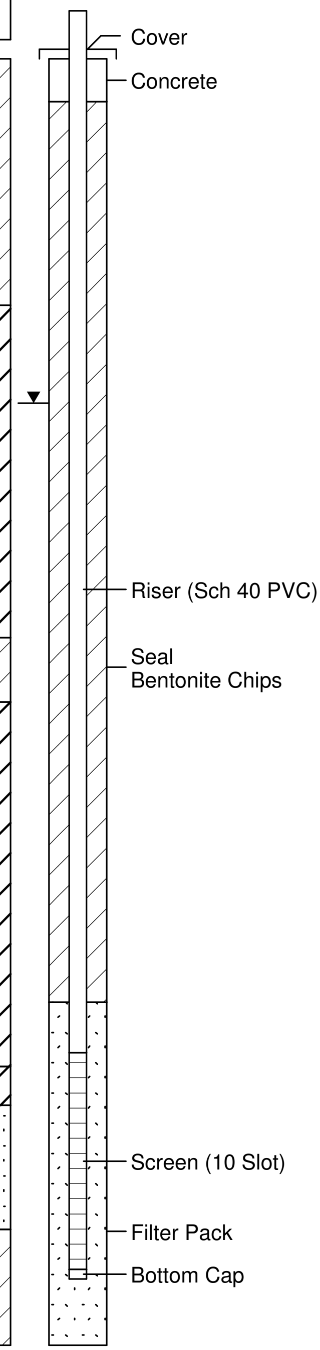
Depth in Feet	DESCRIPTION	USCS
0 – 5.75	SILTY CLAY, trace sand, med plasticity, organics and roots, dry hard, light gray (Gley1-7/1) with brown mottling (Fe-oxidation) (10YR 3/1), dry - moist	CL
5.75 – 13.5	CLAY (Fat) with Silt, high plasticity, soft to very soft, high organics and roots, dark gray grading to gray with brown mottling, moist - groundwater level at completion = 8.03' bls - medium hardness - light gray (GLEY1-7/1) with yellow-brown Fe-oxid mottling (10%)	CH
13.5 – 15	CLAY (lean) with Silt, medium plasticity, light gray with yellow-brown mottling (10%)	CL
15 – 23.5	CLAY with Silt, trace sand and fine gravel, high plasticity, medium to stiff, light gray with brown mottling (20%) - trace sand and gravel, medium to high plasticity, medium to stiff hardness, mottling 25 to 50%	CH
23.5 – 24.25	SANDY FAT CLAY, fine sand, trace fine gravel, high plasticity, greenish gray (GLEY-6/1), moist	CH
24.25 – 27.25	SAND (fine to medium), trace gravel, poorly graded, light gray, wet - brown (Slotted screen interval = 4.52 ft)	SP
27.25 – 30	SILTY CLAY, trace sand and gravel (angular), medium plasticity, very stiff, olive brown (2.5Y 4/4) with light gray mottling <20%, moist (TILL)	CL

Surf. Elev. 452.62 — elevation ticks: 450, 445, 440, 435, 430, 425

Samples	Recovery inches	Qp TSF
1		>4.5
2		>4.5
3	60/60	3.5
4		2.5
5		2.5
6		2.5
7		2.5
8	60/60	1
9		1
10		1
11		1.75
12		2.25
13	60/60	2.25
14		3.0
15		2.5
16		3.75
17		2.75
18	60/60	3.5
19		3.5
20		3
21		3
22		2.5
23	60/60	2.5
24		2.5
25		2.5
26		
27		2.5
28	60/60	
29		4.0
30		4.5

GRAPHIC

Well: MW-104DR
Elev.: 455.62



KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-104DR

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SE, SE

Date Completed	: 07/25/11	Driller	: Matt Cooper
Hole Diameter	: 7 3/4"OD; 3 3/4" ID	Geologist	: Stu Cravens (Kelron)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 452.62
Sampling Method	: MacroCore (60")	Top of Casing Elevation	455.62
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2386609, 554201

Well: MW-104DR
Elev.: 455.62

Depth in Feet	DESCRIPTION	Surf. Elev. 452.62	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
30	SHALE, highly weathered; Clay with Silt, platy /laminated, medium to high plasticity, very stiff, moist		31	60/60	3.0	~~CL~~ SH	
		420	32				
			33				
			34		3.5		
	- unweathered, light gray, fissile, dry		35				
35	END BOREHOLE AT 35 FEET BLS						
		415					
40							
		410					
45							
		405					
50							
		400					
55							
		395					
60							

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RECORD OF SUBSURFACE EXPLORATION

MONITORING WELL BAMW-104D

PROJECT: IP BALDWIN
PHASE II

JOB NO.: 122487

DATE DRILLED: 11/26/90

DRILLING METHOD: H.S.A.

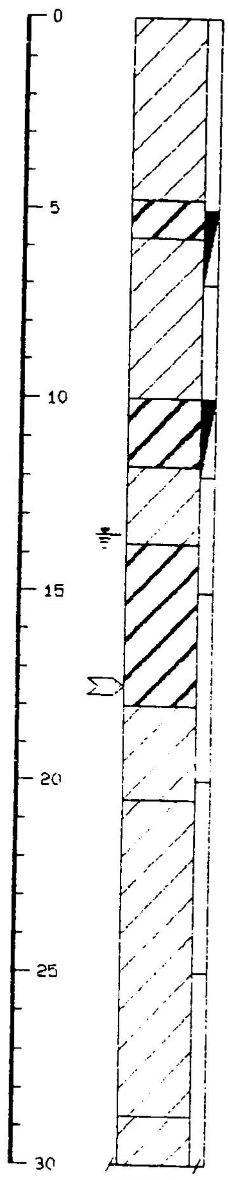
DRILLED BY: Brotcke

LOGGED BY: Duncan

MONITORING WELL INSTALLED: Yes

GROUNDWATER: During Drilling - 17.5 Feet
At completion - 11.3 Feet
0.3 Hours after completion - 13.5 Feet

ELEVATION / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA



USCS	DESCRIPTION	REMARKS	RECOVERY RATIO in/in	PENETROMETER, HAND, tsf
CL	Gray-Brown Silty CLAY Trace Sand		53/60	
CH	Gray-Brown CLAY w/Silt Trace Sand		22/24	
CL	Gray-Brown Silty CLAY Trace Sand			
	-Trace Gravel 7.5-9.0'		36/36	
	-Dark Gray-Brown below 9.0'			
CH	Gray-Brown CLAY w/Silt Trace Sand		12/24	
CL	Gray-Brown Silty CLAY Trace Sand		41/36	
CH	Gray-Brown CLAY w/Silt Trace Sand		62/60	
CL	Gray-Brown Silty CLAY Trace Sand			
SC	Gray-Brown Clayey SAND Trace Gravel		60/60	
		Particle Size Curve No. 9 Liquid Limit - 26 Plastic Limit = 15 Natural Moisture = 23.5% Organic Content - 6.4% Specific Gravity = 2.66 Note: Above analysis run on sample from 23.5-24.0'	62/60	
CL	Gray-Brown Silty CLAY Trace Sand			

RECORD OF SUBSURFACE EXPLORATION

MONITORING WELL BAMW-104D

PROJECT: IP BALDWIN
PHASE II

JOB NO.: 122487

DRILLING METHOD: H.S.A.

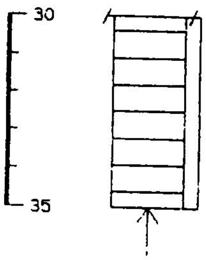
DATE DRILLED: 11/26/90

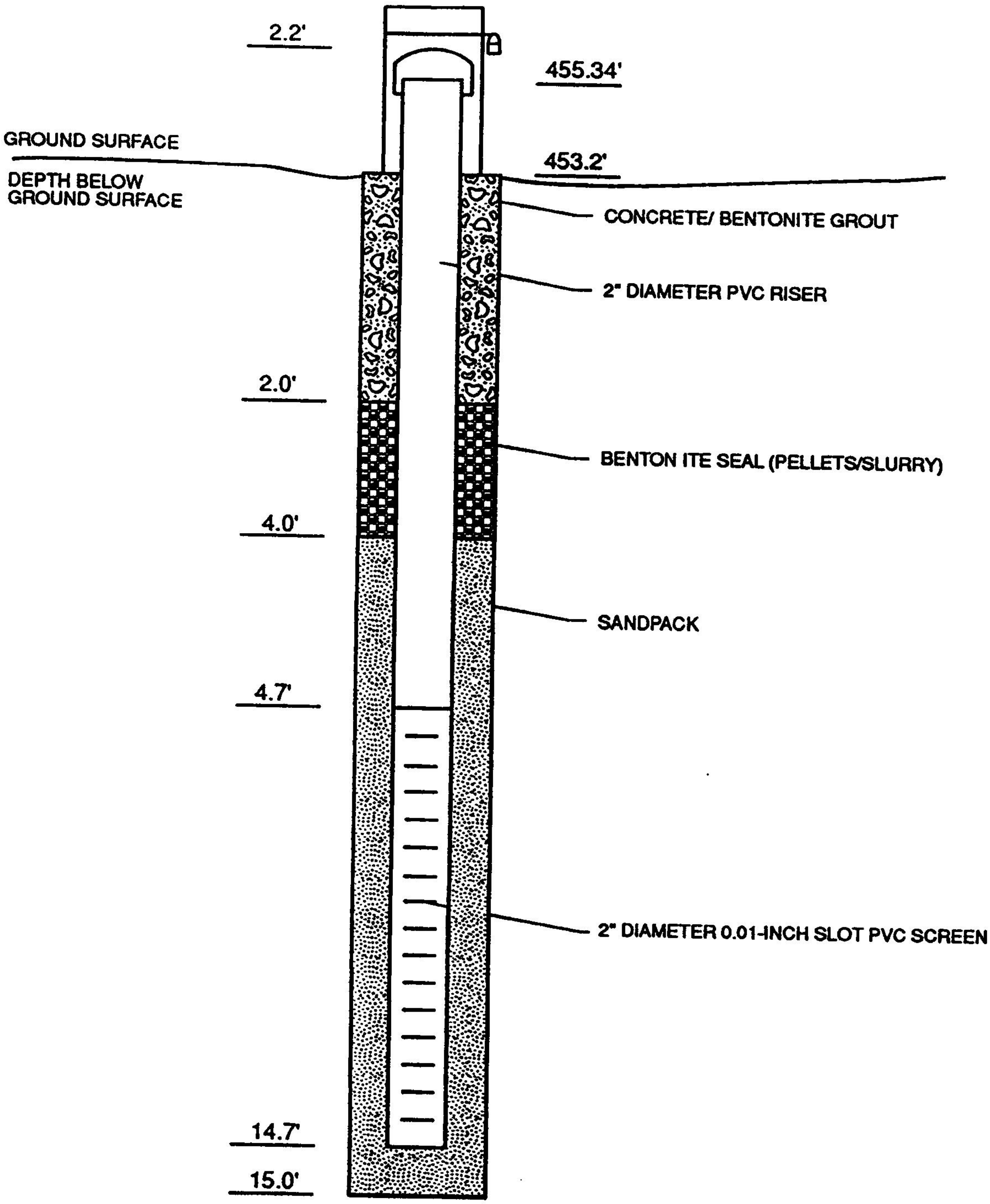
DRILLED BY: Brotcke

LOGGED BY: Duncan

GROUNDWATER: During Drilling - 17.5 Feet
At completion - 11.3 Feet
0.3 Hours after completion - 13.5 Feet

MONITORING WELL INSTALLED: Yes

ELEVATION / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	REMARKS	RECOVERY RATIO in/in	PENETROMETER, HAND, tsf
30–35			Gray-Brown Highly Weathered Clayey SHALE		60/60	



NOT TO SCALE

Burlington Environmental Inc.	
BAMW -104S MONITORING WELL CONSTRUCTION DIAGRAM	
BALDWIN FGD SOLID WASTE MANAGEMENT FACILITY 123558	BAMW-104S

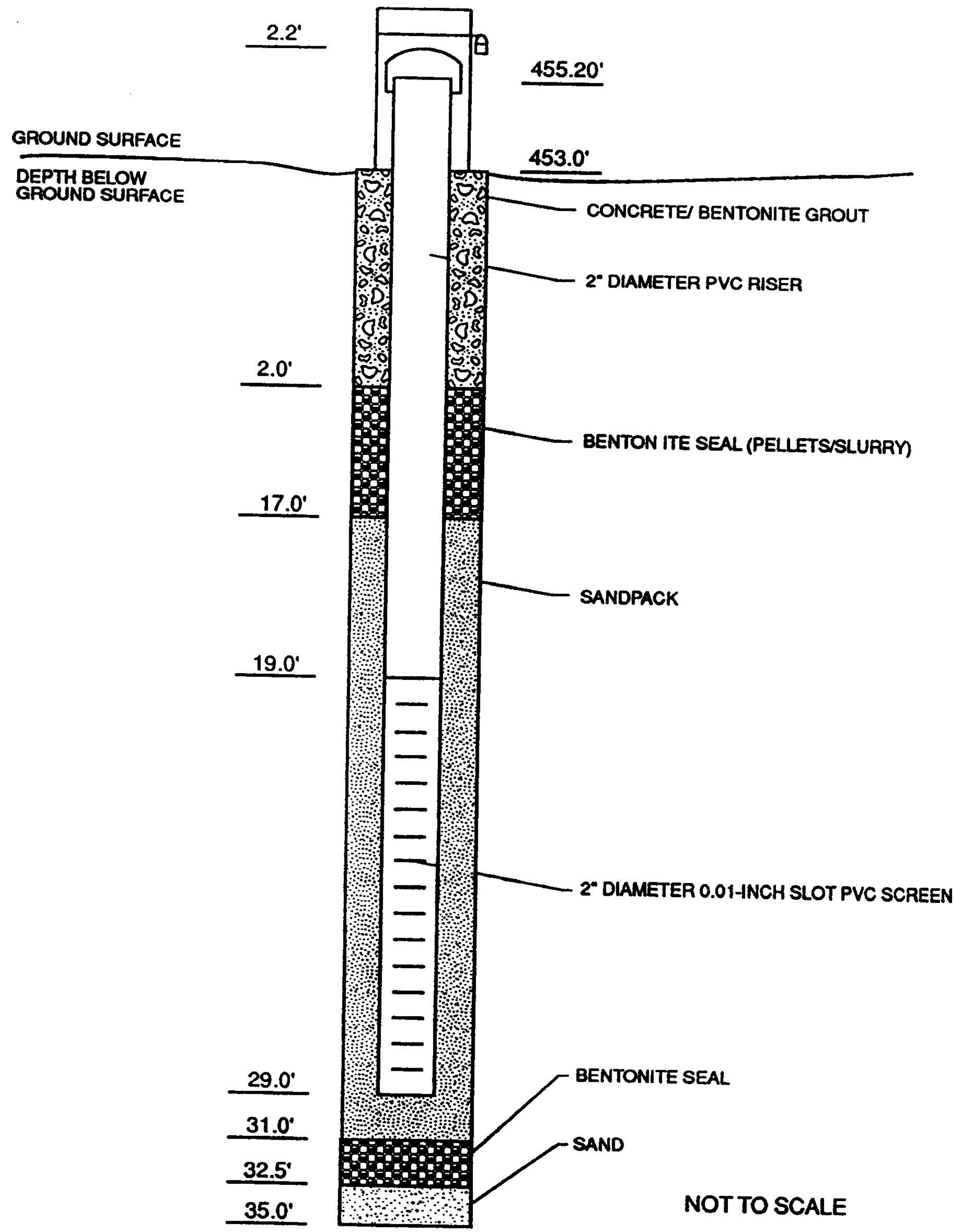
PROJECT MANAGER

PROJECT MANAGER

CHECKED BY

DRAWN BY

MA
REV. DATE 1/28/02



NOT TO SCALE

PROJECT MANAGER

PROJECT MANAGER

CHECKED BY

DRAWN BY

MB
REV. DATE 1/29/92

Burlington Environmental Inc.	
BAMW -104D MONITORING WELL CONSTRUCTION DIAGRAM	
BALDWIN FGD SOLID WASTE MANAGEMENT FACILITY 123558	BAMW-104D

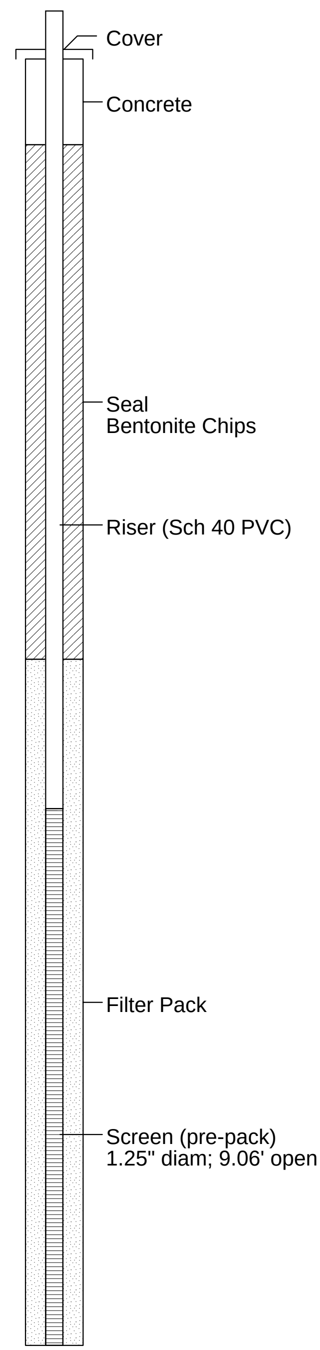
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-158 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 453.26
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 456.26
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2387752, 556741

Depth in Feet	DESCRIPTION	Surf. Elev. 453.26	Samples	Recovery inches	Qp TSF	USCS
0	Silty Loam with roots, stiff, non-plastic, pale brown (10YR 6/3), dry		1	60/60	2	CL
	- dark brown (10YR 3/3)		2		2.75	
	Silty CLAY, very stiff, low plasticity, gray (10YR 5/1) with yellowish-brown mottling, moist		3		3.75	CL
		450	4		3.5	
	- 25-50% mottling w/ black oxidation staining		5		4.5	
5	- high plasticity, <25% mottling		6	60/60	2.5	
			7		2.5	
			8		1.25	
		445	9		1.25	
			10		1.75	
10			11	60/60	1.75	
			12		3.5	
	- trace fine-medium sand, brownish yellow mottling (10YR 6/8)					
	- trace fine-coarse sand and fine gravel (angular to sub-angular)		13		2.25	
	- few to little sand and gravel, very stiff, 50-75% mottling	440	14		2.75	
			15		2.5	
15	- high plasticity					

Well: TPZ-158
Elev.: 456.26



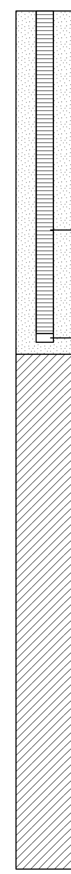
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-158 (Page 2 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 453.26
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 456.26
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2387752, 556741

Depth in Feet	DESCRIPTION	Surf. Elev. 453.26	Samples	Recovery inches	Qp TSF	USCS
15	- high plasticity		16	60/60	1.0	CL
	- trace fine to medium sand, soft, light gray (10YR 6/1) with 50-75% brownish-yellow mottling		17		0.75	
	Sandy CLAY (fine to medium sand) with trace fine-coarse gravel (<1"), very soft		18		- -	
	SAND, fine to coarse, well graded, brownish-yellow (10YR 6/8), wet	435				SW
	Sandy CLAY (fine-coarse sand) with gravel, hard, non-plastic, moist		19		>4.5	CL
20	Silty CLAY with trace sand and gravel, hard, medium to high plasticity, very pale brown (10YR 7/3)		20		>4.5	
	- very soft, high plasticity		21	60/60	<0.5	
	SAND, fine to coarse, well graded, yellowish-brown (10YR 5/8), wet		22		- -	SW
			23		- -	
		430	24		- -	
	Silty CLAY with trace fine to coarse sand, hard, brownish-yellow (10YR 6/6), moist		25		4.0	CL
25	SHALE, weathered, gray (10YR 6/1), dry at 24.75' - platy/laminated, dark gray (10YR 4/1), at 24.9' - top of bedrock = 24.75' bls					SH
	END BOREHOLE AT 25 FEET BLS					
		425				
30						

Well: TPZ-158
Elev.: 456.26



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KELRON ENVIRONMENTAL
Incorporated

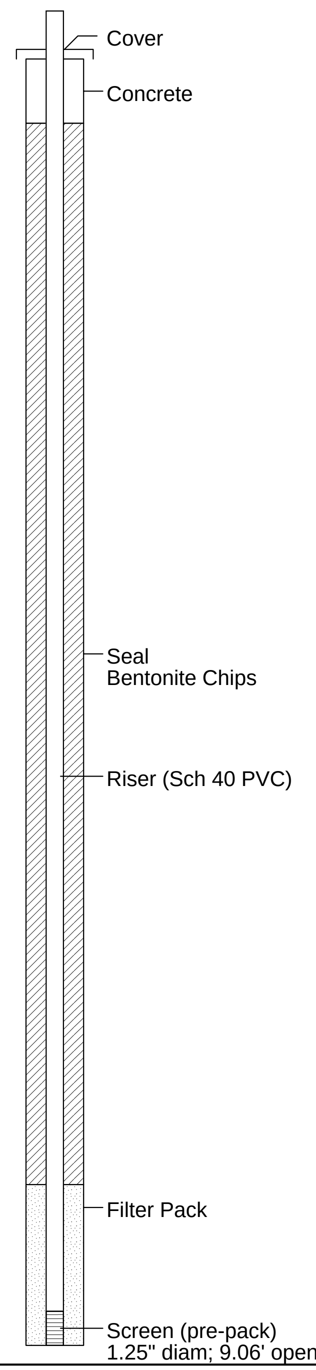
LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS
0	FILL - Bottom Ash with some clay and silt, soft, loose, dry					AR
	FILL - Silty CLAY with some bottom ash, sand, and gravel, hard, low-medium plasticity, yellowish brown (10YR 5/4) with variable brown to gray mottling		1	49/60	- -	FL/CL
5		440	2	7/42	- -	
			3	8/18	3.0	
10	- few bottom ash, very stiff, high plasticity, moist	435				
			4	0/60	- -	
15	Silty CLAY, trace fine-coarse sand, stiff, med plasticity, light yellowish brown (10YR 6/4), moist	430	5	60/60	2.5	CL
			6		3.25	
			7		1.75	
	- high plasticity, gray (10YR 5/1) with <10% yellowish-brown mottling		8		2.0	
20		425	9		3.0	

Well: TPZ-159
Elev.: 447.64



KELRON ENVIRONMENTAL
Incorporated

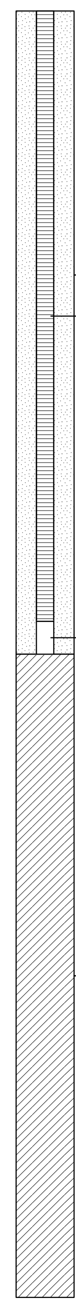
LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS
20	Silty CLAY, trace fine-coarse sand, stiff, med plasticity, light yellowish brown (10YR 6/4), moist		10	16/60	- -	CL
	- soft to medium hardness, yellowish-brown mottling with black manganese staining	420				
25			11	32/60	1.5	
			12		- -	
	- high plasticity, brown (10YR 5/3)		13		1.25	
			14		1.25	
	- trace fine-medium sand, very stiff, gray (10YR 6/1) with 10-25% yellowish-brown mottling (10YR 5/6)	415	15		2.75	
30			16	49/60	- -	
	- no sand, brown		17		1.5	
			18		1.0	
	- trace sand, gray (10YR 6/1) with 10-25% yellowish-brown mottling		19		2.0	
	- trace fine-coarse sand and gravel (sub-angular to sub-rounded)	410	20		2.0	
35	- stiff, medium plasticity, pale brown (10YR 6/3) with <10% gray mottling		21	60/60	2.5	
			22		2.0	
			23		1.0	
			24		0.5	
	- few fine-coarse sand and fine gravel, very stiff, yellowish brown (10YR 5/8)	405	25		3.0	
40	- hard, non-plastic, dry					

Well: TPZ-159
Elev.: 447.64



KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Well: TPZ-159
Elev.: 447.64

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
40	- trace sand and gravel, very stiff, high plasticity, brown (10YR 5/3) to pale brown (10YR 6/3)		26	50/60	2.75	CL	
			27		- -		
			28		<0.5		
	SAND, fine to coarse, well graded, greenish gray (Gley1 10Y 5/1), wet (2.4 inch seam)	400	29		>4.5	SW	
45	Silty CLAY, trace sand, hard grading to very stiff, low plasticity grading to high plasticity, dark gray (Gley1 4/N), moist [TILL]		30	5/60	- -	CL	
		395	31		3.25		
50	END BOREHOLE AT 50 FEET BLS						
55		390					
60		385					

Seal of MacroCore hole
Bentonite Chips

KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-160

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

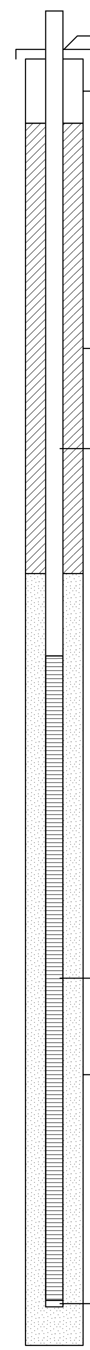
Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 428.59
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.49
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380230, 558046

Depth in Feet	DESCRIPTION	USCS
0 – 9.4	Silty CLAY with grass / roots, hard, non-plastic, pale brown (10YR 6/3), dry - gray (10YR 6/1) with reddish-brown mottling and black oxidation staining - very stiff, low plasticity, brown (10YR 4/3), moist - high plasticity, grayish brown (10YR 5/2) with 10-25% reddish-brown mottling' - gray (10YR 6/1), <10% mottling - 10-25% mottling, black organics	CL
9.4 – 13.8	Sandy SILT, fine sand, very soft, non-plastic, light brownish gray (10YR 6/2), wet Clayey SILT, trace fine sand, very soft, medium plasticity, gray (10YR 6/1)	ML
13.8 – 14.6	Silty CLAY, medium to high plasticity, gray with trace reddish-brown mottling, moist - 1-inch weathered zone with 75% yellowish-brown (10YR 5/8) mottling @ 14.5'	CL
14.6 – 18.5	SILT, gray (10YR 7/1), wet @ 14.9'	ML
18.5 – 20	CLAY, medium hardness,brown (10YR 5/3), moist - greenish gray (Gley1 10GY 5/1)	CL

Surf. Elev. 428.59: 425 (at ~3.6 ft), 420 (at ~8.6 ft), 415 (at ~13.6 ft), 410 (at ~18.6 ft)

Samples	Recovery inches	Qp TSF
1	58/60	4.5
2		3.25
3		3.0
4		3.0
5		2.25
6	58/60	1.5
7		1.0
8		1.0
9		1.0
10		1.0
11	41/60	- -
12		<0.5
13		<0.5
14		<0.5
15		1.25
16	16/60	- -
17		1.25
18		1.5

Well: TPZ-160
Elev.: 431.49



KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-160

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 428.59
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.49
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380230, 558046

Well: TPZ-160
Elev.: 431.49

Depth in Feet	DESCRIPTION	Surf. Elev. 428.59	Samples	Recovery inches	Qp TSF	USCS
20			19	24/60	- -	
	- gray (10YR 6/1)					
	- very soft, brown (10YR 5/3)	405	20		<0.5	
	- soft, greenish gray		21		1.25	
25						CL
			22	27/60	- -	
			23		0.75	
		400	24		1.0	
			25		1.5	
			26		2.5	
30	Silty CLAY with fine-coarse sand and fine gravel (sub-angular to sub-rounded), very stiff, greenish gray with reddish-brown mottling [TILL]					
			27	27/60	- -	
						CL
	- very soft, high plasticity, yellowish-brown (10YR 5/4)		28		0.5	
	- medium plasticity, greenish gray with 50-75% yellowish-brown mottling, moist	395	29		0.5	
			30		1.5	
35	Sandy CLAY, stiff, dark yellowish-brown (10YR 4/4) with <25% greenish-gray mottling, dry					CL
	END BOREHOLE AT 35 FEET BLS					
		390				
40						

Seal of MacroCore Hole
Bentonite Chips

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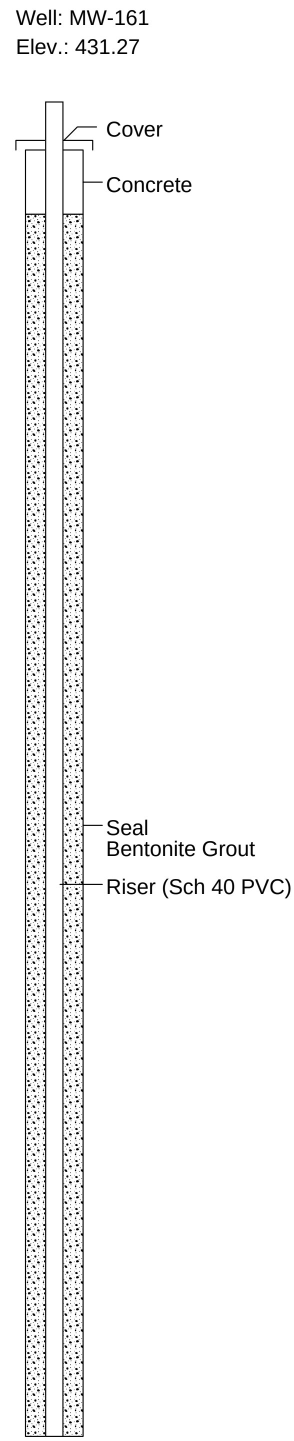
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-161

(Page 1 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS
0	FILL - Silt with clay, organics (roots), stiff, non-plastic, light yellowish brown (10YR 6/4), dry		1	38/42	2.75	FL/CL
			2		>4.5	
	SILT with clay, roots, hard, brownish yellow (10YR 6/6)		3		3.0	ML
	Silty CLAY with roots, very stiff, medium plasticity, with reddish-brown mottling and manganese staining, moist	425	4	60/60	2.0	CL
5			5		2.0	
	- medium hardness, medium to high plasticity, light brownish gray (10YR 6/2) with mottling and manganese staining		6		2.25	
			7		2.5	
			8		1.75	
	SILT, stiff, non-plastic, brownish yellow (10YR 6/6) - with clay, very soft, medium plasticity, wet	420	9	60/60	1.0	ML
10	Silty CLAY, stiff to very stiff, high plasticity, light brownish gray (10YR 6/2) with reddish brown and black mottling grading to light gray, moist		10		2.5	CL
			11		1.0	
	SILT, very soft, non-plastic, light brownish gray (10YR 6/2) - wet		12		0.75	ML
	Silty CLAY, stiff, medium plasticity, gray (10YR 6/1), moist		13		2.0	CL
		415	14	60/60	1.5	
15	- soft to medium hardness, high plasticity, yellowish brown (10YR 5/6)		15		1.25	
	- <25% mottling		16		1.5	
			17		1.25	
			18		2.25	
		410	19	60/60	2.0	
			20		1.0	
20						



KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-161 (Page 2 of 3)

LOG OF PROBEHOLE MW-161

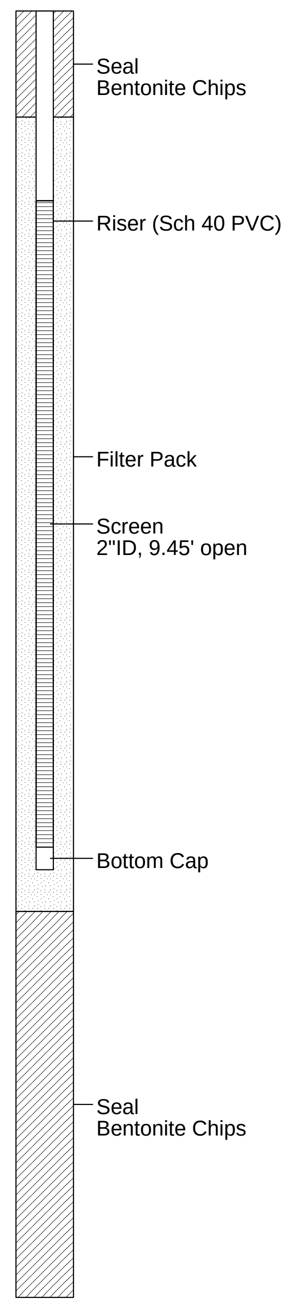
(Page 2 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS
20			20		1.0	CL
	SILT with clay, stiff, low plasticity, brownish yellow (10YR 6/8)		21		2.0	ML
	- soft, yellowish brown (10YR 5/4), wet		22		2.0	ML
	Silty CLAY, stiff, low to medium plasticity, pale brown (10YR 6/3) with reddish-brown mottling, moist		23		1.0	CL
	- soft to very soft, high plasticity, light yellowish brown - brown (10YR 5/3) with <10% reddish brown mottling	405	24	60/60	0.75	CL
25			25			CL
			26			CL
	- with fine sand		27		1.0	CL
			28			CL
	SAND with Silt, fine grained, gray-brown, wet	400	29	53/60		SP/SM
30			30			SP/SM
	<Sample MC161-32 @ 31.5-32.5'> grain size analysis: 89.8% Sand, 10.2% Silt		31			SP/SM
	- pale green (Gley1 5G 6/2)		32			SP/SM
	CLAY (lean), trace fine-medium sand, hard, low plasticity, greenish-gray (10GY 5/1), moist [TILL]		33		3.0	CL
	- medium to stiff, medium to high plasticity	395	34	60/60	2.5	CL
35			35		1.25	CL
			36		1.5	CL
			37		1.75	CL
			38		3.0	CL
	- trace sand, stiff to hard	390	39	44/60	2.0	CL
40			40		1.5	CL

Well: MW-161
Elev.: 431.27



KELRON ENVIRONMENTAL
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LOG OF PROBEHOLE MW-161

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
40			40		1.5	CL	
			41		2.0		
			42		1.5		
	Sandy SILT, medium hardness, non-plastic					ML	
	Silty CLAY with shale and fine-coarse limestone gravel (rounded to sub-rounded up to 1.5"), stiff to very stiff, greenish gray (Gley1 10Y 5/1)	385	43		2.0	CL	
			44	14/14	>4.5		
45	SHALE, laminated, hard, weathered (top of bedrock = 44.3' bls)					SH	
	END BOREHOLE AT 44.7 FEET BLS Refusal of Macrocore and Auger on top of competent bedrock						
		380					
50							
		375					
55							
		370					
60							

Well: MW-161
Elev.: 431.27

Seal
Bentonite Chips

KELRON ENVIRONMENTAL Incorporated

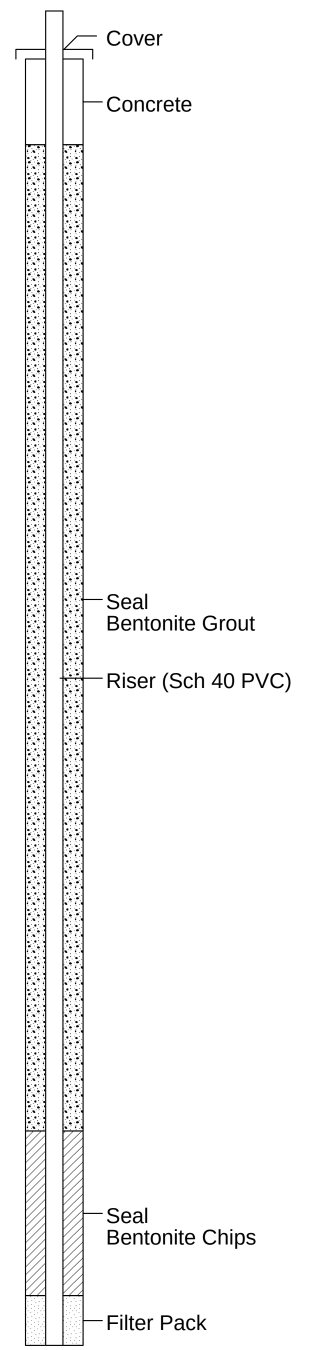
LOG OF PROBEHOLE MW-162

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/20/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.83
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.20
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555725

Depth in Feet	DESCRIPTION	Surf. Elev. 430.83	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continous Boring - no soil sampling conducted. Descriptions of subsurface materials on this log are from adjacent boring log for well MW-262.	430					
	Silty Clay with gravel, roots, stiff, non-plastic, pale brown (10YR 6/3), dry						
	- brownish yellow (10YR 6/6), moist					CL	
5	- medium stiff, high plasticity	425					
	SILT, very soft, non-plastic, light yellowish brown (10YR 6/4), moist [LOESS]						
10	- clayey, soft to medium hardness, low to medium plasticity	420				ML	
	- soft, yellowish brown (10YR 5/4)						
15	- non-plastic						

Well: MW-162
Elev.: 433.20



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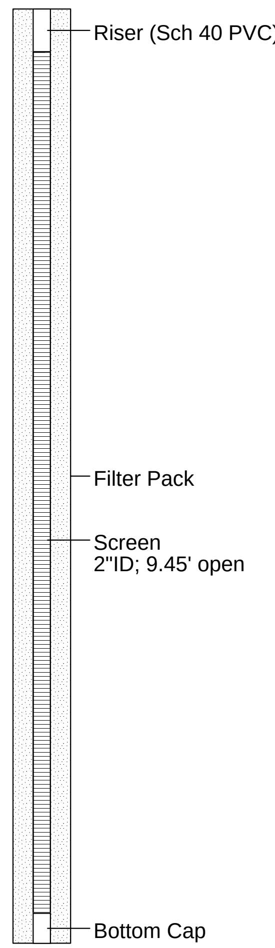
LOG OF PROBEHOLE MW-162

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/20/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.83
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.20
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555725

Depth in Feet	DESCRIPTION	Surf. Elev. 430.83	Samples	Recovery inches	Qp TSF	USCS
15		415				ML
	Sandy CLAY (lean), medium hardness, low to medium plasticity, yellowish brown, moist					CL
20	SILT, very soft, non-plastic, brownish yellow (10YR 6/6), moist	410				ML
	Silty CLAY, very soft, low plasticity - medium plasticity, wet					CL
25		405				
	END BOREHOLE AT 25.9 feet BLS					
30						

Well: MW-162
Elev.: 433.20



KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-163

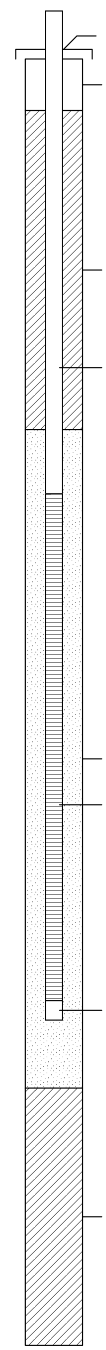
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 455.51
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 458.41
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2385507, 555798

Depth in Feet	DESCRIPTION	Surf. Elev. 455.51	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Silty clay loam with roots, loose, pale brown (10YR 6/3), dry (13" thick soil cover)						FL/CL
	FILL - Fly Ash, silty, loose very dark gray (10YR 3/1)						AR
	<Shelby Tube Sample ST163-3 @1.5-3.5'> grain size analysis (Ash - very dark brown): 51% Sand, 45.8% Silt, 3.2% Clay		1		9/24	- -	
5		450					
	- very soft, wet		2	1 0 1	18/18	<0.5	
10		445					
			3	1 0 1	18/18	<0.5	
15		440					
	Silty CLAY (lean to fat), trace fine sand, stiff, medium to high plasticity, gray (10YR 6/1) with 10-25% yellowish-brown mottling (10YR 6/8), moist		4	1 3 5	17/18	2.75	CL/CH
20		435					
	- very stiff		5	2 2 4	18/18	2.25	
25		430					

GRAPHIC

Well: TPZ-163
Elev.: 458.41



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LOG OF PROBEHOLE TPZ-163

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 455.51
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 458.41
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2385507, 555798

Well: TPZ-163
Elev.: 458.41

Depth in Feet	DESCRIPTION	Surf. Elev. 455.51	Samples	Blow Count	Recovery inches	Qp TSF	USCS
25							
	- dark yellowish brown <Shelby Tube Sample ST163-30 @ 28-30'> grain size analysis: 10.6% Sand, 51.2% Silt, 38.2% Clay		6		24/24	- -	CL/CH
30		425					
	Silty CLAY with trace fine-coarse sand and fine gravel, stiff to very stiff, high plasticity, brownish-yellow (10YR 6/6), moist [TILL]		7	2 2 5	18/18	2.5	
35		420					
	- medium plasticity, pale brown (10YR 6/3)						CL
			8	5 5 7	18/18	3.5	
40	- brownish-yellow (10YR 6/6) with 10-25% light gray mottling (10YR 6/1)	415					
	SHALE, platy/laminated with weathered clay layers; hard, gray (10YR 5/1) with 25-50% olive yellow clayey layers (2.5Y 6/6) (top of bedrock = 43.5' bls)		9	5 7 8	18/18	>4.5	SH
45	END BOREHOLE AT 45 FEET BLS	410					
50		405					

Seal of HSA hole
Bentonite Chips

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LOG OF PROBEHOLE TPZ-164

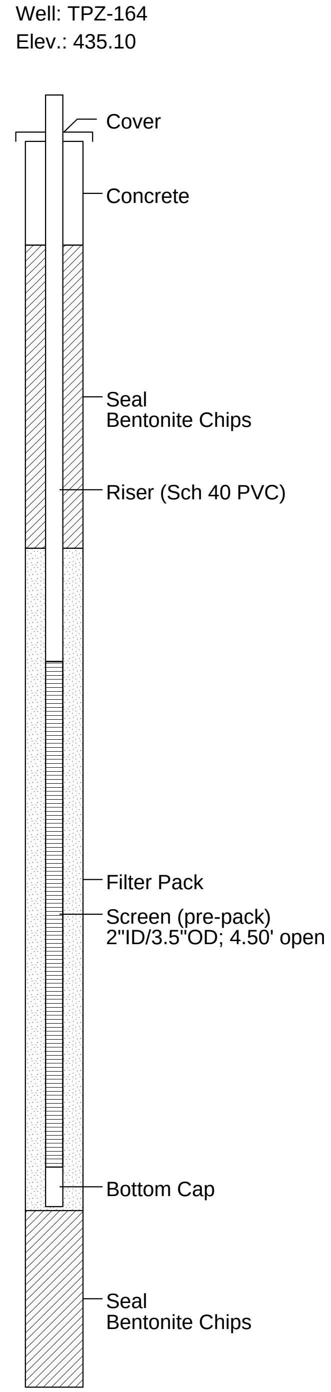
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 432.50
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Surf. Elev. 432.50	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry						
1							
2		430					
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay	429					
4			1		17/24		AR
	- wet	428					
5		427					
6		426					
7		425					
8		424		3			
9	CLAY (lean), stiff, medium to high plasticity, dark gray (10YR 4/1), moist - @8.9' - light yellowish brown (10YR 6/4) with <10% light gray mottling - @9.3' - gray (10YR 6/1) with 25-50% brownish-yellow mottling (10YR 6/6)	423	2	3 5	18/18		CL
10	- light olive brown <Shelby Tube Sample ST164-12 @ 10-12'> grain size analysis: 7.2% Sand, 62.2% Silt, 30.6% Clay	422					
11		421	3		23/24		CL
12	END BOREHOLE AT 10.3 FEET BLS END Split-Spoon Sampling at 12 feet BLS						

420

419



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LOG OF PROBEHOLE TPZ-165

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 396.10
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 398.85
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380478, 555940

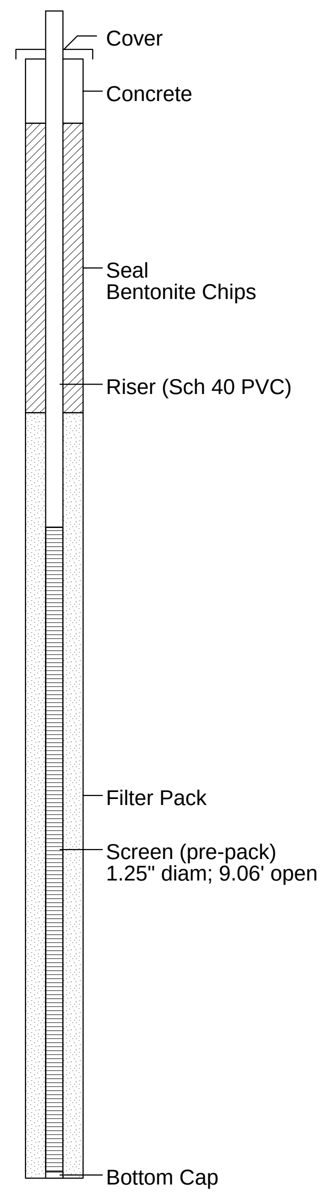
Depth in Feet: 0, 5, 10, 15, 20
Surf. Elev. 396.10: 395, 390, 385, 380

DESCRIPTION	USCS
FILL - Fly Ash, silty, stiff, non-plastic to low plasticity, very dark grayish-brown (10YR 3/2), moist	AR
FILL - Silty Clay with Fly Ash, very soft, dark gray (10YR 4/1)	FL/CL
Silty CLAY (lean) with organics and roots, soft, high plasticity, dark gray - gray (10YR 5/1) - trace sand, very dark gray brown <Shelby Tube Sample ST165-10 @ 8-10'> grain size analysis: 11.2% Sand, 59.2% Silt, 29.6% Clay	CL
Silty CLAY (lean) with trace fine-coarse sand and fine gravel, very soft, medium to high plasticity, dark gray (10YR 4/1), moist [TILL]	CL
LIMESTONE, hard, light gray, hammer refusal at 16.5', auger refusal at 17.4' bls (top of bedrock)	LS

END BOREHOLE AT 17.4 FEET BLS

Samples	Recovery inches	Qp TSF
1	41/60	1.75
2		0.75
3		- -
4		- -
5		- -
6	60/60	1.5
7		2.0
8		2.75
9		2.5
10		1.25
11	49/60	2.0
12		0.5
13		0.5
14		1.0
15		0.5
16	18/18	0.5
17		- -

Well: TPZ-165
Elev.: 398.85

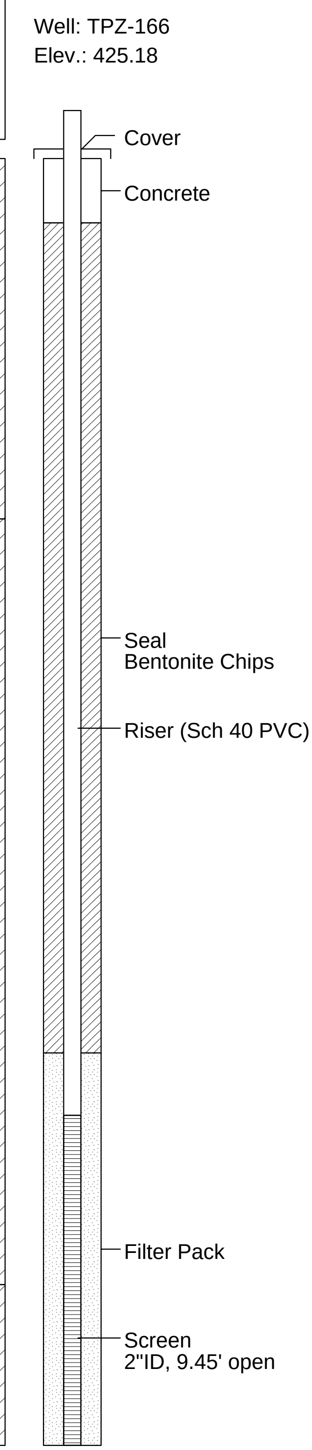


KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-166 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

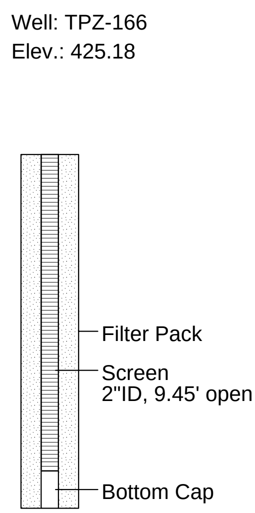
Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 422.33
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 425.18
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381183, 555587

Depth in Feet	DESCRIPTION	Surf. Elev. 422.33	Samples	Recovery inches	Qp TSF	USCS
0	FILL - Silty CLAY, trace roots, very stiff, non-plastic, light brown gray (10YR 6/2), dry		1	60/60	2.75	FL/CL
	- medium plasticity, pale brown (10YR 6/3) w/ trace manganese and iron oxide staining		2		2.75	
	- very stiff, yellowish brown (10YR 5/4) with 25% reddish-brown mottling	420	3		3.75	
	- very stiff, low plasticity		4		1.5	
5	- gray mottling		5		2.75	
	- 1-inch silt lense with high organics, trace roots		6	60/60	1.5	
	Silty CLAY, very stiff, medium plasticity, gray (10YR 6/1) with reddish-brown mottling and manganese staining		7		2.75	CL
	- medium to stiff, high plasticity, 25-50% manganese staining	415	8		1.75	
	- no manganese staining		9		2.5	
10			10		2.5	
			11	60/60	1.5	
			12		1.5	
	- stiff, medium plasticity, yellowish brown (10YR 5/4) with 10-25% reddish-brown mottling, moist	410	13		2.25	
			14		2.0	
15			15		2.5	
	- very soft, high plasticity		16	60/60	1.0	
	- very stiff, medium plasticity		17		3.0	
		405	18		3.0	
	Silty CLAY with trace fine-coarse sand and fine gravel, very stiff, medium plasticity, yellowish brown (10YR 5/4) with <10% reddish-brown mottling, moist [TILL]		19		3.5	CL
20	- hard, gray (10YR 6/1) with 10-25% reddish-brown mottling		20		3.25	



KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-166 (Page 2 of 2)
Phase II Hydrogeologic Investigation Baldwin Energy Complex Dynegy Midwest Generation, Inc.	Date Completed : 08/16/2013 Hole Diameter : 8 1/2" OD / 4 1/4" ID Drilling Method : HSA (CME-55LC) Sampling Method : MacroCore (60") Drilling Company : Bulldog Drilling, LLC Driller : John Gates Geologist : Stuart Cravens (Kelron) Ground Elevation : 422.33 Casing (MP) Elevation : 425.18 X,Y Coordinates : 2381183, 555587

Depth in Feet	DESCRIPTION	Surf. Elev. 422.33	Samples	Recovery inches	Qp TSF	USCS
20			21	24/24	>4.5	CL
	END BOREHOLE TPZ-166 AT 22' BLS.		22		>4.5	
	CONTINUE LOG USING URS BORINGS B-13-4 and B-13-5 FROM 08/01/2013	400				
25						
		395				CL
30						
		390				
	SHALE, calcareous, fine grained, highly weathered, very weak, brown-gray to gray (top of bedrock = 32.53' bls; elevation = 389.8 ft NAVD88)					
35						SH
		385				
	END URS LOGS AT 38 FEET BLS					
40						



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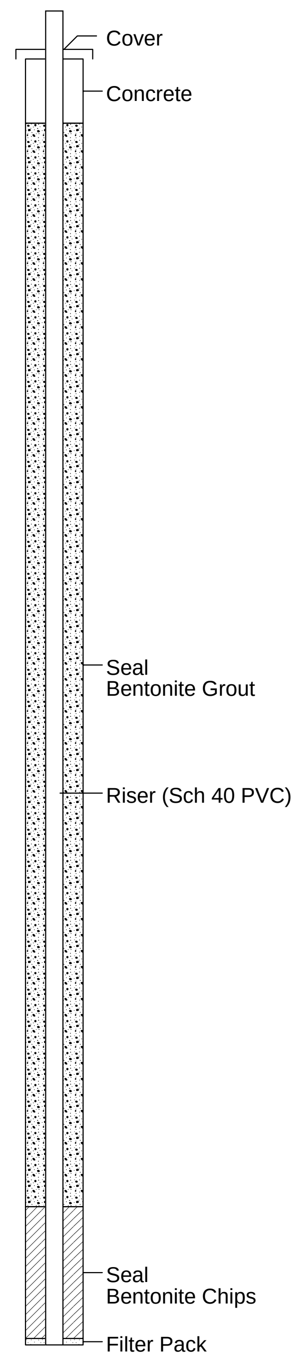
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-167 (Page 1 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Fly Ash, silty to clayey with coarse sand grain size, soft, medium to high plasticity, dark gray (Gley 1 4/N), moist							
		435						
	- very soft, non-plastic, wet		1		18/18			
5								
	- dark greenish gray (10Y 4/1)	430						
			2	2 2 1	18/18			
10							AR	
	- silty with sand grain size, very dark greenish gray (10Y 3/1)	425						
			3	0 0 1	18/18			
15								
		420						
20								

Well: TPZ-167
Elev.: 441.38



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KELRON
ENVIRONMENTAL
Incorporated

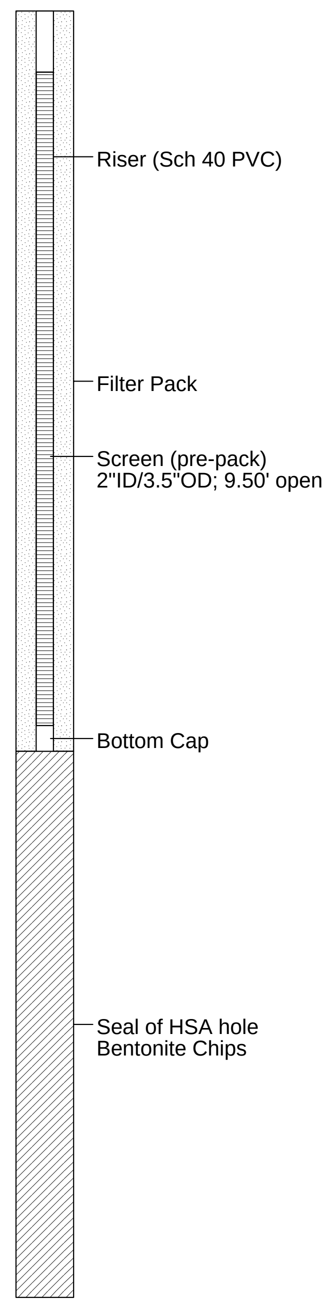
LOG OF PROBEHOLE TPZ-167

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
20								
	- dark greenish gray	415	4	0 0 1	18/18			
25							AR	
	- very dark gray brown <Sample SS167-30 @ 29-30'> grain size analysis (Ash): 1.5% Sand, 77.6% Silt, 20.8% Clay	410	5	0 0 0	18/18			
30								
	Silty CLAY (lean) with sand and trace fine gravel (chert, angular to sub-angular), very stiff, medium to high plasticity, light gray (10Y 7/N) with 15-50% reddish brown mottling, dry [TILL] <Shelby Tube Sample ST167-34 @ 32-34'> grain size analysis: 15.7% Sand, 52.6% Silt, 31.7% Clay	405	6		20/24			
35							CL	
		400	7	3 4 6	16/18	3.5		
40								

Well: TPZ-167
Elev.: 441.38



KELRON ENVIRONMENTAL Incorporated

LOG OF PROBEHOLE TPZ-167

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Well: TPZ-167
Elev.: 441.38

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
40							CL	
	- soft, brownish-yellow (10YR 6/6), moist	395	8	2 2 2	18/18	>4.5		
45	- laminated, hard, non-plastic, black (3/4" thick organic-rich layer)						CL	
	CLAY (lean to fat) with sand, stiff to very stiff, medium to high plasticity, greenish gray (10YR 6/1), dry						CL/CH	
	- with sand and fine gravel (angular)		9	5 5 50	18/18	4.0		
		390	10	50	3/3			
	SHALE, weathered; clay (laminated) with platy and micaceous layer and limestone parting, dark gray (Gley1 4/N), dry (top of bedrock = 48.75' bls)		11	53	5/5		SH	
50	END BOREHOLE (Auger Refusal) at 48.75 feet BLS END Split-Spoon Sampling at 49.15 feet BLS							
		385						
55								
		380						
60								

Seal of HSA hole
Bentonite Chips

KELRON ENVIRONMENTAL
Incorporated

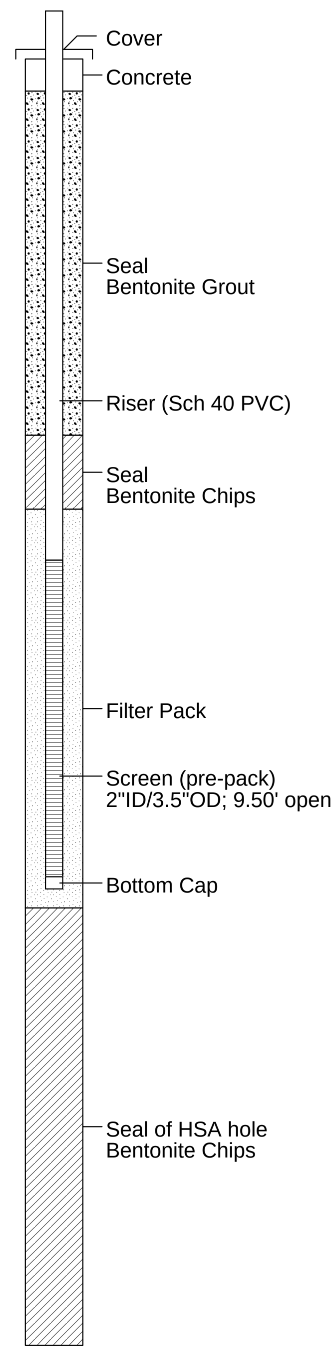
LOG OF PROBEHOLE TPZ-168

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/15/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 454.93
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 457.53
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383585, 554314

Depth in Feet	DESCRIPTION	Surf. Elev. 454.93	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Fly Ash, silt size, greenish gray (10Y 5/1), moist						AR
5	<Shelby Tube Sample ST168-5 @ 3-5'> grain size analysis: 29.4% Sand, 50.2% Silt, 20.4% Clay	450	1		21/24		
10	- wet	445	2	3 2 3	18/18		
15	- silty with coarse sand grain size, greenish black (10Y 2.5/1)	440	3	1 1 1	16/18		
20		435	4		0/24		
25		430	5		3/18		
30	Silty CLAY, medium to stiff, high plasticity, light gray (10YR 7/1) with 10-50% reddish-brown mottling	425	6	3 3 5	18/18	2.0	CL
35		420					
40		415	7	2 4 5	18/18	3.5	CL

Well: TPZ-168
Elev.: 457.53



KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-168 (Page 2 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/15/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 454.93
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 457.53
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383585, 554314

Well: TPZ-168
Elev.: 457.53

Depth in Feet	DESCRIPTION	Surf. Elev. 454.93	Samples	Blow Count	Recovery inches	Qp TSF	USCS	Well
40	Silty CLAY, trace sand and fine gravel (angular to sub-angular), stiff to very stiff, 10-25% reddish-brown mottling, moist [TILL]							
45		410						
	- light yellowish-brown (10YR 6/4) with <10% light gray mottling		8	3 7 10	18/18	3.5		
50	Clay, black (1/2" thick organic-rich layer) surrounded by highly weathered zone with >75% reddish-brown mottling	405						
55		400					CL	Seal of HSA hole Bentonite Chips
	- medium to stiff, high plasticity, yellowish brown (10YR 5/4)		9	3 4 8	18/18	2.0		
60	- with 25-50% light gray mottling	395						
65		390						
	- with sand seams, very stiff, medium plasticity, dark gray (10YR 4/1)		10	10 16 18	18/18	>4.5		
70	SHALE, laminated, hard, dark gray (top of bedrock = 69.6' bls)	385					SH	
	END BOREHOLE AT 70 FEET BLS							
75		380						
80		375						

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KELRON ENVIRONMENTAL
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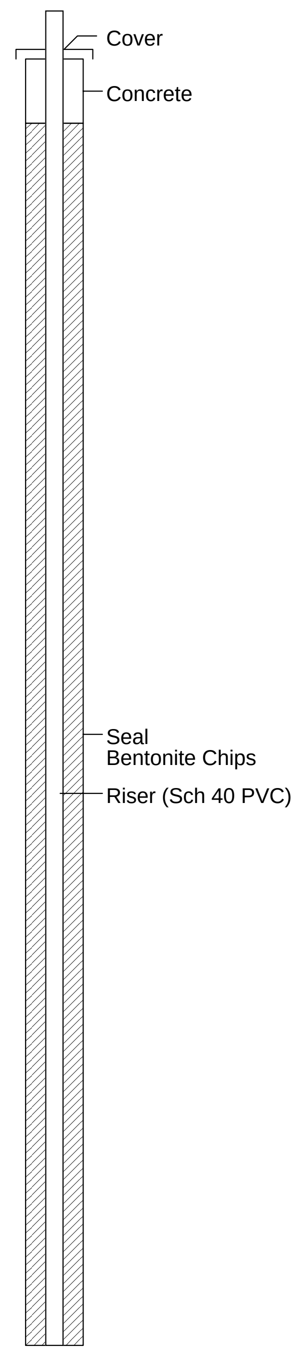
LOG OF PROBEHOLE OW-256

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/22/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 425.20
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 427.70
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381947, 558054

Depth in Feet	DESCRIPTION	Surf. Elev. 425.20	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring to 13.5 feet below ground surface. Refer to boring log for adjacent well OW-156.	425					
5		420				CL	
10		415					
13.5	CLAY (lean), very stiff, high plasticity, pale brown (10YR 6/3),moist - 25% reddish-brown mottling with black manganese staining - light gray (10YR 7/1) with 10-25% mottling		1	60/60	3.0	CL	
15		410	2		2.25		
			3		2.0		
			4		2.0		
			5		1.75		
18.5	Silty CLAY, trace fine to coarse sand [TILL]		6	60/60	2.5	CL	
			7		1.0		
20							



KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE OW-256

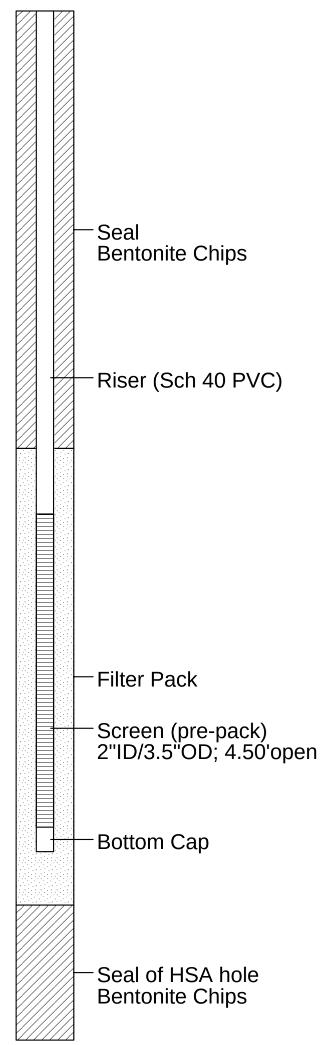
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/22/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 425.20
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 427.70
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381947, 558054

Depth in Feet	DESCRIPTION	Surf. Elev. 425.20	Samples	Recovery inches	Qp TSF	USCS
20		405	7		1.0	CL
			8		1.75	
			9		1.75	
			10		1.0	
	- trace fine-coarse gravel (angular to sub-angular; granite piece of 1 1/4"), 50-75% yellowish-brown (10YR 6/8) mottling - few sand and gravel, stiff, high plasticity, gray (10YR 6/1) with 25-75% mottling		11	60/60	1.0	
25		400	12		2.0	
	- <25% mottling - with sand (fine-medium)		13		1.0	
			14		1.0	
	SAND (fine-medium), well graded, brownish yellow (10YR 6/6), wet		15			SW
	Silty CLAY (lean) with sand (fine-medium), medium plasticity, brownish yellow, wet		16	35/60		CL
30		395	17			
	- hard, non plastic, light brownish gray (10YR 6/2), moist [Vandalia Till @ 31.5'] - little sand (fine-coarse) and gravel (fine-coarse, sub-angular to sub-rounded), low to non-plastic, gray (10YR 5/1)		18		>4.5	
			19			
			20			
	SHALE and CLAY, semi-competent, laminated clay with up to 1/2-inch thick layers of hard shale, dry [note: top of weathered bedrock at 33.9 feet below ground surface]		21	54/60	3.0	SH/CL
35		390	22		4.0	
	SHALE with intermittent clay layers, hard, gray		23		>4.5	SH
			24		>4.5	
			25		>4.5	
	END Sampling at 38.5 feet BLS END WELL BOREHOLE at 36.0 feet BLS					
40						

GRAPHIC

Well: OW-256
Elev.: 427.70



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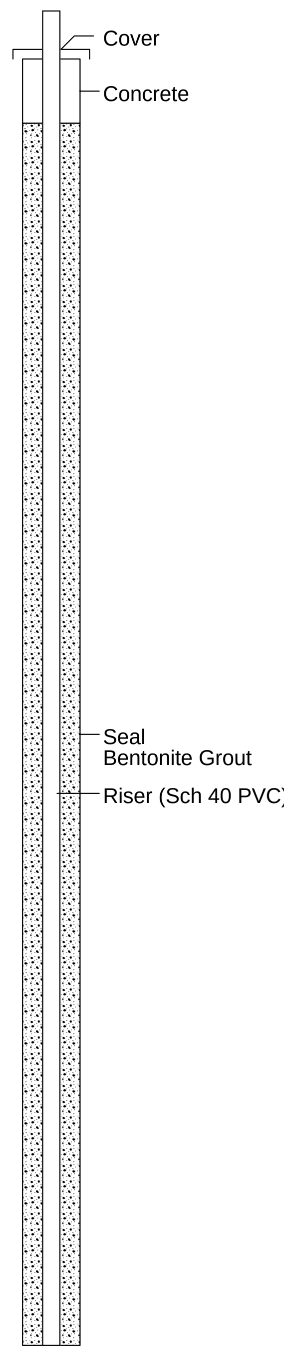
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE OW-257 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.17
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.02
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2382572, 556198

Depth in Feet	DESCRIPTION	Surf. Elev. 428.17	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring to 18.5 feet below ground surface. Refer to boring log for adjacent well OW-157.	425, 420, 415, 410				CL	
18.5–20	Silty CLAY, trace sand and gravel, stiff, high plasticity, gray (10YR 6/1) with 25-50% reddish-brown mottling, moist [TILL]		1	56/60	3.0	CL	
			2		2.75		

Well: OW-257
Elev.: 431.02



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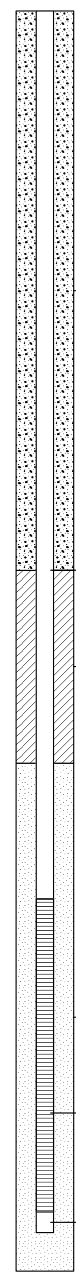
LOG OF PROBEHOLE OW-257

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.17
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.02
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2382572, 556198

Depth in Feet	DESCRIPTION	Surf. Elev. 428.17	Samples	Recovery inches	Qp TSF	USCS
20			2		2.75	CL
	- >50% mottling		3		2.5	
	Sandy CLAY with gravel (fine-coarse, sub-angular; granite piece of 1.5"), brownish yellow (10YR 6/6), wet					CL
	Silty CLAY, trace sand and gravel, soft, high plasticity, yellowish brown (10YR5/6) with 10-25% light gray mottling		4		1.0	
		405	5		1.5	
	- very soft, brownish yellow with <10% mottling		6	60/60	0.5	
25	- with trace pyrite crystals		7		1.0	
	- medium hardness grading to stiff		8		2.0	
			9		2.0	
		400	10		3.25	
			11	60/60	1.5	CL
30			12		3.5	
	- stiff, high plasticity, gray with <10% reddish-brown mottling, moist		13		2.75	
	- very stiff, dark gray (10YR 4/1)		14		2.0	
		395	15		3.5	
			16	60/60	2.0	
35			17		2.0	
	- low plasticity, very dark gray (10YR 3/1)		18		4.0	
	SHALE and CLAY (fat), intermittent lamination, hard, very dark gray, moist [note: top of weathered bedrock at 36.3 feet below ground surface]		19		3.0	
		390	20		>4.5	SH/CL
			21	13/13		
40	END BOREHOLE at 39.6 feet BLS					

Well: OW-257
Elev.: 431.02



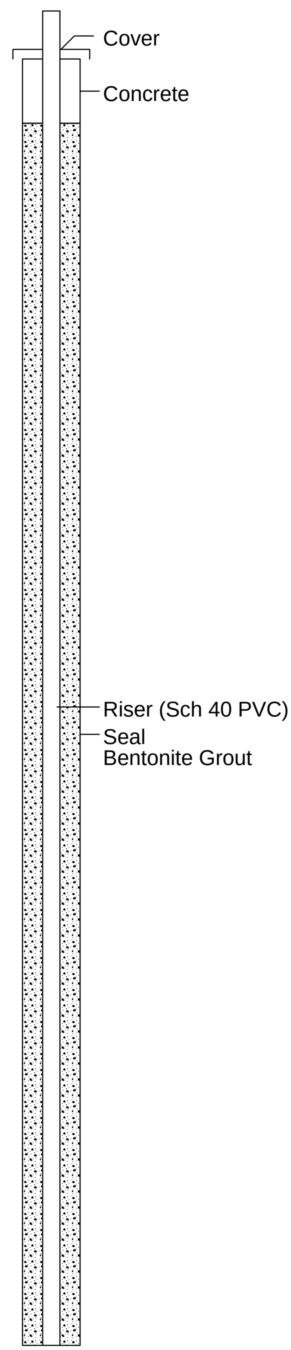
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-262 (Page 1 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
0	Silty Clay with gravel, roots, stiff, non-plastic, pale brown (10YR 6/3), dry	430	1	60/60	2.5	CL
			2		>4.5	
	- brownish yellow (10YR 6/6), moist		3		3.25	
			4		2.5	
5			5		2.25	
	- medium stiff, high plasticity	425	6	42/42	1.5	
			7		1.75	
			8		2.0	
	SILT, very soft, non-plastic, light yellowish brown (10YR 6/4), moist [LOESS]		9	60/60	1.0	ML
10	- clayey, soft to medium hardness, low to medium plasticity		10		1.5	
		420	11		1.25	
			12		1.5	
			13		1.5	
	- soft, yellowish brown (10YR 5/4) - non-plastic		14	60/60	1.0	
15			15		1.25	
		415	16		1.25	
			17		1.5	
	Sandy CLAY (lean), medium hardness, low to medium plasticity, yellowish brown, moist		18		2.0	CL
	SILT, very soft, non-plastic, brownish yellow (10YR 6/6), moist		19	60/60	2.0	ML
20			20			

Well: MW-262
Elev.: 433.21



KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE MW-262

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Well: MW-262
Elev.: 433.21

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
20			20			ML
		410	21			ML
			22			ML
	Silty CLAY, very soft, low plasticity		23		0.75	CL
	- medium plasticity, wet		24	60/60	0.75	CL
25			25		0.75	CL
	- high plasticity, yellowish brown (10YR 5/4)	405	26		0.75	CL
	- moist		27		0.5	CL
			28		1.25	CL
			29	53/60	1.0	CL
30	- with fine sand		30		0.75	CL
		400	31			CL
	SAND, fine to medium grained, with clay, yellowish brown (10YR 5/6), wet - light brownish gray		32			SW/SC
	CLAY (fat), trace fine to medium sand, high plasticity, light brownish gray <Sample ST262-35 @ 33.5 - 35.5'> grain size analysis: 13.1% Sand, 33.2% Silt, 53.7% Clay		33			CH
			34	24/24		CH
35			35			CH
	- very stiff, greenish gray (Gley1 10Y 6/1)	395	36	16/36	2.75	CH
			37			CH
	- medium plasticity		38		2.75	CH
			39	56/60	1.0	CH
40			40		0.75	CH

Seal
Bentonite Grout

Riser (Sch 40 PVC)

Seal
Bentonite Chips

KELRON
ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE MW-262

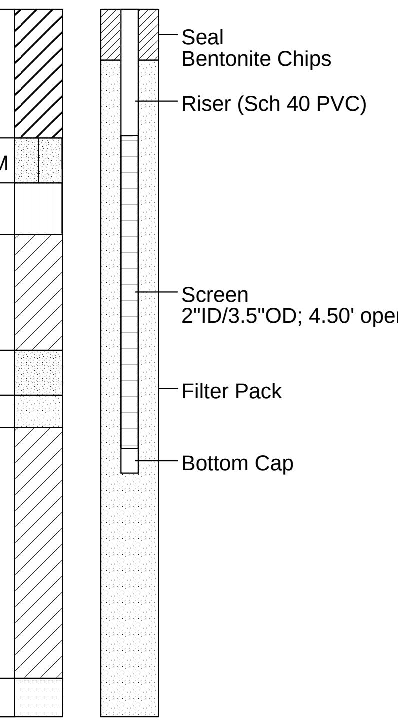
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
40	- with <10% reddish-brown mottling	390	40, 41, 42		0.75, 1.25, 1.5	CH
	SAND with Silt, fine grained, poorly graded, light brown (10YR 6/4), wet					SP/SM
	Sandy SILT		43			ML
45	Silty CLAY with fine sand, very soft, brownish yellow (10YR 6/6)		44, 45	60/60	0.75, 0.75	CL
	SAND, fine grained, poorly graded	385				SP
	SAND, fine to coarse grained, well graded, trace gravel		46		1.25	SW
50	Silty CLAY with trace and and gravel, stiff, high plasticity, light yellowish brown (10YR 6/4), moist [TILL] - trace reddish-brown mottling		47, 48, 49, 50	30/30	3.0, 2.25, 2.25, 2.25	CL
	SHALE, clay partings, laminated, gray, weathered, dry (top of bedrock = 50.4' bls)	380	51		3.5	SH
	END BOREHOLE AT 51 feet BLS					
55		375				
60						

GRAPHIC

Well: MW-262
Elev.: 433.21



APPENDIX B

IDPH WELL CONSTRUCTION REPORTS: 2010-2013

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 25.15

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 25.15 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	5.5	5.5*50=275	1	13.5	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		13.5	25.15

2. Well Use: Monitoring   Well Disinfected? No

3. Date Well Completed: 9/8/2010   Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______   Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______   Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______   9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______

Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex   Well # 150

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill   16. Permit Number: ______

Date Issued: ______   17. Date Drilling Started Sep 8, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin   Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH   b. Site Elevation 420 ft. (above msl)

c. Township: 4S   Range: 7W   Section: 16

d. NW Quarter of the NE Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 21.62 N

Lon: Degrees 89 Minutes 52 Seconds 42.59 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	15.39
2	SCH.40 PVC SCREEN	15.39	24.64
2	SCH.40 PVC SUMP	24.64	25.15

23. Is the well screened? Yes   If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.25	0.01	15.39	24.64

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 19.64 which is (in.) above ground 33

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
CLAY	0	15.5
clayey-SILT w/ sand	15.5	18
CLAY	18	25.15

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature   License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ____ Depth (ft.) ____

b. **Bored Well**: Casing Diameter (in.) ____ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 16.36

d. **Drilled Well**: Steel Casing Mechanically Driven ____

e. Hole Diameter (in.) 8.5 to (ft.) 16.36 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1.5	75 LBS	1	5	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		5	21.5

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Sep 21, 2010 Driller's Estimated Well Yield (gpm): ____

4. Date Permanent Pump Installed: ____ Set at Depth (ft.): ____

5. Pump Capacity (gpm): ____

6. Pitless Adapter Model and Manufacturer: ____ Attachment to Casing: ____

7. Well Cap Type & Manufacturer: ____

8. Pressure Tank Working Cycle (gals.): ____ Captive Air? ____ 9. Pump System Disinfected: ____

10. Name of Pump Company ____

11. Pump Installer: ____ License # ____

12. ____ Date ____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 151

14. Driller: ____ License # ____

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ____

Date Issued: ____ 17. Date Drilling Started 9/21/2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ____

20. Subdivision Name: ____ Lot # ____

21. Location: a. County Randolph b. Site Elevation 398 ft. (above msl)

c. Township: 4S Range: 7W Section: 16

d. ____ Quarter of the NW Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 18.22 N

Lon: Degrees 89 Minutes 52 Seconds 17.5 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	6.6
2	SCH.40 PVC SCREEN	6.6	15.85
2	SCH.40 PVC SUMP	15.85	16.36

23. Is the well screened? Yes

If yes	Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
	2	9.25	0.01	6.6	15.85

24. Water from ____ at a depth of (ft.) ____ To (ft.) ____

a. Static water level (ft.) below top of casing 2.86 which is (in.) above ground 32

b. pumping level is (ft.) ____ pumping (gpm) ____ for (hours) ____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	4.5
sandy-CLAY	4.5	9
CLAY	9	21.5

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

____ License # 092-00657
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT
Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ____ Depth (ft.) ____

b. **Bored Well**: Casing Diameter (in.) ____ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 17.23

d. **Drilled Well**: Steel Casing Mechanically Driven ____

e. Hole Diameter (in.) 8.5 to (ft.) 17.23 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1.5	75 LBS	1	5.5	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		5.5	17.23

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Sep 23, 2010 Driller's Estimated Well Yield (gpm): ____

4. Date Permanent Pump Installed: ____ Set at Depth (ft.): ____

5. Pump Capacity (gpm): ____

6. Pitless Adapter Model and Manufacturer: ____ Attachment to Casing: ____

7. Well Cap Type & Manufacturer: ____

8. Pressure Tank Working Cycle (gals.): ____ Captive Air? ____ 9. Pump System Disinfected: ____

10. Name of Pump Company ____

11. Pump Installer: ____ License # ____

12. ____ Date ____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 152

14. Driller: ____ License # ____

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ____

Date Issued: ____ 17. Date Drilling Started 9/23/2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ____

20. Subdivision Name: ____ Lot # ____

21. Location: a. County Randolph b. Site Elevation 421 ft. (above msl)

c. Township: 4S Range: 7W Section: 16

d. SE Quarter of the NE Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 15.31 N
Lon: Degrees 89 Minutes 52 Seconds 00.07 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	7.47
2	SCH.40 PVC SCREEN	7.47	16.72
2	SCH.40 PVC SUMP	16.72	17.23

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.25	0.01	7.47	16.72

24. Water from ____ at a depth of (ft.) ____ To (ft.) ____

a. Static water level (ft.) below top of casing 7.09 which is (in.) above ground 33.6

b. pumping level is (ft.) ____ pumping (gpm) ____ for (hours) ____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	5
CLAY	5	17.23

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 20.5

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 20.5 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	1.5	1.5*50=75	1	8.7	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		8.7	20.5

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/21/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______

Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 153

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 21, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 450 ft. (above msl)

c. Township: 4S Range: 7W Section: 15

d. SW Quarter of the SW Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 08.94 N

Lon: Degrees 89 Minutes 51 Seconds 39.53 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	10.74
2	SCH.40 PVC SCREEN	10.74	19.99
2	SCH.40 PVC SUMP	19.99	20.5

23. Is the well screened? Yes

If yes	Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
	2	9.25	0.01	10.74	19.99

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 15.36 which is (in.) above ground 34.8

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	11
CLAY w/ sand	11	20.5

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 0092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 12.63

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 17.71 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	2	2*50=100	1	6.6	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		6.6	12.63

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/20/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 154

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 20, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 375 ft. (above msl)

c. Township: 4S Range: 7W Section: 9

d. SW Quarter of the NE Quarter of the SW Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 47.62 N

Lon: Degrees 89 Minutes 53 Seconds 1.5 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	7.5
2	SCH.40 PVC SCREEN	7.5	12.12
2	SCH.40 PVC SUMP	12.12	12.63

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.425	0.01	7.5	12.12

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 15.13 which is (in.) above ground 33

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	9.5
CLAY w/ sand	9.5	12.63

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

______ License # 092-006857
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 20.52

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 20.52 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	1.5	1.5*50=75	1	8.7	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		8.7	20.52

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/10/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

13. Property Owner: Dynegy Baldwin Energy Complex Well # 155

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 10, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 375 ft. (above msl)

c. Township: 4S Range: 7W Section: 9

d. SW Quarter of the SE Quarter of the SW Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 35.49 N

Lon: Degrees 89 Minutes 52 Seconds 58.06 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	10.76
2	SCH.40 PVC SCREEN	10.76	20.01
2	SCH.40 PVC SUMP	20.01	20.52

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.25	0.01	10.76	20.01

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 19.5 which is (in.) above ground 34.32

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	11
CLAY w/ sand	11	20.52

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006557

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 17.7

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 17.7 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	2	2*50=100	1	6	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		6	17.7

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/10/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 156

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 10, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 432 ft. (above msl)

c. Township: 4S Range: 7W Section: 9

d. ______ Quarter of the NE Quarter of the SE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 56.52 N

Lon: Degrees 89 Minutes 52 Seconds 10.58 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	7.94
2	SCH.40 PVC SCREEN	7.86	17.19
2	SCH.40 PVC SUMP	17.19	17.7

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.33	0.01	7.86	17.19

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 7.36 which is (in.) above ground 33

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	9.5
CLAY w/ sand	9.5	17.7

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

John T. Ford
Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ____ Depth (ft.) ____

b. **Bored Well**: Casing Diameter (in.) ____ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 17.71

d. **Drilled Well**: Steel Casing Mechanically Driven ____

e. Hole Diameter (in.) 8.5 to (ft.) 17.71 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
BENTONITE CHIPS	2	2*50=100	1	6	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		6	17.71

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/9/2010 Driller's Estimated Well Yield (gpm): ____

4. Date Permanent Pump Installed: ____ Set at Depth (ft.): ____

5. Pump Capacity (gpm): ____

6. Pitless Adapter Model and Manufacturer: ____ Attachment to Casing: ____

7. Well Cap Type & Manufacturer: ____

8. Pressure Tank Working Cycle (gals.): ____ Captive Air? ____ 9. Pump System Disinfected: ____

10. Name of Pump Company ____

11. Pump Installer: ____ License # ____

12. ____ Date ____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 157

14. Driller: ____ License # ____

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ____

Date Issued: ____ 17. Date Drilling Started Sep 9, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ____

20. Subdivision Name: ____ Lot # ____

21. Location: a. County RANDOLPH b. Site Elevation 420 ft. (above msl)

c. Township: 4S Range: 7W Section: 9

d. ____ Quarter of the SE Quarter of the SE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 38.01 N

Lon: Degrees 89 Minutes 52 Seconds 2.72 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	7.95
2	SCH.40 PVC SCREEN	7.87	17.2
2	SCH.40 PVC SUMP	17.2	17.71

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.33	0.01	7.87	17.2

24. Water from ____ at a depth of (ft.) ____ To (ft.) ____

a. Static water level (ft.) below top of casing 1.37 which is (in.) above ground 32.04

b. pumping level is (ft.) ____ pumping (gpm) ____ for (hours) ____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	9.5
CLAY w/ sand	9.5	17.71

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

John F. [signature] License # 092-006857
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 49.54

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 49.54 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Cement-Bentonite	4	4 *94=376 LBS	1	39.3	39
Bentonite Chips	2	2*50=100 LBS	39.3	43	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		43	49.54

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Sep 23, 2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 252

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started 9/22/2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 421 ft. (above msl)

c. Township: 4S Range: 7W Section: 16

d. SE Quarter of the NE Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 15.31 N

Lon: Degrees 89 Minutes 52 Seconds 00.07 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	44.41
2	SCH.40 PVC SCREEN	44.41	49.03
2	SCH.40 PVC SUMP	49.03	49.54

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.625	0.01	44.41	49.03

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 0.25 which is (in.) above ground 33.6

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	5
CLAY	5	19
sandy-CLAY	19	27
SAND w/ clay	27	28
CLAY	28	49.54

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

John T. [signature]
Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT
Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 35.04

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 35.04 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
CEMENT-BENTONITE	3	3*94=282	1	25.7	
BENTONITE CHIPS	1	1*50=50	25.7	27.7	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		27.7	35.04

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/20/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 253

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 20, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 450 ft. (above msl)

c. Township: 4S Range: 7W Section: 15

d. SW Quarter of the SW Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 08.94 N

Lon: Degrees 89 Minutes 51 Seconds 39.53 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	29.91
2	SCH.40 PVC SCREEN	29.91	34.53
2	SCH.40 PVC SUMP	34.53	35.04

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.625	0.01	29.91	34.53

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 31.41 which is (in.) above ground 37.2

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	11
CLAY w/ sand	11	35.04

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 46.62

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 26.4 ; (in.) 3.9 to (ft.) 46.62 ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
CEMENT-BENTONITE	5.5	5.5*94=517	1	26.4	26
BENTONITE CHIPS	0.5	.5*50=25	26.4	37	

g. Well Finished within BEDROCK

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		37	46.62

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/9/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 350

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 8, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 420 ft. (above msl)

c. Township: 4S Range: 7W Section: 16

d. NW Quarter of the NE Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 21.62 N

Lon: Degrees 89 Minutes 52 Seconds 42.59 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	41.49
2	SCH.40 PVC SCREEN	41.49	46.11
2	SCH.40 PVC SUMP	46.11	46.62

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.625	0.01	41.49	46.11

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 24.56 which is (in.) above ground 33

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
CLAY	0	15.5
clayey-SILT w/ sand	15.5	18
CLAY	18	26.4
LIMESTONE w interbedded shales	26.4	35.5
SHALE	35.5	41
LIMESTONE	41	46.62

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

______ License # 092-006857
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 73.8

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 53.7 ; (in.) 3.9 to (ft.) 73.8 ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Cement-Bentonite	5	4 *94=470 LBS	1	61.3	61
Bentonite Chips	2	2*50=100 LBS	61.3	65.3	

g. Well Finished within Bedrock

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		65.3	73.8

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: Sep 16, 2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 352

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started 9/15/2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 421 ft. (above msl)

c. Township: 4S Range: 7W Section: 16

d. SE Quarter of the NE Quarter of the NE Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 15.31 N
Lon: Degrees 89 Minutes 52 Seconds 00.07 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	68.67
2	SCH.40 PVC SCREEN	68.67	73.29
2	SCH.40 PVC SUMP	73.29	73.8

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.625	0.01	68.67	73.29

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 55.37 which is (in.) above ground 33.6

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	5
CLAY	5	19
sandy-CLAY	19	27
SAND w/ clay	27	28
CLAY	28	53.7
LIMESTONE some shales	53.7	73.8

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

______ License # 092-00[illegible]57
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 32.59

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8.5 to (ft.) 21.9 ; (in.) 3.9 to (ft.) 32.59 ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
CEMENT-BENTONITE	3	3*94=282	1	20	
BENTONITE CHIPS	1	1*50=50	20	23.4	

g. Well Finished within Bedrock

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
CLEAN SILICA SAND		23.4	32.59

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 9/14/2010 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # 355

14. Driller: ______ License # ______

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Sep 14, 2010

18. Well Site Address: Dynegy Baldwin Energy Complex

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County RANDOLPH b. Site Elevation 375 ft. (above msl)

c. Township: 4S Range: 7W Section: 9

d. SW Quarter of the SE Quarter of the SW Quarter

e. GPS: Lat: Degrees 38 Minutes 11 Seconds 35.49 N

Lon: Degrees 89 Minutes 52 Seconds 58.06 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PCV RISER	0	27.46
2	SCH.40 PVC SCREEN	27.46	32.08
2	SCH.40 PVC SUMP	32.08	32.59

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.625	0.01	10.76	20.01

24. Water from ______ at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing 21.85 which is (in.) above ground 33.84

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
silty-CLAY	0	11
CLAY w/ sand	11	21.9
LIMESTONE	21.9	32.59

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ____ Depth (ft.) ____

b. **Bored Well**: Casing Diameter (in.) ____ Buried Slab? ____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 15

d. **Drilled Well**: Steel Casing Mechanically Driven ____

e. Hole Diameter (in.) 7.75 to (ft.) 15 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f. Type of Grout

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Chips	1	50	1	4	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Clean Silica Sand	#1/FilterSil (6 bags)	4	15

2. Well Use: Monitoring Well Disinfected? ____

3. Date Well Completed: Jul 26, 2011 Driller's Estimated Well Yield (gpm): ____

4. Date Permanent Pump Installed: ____ Set at Depth (ft.): ____

5. Pump Capacity (gpm): ____

6. Pitless Adapter Model and Manufacturer: ____ Attachment to Casing: ____

7. Well Cap Type & Manufacturer: ____

8. Pressure Tank Working Cycle (gals.): ____ Captive Air? ____ 9. Pump System Disinfected: ____

10. Name of Pump Company ____

11. Pump Installer: ____ License # ____

12. ____ Date ____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # MW-104SR

14. Driller: Mat Cooper /John T. Marlo License # 092-006857

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ____

Date Issued: ____ 17. Date Drilling Started Jul 26, 2011

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ____

20. Subdivision Name: ____ Lot # ____

21. Location: a. County Randolph b. Site Elevation 453 ft. (above msl)

c. Township: 04S Range: 07W Section: 10

d. SE Quarter of the SE Quarter of the SE Quarter

e. GPS: Lat: Degrees 28N Minutes 11 Seconds 17.8 N

Lon: Degrees 89W Minutes 51 Seconds 12.4 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-3.02	4.76
2	SCH. 40 PVC SCREEN	4.76	14.78
2	SCHL 40 PVC SUMP	14.78	15

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10.06	10	4.72	14.78

24. Water from Clay with Silt at a depth of (ft.) 5 To (ft.) 15

a. Static water level (ft.) below top of casing 10.4 which is (in.) above ground 36

b. pumping level is (ft.) ____ pumping (gpm) ____ for (hours) ____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty Clay	0	15

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 15

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 7.75 to (ft.) 15 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Chips	7	7*50 = 350	1	22	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Clean Silica Sand	#1/FilterSil (4 bags)	22	30

2. Well Use: Monitoring Well Disinfected? ______

3. Date Well Completed: Jul 26, 2011 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______

Licensed Pump Installation Contractor Signature

13. Property Owner: Dynegy Baldwin Energy Complex Well # MW-104DR

14. Driller: Mat Cooper /John T. Marlo License #092-006857

15. Name of Drilling Company : Terra-Drill 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Jul 25, 2011

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 453 ft. (above msl)

c. Township: 04S Range: 07W Section: 10

d. SE Quarter of the SE Quarter of the SE Quarter

e. GPS: Lat: Degrees 28N Minutes 11 Seconds 17.8 N

Lon: Degrees 89W Minutes 51 Seconds 12.4 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-3	23.18
2	SCH. 40 PVC SCREEN	23.18	28.23
2	SCHL 40 PVC SUMP	28.23	28.45

23. Is the well screened? Yes

If yes	Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
	2	5.05	10	23.18	28.23

24. Water from Sand at a depth of (ft.) 24.5 To (ft.) 27.25

a. Static water level (ft.) below top of casing 8.03 which is (in.) above ground 36

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty Clay	0	23.5
Sandy Clay	23.5	24.5
Sand (fine to medium)	24.5	27.25
Silty Clay	27.25	30

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License #092-006857

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 23.55

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8 to (ft.) 33.35 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	4	4*50#=200	1	20	20
Bentonite Chips	5	5*50#= 250	20	21.65	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
FilterSil Quartz	#1/FilterSil (6.5 bags)	21.65	34

2. Well Use: Monitoring Well Disinfected? ______

3. Date Well Completed: Aug 21, 2013 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ **9.** Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______

Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # MW-161

14. Driller: John Gates License # ______

15. Name of Drilling Company : Bulldog Drilling, LLC **16.** Permit Number: ______

Date Issued: ______ **17.** Date Drilling Started Aug 20, 2013

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 428 ft. (above msl)

c. Township: 04S Range: 07W Section: 9

d. NW Quarter of the NW Quarter of the SE Quarter

e. GPS: Lat: Degrees 38N Minutes 11 Seconds 46.71 N

Lon: Degrees 89W Minutes 52 Seconds 44.97 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-2.53	23.55
2	SCH. 40 PVC SCREEN	23.55	33
2	SCHL 40 PVC SUMP	33	33.35

23. Is the well screened? Yes

If yes	Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
	2	9.45	10	23.55	32.49

24. Water from Sand with clay at a depth of (ft.) 28.4 To (ft.) 32.7

a. Static water level (ft.) below top of casing 22.27 which is (in.) above ground 30.4

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
FILL - silt with clay	0	1.6
Silty CLAY and SILT	1.6	28.4
SAND with clay	28.4	32.7
Silty CLAY with sand; Sandy SILT	32.7	42.9
Silty CLAY with shale and limestone gravel	42.9	44.3
SHALE	44.3	44.7

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

John T. Gates

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 16.1

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8 to (ft.) 25.9 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	3	3*50#=150	1	12.5	12.5
Bentonite Chips	1	1*50#= 50	12.5	14.42	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
FilterSil Quartz	#1/FilterSil (6 bags)	14.42	25.9

2. Well Use: Monitoring Well Disinfected? ______

3. Date Well Completed: Aug 20, 2013 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # MW-162

14. Driller: John Gates License # ______

15. Name of Drilling Company : Bulldog Drilling, LLC 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Aug 20, 2013

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 433 ft. (above msl)

c. Township: 04S Range: 07W Section: 9

d. SW Quarter of the SW Quarter of the SE Quarter

e. GPS: Lat: Degrees 38N Minutes 11 Seconds 33.38 N

Lon: Degrees 89W Minutes 52 Seconds 45.19 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-2.37	16.1
2	SCH. 40 PVC SCREEN	16.1	25.55
2	SCHL 40 PVC SUMP	25.55	25.9

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	9.45	10	16.1	25.55

24. Water from Dry well at a depth of (ft.) ______ To (ft.) ______

a. Static water level (ft.) below top of casing ______ which is (in.) above ground ______

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty CLAY	0	8.5
SILT	8.5	9.7
Clayey SILT	9.7	18.5
SILT	18.5	22.7
Silty CLAY	22.7	25.9

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

______ License # 092-006857
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 42.33

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8 to (ft.) 51 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	6	6*50#=300	1	38.4	38.4
Bentonite Chips	1	1*50#= 50	38.4	40.79	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
FilterSil Quartz	#1/FilterSil (2.5 bags)	40.79	51

2. Well Use: Monitoring Well Disinfected? ______

3. Date Well Completed: Aug 19, 2013 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______

Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # MW-262

14. Driller: John Gates License # ______

15. Name of Drilling Company : Bulldog Drilling, LLC 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Aug 19, 2013

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 433 ft. (above msl)

c. Township: 04S Range: 07W Section: 9

d. SW Quarter of the SW Quarter of the SE Quarter

e. GPS: Lat: Degrees 38N Minutes 11 Seconds 33.38 N

Lon: Degrees 89W Minutes 52 Seconds 45.19 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-2.35	42.33
2	SCH. 40 PVC SCREEN	42.33	46.83
2	SCHL 40 PVC SUMP	46.83	47.21

23. Is the well screened? Yes

If yes	Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
	2	4.5	10	42.33	46.83

24. Water from Sand and Sandy Silt at a depth of (ft.) 42 To (ft.) 46.5

a. Static water level (ft.) below top of casing 35.31 which is (in.) above ground 28.2

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty CLAY and SILT	0	30.3
SAND	30.3	32.9
Sandy CLAY and CLAY	32.9	42
SAND and Sandy SILT; some Silty CLAY	42	46.5
Silty CLAY	46.5	50.4
SHALE	50.4	51

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

John T. [signature] License # 092-006857

Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ______ Depth (ft.) ______

b. **Bored Well**: Casing Diameter (in.) ______ Buried Slab? ______

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 27.99

d. **Drilled Well**: Steel Casing Mechanically Driven ______

e. Hole Diameter (in.) 8 to (ft.) 36 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite Chips	4	5*50#=250	1	26.8	
Bentonite Chips	1	1*50#= 50	33.9	36	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
FilterSil Quartz	#1/FilterSil (3 bags)	26.8	33.9

2. Well Use: Monitoring Well Disinfected? ______

3. Date Well Completed: Aug 22, 2013 Driller's Estimated Well Yield (gpm): ______

4. Date Permanent Pump Installed: ______ Set at Depth (ft.): ______

5. Pump Capacity (gpm): ______

6. Pitless Adapter Model and Manufacturer: ______ Attachment to Casing: ______

7. Well Cap Type & Manufacturer: ______

8. Pressure Tank Working Cycle (gals.): ______ Captive Air? ______ 9. Pump System Disinfected: ______

10. Name of Pump Company ______

11. Pump Installer: ______ License # ______

12. ______ Date ______
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

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IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex Well # OW-256

14. Driller: John Gates License # ______

15. Name of Drilling Company : Bulldog Drilling, LLC 16. Permit Number: ______

Date Issued: ______ 17. Date Drilling Started Aug 22, 2013

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin Land I.D. # ______

20. Subdivision Name: ______ Lot # ______

21. Location: a. County Randolph b. Site Elevation 428 ft. (above msl)

c. Township: 04S Range: 07W Section: 10

d. NW Quarter of the NW Quarter of the SW Quarter

e. GPS: Lat: Degrees 38N Minutes 11 Seconds 56.28 N

Lon: Degrees 89W Minutes 52 Seconds 10.60 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-2.5	27.99
2	SCH. 40 PVC SCREEN	27.99	32.49
2	SCHL 40 PVC SUMP	32.49	33.07

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.5	10	27.99	32.49

24. Water from Sand at a depth of (ft.) 27.1 To (ft.) 28.6

a. Static water level (ft.) below top of casing 11.48 which is (in.) above ground 30

b. pumping level is (ft.) ______ pumping (gpm) ______ for (hours) ______

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty CLAY	0	9.5
CLAY with sand	9.5	13.5
Silty CLAY	13.5	27.1
SAND	27.1	28.6
Silty to Sandy CLAY	28.6	33.9
SHALE, weathered	33.9	38.5

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature License # 092-006857

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) ____ Depth (ft.) ____

b. **Bored Well**: Casing Diameter (in.) ____ Buried Slab? ____

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) 39.6

d. **Drilled Well**: Steel Casing Mechanically Driven ____

e. Hole Diameter (in.) 8 to (ft.) 39.6 ; (in.) ____ to (ft.) ____ ; (in.) ____ to (ft.) ____

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	4	5*50#=250	1	28.7	28.7
Bentonite Chips	1	1*50#= 50	28.7	31.7	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
FilterSil Quartz	#1/FilterSil (4 bags)	31.7	39.6

2. Well Use: Monitoring   Well Disinfected? ____

3. Date Well Completed: Aug 16, 2013   Driller's Estimated Well Yield (gpm): ____

4. Date Permanent Pump Installed: ____ Set at Depth (ft.): ____

5. Pump Capacity (gpm): ____

6. Pitless Adapter Model and Manufacturer: ____ Attachment to Casing: ____

7. Well Cap Type & Manufacturer: ____

8. Pressure Tank Working Cycle (gals.): ____ Captive Air? ____ 9. Pump System Disinfected: ____

10. Name of Pump Company ____

11. Pump Installer: ____ License # ____

12. ____ Date ____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: Dynegy Baldwin Energy Complex   Well # OW-257

14. Driller: John Gates   License # ____

15. Name of Drilling Company : Bulldog Drilling, LLC   16. Permit Number: ____

Date Issued: ____   17. Date Drilling Started Aug 15, 2013

18. Well Site Address: 10901 Baldwin Road, Baldwin, IL 62217

19. Township Name: Baldwin   Land I.D. # ____

20. Subdivision Name: ____   Lot # ____

21. Location: a. County Randolph   b. Site Elevation 428 ft. (above msl)

c. Township: 04S   Range: 07W   Section: 10

d. SE Quarter of the SE Quarter of the SW Quarter

e. GPS: Lat: Degrees 38N Minutes 11 Seconds 37.91 N

Lon: Degrees 89W Minutes 52 Seconds 02.84 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	SCH. 40 PVC RISER	-2.85	33.98
2	SCH. 40 PVC SCREEN	33.98	38.48
2	SCHL 40 PVC SUMP	38.48	39.06

23. Is the well screened? Yes   If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	4.5	10	33.98	38.48

24. Water from Silty clay at a depth of (ft.) 33.98 To (ft.) 38.48

a. Static water level (ft.) below top of casing 5.8 which is (in.) above ground 34.2

b. pumping level is (ft.) ____ pumping (gpm) ____ for (hours) ____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Silty CLAY	0	38.75
SHALE, weathered	38.75	39.6

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

Licensed Water Well Contractor Signature   License # 092-006857

APPENDIX C

WELL DEVELOPMENT REPORTS: 2010-2013

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 1Ø4S

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☒ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 17.44 mp
Initial Depth to Water (feet) 12.86
Height of Water Column in Well (feet) 4.58
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		Ø.78	2.3
Gravel Pack			
Drilling Fluids			
Total			2.3

Instruments

Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) Spec.	Visual Clarity	Comments
9-7-10	1445	X			17'		1.Ø				21.9	6.61	1,472	Dk br./v. turbid	Pumped Dry
"	1455	X		<Ø.2		~~15.??~~	1.Ø	2.Ø			20.7	6.35	1,484	Lt. br/turbid	Pumped Dry
"	1540	X				15.19									Very slow recovery (may not want ~~[illegible]~~ bladder pump)

Circle the date and time that the development criteria are met.

Comments: Final Well Depth = 17.44' mp / = 14.86' LS / Stickup = 2.58' / MP = N. (high) side PVC

Developer's Signature(s) [signature] Date 9/7/10 Reviewer ______ Date ______

145 = 9 1 @ 6 : Lose Total Discharge

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 104S

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 17.44
Initial Depth to Water (feet) 13.57
Height of Water Column in Well (feet) 3.87
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		.63	1.89
Gravel Pack		Liters =	7.2
Drilling Fluids			
Total			

Instruments

Serial No. (If applicable)

☑ Temperature Meter Quanta - G
☑ pH Meter
☑ Conductivity Meter
☑ DO Meter
☑ ORP Meter

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (~~gal/min~~ or Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (~~gallons~~ / liters): Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L	ORP	Comments: Pump Setting	Clarity
11/3/10	1622	X		.1	16	2	top of pump		—	—	18.34	6.74	0.610	0.94	-57	145	
						3			—	—							
						4											
						5											
						6											
						7											
						8											

Circle the date and time that the development criteria are met.

Comments 1601 start ; Limited recharge capability.

Developer's Signature(s) Bren Wilder Date 11/3/10 Reviewer Date

Form A0101 Rev. 10/6/94

C:\Consulting A\Power Plants\Baldwin 2010 Hydrogeologic Study\Field Work Phase\Field Forms\develop_purge-d...

2.394 Liters = 1 well volume

104S: 5200 pump has 14.5' of tubing + 1.5' pump

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 104D

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☒ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 30.08 (m/NC)
Initial Depth to Water (feet) 12.89
Height of Water Column in Well (feet) 17.19
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.42	8.8
Gravel Pack			
Drilling Fluids			
Total			8.8

Instruments

Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-7-10	1510	X			30		0.25'				20.6	7.02	1234	Dk brown	very turbid-clay/silt/sand
	1513	X					1.75	2			15.6	6.97	1,243		"
	1517	X					2.0	4			16.2	6.97	1119		"
	1520	X					1.0	5			15.8	7.01	1205		"
	1522	X					5.0	10			15.3	7.08	1245	Med. brown	very turbid
	1525	X					3.0	13			15.2	7.07	1202		"
	1527	X				~~14.5~~	1.0	14			15.2	6.97	1,196		"
	1535			~0.5		14.5	—	—			—	—	—		

Circle the date and time that the development criteria are met.

Comments: Final well Depth = 31.85' = 29.38' (ls) / STRky = 2.47 Rapid recovery / high Q ≈ 0.5 gpm

Developer's Signature(s) [signature] Date 9/7/10 Reviewer Date

145 9 1 6 6 (sec)
116 10.6 1.4 5 7 = optimal setting ; stable - no drawdown 0.17 l/min

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 104D

Project Name: Groundwater Investigation – BEC Ash Pond System

Project Number: (Kelron) 2010.100 Cost Code:

Client Company: Dynegy, Inc.

Project Manager: Stuart Cravens (Kelron Environmental)

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 31.85
Initial Depth to Water (feet) 13.57
Height of Water Column in Well (feet) 18.28
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.98	8.95
Gravel Pack		Liters =	34
Drilling Fluids			
Total			

Instruments

Serial No. (If applicable)

☑ Temperature Meter Quanta G
☑ pH Meter
☑ Conductivity Meter
☑ DO Meter
☑ ORP Meter

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gallons)~~ or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed Liters ~~(gallons)~~: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual	Clarity	Comments
											16.49	7.12	1.269	DO mg/L	ORP	
11/3/10	1457	X		0.17	20.5	13.95	4		—	—				2.24	-41	145 → 116 Slight turbidity
	1715			0.22			8				16.18	7.10	1.214	1.76	-21	116
							12									
							16									
							20									
							24									
							28									
							32									

Circle the date and time that the development criteria are met. 34

Comments 1631 start

Developer's Signature(s) Brad Wilder Date 11/3/10 Reviewer ______ Date ______

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104D = 5000 Series Pump w/ 25.5' tubing to 3' long screen

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 15∅

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 27.78 mp/TVC
Initial Depth to Water (feet) 19.68 mp/TVC
Height of Water Column in Well (feet) 8.1
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.4	4.1
Gravel Pack			
Drilling Fluids			
Total			4.1

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-10-10	0910	X		~~∅~~	22	23.8	5							Med br., turbid	
	0915	X				26.15	3.5							–	Good Recovery/Recharge
	0920	X		0.3		26.5	1.5	10			15.6	7.13	1,427	Lt brown, turbid	
	0928	X		0.3			2.5				14.1	7.26	1,460	–	
	0937	X		0.3		25.53	2.5	15			14.2	7.32	1,474	Lt brown,	cloudy. Solid bottom
9-14-10	1000	–			–	19.56	–				–	–	–	–	Static water level.
			Avg=	~~0.0~~											
9-30-10				0.3		19.64	SWL								

Circle the date and time that the development criteria are met.

Comments Final Well Depth = 27.87' mp/ = 25.15 LS/ stickup = 2.72' Rapid recharge/high Q

Developer's Signature(s) [signature] Date 9/10/10 Reviewer SJC Date 10/1/10

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127: 5 GPM 8.1 F / [illegible]
Depth = ~45'

1.35 × 3.8 = 5.13 = 1 well Volume
gallons × 4/9 = Liters

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 150

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 27.07
Initial Depth to Water (feet) 19.58
Height of Water Column in Well (feet)
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.35	
Gravel Pack			
Drilling Fluids			
Total			

Instruments
Serial No. (If applicable)
☑ Temperature Meter Quanta - G
☑ pH Meter "
☑ Conductivity Meter "
☑ DO Meter "
☑ ORP Meter "

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed ~~(gallons)~~ Liters: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L / ORP	Comments
11/2/10	1355			1	~25	19.85	1		—	—	14.36	8.13	1.391	1.41 / 105	Slight Turbid ID = 127
	1401			1		19.95	2				14.34	7.84	1.395	1.07 / 111	" "
	1405			.20	(.20)	"	3				14.35	7.67	1.393	0.93 / 119	" "
	1410					20.03	4				14.42	7.53	1.382	0.90 / 122	" "
	1415					"	5				14.35	7.45	1.378	0.97 / 124	" "
	1438					20.13	10				14.25	7.26	1.371	0.74 / 129	" "
	1459					"	15				14.31	7.19	1.365	0.59 / 127	Clear
	1504					"	16				14.28	7.18	1.368	0.58 / 126	

Circle the date and time that the development criteria are met.

Comments 1346 Start ; 1600 completed development

Developer's Signature(s) Brian J Wilder Date 11/2/10 Reviewer Date

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW-151

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal and/or
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 19.12 M/TOC
Initial Depth to Water (feet) 2.83 TM
Height of Water Column in Well (feet) 16.29
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.75	8.3
Gravel Pack			
Drilling Fluids			
Total		3x volumes	8.3

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI 63
☒ pH Meter YSI 63
☒ Conductivity Meter YSI 63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-23-10	1510	X		–	~19'	15.17'	2.0				21.9	7.27	1,182	Med br./turbid	Start 1506
↓	1520	X		0.15	~19'	15.92'	1.5				21.9	7.32	1,148	Lt gray/turbid	Pumped Dry/Cycle
	1530	X		0.10	~19'	16.01'	1.0				20.8	7.43	1,113	SAA	" "
	1538	X		0.06	"	16.09	0.5	5.0			20.9	7.41	1,107	SAA	Pumped Dry/Cycle
			Avg= 0.1 gpm												
9-24-10	1146		X			17.76	3.0	8.0			18.8	7.02	1,093		SWL = 2.85' TM
	1147		X				0.25				18.9	7.09	1,094		
							SJC			SJC					

Circle the date and time that the development criteria are met.

Comments Final Well Depth = 19.12' / ~~[illegible]~~ | Stickup = ~~2.88~~ 3.12' (Well = 16.00 bgs). Very low Q

Developer's Signature(s) [signature] Date 9/23/10 Reviewer ______ Date ______

19.12
2.80
16.32

101 =	11	4	@	4 CPM	TD
99 =	12	3		4	12
98 =	12.5	2.5		4	10
118 =	10.2	1.8		5	9
147 =	8.6	1.4		6 =	8.4 (sec)
97 =	13	2		4	8.0
116 =	10.6	1.4		5	7.0

113 = 7 1 @ 6 CPM = 6 sec. TD
165 = 5 5 @ 6 CPM = 30 sec TD

— Best settings

To complete dev. only!

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 151

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Methods of Development
Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 19.03
Initial Depth to Water (feet) 3.32
Height of Water Column in Well (feet) 15.71
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.56	7.69
Gravel Pack		Liters=	29.22
Drilling Fluids		=	30
Total			

Instruments
Serial No. (If applicable)
- ☑ Temperature Meter — Quanta-G
- ☑ pH Meter
- ☑ Conductivity Meter
- ☑ DO Meter
- ☑ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (Liters): Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed: Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L / ORP	Comments: Setting / Clarity
11/3/10	1326	X		.44		8.7	4		—	—	16.35	7.22	1.020	1.47 / 134	ID 101 slight turbidity
	1335					10.73	8				16.31	7.16	1.023	1.45 / 129	99
	1348					12.00	12				16.19	7.10	1.048	0.62 / 128	98 > 118 > 147
	1406			.22		12.32	16				16.06	7.07	1.042	0.28 / 125	97 → 116 slight turbid
	1425					12.64	20				15.94	7.06	1.036	0.24 / 122	116 "
	1446			.19		12.55	24				16.01	7.05	1.019	0.19 / 119	145 (OPTIMAL RATE)
	1456				Below → Pump		28				16.09	7.10	1.075	0.47 / 118	165
	1501						30				15.94	7.07	1.049	0.39 / 118	"

Circle the date and time that the development criteria are met.

Comments 1317 start ; 1450 Compressor slowly losing battery - power

Developer's Signature(s) [signature] Date 11/3/10 Reviewer Date

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 152

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code: ______

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☒ Whale ☐ Grundfos ☐ Bladder ☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 20.03 m/PVC
Initial Depth to Water (feet) 6.90 mp
Height of Water Column in Well (feet) 13.13
Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.2	6.7
Gravel Pack			
Drilling Fluids			
Total		3x vol. =	6.7 gal

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI63
☒ pH Meter	YSI63
☒ Conductivity Meter	YSI63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-24-10	1305	X			20'	18.07	2.5	–			18.6	7.17	2,105	Dk br/turbid	
↓	1333	X			↓		0.25	–			18.6	7.29	2,080	–	
↓	1335	X			↓	17.73	0.25	3.0			18.0	7.31	2,126	Med br/turbid	

Circle the date and time that the development criteria are met.

Comments Sticky = 2.80' / Final well depth = 20.03' btoc/mp / = 17.23' bgs

Developer's Signature(s) [signature] Date 9/24/10 Reviewer ______ Date ______

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145 :	9	1	@	6	= 6
114	11	1		5	5
95	14	1		4	4

☐ Development
☐ Purging

95 = Optimal Setting ID

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 152

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code: ______

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 20.03
Initial Depth to Water (feet) 7.35
Height of Water Column in Well (feet) 12.68
Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.07	6.2
Gravel Pack		Liters	= 24
Drilling Fluids			
Total			

Instruments

Instrument	Serial No. (If applicable)
☑ Temperature Meter	Quanta - G
☑ pH Meter	
☑ Conductivity Meter	
☑ DO Meter	
☑ ORP Meter	

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gal/min)~~ or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed Liters ~~(gallons)~~: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity: DO %	Visual Clarity: ORP	Comments: Pump Setting / Clarity
11/8/10	1057	X			17	9.85	3	3	—	—				DO %	ORP	Pump Setting / Clarity
	1107					10.56		6			15.81	6.98	2.05	1.71	221	145 / Turbid
	1123					"		9			15.76	6.92	2.10	0.89	214	114 "
	1126					Below Pump		12			15.79	6.9	2.13	0.70	207	95 "
	1137					"	TOP	15			15.85	6.94	2.13	0.85	204	165
	1232					13.3		18			15.82	6.95	2.14	2.03	201	(needs to recharge)
	1235					BPT		21			15.98	6.87	2.15	2.50	123	Turbid
	1305							24			15.97	6.90	2.15	3.35	125	"
											16.74	6.89	2.16	3.05	138	"

OPTIMAL →

Circle the date and time that the development criteria are met.

Comments 1039 initiate develop.ment; 1129 let recharge 1225 = 7.35' bgs; restarted development

Developer's Signature(s) Bret Welder Date 11/8/10 Reviewer ______ Date ______

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER MW/53

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Bladder
☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 23.40' mp/NL
Initial Depth to Water (feet) 14.82 mp
Height of Water Column in Well (feet) 8.58
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.5	~4.5
Gravel Pack			
Drilling Fluids			
Total		3x vol = 4.5	

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-22-10	0945	X			~23	—	1.5				17.1	7.23	936	Lt.br./turbid	Start 0944
↓	0948	X			↓	~~20.2~~	~~2.0~~ 3.5	5.0			16.4	7.13	725	SAA	Rapid Q
	0956	X					4.5	9.5			15.9	7.18	765	Lt.br/turbid	Pumping WL = 21.85'
	1005	X				20.55	2.0	11.5			15.8	7.22	753	SAA	
9-22-10	1011	X		~~2.08~~		20.23	1.0	12.5			15.8	7.06	745	SAA	Completed development
				Avg = 0.2 gpm											

Circle the date and time that the development criteria are met.

Comments ~stickup = 2.9'. Final well Depth = 23.40' toc/mp = 20.50' bgs / Stickup = 2.9'

Developer's Signature(s) [signature] Date 9/22/10 Reviewer Date

ID Fill / ~~Discharge~~
127 = 8.4 / 3.6
126 = 8.6 / 3.4
125 = 8.8 / 3.2
124 = 9 / 3

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 153

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100   Cost Code: ______
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic
☐ Whale
☐ Grundfos
☒ Bladder
☐ ______

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 23.40
Initial Depth to Water (feet) 16.38
Height of Water Column in Well (feet) 7.02
Diameter (inches): Well 2" Gravel Pack ____

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.14	3.44 x 3.8 =
Gravel Pack			13.072 Liters
Drilling Fluids			
Total			

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	Quanta G
☒ pH Meter	
☒ Conductivity Meter	
☒ DO Meter	
☒ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data
Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (~~Gallons~~ Liters): Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity DO mg/L / ORP	Comments Pump Settings / water Clarity
11/2/10	1555	X			20.5	16.83	2		—	—					
	1603					17.03	4				15.91	7.27	0.631	3.39 / 141	ID-127; Clear
	1611					17.15	6				15.96	7.16	0.644	3.29 / 142	126
	1620			.22		17.23	8				15.91	7.14	0.644	3.22 / 141	125
	1628			.25		〃	10				15.83	7.11	0.649	3.14 / 141	124 Very Clear
	1637			.25		17.31	12				15.77	7.10	0.650	3.10 / 141	〃 〃
	1645			.25		〃	14				15.64	7.09	0.649	3.10 / 141	〃 〃
											15.60	7.08	0.649	3.02 / 141	〃 〃

Circle the date and time that the development criteria are met.

Comments 1547 start; 16:50 completed development w/ minimal drawdown

Developer's Signature(s) Brent Wilder   Date 11/2/10   Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW-154

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100 Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 15.43' mp/TOC
Initial Depth to Water (feet) 14.08 mp
Height of Water Column in Well (feet)
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-21-10	1120		X			14.86	0.5	0.5			19.2	7.59	1,223	Lt. brown	very turbid
9-22-10	0825		X			15.22	<0.1				—	—	—	Lt. br, turbid	SWL = 14.76'
9-23-10	1650		X			15.29	<0.1				—	—	—		SWL = 14.91'
9-24-10	1049		—			15.06'	—	—			—	—	—		static water level.
9-30-10						15.13' (static water level)									

Circle the date and time that the development criteria are met.

Comments Final Well Depth = 15.43' mp/TOC / ~~2.80~~ ~~bgs~~ = 12.63' bgs (Stickup = 2.80')

Developer's Signature(s) [signature] Date 9/24/10 Reviewer SJC Date 10-1-10

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER L55

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 23.38' mp/TOC
Initial Depth to Water (feet) 19.10 mp
Height of Water Column in Well (feet) 3.48
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.7	2.1
Gravel Pack			
Drilling Fluids			
Total		3X w/=	2.1

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-15-10	0906	X			23		–	–			–	–	–	Lt. brown, cldy	Start pump
	0909	X					2.5	–			15.1	7.12	787	Lt br., turbid	Pump Dry
	0921	X		0.06			0.75	–			15.3	7.12	786	Lt br., cldy	Cycle pump
	0943	X		0.05			0.75	4.0			15.9	7.24	787	SAA	"
	0950	–				21.15	–	–			–	–	–	–	
9-22-10	0845		X				0.5				15.2	7.10	782	Clear	SWL=20.62'
"	0850		X	0.20		21.45'	1.5	6.0			14.6	7.09	766	Clear	Completed development

Circle the date and time that the development criteria are met.

Comments Final well Depth = 23.38' mp/TOC / = 20.58' ; Stickup ≈ 2.80' Slow recovery/slow recharge ~0.2 gpm

Developer's Signature(s) [signature] Date 9/15/10
[signature] 9/22/10

Reviewer SJC Date 10/1/10

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Amp/Bud/S-L

	CPM	Fill	Discharge	
145	6	9	1	6 TD (sec)

☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 155

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code: ______

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 23.38
Initial Depth to Water (feet) 20.70
Height of Water Column in Well (feet) 2.68
Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.44	1.31
Gravel Pack		Liters =	5.0
Drilling Fluids			
Total			

Instruments

Instrument	Serial No. (If applicable)
☑ Temperature Meter	Quanta-G
☑ pH Meter	
☑ Conductivity Meter	
☑ DO Meter	
☑ ORP Meter	

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (liters): Increment	Water Volume Removed (liters): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L	ORP	Comments: Pump ID	Clarity
11/4/10		x			22	20.48	1	1	—	—	14.05	7.32	0.605	3.43	-50	145	Clear
	1522			~~1522~~		Below Top of Pump		2			14.04	7.29	0.594	3.29	-31	"	
	1530			.125		"		3			14.05	7.28	0.594	2.84	-19	"	
								4			14.07	7.28	0.594	2.03	-14	"	
								5			14.28	7.27	0.594	1.93	-6	"	

Circle the date and time that the development criteria are met.

Comments 1459 start ; 1605 complete development

Developer's Signature(s) [signature] Date 11/4/10 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 252

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Bladder
☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 52.33' mp/TOC
Initial Depth to Water (feet) 3.25' mp
Height of Water Column in Well (feet) 49.08
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		8.3	25
Gravel Pack			
Drilling Fluids			
Total		3x vol =	25

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9/24/10	1245	X			45	29.7	5				17.8	8.55	718	Clear	Start 1240
↓	1250	X			↓	41.00	2.5				18.8	8.41	755	Lt. brown/Turbid	
	1320	X				48.80	2.0	9.5			17.2	8.65	825	Lt. br.	
	1325	X				48.70	0.15				18.3	8.26	—	Med br/turbid	
9-30-10						0.25 (static water level)									

Circle the date and time that the development criteria are met.

Comments: Stickup = 2.80' / Final Well Depth = 52.34' mp/TOC; = 49.54' bgs

Developer's Signature(s) Date 9/30/10 Reviewer Date

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16.43 - 0.4 = 16.03 × .1632 = 2.62 × 3.8 = 9.94 liters

= very slow water infiltration.

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 252

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code: ______

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria

- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other ______

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☑ Peristaltic
- ☐ Whale
- ☐ Grundfos

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer
- ☑ Bladder
- ☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 52.34

Initial Depth to Water (feet) 0.40

Height of Water Column in Well (feet) 51.94

Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		8.47	25.43
Gravel Pack		Liters =>	96.63
Drilling Fluids			
Total			

Instruments

Instrument	Serial No. (If applicable)
☑ Temperature Meter	Quanta C
☑ pH Meter	
☑ Conductivity Meter	
☑ DO Meter	
☑ ORP Meter	

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gal/min)~~ or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed Liters ~~(gallons)~~: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity (DO ORP)	Comments
11/8/10	1147	X		.21	52	16.43	11	11	—	—	14.82	6.9	1.306	0.89 200	Slight turbidity
	1343					32.05	13	24			14.58	6.84	1.82	0.26 127	
							12	36							
								48							
								60							
								72							
								84							
								96							

Circle the date and time that the development criteria are met.

Comments 1050 start development (Removed 28 Liters total)

Developer's Signature(s) Brent Welder Date 11/8/10 Reviewer ______ Date ______

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW253

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 38.14' mp/TOC
Initial Depth to Water (feet) 29.64 mp
Height of Water Column in Well (feet) 8.51'
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Gallons	Gallons to be Removed
Well Casing		1.45	4.3 gal
Gravel Pack			
Drilling Fluids			
Total		3× vol =	4.3 gal

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Cumulative	Product Volume Removed (gallons): Increment	Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9/22/10	1019	X			~38		2.0	–							
9/22	1021	X				35.58'	1.5	3.5			15.4	7.63	1,073	Lt.br., turbid	start 1015
9/22	1024	X		~0.05		36.01	0.50	4.0	s/c		–	–	–		
9/23/10	1718		X			37.70	1.50	5.5			16.7	7.14	1,173	Lt.br., turbid	WL@1033=35.89'
											15.9	7.27	1,301	Lt.br., sl. turbid	WL@1500=34.85'

Circle the date and time that the development criteria are met.

Comments: NSTD/kg=30', Slow Recharge. Final Well Depth=38.14' mp/TOC/=35.84 bgs

Developer's Signature(s) Date 9/23/10 Reviewer Date

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ID	Fill	Discharge	CPM
99 =	12	3	4
97 =	13	2	4
68 =	18	2	3
165 =	5	5	6

-Best Rate or lower
(max removal rate)

☑ Development
☐ Purging

23.10 - 18.22 = 4.88 feet H_2O · 0.1632 gallons/ft = 0.79 gallons × 3.8 Liters/gallon = 3.02 liters

Note: Using ID 68; removed 4 liters @ .102 L/min; recieved 1 Liter water infiltration.

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 253

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100   Cost Code: ____

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria

- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other ____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐ ____

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 38.14
Initial Depth to Water (feet) 12.71
Height of Water Column in Well (feet) 25.43
Diameter (inches): Well 2" Gravel Pack ____

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		4.15	= 15.77 Liters
Gravel Pack		X3	= 47.3 →
Drilling Fluids			48
Total			

Instruments

Instrument	Serial No. (If applicable)
☑ Temperature Meter	Quanta - G
☑ pH Meter	
☑ Conductivity Meter	
☑ DO Meter	
☑ ORP Meter	✓

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gal/min)~~ or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed ~~(gallons)~~ liters: Increment	Cumulative	Product Volume Removed (gallons): Increment	Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
11/3/10	1011	x		.15	35.5	15.99	2							DO mg/L / ORP (mv)	Pump Setting / Clarity
	1023			.16		18.22	4		—	—	14.31	6.86	1.85	5.53 / 168	ID=99 / Clear
	1102			.102		23.10	8				14.39	6.98	1.81	7.10 / 161	97 / very Clear
	1116			.29		28.33	12				14.52	~~6.x~~	1.76	6.72 / 149	ID = 68 / pH = 7.05
	1125			"		32.97	16				14.30	7.11	1.64	6.59 / 141	ID = 165 / very Clear
	1132			"		34.15	20				14.35	7.15	1.58	6.01 / 137	" / "
	1141			"		35.25	24				14.27	7.11	1.75	5.75 / 136	" / "
	1150	v				Below	28				14.12	7.01	1.86	3.48 / 138	" / "
											14.07	6.98	1.89	0.79 / 121	" / "

Best sampling Rate (OR LESS)

Circle the date and time that the development criteria are met.

Comments: 0958 start; 1155 below pump @ ~30 Liters (Top of Pump Screen)

Developer's Signature(s): [signature] Date 6/3/10 Reviewer ____ Date ____

1/2

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 350

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100   Cost Code: ______
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐ ______

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 49.40 mp/TOC
Initial Depth to Water (feet) 15.00 mp/TOC
Height of Water Column in Well (feet) 34.4
Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		5.8	17.5
Gravel Pack			
Drilling Fluids			
Total			17.5

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	45563
☒ pH Meter	45563
☒ Conductivity Meter	45563
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data
Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-10-10	0816	X			49.4	36.90	4.0				—	—	—	Cldy	Solid bottom
↓	0855		X		—	48.42	3.5	7.5			—	—	—	Cldy	Very slow recharge
	0944		X		—	47.39	—				—	—	—	—	Recovery 44 min.
9-14-10	1035	~	—		—	25.48					—	—	—	—	Static WL
↓	1042	X			49.4	—	5.0				17.4	[illegible]	1,657	Cldy	—
	1045	X				46.30	1.0				15.6	12.03	1,410	Cldy	—
9-15-10	1025	X			49		3.0	16.5			16.3	11.79	1,154	Clear	Starting WL=32.0'
9-17-10	0910	X			49	43.72	3.0	19.5			14.9	11.56	1,041	Clear	Starting WL=27.74'

Circle the date and time that the development criteria are met.

Comments: Final Well Depth = 49.42' mp/TOC / = 46.62' LS / Stickup = 2.80'

Developer's Signature(s) [signature] Date 9/17/10 Reviewer ______ Date ______

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4811

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 350

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☒ Submersible
- ☐ Peristaltic

Bailer
- ☒ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☒ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 49.42 mp/TOC
Initial Depth to Water (feet)
Height of Water Column in Well (feet)
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (If applicable)
- ☒ Temperature Meter YSI 63
- ☒ pH Meter YSI 63
- ☒ Conductivity Meter YSI 63
- ☐ DO Meter
- ☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-17-10	0930		X		~~49'~~	48.57	1.5	21			—	—	—	Clear	~~[illegible]~~
9-21-10	1225	X			~49'	45.80	4.0	25			15.5	11.65	1,125	Clear	SWL = 25.37'
9-22-10	0805	X			~49'	44.62	1.75	26.75			15.5	11.08	718	Clear	Start WL = 34.11'
9-23-10	1625	X			~49'	46.28	3.25	30			15.4	11.08	691	Clear	Start WL = 29.85'

Circle the date and time that the development criteria are met.

Comments: Completed well development. Poor recharge/low Q.

Developer's Signature(s): [signature] Date 9/23/10 Reviewer ____ Date ____

note : 24.76 - 23.22 = 1.54 ft × 0.1632 gallon/ft = .25 × 3.8 gallon/liter = 0.95542
26.35 - 24.76 = 1.59 × 0.1632 = .259 × 3.8 = 0.986

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 350

Project Name: Groundwater Investigation – BEC Ash Pond System

Client Company: Dynegy, Inc.

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:

Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria

- ☐ 3 to 5 Casing Volumes of Water Removal
- ☑ Stabilization of Indicator Parameters
- ☑ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 49.42

Initial Depth to Water (feet) 22.52

Height of Water Column in Well (feet) 26.90

Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		4.39	4.39
Gravel Pack			
Drilling Fluids			
Total			

Instruments

Instrument	Serial No. (If applicable)
☑ Temperature Meter	Quanta-G
☑ pH Meter	"
☑ Conductivity Meter	"
☑ DO Meter	"
☑ ORP Meter	"

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (Liters): Increment	Water Volume Removed (Liters): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity DO/ORP	Comments
															(VERY CLEAR)
11/2/10	1139	X		0.07	45	23.22	1		–	–	15.01	12.08	1.71	5.18/-16	14 fill 1 Discharge @ 4 GPM
	1149	/		0.067		24.76	2				14.95	12.06	0.770	5.67/-23	10 8 / 1.2 @ 5 GPM
	1204	/		"		26.35	3				15.00	12.04	1.71	4.75/-31	ID 95 (vu, clear water)
	1230	✓				27.64	4				13.81	12.05	1.460	4.7/-42	
	1238	X				34.20	8				13.73	12.07	0.450	4.16/-42	5/5 @ 6 GPM ID = 165
	1243	X				40.10	12				13.67	12.06	1.63	4.61/-45	" "
	1250				below =	Pump	14				13.77	12.05	1.63	4.29/-45	
							20								

ID=95

Circle the date and time that the development criteria are met.

Comments 1119 start ; finish Purged well dry @ 18 Liters

Developer's Signature(s) [signature] Date 11/2/10 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 352

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal or
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 75.72' m/TOC
Initial Depth to Water (feet) 2.01' m/TOC
Height of Water Column in Well (feet) 73.71'
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		12.5	
Gravel Pack			
Drilling Fluids			
Total			

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI63
☒ pH Meter	YSI63
☒ Conductivity Meter	YSI63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-21-10	1448	X			~74	66.01	10.5	10.5			21.5	7.80	826	clear	start 1425
9-22-10	0727	–				64.72	–	–			–	–	–	–	no pumping
9-23-10	1605	–				64.53	–	–			–	–	–	–	no pumping
9-24-10	1220	–				63.28	–	–			–	–	–	clear	no pumping
9-30-10						55.37 (static water level)									

Circle the date and time that the development criteria are met.

Comments

Developer's Signature(s) [signature] Date 9/30/10 Reviewer Date

117 =	10.04	1.6	@ 5	8.0
165 =	5	5	@ 6	30.0

31.9 - 23.85 = 8.05 • .1632 = 1.31 x 3.8 = 4.99
@ 0.1 L/min; experienced significant drawdown

☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 352

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Project Number: (Kelron) 2010.100 Cost Code:
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 75.72
Initial Depth to Water (feet) 23.85
Height of Water Column in Well (feet) 51.87
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		8.46	25.39
Gravel Pack		Liters =	96.5
Drilling Fluids			
Total			

Instruments Serial No. (If applicable)
- ☑ Temperature Meter Quanta - G
- ☑ pH Meter
- ☑ Conductivity Meter
- ☑ DO Meter
- ☑ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gal/min)~~ or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed Liters ~~(gallons)~~: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L	ORP	Comments: Pump ID	Comments: Clarity
11/4/10	1114	X		0.1	73.5	31.9	4	4	—	—	12.89	10.83	0.522	3.32	77	117	Very Clear
	1134			0.5		50.90	~~8~~ 10	~~18~~ 14	—	—	13.56	11.81	1.118	1.92	25	165	"
	11 42			"		60.3	6	20			13.51	11.94	1.054	3.05	11	"	"
	11 47			"		66.83	4	24			13.51	12.01	0.927	4.49	7	"	"
11/8/10	14:40							28			14.3	11.89	1.65	3.64	-64	"	

Circle the date and time that the development criteria are met.

Comments 1035 start; Went below pump screen @ ~26 liters

Developer's Signature(s) Bryan Wilder Date 11/9/10 Reviewer Date

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER 355

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100 Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale ☐ Grundfos ☐ Bladder ☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 35.43' MP
Initial Depth to Water (feet) 22.91' m/TOC
Height of Water Column in Well (feet) 12.52'
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.13	6.4
Gravel Pack			
Drilling Fluids			
Total		3 x vol = 6.4	

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI 63
☒ pH Meter	YSI 63
☒ Conductivity Meter	YSI 63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-17-10	0815	X			~35.4'	32.80'	2.0				–	–	–	Lt gray/cldy	Pumped Dry
9-17-10	0835		X			34.85'	1.0	3.0			–	–	–	SAA	
9/21-10	1140	X			~35.4						18.1	7.11	832	Clear	SWL=23.05'
11	1143	X				31.68'	2.0	5.0			15.6	7.16	678	Clear	
11	1148		X				1.0				15.0	7.08	925	Clear	
11	1159		X			34.10'	2.0	8.0			14.6	7.31	882	Clear	
9/22/10	0857	X				31.71	2.0				14.3	7.21	846	Clear	SWL=23.01' (0853)
11		X				32.15	1.0	11.0			15.3	7.18	905	SAA	

Circle the date and time that the development criteria are met.

Comments: Very low recharge/recovery. Final well Depth = ~~34.40~~ mp/TOC / = 32.59 bgs ~~12.80~~ Completed Development s/l 35.40 sticky

Developer's Signature(s) [signature] Date 9/23/10 Reviewer Date

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Setting		Discharge	CPM	TD (sec)/minute
116	10.6	1.4	5	7.0
119	10	2	5	10
129	8	4	5	20
165	6	5	5	30

118 : OPTIMAL 10.2 & 1.8 = 9 sec TD

☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER 355

Project Name: Groundwater Investigation – BEC Ash Pond System

Project Number: (Kelron) 2010.100 Cost Code:

Client Company: Dynegy, Inc.

Project Manager: Stuart Cravens (Kelron Environmental)

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria

- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☑ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 35.41

Initial Depth to Water (feet) 23.90

Height of Water Column in Well (feet) 11.51

Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.87	5.64
Gravel Pack		Liters =	21.41
Drilling Fluids			
Total			

Instruments

Serial No. (If applicable)

- ☑ Temperature Meter — Quanta-G
- ☑ pH Meter
- ☑ Conductivity Meter
- ☑ DO Meter
- ☑ ORP Meter

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate ~~(gal/min)~~ or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed ~~(gallons)~~ Liters: Increment	Water Volume Removed: Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed: Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	DO mg/L	ORP	Comments: Pump Setting	Comments: Clarity
11/4/10	1338	X		0.18	34'	24.90	2	2	—	—	13.93	7.84	0.978	0.60	-130	116	Gray & Turbid
	1352					24.67		4			13.92	7.57	0.979	0.55	-125	"	" Odor
	1402			0.20		24.90		6			13.94	7.38	0.682	0.19	-113	119	"
	1407			0.4		26.10		8			13.73	7.36	0.740	0.15	-112	129	"
	1426					27.23		12			13.74	7.29	0.740	0.13	-107	165	"
	1434					28.60		16			13.73	7.28	0.719	0.12	-108	"	Clearer
	1440					31.15		20			13.73	7.29	0.718	0.55	-109	"	"
	1443	✓				Below Top of Pump		22			13.72	7.27	0.768	0.58	-105		

Compressor shutdown for 10 minutes

Circle the date and time that the development criteria are met.

Comments 1327 Start ; 1443 Completed development

Developer's Signature(s) [signature] Date 11/4/10 Reviewer Date

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☑ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER Ow-156

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100 Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump: ☐ Centrifugal ☒ Submersible ☐ Peristaltic
Bailer: ☐ Bottom Valve ☐ Double Check Valve ☐ Stainless-steel Kemmerer
☒ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation ($2"=0.1632$, $4"=0.6528$)
Initial Depth of Well (feet) 20.46' m/TVC
Initial Depth to Water (feet) 7.03' m/TVC
Height of Water Column in Well (feet) 13.43
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Gallons	Gallons to be Removed
Well Casing		2.3	6.8
Gravel Pack			
Drilling Fluids			
Total		3 vol =	6.8

Instruments — Serial No. (If applicable)
☒ Temperature Meter Y55-63
☒ pH Meter Y55-63
☒ Conductivity Meter Y55-63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Bailer	Removal Rate (Gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Cumulative	Product Volume Removed (gallons): Increment	Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-14-10	1128	X				—	1.0				18.7	6.98	933	Lt.br/cldy	
	1132	X			sf	14.50	3.0				18.1	6.93	864	SAA	
	1136	X		0.25		18.5	4.0	8.0			16.5	6.93	813	SAA	Pumped dry
	1142	—			s/c	14.70	—				—	—	—	—	Recovery water level
	1152	X		0.25		19.08	2.0	10.0			17.1	7.00	826	SAA	Cycle ½ gal increments
	1155	X		0.10	s/c	18.41	0.5	10.5			16.9	6.97	818	Lt br/cldy	
↓	1158	—				18.41									

Circle the date and time that the development criteria are met.
Comments Final well Depth = 20.45' TOC / = 17.70' bgs / stickup = 2.75' Slow but sustained recovery ~0.5 gal/2 min.

Developer's Signature(s) [signature] Date 9/14/10 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER OW-157

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 20.38 mp/TOC
Initial Depth to Water (feet) 4.04 mp
Height of Water Column in Well (feet) 16.34
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.8	8.3
Gravel Pack			
Drilling Fluids			
Total		3x wl =	8.3

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data
Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
9-14-10	1224	X			20.3	~~5.50~~	5.0				19.6	6.35	2,665	Dk.br, v.turbid	Start 1220
	1232	X		0.63	"	14.50	5.0	10			18.8	6.47	3,635	Lt br, cldy	w/fine sand, Pumping level
	1240	X		0.63	"	17.0	5.0	15			17.5	6.86	2,517	Med br, turbid	Pumping level
	1246	X		0.33	"	—	2.0	17			17.0	6.75	2,634	SAA	Pumped Dry. Start cycling
9/14/10	1250	—			—	15.65									

Circle the date and time that the development criteria are met.

Comments: Fnl Depth = 20.38 mp / = 17.71 bgs / Stickup = 2.67'. Rapid recharge rate / High Q

Developer's Signature(s) [signature] Date 9/14/10 Reviewer ______ Date ______

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER MW-104SR

Project Name: Groundwater Investigation – BEC Ash Pond System
Project Number: (Kelron) 2010.100
Cost Code:
Client Company: Dynegy, Inc.
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Bladder
☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 18.02' mp
Initial Depth to Water (feet) 10.40' mp
Height of Water Column in Well (feet) /
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.2	4-6.0
Gravel Pack			
Drilling Fluids			
Total			4-6

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI-63 (4A-0154)
☒ pH Meter YSI-63
☒ Conductivity Meter YSI-63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
8/1/11	0816		X	–	N/A	12.65'	1.25	1.25	N/A	N/A	18.5	6.88	1,442	Lt brown	Start @ 0818
	0821		X	0.25			1.25	2.5	–	–	17.6	6.88	1,552	Clear	
	0827		X			15.95'	1.5	4.0	–	–	17.9	6.93	1,470	Cldy	
	0849		X				1.25	5.25	/	/	16.9	6.90	1,508	Clear	Start @ 0843
	0859		X				1.25	6.5	/	/	17.4	6.92	1,506	Clear	
	0908		X			15.25			/	/					
			X						/	/					

Circle the date and time that the development criteria are met.

Comments: Final Total = 6.5g Final well depth = 18.02' mp (solid bottom)

Developer's Signature(s) [signature] Date 8/1/11 Reviewer ______ Date ______

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW-104DR

Project Name: Groundwater Investigation – BEC Ash Pond System
Client Company: Dynegy, Inc.
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois
Project Number: (Kelron) 2010.100 Cost Code:
Project Manager: Stuart Cravens (Kelron Environmental)

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 31.45' mp
Initial Depth to Water (feet) 10.44 mp
Height of Water Column in Well (feet)
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing		3.4	17 g.
Gravel Pack			
Drilling Fluids			
Total			17 g

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI-63 (4A-0154)
☒ pH Meter YSI-63
☒ Conductivity Meter YSI-63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm) SC	Visual Clarity	Comments
8/1/11	0756	X		1 gpm	31'		10.0	10	N/A	N/A	17.4	6.91	560	med brown	Start @ 0746
	0801	X					5	15	/	/	15.7	6.49	1,136		PWL = 26.65'
	0805	X		1.25			5	20	/	/	15.5	7.08	1,135	lt. brown	
	0833	X					5	25	/	/	16.5	7.21	1,130	" "	Start @ 0829
	0837	X					5	30	/	/	15.5	7.12	1,129	Cldy	
	0843	X		~1 gpm			5	35	/	/	15.5	7.14	1,132	~~Cldy~~ Clear	PWL = 24.15'
8/1/11	0906	–	–			11.20'			/	/		7.13			
												7.11			

Circle the date and time that the development criteria are met.

Comments: Final total = 35 gals. Final well Depth = 18.45' mp (solid bottom)

Developer's Signature(s) [signature] Date 8/1/11 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-158

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☒ Peristaltic

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 21.86'
Initial Depth to Water (feet) 12.04'
Height of Water Column in Well (feet) 9.82'
Diameter (inches): Well 1¼" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.83	2.5-4.1
Gravel Pack			
Drilling Fluids			
Total			2.5-4.1

Instruments
Instrument	Serial No. (if applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9/5/13	1045	X	X			*14.20	0.5	0.5			17.5	8.40	779	Cloudy, Sl. tub	Started 1043
	1048	X				*15.30	1.5	2.0			16.8	8.13	743	cloudy, Fair	slightly turbid, Lt. gray
	1051	X				*16.35	1.0	3.0			16.4	7.87	729	Good	clay, Sl. turbid, V. lt gray
	1055	X				*18.60	0.75	3.75			16.0	7.70	736	Good.	clay, V. lt. gray
	1058	X				*20.61	0.5	4.25			15.9	7.60	742	SAA	SAA, Any to lighter
	1101	X				—	0.75	5.00			16.4	7.40	741	Fair	Med brown, Sl. turbid
	1106	X				*19.12	1.0	6.0			16.1	7.42	736	Good.	Lt. Gray, Clay
9/5/13	1144	—		—	—	13.48									Final level.

Circle the date and time that the development criteria are met.

Comments * Pumping water level. Final well depth = 21.86' mp. Stick-up = 3.00'

Developer's Signature(s) [signature] Date 9/5/13 Reviewer ______ Date ______

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TP2-159

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☒ Peristaltic

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 32.54
Initial Depth to Water (feet) 18.20
Height of Water Column in Well (feet) 14.34
Diameter (inches): Well 1.25 Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.92	2.75-4.6
Gravel Pack			
Drilling Fluids			
Total			2.75-4.6

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	1544	X			~26	21.41	0.5	0.5			20.6	7.23	874	Fair	Lt gray/Cldy
	1600	X			32.3	24.05	0.5	1.0			20.9	6.97	936	Poor	Med brown/very turbid
	1612	X			32.3	25.60	0.5	1.5			20.9	6.96	888	Fair	Lt brown/sl. turbid
	1623	X			32.3	25.60	0.5	2.0			20.2	6.76	924	SAA	Cloudy
	1632	X			32.3	25.60	0.5	2.5			19.5	6.72	914	Good	Cloudy
	1641	X			11	11	0.5	3.0			20.5	6.80	903	Good	Cldy
	1645	X			11	11	0.25	3.25			19.6	6.79	897	Good	Cldy
9-3-13	1650					19.95									

Circle the date and time that the development criteria are met.

Comments: Final well depth = 32.54' mp. Stick-up = 2.95'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer Date

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-160

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☒ Peristaltic
Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 22.30
Initial Depth to Water (feet) 8.23 mp
Height of Water Column in Well (feet) 14.07
Diameter (inches): Well 1¼ Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.90	2.7-4.5
Gravel Pack			
Drilling Fluids			
Total			2.7-4.5

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI-13
☒ pH Meter YSI-13
☒ Conductivity Meter YSI-13
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	1458	X			~22'	*13.30	1.5	1.5			21.1	7.52	755	Poor/Opaque	Lt. brown, mod. turbid
	1500	X				*13.50	1.0	2.5			20.5	7.40	770	Poor	V. lt. brown, mod. turbid
	1503	X				*13.58	0.5	3.0			19.9	7.35	763	Good	V. lt. gray, cloudy
	1505	X				*13.56	1.0	4.0			19.5	7.32	723	V. Good	clear
	1507	X				*13.43	0.5	4.5			19.0	7.29	776	V. Good	clear
9-3-13	1513					8.30									

Circle the date and time that the development criteria are met.

Comments *Pumping water level. Final well depth = 22.30' mp, stick-up = 2.90'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-163

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009 Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☒ Peristaltic

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 21.57'
Initial Depth to Water (feet) 11.19'
Height of Water Column in Well (feet) 10.38
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.76	5.3-8.8
Gravel Pack			
Drilling Fluids			
Total			5.3-8.8

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9/5/13	0840	X	X		21.2	16.89	0.5	0.5			15.9	9.15	923	V. Poor, V. turbid	Start 0838. V. dk. gray
	0845	X			21.2	16.80	2.0	2.5			15.7	9.53	1,924	SAA	SAA
	0852	X			21.5	*19.53	2.5	5.0			15.1	9.62	1,865	Poor. Opaque	very turbid, DK. gray
	0858	X				*>21.5	1.25	6.25			15.1	9.54	1,876	Poor.	Turbid (clay), Med gray.
	0903	X				*>21.5	1.25	7.50			15.1	9.61	1,847	Poor	Turbid, Med gray.
	0912	X				—	1.50	9.0			15.5	9.79	1,798	Fair	Sl. turbid. V. lt. gray.
	0923	X			21.5	—	1.5	10.5			15.5	9.81	1,794	Fair	SAA
9/5/13	0939	—	—	—	—	11.80	—	—			—	—	—	—	Final water level

Circle the date and time that the development criteria are met.

Comments *Pumping water level. Final well depth = 21.58', stick-up = 2.90'

Developer's Signature(s) [signature] Date 9/5/13 Reviewer ____ Date ____

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER TPZ-164

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☐ Submersible
☒ Peristaltic
☐ Whale
☐ Grundfos

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Bladder
☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 12.86'
Initial Depth to Water (feet) 4.82'
Height of Water Column in Well (feet) 8.04
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.4 (1.31)	4.1-6.85
Gravel Pack			
Drilling Fluids			
Total		N	4.1-6.4

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI-63
☒ pH Meter YSI-63
☒ Conductivity Meter YSI-63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-4-13	1407	X			12.80	*4.98	1.5	1.5			21.6	7.38	903	Very turb.	Start @ 1404. Dk. gray
	1409	X				*4.98	1.5	3.0			21.2	7.25	904	Fair	V. light gray Sl. turbid
	1412	X				*4.98	1.5	4.5			21.1	7.15	921	Clear/Excell	No visible turbidity
	1417	X					2.5	7.0			21.2	7.07	905	Clear	
9-4-13	1418	X					1.0	8.0			21.1	7.01	904	Clear	
9-4-13	1425				—	~~4.83~~ G 4.83	—	—			—	—	—		Final water level.

Circle the date and time that the development criteria are met.

Comments *Pumping water level.

Developer's Signature(s) [signature] Date 9/4/13 Reviewer Date

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-165

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
SJL ☒ Submersible
☒ Peristaltic
SJL ☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☐ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 20.15
Initial Depth to Water (feet) 5.82
Height of Water Column in Well (feet) 14.33
Diameter (inches): Well 1¼" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		0.92	2.8-4.6
Gravel Pack			
Drilling Fluids			
Total			2.8-4.6

Instruments
Serial No. (If applicable)
☒ Temperature Meter YSI-63
☒ pH Meter YSI-63
☒ Conductivity Meter YSI-63
☐ DO Meter
☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	1347	X				—	0.25	0.25			21.7	6.80	2489	Fair	Light gray, turbid
	1354	X			~20	>20	1.25	1.50			25.7	7.05	2602	"	SAA
	1357	X				—	0.50	2.0			20.5	6.93	2497	"	SAA
	1400	X			17.[illegible]		0.50	2.5			20.5	6.71	2515	Good	Very light gray, sl turbid
	1408	X				17.11	0.5	3.0			20.9	6.74	3524	Good	Cloudy, lt gray
	1412	X				—	0.5	3.5			20.3	6.74	2497	Good	Cloudy, very lt gray
	1416	X				>20	0.5	4.0			20.1	6.63	2451	Good	Clear.
9-3-13	1425					9.15*									

Circle the date and time that the development criteria are met.

Comments * Pumping water level. Final well depth = 20.15' mp, Stick-up = 2.75'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-166

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☒ Whale ☐ Grundfos ☐ Bladder ☐

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 28.12
Initial Depth to Water (feet) 8.55
Height of Water Column in Well (feet) 19.57
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		3.3	16.6-27.7
Gravel Pack			
Drilling Fluids			
Total			16.6-27.7

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	"
☒ Conductivity Meter	"
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	1220		X		—	19.90	5.0	5.0			16.8	8.09	765	Fair	Lt. brown, sl. turbid
	1231		X		—	21.98	5.0	10.0			15.6	7.55	616	Fair	SAA
	1239	X			—	25.60	4.0	14.0			15.6	7.26	595	Poor	Med brown, turbid
	1244	X			28.0	>27.1	2.0	16.0			—	—	—	—	Pumped well dry
	1247	X			28.0	>27.1	2.0	18.0			15.5	7.21	553	Fair	Lt. brown, sl. turbid
	1255	X			28.0	>27.0	1.5	19.5			16.4	7.02	558	Fair	Lt. gray
	1305	X			28.0	>27.1	1.0	20.5			15.9	7.06	550	Fair	Lt. gray
						26.12									

Circle the date and time that the development criteria are met.

Comments *Pumping water level. Final well depth = 28.12' m, Stick-up = 2.85'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer Date

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-167

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code: ____
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other ____

Methods of Development
Pump
- ☐ Centrifugal
- ☒ Submersible
- ☒ Peristaltic
- ☒ Whale
- ☐ Grundfos
- ☐ Bladder
- ☐ ____

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 34.26
Initial Depth to Water (feet) 7.35
Height of Water Column in Well (feet) 26.91
Diameter (inches): Well 2" Gravel Pack ____

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		4.57	13.7-22.9
Gravel Pack			
Drilling Fluids			
Total			13.7-22.9

Instruments
Serial No. (If applicable)
- ☒ Temperature Meter YSI-63
- ☒ pH Meter 11
- ☒ Conductivity Meter 11
- ☐ DO Meter
- ☐ ORP Meter

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	0904	X			33.5	—	1.75	1.75	/	/	18.1	9.31	3,658	Dk. br., opaque	Dk brown, turbid
	0919	X			11	*7.67	3.25	5.0	/	/	18.0	9.63	3,630	Poor/opaque	SAA
	0941	X			11	—	5.25	8.25	/	/	17.6	9.84	3,868	Poor	Lt. brown, turbid
	0949	X			11	*10.01	3.25	11.5	/	/	17.0	9.84	3,890	Med	Lt. gray, slightly turbid
	0954	X			34.2	*10.10	2.50	14.0	/	/	16.8	9.88	3,892	Fair	Very lt. gray, sl. turbid
	1004	X			11	*10.12	6.0	20.0	/	/	17.1	9.89	3,863	Fair	SAA
9-13-13	1011	X			11	—	3.0	23.0	/	/	17.0	9.91	3,880	Fair	SAA
11	1014					7.68									

Circle the date and time that the development criteria are met.

Comments *pumping water level. final well depth = 34.26' mp. stick-up = 2.75'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer ____ Date ____

☒ Development
☐ Purging

environmental

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER TPZ-168

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☒ Peristaltic
☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 28.41'
Initial Depth to Water (feet) 17.76'
Height of Water Column in Well (feet) 10.65
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		1.8	5.4-9.0
Gravel Pack			
Drilling Fluids			
Total			5.4-9.0

Instruments

Instrument	Serial No. (if applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	"
☒ Conductivity Meter	"
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-3-13	1043	X			28.3'	*19.44	2.5	2.5			18.4	10.17	4,553	Poor/Opaque	Dark Brown, very turbid
	1051	X				~~*19.08~~	2.5	5.0			16.9	10.33	4,713	SAA	SAA
	1114		X			*17.13	5.0	10.0			17.1	11.06	4,966	SAA	SAA
	1122	X				—	2.0	12.0			17.0	11.03	5,050	SAA	SAA
	1130	X				*17.06	1.5	13.5			16.9	11.34	5,140	Poor-Fair	Med Brown, turbid
	1137	X					1.5	15.0			16.9	11.44	5,150	Fair	Lt gray, mod. turbid
	1142	X				*17.22	1.0	16.0			16.9	11.41	5,140	Fair	Lt gray, mod turbid
9-3-13	1147					16.83									

Circle the date and time that the development criteria are met.

Comments *Pumping water level. Final well depth = 28.41' mp. Stick-up = 2.60'

Developer's Signature(s) [signature] Date 9/3/13 Reviewer Date

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW-161

Project Name: Hydrogeologic Investigation – BEC Ash Pond System Project Number: (Kelron) 2013.009 Cost Code: ______

Client Company: Dynegy Operating Co. / Dynegy Midwest Generation Project Manager: Stuart Cravens (Kelron Environmental)

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development
Pump: ☐ Centrifugal ☒ Submersible ☐ Peristaltic
Bailer: ☒ Bottom Valve ☐ Double Check Valve ☐ Stainless-steel Kemmerer
☒ Whale ☐ Grundfos ☐ Bladder ☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 34.64'
Initial Depth to Water (feet) 22.27'
Height of Water Column in Well (feet) 12.37
Diameter (inches): Well 2" Gravel Pack ______

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.1	6.3-10.5
Gravel Pack			
Drilling Fluids			
Total			6.3-10.5

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-4-13	0901	X	X		~32	27.40	0.5	0.5			16.1	7.44	874	V.Poor, V.turbid	Start 08:59. Dk.gray
9-4-13	0906	X	X		~32	—	3.5	4.0			15.3	7.28	808	V.Poor	Dk.gray, Very turbid
	0911	X	X		34.5 *	>34.45	1.0	5.0			15.1	7.27	829	V.Poor	SAA (high clay content)
	0917	X			34.5 *	>34.45	2.0	7.0			15.2	7.20	791	V.Poor	SAA
	0923	X			〃	33.35	2.0	9.0			15.0	7.10	809	V.Poor	SAA
	0933	X			〃	33.20	2.25	11.25			15.4	7.33	794	V.Poor	Dk.gray, Very turbid
9-4-13	0946	—			—	29.44	—	—			—	—	—	—	Final water level.

Circle the date and time that the development criteria are met.

Comments: *Pumping water level. Final well depth = 35.88' mp. Stick-up = 2.53'

Developer's Signature(s) [signature] Date 9/4/13 Reviewer ______ Date ______

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- [x] Development
- [ ] Purging

WELL DEVELOPMENT AND PURGING DATA

WELL NUMBER OW-256

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:

Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria

- [x] 3 to 5 Casing Volumes of Water Removal
- [x] Stabilization of Indicator Parameters
- [ ] Other

Methods of Development

Pump
- [ ] Centrifugal
- [x] Submersible
- [ ] Peristaltic
- [x] Whale
- [ ] Grundfos
- [ ] Bladder
- [ ]

Bailer
- [x] Bottom Valve
- [ ] Double Check Valve
- [ ] Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)

Initial Depth of Well (feet) 35.57
Initial Depth to Water (feet) 11.48
Height of Water Column in Well (feet) 24.09
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		4.1	12.3-20.5
Gravel Pack			
Drilling Fluids			
Total			12.3-20.5

Instruments

Serial No. (If applicable)

- [x] Temperature Meter YSI-63
- [x] pH Meter YSI-63
- [x] Conductivity Meter YSI-63
- [ ] DO Meter
- [ ] ORP Meter

Water Disposal

Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-4-13	1235	X	X		34.5	—	2.0	2.0			17.2	8.11	598	Poor, Turbid	Start @ 1234, Med brown
	1238	X			35.5	*32.70	3.0	5.0			17.7	7.97	645	Fair	Turbid, Light gray
	1242	X				>32.7	2.0	7.0			16.2	7.71	765	Fair	SAA
	1248	X				>32.7	3.0	10.0			15.9	7.45	879	Fair	Light gray, Turbid (clay)
	1258	X				>32.7	4.0	14.0			16.2	7.35	902	Good	Cloudy, Sl. turbid
	1310	X				>32.7	3.5	17.5			16.5	7.33	882	Very Good	Sl. cloudy, No turbidity
9-4-13	1316	X			35.5	>32.7	3.0	20.5			16.1	7.30	879	Very Good	Sl. cloudy, No turbidity
9-4-13	1322				—	[illegible]	—	—			—	—	—	—	Final water level

Circle the date and time that the development criteria are met.

Comments *Pumping water level. Final well Depth = 35.57' m. Stick-up = 2.50'

Developer's Signature(s) [signature] Date 9/4/13 Reviewer ______ Date ______

☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER OW-257

Project Name: Hydrogeologic Investigation – BEC Ash Pond System
Project Number: (Kelron) 2013.009
Cost Code:
Client Company: Dynegy Operating Co. / Dynegy Midwest Generation
Project Manager: Stuart Cravens (Kelron Environmental)
Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos
☐ Bladder
☐

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 39.86
Initial Depth to Water (feet) 5.80 mp
Height of Water Column in Well (feet) 34.06
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		5.8	17.4-29
Gravel Pack			
Drilling Fluids			
Total			17.4-29

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (Liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-4-13	1058	X	X		~39'		1.0	1.0			18.2	7.30	2,504	V. Poor, V. turb	Starte 1057. V. dk. gray
	1101	X				34.75	3.5	4.5			17.7	7.18	2,327	V. Poor	V. turbid. V. dk grey
	1109	X	X			*37.75	2.5	7.0			17.2	7.12	2,161	SAA	SAA
	1121	X				>39.05	1.5	8.5			—	—	—	SAA	Pumped well dry
9-4-13	1156	X				>39.05	0.25	8.75			19.1	7.19	2,099	SAA	" " "
9-5-13	0754	X				>39.05	0.5	9.25			15.4	7.33	1,723	V. Poor, V. turbid	V. dk. gray
9-5-13	0758	X				>39.05	4.0	13.25			15.2	7.17	1,533	SAA	Pumped Dry
9-5-13	0805				—	38.71	—	—			—	—	—	—	

Circle the date and time that the development criteria are met.

Comments * Pumping water level. Final well depth = 41.91. stickup = 2.85, water level on 9/5/13 = 21.38 mp

Developer's Signature(s) [signature] Date 9/5/13 Reviewer ______ Date ______

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☒ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA
WELL NUMBER MW-262

Project Name: Hydrogeologic Investigation – BEC Ash Pond System

Project Number: (Kelron) 2013.009 Cost Code: ______

Client Company: Dynegy Operating Co. / Dynegy Midwest Generation

Project Manager: Stuart Cravens (Kelron Environmental)

Site Address: Baldwin Energy Complex, 10901 Baldwin Road; Baldwin, Illinois

Development Criteria
☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other ______

Methods of Development
Pump
☐ Centrifugal
☒ Submersible
☐ Peristaltic
☒ Whale
☐ Grundfos

Bailer
☒ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer
☐ Bladder
☐ ______

Water Volume Calculation (2"=0.1632, 4"=0.6528)
Initial Depth of Well (feet) 49.56
Initial Depth to Water (feet) 35.31
Height of Water Column in Well (feet) 14.25
Diameter (inches): Well 2" Gravel Pack ____

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		2.4	7.3-12.1
Gravel Pack			
Drilling Fluids			
Total			7.3-12.1

Instruments
Instrument	Serial No. (If applicable)
☒ Temperature Meter	YSI-63
☒ pH Meter	YSI-63
☒ Conductivity Meter	YSI-63
☐ DO Meter	
☐ ORP Meter	

Water Disposal
Discharged to ground.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min) or (liter/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mS/cm)	Visual Clarity	Comments
9-4-13	0805	X	X		49.5	sic 40.03	0.5	0.5			16.5	6.71	703	Poor, V. turbid	Start 0804. Dark brown
	0808	X	X		"	40.03	2.5	3.0			15.7	6.40	554	Poor	DK. brown. Very turbid
	0813	X	X		"	40.03	2.0	5.0			15.6	6.39	464	Poor	Med brown. Turbid
	0818	X			"	*45.08	3.0	8.0			15.6	6.44	468	Fair	Light brown. Sl. turbid
	0821	X			"	*45.18	2.0	10.0			15.6	6.44	470	Fair	S.A.A.
	0824	X			49.5	*47.15	5.0	15.0			16.8	6.67	495	Fair	Lt. brown. Sl. turbid
9-4-13	0839	—			—	37.11	—	—							Final water levels

Circle the date and time that the development criteria are met.

Comments: *Pumping water level. Final well depth = 49.56'. stick-up = 2.35'

Developer's Signature(s) [signature] Date 9/4/13 Reviewer ______ Date ______

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APPENDIX D

LABORATORY PHYSICAL TEST RESULTS

Shively Geotechnical
A Division of Environmental Operations, Inc.

October 11, 2010
Project No. 6339

Stuart Cravens
Kelron Environmental
1213 Dorchester Drive
Champaign, Illinois 61821

Subject: Geotechnical Laboratory Testing
Groundwater Investigation
BEC Ash Pond System
Baldwin, Illinois

Dear Mr. Cravens:

Please find the attached results of laboratory testing performed on samples provided to Shively Geotechnical, a Division of Environmental Operations. Samples were taken from the BEC Ash Pond System Groundwater Investigation project by others and were submitted to our laboratory for various testing. Assignments for the testing were initiated by Stuart Cravens of Kelron Environmental.

Testing was performed in accordance with the following American Society for Testing and Materials (ASTM) test procedures:

D 422	Particle-Size Analysis of Soils.
D 2216	Water (Moisture) Content of Soil and Rock by Mass
D 2487	Classification of Soils (Unified Soil Classification System)
D 5084	Hydraulic Conductivity Using a Flexible Wall Permeameter

We appreciate the opportunity to be of service to Kelron Environmental and to Dynegy, Inc. Please let us know if you have any questions or if we can be of further assistance.

Sincerely,

Shively Geotechnical,
a Division of Environmental Operations, Inc.

Janet M. May

Janet M. May
Laboratory Services Manager

Attachments

SUMMARY OF LABORATORY TEST RESULTS

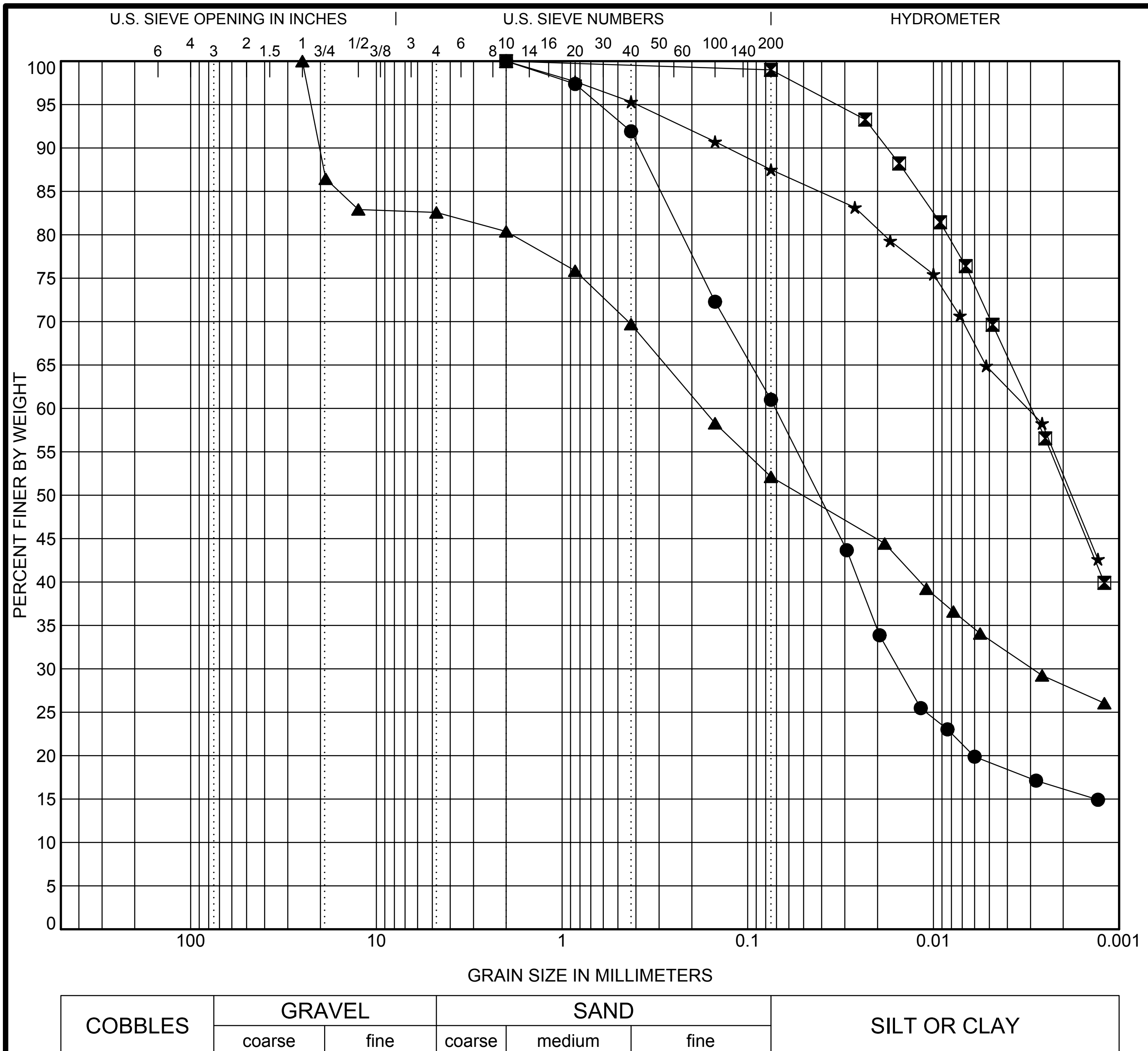
Boring Number	Sample Depth (Feet)	Moisture Content, %	USCS Classification
MW-151	7.5-8.0	20.8	Very Dark Gray-Brown Sandy CLAY (CL)
MW-151	16.0-17.0	20.0	Olive-Gray Shaley Fat CLAY (CH)
MW-154	3.0-4.0	24.4	Black Fat CLAY (CH)
MW-154	8.0-9.2	16.9	Dark Gray & Yellow-Brown Sandy CLAY with Gravel (CL)
MW-154	11.0-12.0	27.2	Gray & Light Olive-Brown Shaley Fat CLAY (CH)
MW-155	7.0-8.0	16.0	Brown Lean CLAY to Fat CLAY (CL/CH)
MW-155	18.5-19.5	15.2	Dark Yellow-Brown Clayey SAND (SC)
MW-156	10.0-11.0	27.4	Dark Brown Lean CLAY (CL)
MW-157	2.0-3.0	23.3	Dark Gray-Brown Lean CLAY (CL)
MW-157	7.0-9.0	36.6	Light Olive-Brown Fat CLAY (CH)
MW-157	17.0-18.0	25.3	Dark Yellow-Brown Lean CLAY to Fat CLAY (CL/CH)
MW-252	14.0-16.0	15.1	Dark Yellow-Brown Sandy CLAY (CL)
MW-252	44.0-46.0	31.4	Dark Yellow-Brown Fat CLAY (CH)
MW-253	11.0-12.0	18.6	Dark Yellow-Brown Fat CLAY with Sand (CH)
MW-253	19.0-19.5	19.1	Dark Yellow-Brown Lean CLAY with Sand (CL)
MW-253	29.0-30.0	23.5	Olive Shaley Fat CLAY (CH)
MW-350	5.0-6.0	52.6	Brown Fat CLAY (CH)
MW-350	11.0-12.0	55.5	Light Olive-Brown Lean CLAY to Fat CLAY (CL/CH)
MW-350	18.0-20.0	26.3	Dark Yellow-Brown Fat CLAY (CH)
MW-350	22.0-23.0	27.4	Dark Yellow-Brown Fat CLAY (CH)
MW-352	6.5-7.5	19.4	Dark Gray-Brown Lean CLAY (CL)
MW-352	16.5-17.5	19.5	Olive-Brown Sandy CLAY (CL)
MW-352	26.5-27.5	46.8	Yellow-Brown Sandy CLAY (CL)
MW-352	32.0-33.0	21.4	Yellow-Brown Lean CLAY to Fat CLAY (CL/CH)
MW-352	37.0-38.0	26.3	Yellow-Brown Lean CLAY to Fat CLAY (CL/CH)
MW-355	21.0-22.0	24.1	Gray & Yellow-Brown Lean CLAY (CL)

USCS – Unified Soil Classification System

LABORATORY HYDRAULIC CONDUCTIVITY TEST RESULTS

		ASTM D 2216	ASTM D 6023	ASTM D 5084	
Boring Number	Sample Depth (Feet)	Moisture Content, %	Dry Bulk Density, (pcf)	Hydraulic Conductivity, cm/sec	Range of Hydraulic Gradient
MW-154	8.0-9.2	16.9	105.9	7.8×10^{-6}	0.4 - 1.8
MW-252	44.0-46.0	31.4	91.5	6.3×10^{-9}	2.6 - 10.7
MW-350	18.0-20.0	26.3	97.9	3.4×10^{-7}	0.8 - 2.2

% - Percent
cm/sec - Centimeters per Second
pcf - Pounds per Cubic Foot



Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● **MW-151 7.5-8.0 Feet**	**Very Dark Gray-Brown Sandy CLAY (CL)**					
⌧ **MW-151 16.0-17.0 Feet**	**Olive-Gray Shaley Fat CLAY (CH)**					
▲ **MW-154 8.0-9.2 Feet**	**Dark Gray & Yellow-Brown Sandy CLAY with Gravel, (CL)**					
★ **MW-154 11.0-12.0 Feet**	**Gray & Light Olive-Brown Shaley Fat CLAY (CH)**					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **MW-151 7.5-8.0 Feet**	**2**	**0.071**	**0.015**		**0.0**	**39.0**	**41.8**	**19.2**
⌧ **MW-151 16.0-17.0 Feet**	**2**	**0.003**			**0.0**	**1.0**	**28.5**	**70.5**
▲ **MW-154 8.0-9.2 Feet**	**25**	**0.175**	**0.003**		**17.4**	**30.5**	**18.8**	**33.4**
★ **MW-154 11.0-12.0 Feet**	**2**	**0.003**			**0.0**	**12.5**	**23.0**	**64.5**

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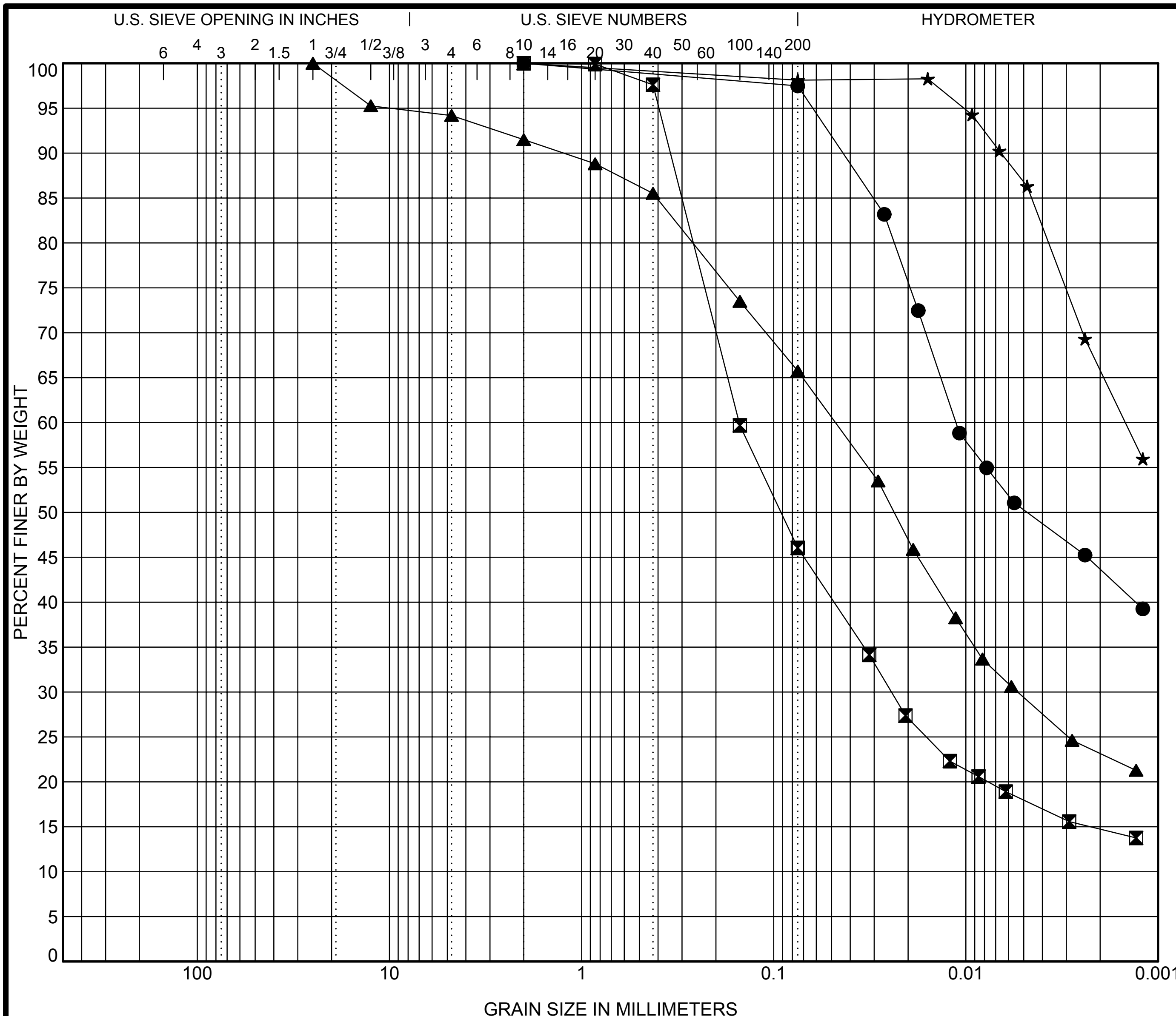
GRAIN SIZE DISTRIBUTION

Project Number: 6339

Project: Ash Pond System

Location: Baldwin Energy Complex

US GRAIN SIZE 6339 HYDRO CURVES.GPJ SHIVELY.GDT 10/11/10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**MW-155 7.0-8.0 Feet**	**Brown Lean to Fat CLAY (CL/CH)**					
⧗	**MW-155 18.5-19.5 Feet**	**Dark Yellow-Brown Clayey SAND (SC)**					
▲	**MW-252 14.0-16.0 Feet**	**Dark Yellow-Brown Sandy CLAY (CL)**					
★	**MW-252 44.0-46.0 Feet**	**Dark Yellow-Brown Fat CLAY (CH)**					

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**MW-155 7.0-8.0 Feet**	**2**	**0.011**			**0.0**	**2.5**	**47.2**	**50.3**
⧗	**MW-155 18.5-19.5 Feet**	**2**	**0.151**	**0.024**		**0.0**	**53.9**	**28.1**	**18.0**
▲	**MW-252 14.0-16.0 Feet**	**25**	**0.048**	**0.005**		**5.8**	**28.4**	**36.3**	**29.4**
★	**MW-252 44.0-46.0 Feet**	**2**	**0.001**			**0.0**	**1.9**	**11.3**	**86.8**

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GRAIN SIZE DISTRIBUTION

Project Number: 6339

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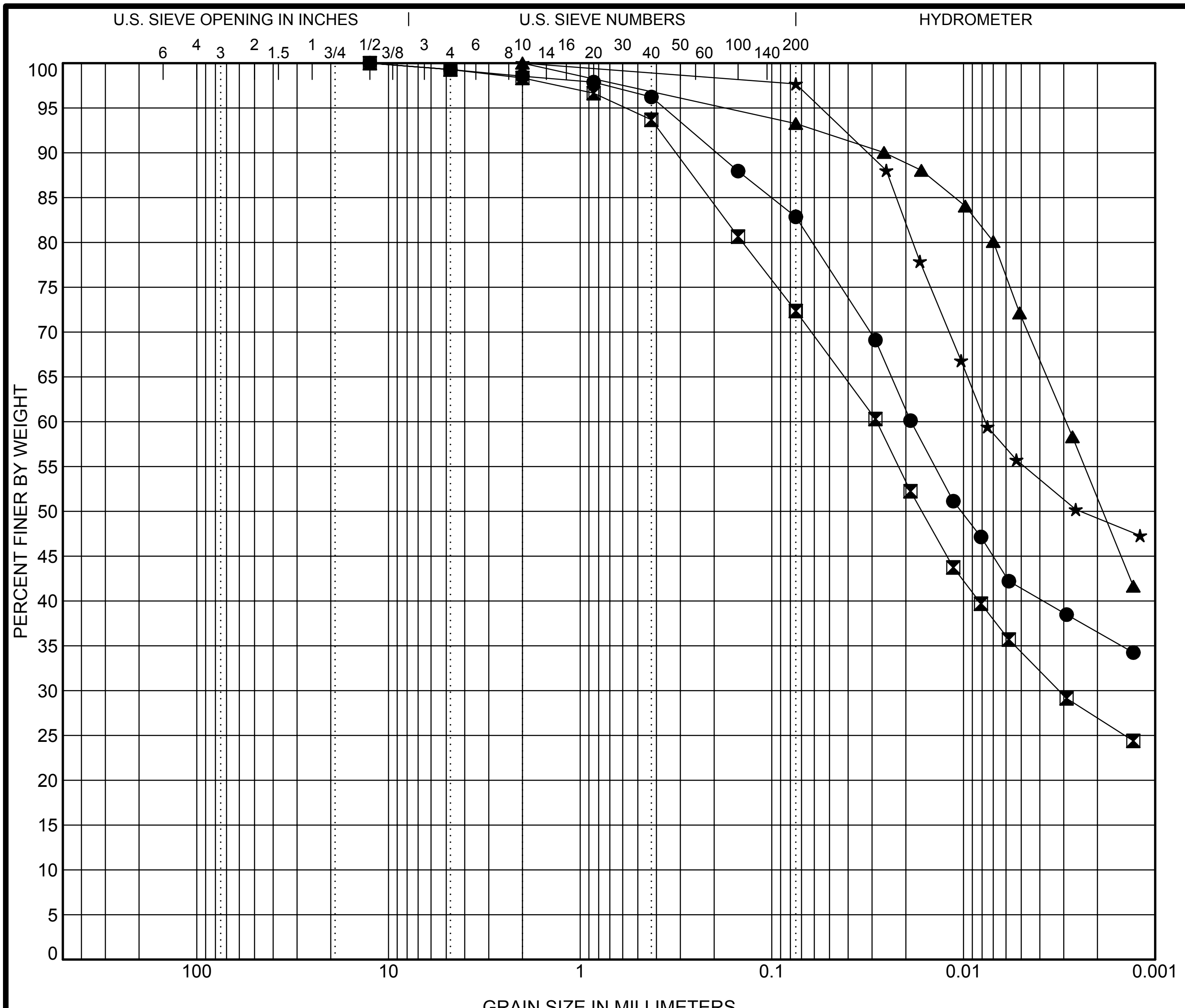
US GRAIN SIZE 6339 HYDRO CURVES.GPJ SHIVELY.GDT 10/11/10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**MW-253 11.0-12.0 Feet**	**Dark Yellow-Brown Fat CLAY with SAND (CH)**					
⧗	**MW-253 19.0-19.5 Feet**	**Dark Yellow-Brown Lean CLAY with Sand (CL)**					
▲	**MW-253 29.0-30.0 Feet**	**Olive Shaley Fat CLAY (CH)**					
★	**MW-350 5.0-6.0 Feet**	**Brown Fat CLAY (CH)**					

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**MW-253 11.0-12.0 Feet**	**12.5**	**0.019**			**0.7**	**16.4**	**41.4**	**41.4**
⧗	**MW-253 19.0-19.5 Feet**	**12.5**	**0.028**	**0.003**		**0.7**	**26.9**	**38.1**	**34.3**
▲	**MW-253 29.0-30.0 Feet**	**2**	**0.003**			**0.0**	**6.7**	**21.6**	**71.7**
★	**MW-350 5.0-6.0 Feet**	**2**	**0.008**			**0.0**	**2.3**	**42.4**	**55.3**

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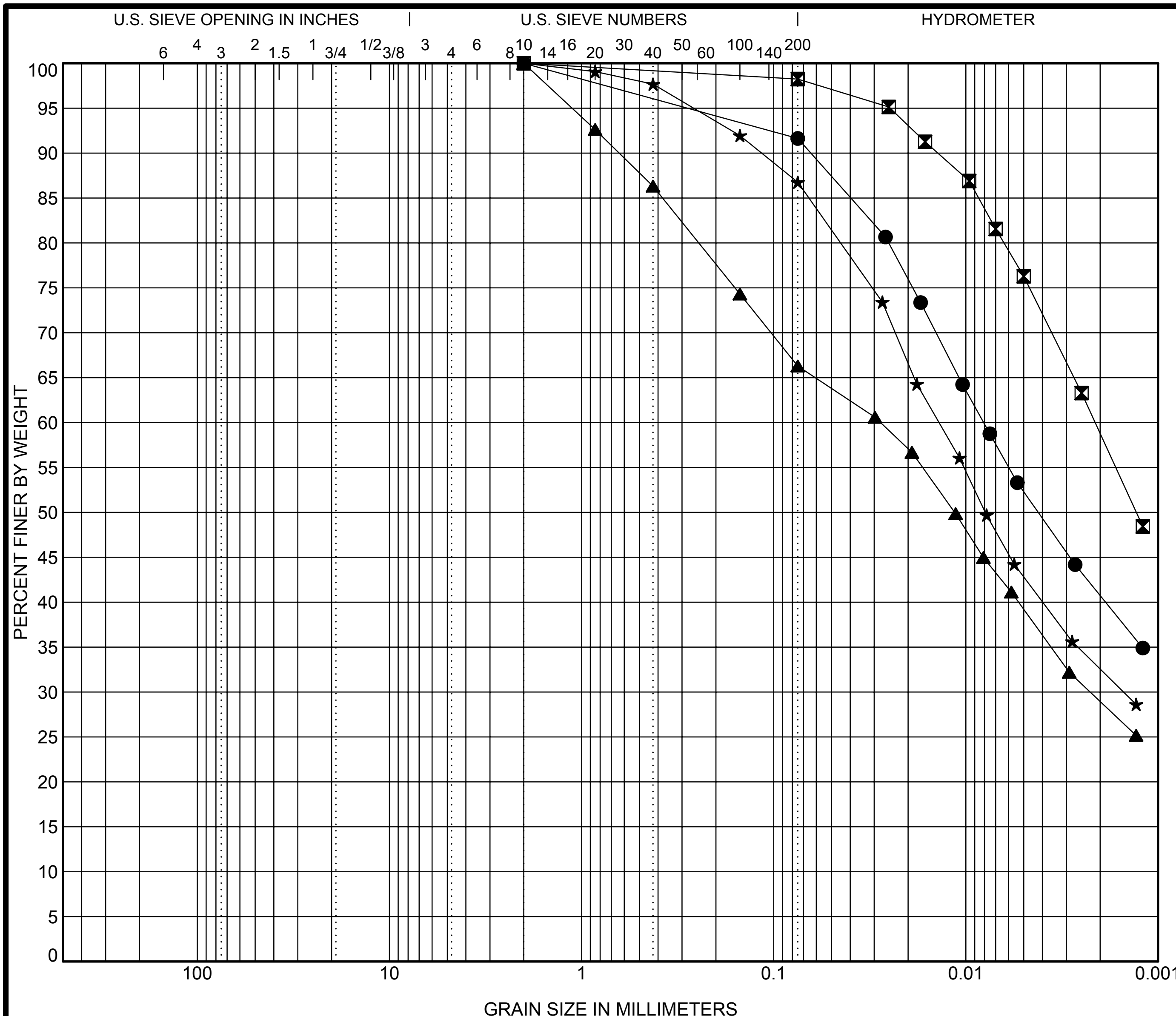
GRAIN SIZE DISTRIBUTION

Project Number: 6339

Project: Ash Pond System

Location: Baldwin Energy Complex



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**MW-350 11.0-12.0 Feet**	**Light Olive-Brown Lean to Fat CLAY (CL/CH)**					
⧗	**MW-350 18.0-20.0 Feet**	**Dark Yellow-Brown Fat CLAY (CH)**					
▲	**MW-352 26.5-27.5 Feet**	**Yellow Brown Sandy CLAY (CL)**					
★	**MW-352 32.0-33.0 Feet**	**Yellow-Brown Lean to Fat CLAY (CL/CH)**					

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**MW-350 11.0-12.0 Feet**	**2**	**0.008**			**0.0**	**8.4**	**39.3**	**52.3**
⧗	**MW-350 18.0-20.0 Feet**	**2**	**0.002**			**0.0**	**1.8**	**21.9**	**76.3**
▲	**MW-352 26.5-27.5 Feet**	**2**	**0.028**	**0.002**		**0.0**	**33.7**	**27.1**	**39.2**
★	**MW-352 32.0-33.0 Feet**	**2**	**0.014**	**0.002**		**0.0**	**13.2**	**43.9**	**42.8**

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GRAIN SIZE DISTRIBUTION

Project Number: 6339

Project: Ash Pond System

Location: Baldwin Energy Complex

US GRAIN SIZE 6339 HYDRO CURVES.GPJ SHIVELY.GDT 10/11/10

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	6339			WET UNIT WEIGHT, pcf:	123.7		
LOCATION:	MW-154			**DRY UNIT WEIGHT, pcf:**	**105.9**		
DEPTH:	8' - 9'2"						
SPECIMEN:							
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.017	LENGTH, cm:	7.663	WET WT SPLE+TARE	752.92	WET WT SPLE+TARE	781.60
DIAMETER, in.:	2.856	DIAMETER, cn	7.254	DRY WT SPLE+TARE	662.30	DRY WT SPLE+TARE	662.30
WET WT., gms.:	627.80			TARE WEIGHT	125.12	TARE WEIGHT	125.12
AREA, sq.in.:	6.406	AREA, sq cm:	41.331	**% MOISTURE**	16.9	% MOISTURE	22.2

B VALUE (before Permeation): 96%   Cell / Back Pressure, psi: 53 / 50

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP °C	ELAPSED MINUTES	BOTTOM BURET	TOP BURET	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD
0.0	01-Oct-10	08:46 AM	25.0	0	10.04	24.13			1.84	14.09
0.0	01-Oct-10	09:23 AM	25.0	37	11.80	22.85	1.76	1.1E-05	1.44	11.05
0.0	01-Oct-10	10:16 AM	25.0	53	13.25	21.41	1.45	9.3E-06	1.06	8.16
0.0	01-Oct-10	11:17 AM	25.1	61	14.30	20.34	1.05	8.0E-06	0.79	6.04
0.0	01-Oct-10	01:01 PM	25.3	104	15.66	19.02	1.36	9.1E-06	0.44	3.36

Average Temp. = 25.1

AVERAGE K = 8.8E-06

Corrected K for 20°C = 7.8E-06

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	6339			WET UNIT WEIGHT, pcf:	120.2		
LOCATION:	MW-252			**DRY UNIT WEIGHT, pcf:**	**91.5**		
DEPTH:	44' - 46'						
SPECIMEN:							
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.002	LENGTH, cm:	7.625	WET WT SPLE+TARE	735.25	WET WT SPLE+TARE	747.80
DIAMETER, in.:	2.855	DIAMETER, cn	7.252	DRY WT SPLE+TARE	590.42	DRY WT SPLE+TARE	590.42
WET WT., gms.:	606.40			TARE WEIGHT	128.85	TARE WEIGHT	128.85
AREA, sq.in.:	6.402	AREA, sq cm:	41.302	**% MOISTURE**	31.4	% MOISTURE	34.1

B VALUE (before Permeation): 97%   Cell / Back Pressure, psi: 45 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURET	TOP BURET	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD
0.0	01-Oct-10	09:23 AM	25.0	0	2.52	22.96			2.68	20.44
0.0	01-Oct-10	01:00 PM	25.4	217	2.71	22.65	0.19	1.8E-07	2.62	19.94
0.0	01-Oct-10	04:58 PM	25.2	238	2.90	22.78	0.19	2.0E-08	2.61	19.88
0.0	04-Oct-10	08:52 AM	22.9	3834	4.10	23.65	1.20	7.1E-09	2.56	19.55
1.0	05-Oct-10	09:52 AM	22.9	0	12.31	23.90			10.74	81.89
1.0	05-Oct-10	05:11 PM	23.0	439	12.40	23.83	0.09	7.2E-09	10.72	81.73
1.0	06-Oct-10	08:37 AM	23.0	926	12.67	23.81	0.27	6.2E-09	10.68	81.44

Average Temp. = 23.4

AVERAGE K = 6.8E-09
Corrected K for 20ºC = 6.3E-09

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HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	6339			WET UNIT WEIGHT, pcf:	123.6		
LOCATION:	MW-350			**DRY UNIT WEIGHT, pcf:**	**97.9**		
DEPTH:	18' - 20'						
SPECIMEN:							
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.518	LENGTH, cm:	8.936	WET WT SPLE+TARE	849.30	WET WT SPLE+TARE	862.40
DIAMETER, in.:	2.864	DIAMETER, cm	7.275	DRY WT SPLE+TARE	696.40	DRY WT SPLE+TARE	696.40
WET WT., gms.:	735.10			TARE WEIGHT	114.20	TARE WEIGHT	114.20
AREA, sq.in.:	6.442	AREA, sq cm:	41.563	**% MOISTURE**	26.3	% MOISTURE	28.5

B VALUE (before Permeation): 96%   Cell / Back Pressure, psi: 53 / 50

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP °C	ELAPSED MINUTES	BOTTOM BURET	TOP BURET	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD
0.0	01-Oct-10	09:23 AM	25.0	0	4.57	23.92			2.17	19.35
0.0	01-Oct-10	01:03 PM	25.4	220	5.09	23.43	0.52	4.6E-07	2.05	18.34
0.0	01-Oct-10	04:58 PM	25.2	235	5.67	22.93	0.58	4.9E-07	1.93	17.26
0.0	04-Oct-10	08:52 AM	22.9	3834	10.89	18.67	5.22	3.9E-07	0.87	7.78
0.0	04-Oct-10	03:35 PM	24.7	403	11.14	18.34	0.25	3.6E-07	0.81	7.20
0.0	04-Oct-10	04:00 PM	24.5	0	5.94	24.03			2.02	18.09
0.0	05-Oct-10	08:14 AM	23.0	974	7.68	22.53	1.74	3.8E-07	1.66	14.85

Average Temp. = 24.1

AVERAGE K = 3.8E-07

Corrected K for 20ºC = 3.4E-07

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A Division of Environmental Operations, Inc.

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Serial No. SSSSD

Project Name Groundwater Investigation – BEC Ash Pond System ✓ Project No. 2010.010

Project Manager Stuart Cravens, Kelron Environmental Phase.Task No.

Client Company Dynegy, Inc.

Site Name Baldwin Energy Complex

Site Address 10901 Baldwin Road, Baldwin, IL

Sampling Method
- [x] Shelby Tube (ST)
- [ ] Split Spoon (SS)
- [x] Macrocore (MC)
- [ ] Other

Reason For Collection
- [ ] Lab Analysis
- [ ] On-Site Headspace
- [x] Geotechnical Lab
- [ ] Other

Portable Screening Instrument Used [x] None

Type	Manufacturer	Model
☐ PID (Lamp____eV)		
☐ FID		
☐ CGI		

Sample No.	Location	Date Collected	Sample Type ST	Sample Type SS	Sample Type MC	Requested Analysis 1 Visual	*Requested Analysis 2 Grain Size	Requested Analysis 3 Vert. Perm (K)
~~MW~~ MW-154	8'-9'2"	9/20/10	✓			✓	✓	✓
MW-252	14-16'	9/22/10	✓			✓	✓	—
MW-252	44-46'	9/22/10	✓			✓	✓	✓
MW-350	18-20'	9/8/10	✓			✓	✓	✓
MW-350	5-6'				✓	✓	✓	
MW-350	11-12'				✓	✓	✓	
MW-350	22-23'				✓	✓	—	
MW-155	7-8'				✓	✓	✓	
MW-155	18.5-19.5'				✓	✓	✓	
MW-156	10-11'				✓	✓	—	
MW-157	7-9'				✓	✓	—	
MW-157	2-3'				✓	✓	—	
MW-157	17-18'				✓	✓	—	
MW-355	21-22'				✓	✓	—	

Chain-of-Custody Form Number 092410.1

Comments *Grain Size = standard sieve/hydrometer per ASTM

Signature [signature] Date 9/24/10 Reviewer ______ Date ______

Brendon Wilder (PSC)
9/27/2010 @ 1026 ext. 1557

6339

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Serial No. SSSSD

Project Name Groundwater Investigation – BEC Ash Pond System | Project No. 2010.010

Project Manager Stuart Cravens, Kelron Environmental | Phase.Task No.

Client Company Dynegy, Inc.

Site Name Baldwin Energy Complex

Site Address 10901 Baldwin Road, Baldwin, IL

Sampling Method
- ☐ Shelby Tube (ST)
- ☐ Split Spoon (SS)
- ☒ Macrocore (MC)
- ☐ Other

Reason For Collection
- ☐ Lab Analysis
- ☐ On-Site Headspace
- ☒ Geotechnical Lab
- ☐ Other

Portable Screening Instrument Used ☒ None

Type	Manufacturer	Model
☐ PID (Lamp____eV)		
☐ FID		
☐ CGI		

Sample No.	Location	Date Collected	Sample Type ST	Sample Type SS	Sample Type MC	Requested Analysis 1 Visual	* Requested Analysis 2 Grain Size	Requested Analysis 3
MW-151	7.5-8'				✓	✓	✓	
MW-151	16-17'				✓	✓	✓	
MW-352	6.5-7.5'				✓	✓	—	
MW-352	26.5-27.5'				✓	✓	✓	
MW-352	16.5-17.5'				✓	✓	—	
MW-352	32-33'				✓	✓	✓	
MW-352	37-38'				✓	✓	—	
MW-253	11-12'				✓	✓	✓	
MW-253	19-19.5'				✓	✓	✓	
MW-253	29-30'				✓	✓	✓	
MW-154	3-4'				✓	✓	—	
MW-154	11-12'				✓	✓	✓	

Chain-of-Custody Form Number 092410.2

Comments *Grain Size = std sieve / hydrometer per ASTM

Signature [signature] Date 9/24/10 Reviewer ______ Date ______

Total = 3 perm / 26 visual / 16 grain size

GEOTECHNOLOGY INC
FROM THE GROUND UP

Via email: kelron1@comcast.net

October 18, 2013 J022188.01

Stuart Cravens
Kelron Environmental
1213 Dorchester Drive
Champaign, Illinois 61821

Re: BEC Ash Pond System Samples – Baldwin, Illinois

Dear Mr. Cravens:

Included in this report are the test results of soil samples received in our laboratory on August 22nd and 27th, 2013. There were 18 samples, eight in Shelby tubes and the remainder in plastic baggies, submitted for testing. The samples were tested in general accordance with the test method listed below.

Test to Determine	Method of Test
Particle Size Analysis of Soils	ASTM D422
Specific Gravity of Soils	ASTM D854
Water (Moisture) Content of Soil and Rock by Mass	ASTM D2216
Classification of Soils (Unified Soil Classification System)	ASTM D2487
Hydraulic Conductivity Using a Flexible Wall Permeameter	ASTM D5084
Determination of Density (Unit Weight) of Soil Specimens	ASTM D7263

Porosity was calculated using soil-mass relationships. Tables are enclosed with test results, as well as the porosity calculation worksheets. Particle size analysis can be found on the enclosed Grain Size Distribution curves.

* * * * *

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We trust this is the information you require. Please contact the undersigned if you have any questions regarding this report.

Respectfully submitted,

GEOTECHNOLOGY, INC.

Janet M. May

Janet M. May
Illinois Laboratory Manager

JMM/LPH:jmm

Copies Submitted: (1)

Attachment: Summary Tables
Grain Size Distribution
Hydraulic Conductivity Test Data Sheets
Porosity Calculation Worksheets

Classification Using Unified Soil Classification System – ASTM D2487

Location	Sample Depth (Feet)	Moisture Content (%)	USCS Classification
MW-161	31.5 - 32.5	17.8	SAND with Silt (SP-SM) - Fine Grained, Gray-Brown
MW-161	41.0 - 42.0	25.0	Lean CLAY (CL) – Medium Plasticity, Trace Sand, Blue-Gray
MW-262	17.0 - 18.0	19.1	Sandy Lean CLAY (CL) – Low to Medium Plasticity, Red-Brown
MW-262	33.5 - 35.5	23.5	Fat CLAY (CH) – High Plasticity, Light Gray-Brown
OW-256	33.0 - 33.5	8.6	Lean CLAY with Sand (CL) –Medium Plasticity, Gray-Brown
OW-257	36.5 - 37.0	19.1	SHALE - “Fat CLAY (CH)” – High Plasticity, Very Dark Gray
TPZ-163	1.5 - 3.5	49.3	ASH – “Silty SAND (SM) – Fine Grained, Very Dark Brown
TPZ-163	28.0 - 30.0	25.1	Lean to Fat CLAY (CL/CH) - Trace Fine Sand, Medium to High Plasticity, Dark Yellow-Brown
TPZ-164	3.0 - 5.0	22.5	ASH – “Sandy SILT (ML)” – Fine Grained Sand, Very Dark Brown
TPZ-164	10.0 - 12.0	25.6	Lean CLAY (CL) - Medium Plasticity, Light Olive-Brown
TPZ-165	8.0 - 10.0	22.3	Lean CLAY (CL) - Medium Plasticity, Trace Sand, Very Dark Gray-Brown
TPZ-165	13.0 - 14.0	24.5	Lean CLAY, with Sand (CL) - Medium Plasticity, Very Dark Gray-Brown
TPZ-167	29.0 - 30.0	31.1	ASH – “SILT (ML)” - Very Dark Gray-Brown
TPZ-167	32.0 - 34.0	24.1	Lean CLAY, with Sand (CL) - Medium Plasticity, Light Gray-Brown
TPZ-167	47.0 - 48.0	28.9	Lean to Fat CLAY (CL/CH) - Medium to High Plasticity, Yellow-Brown
TPZ-168	3.0 - 5.0	56.0	ASH – “Sandy SILT (ML)” – Fine-Medium Grained Sand, Olive-Brown
TPZ-168	39.0 - 40.0	18.6	TILL - Fat CLAY (CH) – High Plasticity, Trace Sand, Gray-Brown
TPZ-168	68.5 - 69.0	17.5	Lean CLAY (CL) - Medium Plasticity, with Sand Seams, Blue-Gray

USCS – Unified Soil Classification System

Hydraulic Conductivity Summary – ASTM D5084

		ASTM D 2216	ASTM D 6023	ASTM D 5084	
Location	Sample Depth (Feet)	Moisture Content, %	Dry Bulk Density, (pcf)	Hydraulic Conductivity, cm/sec	Range of Hydraulic Gradient
MW-262	33.5 - 35.5	23.5	102.2	9.9×10^{-9}	2.0 - 17.5
TPZ-163	1.5 - 3.5	49.3	63.7	2.5×10^{-4}	0.4 - 3.5
TPZ-163	28.0 - 30.0	25.1	98.0	4.2×10^{-4}	0.2 1.7
TPZ-164	3.0 - 5.0	22.5	91.7	6.5×10^{-4}	0.1 - 1.6
TPZ-164	10.0 - 12.0	25.6	95.7	1.3×10^{-6}	0.1 - 2.2
TPZ-165	8.0 - 10.0	22.3	102.4	5.3×10^{-6}	0.3 - 2.1
TPZ-167	29.0 - 30.0	18.8*	99.9*	9.7×10^{-6}	0.3 - 2.9
TPZ-167	32.0 - 34.0	24.1	101.3	6.2×10^{-7}	0.3 - 2.0
TPZ-168	3.0 - 5.0	56.0	63.0	4.2×10^{-4}	0.1 - 2.3

% - Percent
cm/sec - Centimeters per Second
pcf - Pounds per Cubic Foot

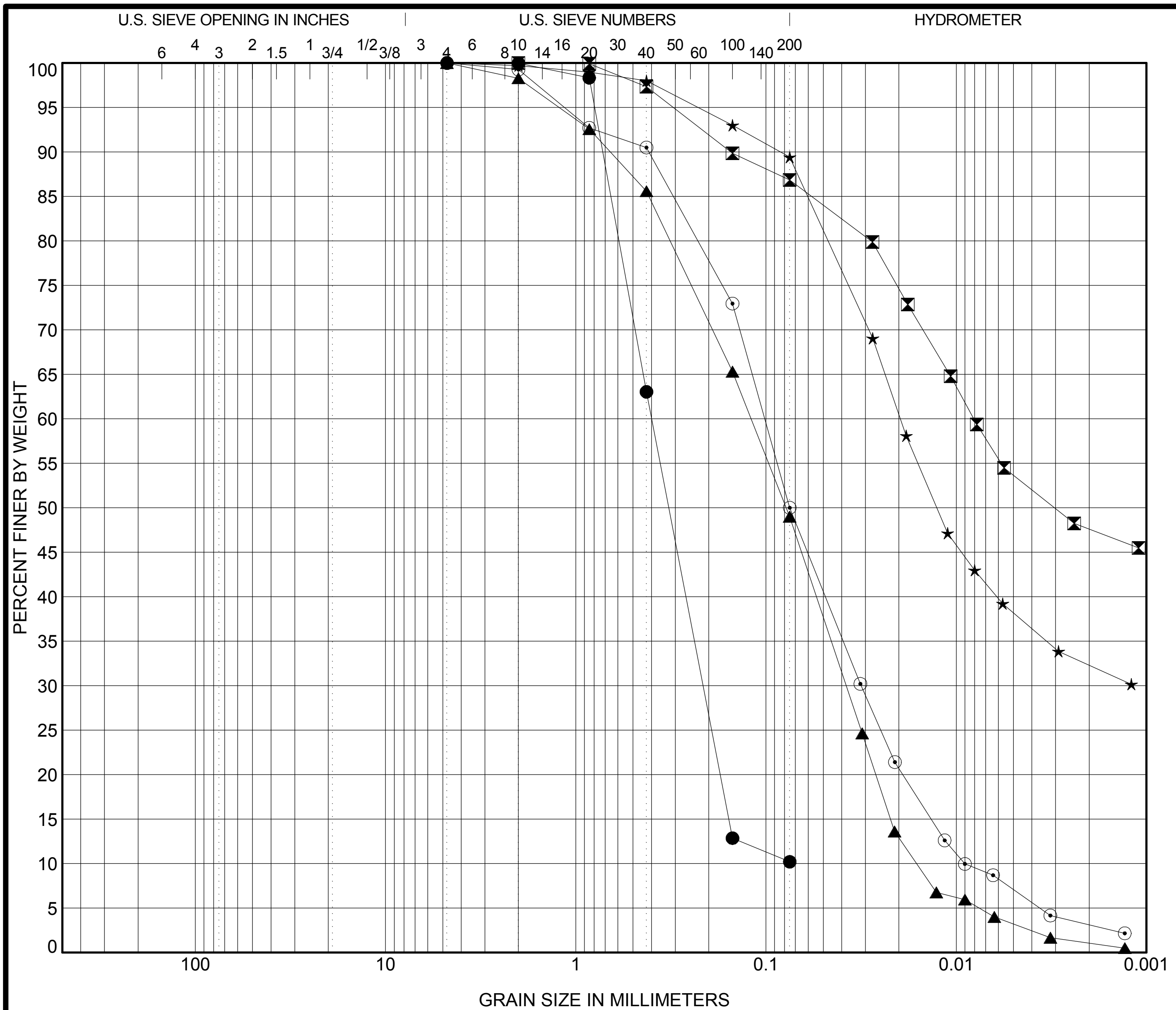
*Sample remolded in laboratory – As received moisture content = 31.1%

Porosity Using Soil-Mass Relationships*

		ASTM D 854	Calculation from Soil-Mass Relationships		
Location	Sample Depth (Feet)	Specific Gravity	Total Porosity, (%)	Water Filled Porosity, (%)	Air Filled Porosity, (%)
TPZ-163	1.5 - 3.5	2.66	61.7	50.2	11.5
TPZ-164	3.0 - 5.0	2.68	45.2	33.0	12.2
TPZ-167	29.0 - 30.0	2.59	38.2	30.2	8.0
TPZ-168	3.0 - 5.0	2.88	64.9	56.5	8.4

% - Percent

*Note: Values not representative of effective porosity.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	MW-161	31.5-32.5 Feet	SAND, with Silt (SP-SM)				1.61	5.60
⧗	MW-262	33.5-35.5 Feet	Fat CLAY (CH)					
▲	TPZ-163	1.5-3.5 Feet	ASH - "Silty SAND (SM)"				0.74	7.42
★	TPZ-163	28.0-30.0 Feet	Lean to Fat CLAY (CL/CH)					
⊙	TPZ-164	3.0-5.0 Feet	ASH - "Sandy SILT (ML)"				1.09	11.23

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	MW-161	31.5-32.5 Feet	4.75	0.399	0.214		0.0	89.8	10.2	
⧗	MW-262	33.5-35.5 Feet	2	0.008			0.0	13.1	33.2	53.7
▲	TPZ-163	1.5-3.5 Feet	4.75	0.12	0.038	0.016	0.0	51.0	45.8	3.2
★	TPZ-163	28.0-30.0 Feet	4.75	0.02			0.0	10.6	51.2	38.2
⊙	TPZ-164	3.0-5.0 Feet	4.75	0.101	0.032	0.009	0.0	50.0	42.9	7.1

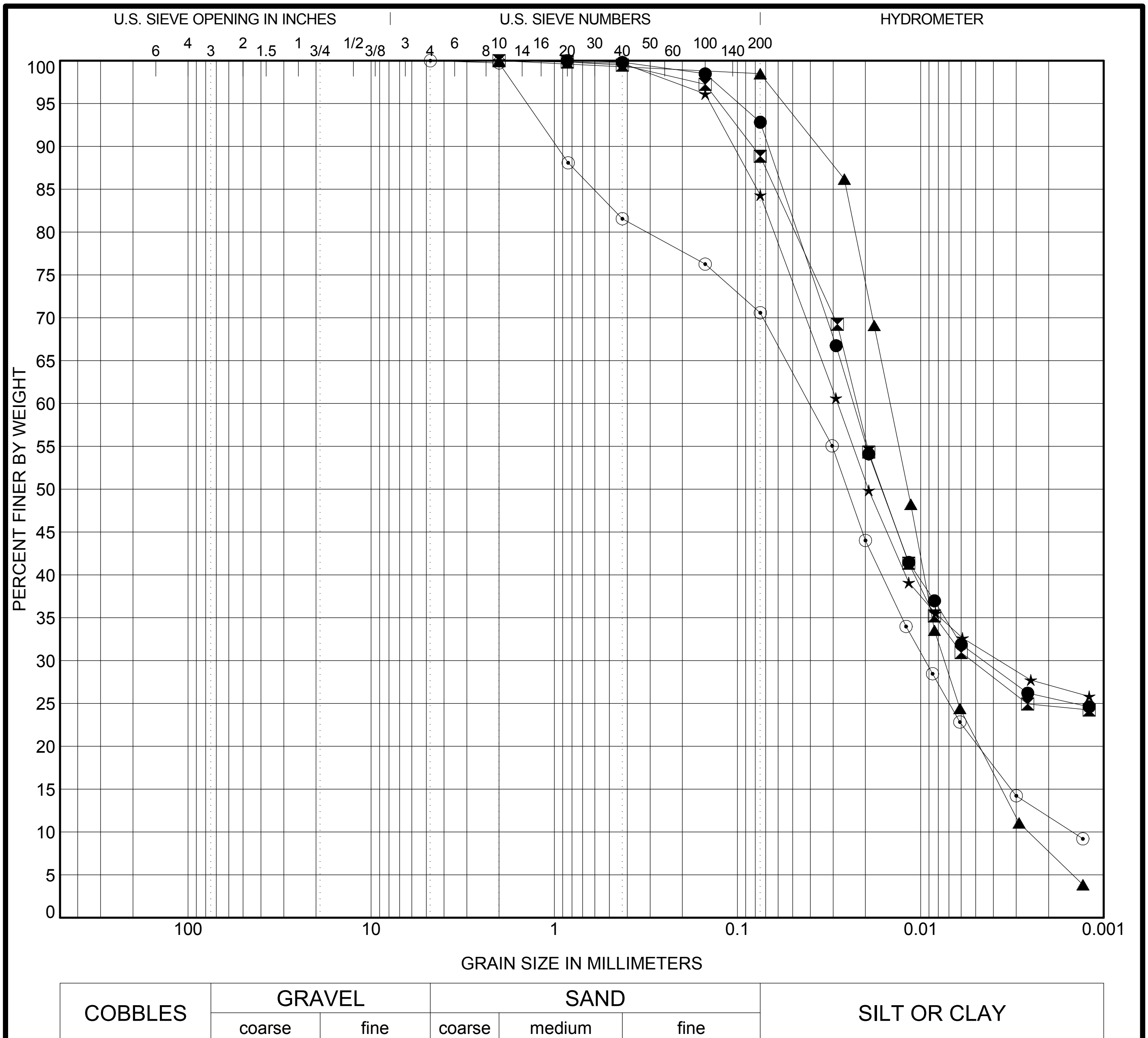
GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Project Number: J02188.01.1300

Project: Baldwin Ash Pond System

Location: Environmental Investigation - Baldwin, Illinois



Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**TPZ-164 10.0-12.0 Feet**	**Lean CLAY (CL)**					
⧗	**TPZ-165 8.0-10.0 Feet**	**Lean CLAY (CL)**					
▲	**TPZ-167 29.0-30.0 Feet**	**ASH - "SILT (ML)"**				**1.46**	**5.69**
★	**TPZ-167 32.0-34.0 Feet**	**Lean CLAY, with Sand (CL)**					
⊙	**TPZ-168 3.0-5.0 Feet**	**ASH - "Sandy SILT (ML)"**				**1.48**	**27.30**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**TPZ-164 10.0-12.0 Feet**	**0.85**	**0.023**	**0.005**		**0.0**	**7.2**	**62.2**	**30.6**
⧗	**TPZ-165 8.0-10.0 Feet**	**2**	**0.022**	**0.005**		**0.0**	**11.2**	**59.2**	**29.6**
▲	**TPZ-167 29.0-30.0 Feet**	**2**	**0.015**	**0.007**	**0.003**	**0.0**	**1.5**	**77.6**	**20.8**
★	**TPZ-167 32.0-34.0 Feet**	**2**	**0.028**	**0.004**		**0.0**	**15.7**	**52.6**	**31.7**
⊙	**TPZ-168 3.0-5.0 Feet**	**4.75**	**0.041**	**0.009**	**0.001**	**0.0**	**29.4**	**50.2**	**20.4**

GEOTECHNOLOGY INC
FROM THE GROUND UP

GRAIN SIZE DISTRIBUTION

Project Number: J02188.01.1300

Project: Baldwin Ash Pond System

Location: Environmental Investigation - Baldwin, Illinois

HYDRAULIC CONDUCTIVITY TEST DATA

(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	95.0		
SAMPLE ID:	ST163-3			**DRY UNIT WEIGHT, pcf:**	**63.7**		
LOCATION:	TPZ-163						
DEPTH:	1.5 - 3.5						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT*	
LENGTH, in.:	2.464	LENGTH, cm:	6.259	WET WT SPLE+TARE	527.00	WET WT SPLE+TARE	
DIAMETER, in.:	2.870	DIAMETER, cm	7.290	DRY WT SPLE+TARE	395.82	DRY WT SPLE+TARE	
WET WT., gms.:	397.53			TARE WEIGHT	129.47	TARE WEIGHT	
AREA, sq.in.:	6.469	AREA, sq cm:	41.737	**% MOISTURE**	49.3	% MOISTURE	
						*Not Available	

B VALUE (before Permeation): 97% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	08-Sep-13	11:32 AM	24.8	0	1.52	23.60			3.53	22.08	
0.0	08-Sep-13	11:37 AM	24.8	5	8.60	15.95	7.08	2.9E-04	1.17	7.35	66.71
0.0	09-Sep-13	01:35 PM	23.7	0	3.75	23.74			3.19	19.99	
0.0	09-Sep-13	01:43 PM	23.7	8	11.57	15.40	7.82	2.7E-04	0.61	3.83	80.84
0.0	09-Sep-13	05:09 PM	23.7	0	5.00	23.77			3.00	18.77	
0.0	09-Sep-13	05:18 PM	23.7	9	12.93	15.83	7.93	2.7E-04	0.46	2.90	84.55
0.0	09-Sep-13	05:20 PM	23.7	0	6.47	23.73			2.76	17.26	
0.0	09-Sep-13	05:30 PM	23.7	10	13.99	16.16	7.52	2.7E-04	0.35	2.17	87.43

Average Temp. = 23.7

AVERAGE K = 2.7E-04

Corrected K for 20ºC = 2.5E-04

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	122.6		
SAMPLE ID:	ST163-30			**DRY UNIT WEIGHT, pcf:**	**98.0**		
LOCATION:	TPZ-163						
DEPTH:	28.0 - 30.0						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.656	LENGTH, cm:	9.286	WET WT SPLE+TARE	901.33	WET WT SPLE+TARE	907.19
DIAMETER, in.:	2.888	DIAMETER, cm	7.336	DRY WT SPLE+TARE	746.92	DRY WT SPLE+TARE	746.92
WET WT., gms.:	770.63			TARE WEIGHT	130.70	TARE WEIGHT	130.7
AREA, sq.in.:	6.551	AREA, sq cm:	42.262	**% MOISTURE**	25.1	% MOISTURE	26.0

B VALUE (before Permeation): 98% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	20-Sep-13	11:54 AM	23.6	0	7.03	23.15			1.74	16.12	
0.0	20-Sep-13	12:02 PM	23.6	8	13.83	16.26	6.80	4.5E-04	0.26	2.43	84.93
0.0	25-Sep-13	09:00 AM	23.9	0	9.51	24.05			1.57	14.54	
0.0	25-Sep-13	09:08 AM	23.9	8	15.65	17.83	6.14	4.6E-04	0.23	2.18	85.01
0.0	25-Sep-13	09:20 AM	23.9	0	9.29	24.37			1.62	15.08	
0.0	25-Sep-13	09:28 AM	23.9	8	15.72	17.84	6.43	4.7E-04	0.23	2.12	85.94

Average Temp. = 23.8

AVERAGE K = 4.6E-04

Corrected K for 20ºC = 4.2E-04

HYDRAULIC CONDUCTIVITY TEST DATA

(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	120.1		
SAMPLE ID:	ST164-12			**DRY UNIT WEIGHT, pcf:**	**95.7**		
LOCATION:	TPZ-164						
DEPTH:	10.0 - 12.0						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.373	LENGTH, cm:	8.567	WET WT SPLE+TARE	793.36	WET WT SPLE+TARE	807.00
DIAMETER, in.:	2.823	DIAMETER, cm	7.170	DRY WT SPLE+TARE	657.83	DRY WT SPLE+TARE	657.83
WET WT., gms.:	665.70			TARE WEIGHT	127.66	TARE WEIGHT	127.66
AREA, sq.in.:	6.259	AREA, sq cm:	40.381	**% MOISTURE**	25.6	% MOISTURE	28.1

B VALUE (before Permeation): 97% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	30-Aug-13	10:28 AM	23.4	0	4.50	23.60			2.23	19.10	
0.0	30-Aug-13	05:44 PM	23.7	436	6.63	21.04	2.13	1.2E-06	1.68	14.41	24.55
0.0	02-Sep-13	09:06 AM	22.9	3802	13.80	14.83	7.17	1.3E-06	0.12	1.03	92.85
0.0	02-Sep-13	09:07 AM	22.9	0	6.28	23.67			2.03	17.39	
0.0	02-Sep-13	02:53 PM	22.8	346	8.47	21.50	2.19	1.5E-06	1.52	13.03	25.07
0.0	03-Sep-13	08:23 AM	23.4	1050	12.14	17.85	3.67	1.5E-06	0.67	5.71	56.18
0.0	03-Sep-13	05:36 PM	23.0	553	13.13	16.91	0.99	1.4E-06	0.44	3.78	33.80
0.0	04-Sep-13	08:10 AM	23.0	874	14.19	16.18	1.06	1.4E-06	0.23	1.99	47.35
0.0	04-Sep-13	02:25 PM	23.4	375	14.43	15.97	0.24	1.5E-06	0.18	1.54	22.61

Average Temp. = 23.1

AVERAGE K = 1.4E-06

Corrected K for 20ºC = 1.3E-06

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	112.3
SAMPLE ID:	ST164-5			**DRY UNIT WEIGHT, pcf:**	**91.7**
LOCATION:	TPZ-164				
DEPTH:	3.0 - 5.0				

				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT*
LENGTH, in.:	5.570	LENGTH, cm:	14.148	WET WT SPLE+TARE	1191.79	WET WT SPLE+TARE
DIAMETER, in.:	2.869	DIAMETER, cm	7.287	DRY WT SPLE+TARE	996.94	DRY WT SPLE+TARE
WET WT., gms.:	1061.53			TARE WEIGHT	130.26	TARE WEIGHT
AREA, sq.in.:	6.465	AREA, sq cm:	41.708	**% MOISTURE**	22.5	% MOISTURE
						*Not Available

B VALUE (before Permeation): 95% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	08-Sep-13	11:32 AM	24.6	0	1.40	23.77			1.58	22.37	
0.0	08-Sep-13	11:36 AM	24.6	4	8.28	17.65	6.88	6.5E-04	0.66	9.37	58.11
0.0	09-Sep-13	01:35 PM	23.7	0	3.53	23.77			1.43	20.24	
0.0	09-Sep-13	01:43 PM	23.7	8	12.10	15.10	8.57	7.1E-04	0.21	3.00	85.18
0.0	09-Sep-13	05:09 PM	23.8	0	5.30	23.70			1.30	18.40	
0.0	09-Sep-13	05:18 PM	23.7	9	13.38	15.52	8.08	7.1E-04	0.15	2.14	88.37
0.0	09-Sep-13	05:20 PM	23.7	0	6.87	24.14			1.22	17.27	
0.0	09-Sep-13	05:30 PM	23.7	10	14.67	16.27	7.80	7.1E-04	0.11	1.60	90.74

Average Temp. = 23.7

AVERAGE K = 7.1E-04

Corrected K for 20ºC = 6.5E-04

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	125.2		
SAMPLE ID:	ST165-10			**DRY UNIT WEIGHT, pcf:**	**102.4**		
LOCATION:	TPZ-165						
DEPTH:	8.0 - 10.0						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.370	LENGTH, cm:	8.560	WET WT SPLE+TARE	804.93	WET WT SPLE+TARE	809.06
DIAMETER, in.:	2.823	DIAMETER, cm	7.170	DRY WT SPLE+TARE	678.39	DRY WT SPLE+TARE	678.39
WET WT., gms.:	693.30			TARE WEIGHT	111.63	TARE WEIGHT	111.63
AREA, sq.in.:	6.259	AREA, sq cm:	40.381	**% MOISTURE**	22.3	% MOISTURE	23.1

B VALUE (before Permeation): 99%   Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	30-Aug-13	10:26 AM	23.4	0	5.03	23.15			2.12	18.12	
0.0	30-Aug-13	05:45 PM	23.7	439	11.30	16.83	6.27	5.0E-06	0.65	5.53	69.48
0.0	02-Sep-13	09:05 AM	23.0	0	6.77	23.53			1.96	16.76	
0.0	02-Sep-13	02:53 PM	23.1	348	12.40	17.78	5.63	6.1E-06	0.63	5.38	67.90
0.0	03-Sep-13	08:22 AM	23.1	0	8.19	23.78			1.82	15.59	
0.0	03-Sep-13	05:34 PM	22.9	552	14.70	17.27	6.51	6.1E-06	0.30	2.57	83.52

Average Temp. = 23.2

AVERAGE K = 5.7E-06
Corrected K for 20ºC = 5.3E-06

Geotechnology, Inc.

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	118.8		
SAMPLE ID:	ST167-30			**DRY UNIT WEIGHT, pcf:**	**99.9**		
LOCATION:	TPZ-167			**Note: Sample Remolded in Lab**			
DEPTH:	29.0 - 30.0						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT*	
LENGTH, in.:	2.408	LENGTH, cm:	6.116	WET WT SPLE+TARE	586.87	WET WT SPLE+TARE	
DIAMETER, in.:	2.835	DIAMETER, cm	7.201	DRY WT SPLE+TARE	511.77	DRY WT SPLE+TARE	
WET WT., gms.:	473.89			TARE WEIGHT	112.98	TARE WEIGHT	
AREA, sq.in.:	6.312	AREA, sq cm:	40.725	**% MOISTURE**	18.8	% MOISTURE	
						*Not Available	

B VALUE (before Permeation): 95% Cell / Back Pressure, psi: 63 / 60

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	07-Oct-13	10:38 AM	23.1	0	6.12	23.77			2.89	17.65	
0.0	07-Oct-13	11:14 AM	23.0	36	8.31	21.53	2.19	1.1E-05	2.16	13.22	25.10
0.0	07-Oct-13	11:58 AM	23.0	44	10.25	19.60	1.94	1.0E-05	1.53	9.35	29.27
0.0	07-Oct-13	02:39 PM	22.8	161	13.60	16.23	3.35	1.0E-05	0.43	2.63	71.87
0.0	08-Oct-13	12:00 PM	23.2	0	7.42	23.43			2.62	16.01	
0.0	08-Oct-13	04:51 PM	22.3	291	14.57	16.22	7.15	1.0E-05	0.27	1.65	89.69

Average Temp. = 22.9

AVERAGE K = 1.0E-05

Corrected K for 20ºC = 9.7E-06

HYDRAULIC CONDUCTIVITY TEST DATA

(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	125.7		
SAMPLE ID:	ST167-34			**DRY UNIT WEIGHT, pcf:**	**101.3**		
LOCATION:	TPZ-167						
DEPTH:	32.0 - 34.0						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.900	LENGTH, cm:	9.906	WET WT SPLE+TARE	922.20	WET WT SPLE+TARE	921.52
DIAMETER, in.:	2.805	DIAMETER, cm	7.125	DRY WT SPLE+TARE	767.59	DRY WT SPLE+TARE	767.59
WET WT., gms.:	795.39			TARE WEIGHT	126.81	TARE WEIGHT	126.81
AREA, sq.in.:	6.180	AREA, sq cm:	39.868	**% MOISTURE**	24.1	% MOISTURE	24.0

B VALUE (before Permeation): 100% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP °C	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	30-Aug-13	10:26 AM	23.4	0	3.20	23.17			2.02	19.97	
0.0	30-Aug-13	05:46 PM	23.7	440	4.40	21.92	1.20	6.5E-07	1.77	17.52	12.27
0.0	02-Sep-13	09:03 AM	22.8	3797	10.73	16.19	6.33	6.7E-07	0.55	5.46	68.84
0.0	03-Sep-13	08:20 AM	23.0	1397	11.70	15.29	0.97	6.5E-07	0.36	3.59	34.25
0.0	03-Sep-13	05:33 PM	23.1	553	12.01	15.06	0.31	6.4E-07	0.31	3.05	15.04
0.0	03-Sep-13	05:59 PM	23.1	0	4.82	23.63			1.90	18.81	
0.0	04-Sep-13	08:08 AM	23.4	849	7.00	21.48	2.18	7.3E-07	1.46	14.48	23.02

Average Temp. = 23.2

AVERAGE K = 6.7E-07

Corrected K for 20°C = 6.2E-07

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	98.3
SAMPLE ID:	ST168-5			**DRY UNIT WEIGHT, pcf:**	**63.0**
LOCATION:	TPZ-168				
DEPTH:	3.0 - 5.0				

				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT*
LENGTH, in.:	2.883	LENGTH, cm:	7.323	WET WT SPLE+TARE	610.66	WET WT SPLE+TARE
DIAMETER, in.:	2.874	DIAMETER, cm	7.300	DRY WT SPLE+TARE	437.44	DRY WT SPLE+TARE
WET WT., gms.:	482.72			TARE WEIGHT	127.94	TARE WEIGHT
AREA, sq.in.:	6.487	AREA, sq cm:	41.853	**% MOISTURE**	56.0	% MOISTURE
						*Not Available

B VALUE (before Permeation): 99%   Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	03-Oct-13	09:40 AM	24.2	0	6.27	23.34			2.33	17.07	
0.0	03-Oct-13	09:46 AM	24.2	6	13.43	16.13	7.16	4.7E-04	0.37	2.70	84.18
0.0	03-Oct-13	09:50 AM	24.2	4	14.39	15.16	0.96	4.8E-04	0.11	0.77	71.48
0.0	03-Oct-13	10:15 AM	24.0	0	7.57	24.18			2.27	16.61	
0.0	03-Oct-13	10:22 AM	24.0	7	14.83	16.85	7.26	4.6E-04	0.28	2.02	87.84
0.0	03-Oct-13	10:27 AM	24.0	5	15.62	16.07	0.79	4.6E-04	0.06	0.45	77.72

Average Temp. = 24.1

AVERAGE K = 4.7E-04

Corrected K for 20ºC = 4.2E-04

Geotechnology, Inc.

HYDRAULIC CONDUCTIVITY TEST DATA

(ASTM D 5084)

JOB NO.:	J022188.01			WET UNIT WEIGHT, pcf:	126.1		
SAMPLE ID:	ST262-35			**DRY UNIT WEIGHT, pcf:**	**102.2**		
LOCATION:	MW-262						
DEPTH:	33.5 - 35.5						
				INITIAL MOISTURE CONTENT		FINAL MOISTURE CONTENT	
LENGTH, in.:	3.545	LENGTH, cm:	9.004	WET WT SPLE+TARE	880.20	WET WT SPLE+TARE	888.98
DIAMETER, in.:	2.854	DIAMETER, cm	7.249	DRY WT SPLE+TARE	737.44	DRY WT SPLE+TARE	737.44
WET WT., gms.:	750.94			TARE WEIGHT	129.26	TARE WEIGHT	129.26
AREA, sq.in.:	6.397	AREA, sq cm:	41.273	**% MOISTURE**	23.5	% MOISTURE	24.9

B VALUE (before Permeation): 99% Cell / Back Pressure, psi: 43 / 40

HEAD (PSI)	DATE (YR,MO,DY)	TIME (HR,MN,SC)	TEMP ºC	ELAPSED MINUTES	BOTTOM BURETTE	TOP BURETTE	Q (CC)	K CM/SEC	HYDRAULIC GRADIENT	HYDRAULIC HEAD	HEAD LOSS,%
0.0	30-Aug-13	10:28 AM	23.4	0	5.05	24.01			2.11	18.96	
0.0	30-Aug-13	05:45 PM	23.7	437	5.69	24.03	0.64	1.5E-07	2.04	18.34	3.27
0.0	02-Sep-13	09:05 AM	22.9	3800	6.48	24.41	0.79	1.1E-08	1.99	17.93	2.24
0.0	03-Sep-13	08:22 AM	23.3	1397	6.67	24.47	0.19	9.9E-09	1.98	17.80	0.73
0.0	03-Sep-13	05:35 PM	23.0	553	6.77	24.50	0.10	1.4E-08	1.97	17.73	0.39
2.0	03-Sep-13	06:02 PM	23.0	0	5.91	23.23			17.54	157.92	
2.0	04-Sep-13	08:09 AM	23.3	847	6.25	22.93	0.34	9.3E-09	17.47	157.28	0.41
2.0	04-Sep-13	02:24 PM	23.4	375	6.40	22.82	0.15	9.3E-09	17.44	157.02	0.17

Average Temp. = 23.2

AVERAGE K = 1.1E-08

Corrected K for 20ºC = 9.9E-09

Va = Volume of air
Vw = Volume of water
Vv = Volume of voids
Vd - Volume of dry soil
V = Total volume
Ma = Mass of air (=0)
Mw = Mass of water
Md = Mass of dry soil
M = Total mass

	Volume		Mass
Volume of Voids	Va	AIR	Ma=0
	Vw	WATER	Mw
	Vd	SOIL	Md
	V	Total	M

Project No.:	J022188.01	
Location:	TPZ-163	
Sample No.:	ST163-3	
Depth (Feet):	1.5 - 3.5	
Height	2.464	(in)
Diameter	2.870	(in)
Weight	397.53	(g)
Volume	261.21	(cc)
Bulk Density, Wet	1.522	(g/cc)
Bulk Density, Dry - ASTM D 2937	**1.020**	**(g/cc)**
Wet + Tare	527.00	(gms)
Dry + Tare	395.82	(gms)
Tare	129.47	(gms)
Water Content - ASTM D 2216	**49.3**	**(%)**
Gravimetric Water Content	**0.493**	**(g/g)**
Volumetric Water Content	**0.502**	**(cc/cc)**

Volume of Voids	Volume (cc)		Mass (gms)
	29.90	AIR	0.00
161.08	131.18	WATER	131.18
	100.13	SOIL	266.35
	261.21	Total	397.53

Specific Gravity - ASTM D 854 = 2.66 (g/cc)

Total Porosity (n) = Vv/V = 0.617 (cc/cc)

Water Filled Porosity (n) = Vw/V = 0.5022 (cc/cc)

Air Filled Porosity (n) = Va/V = 0.1145 (cc/cc)

Project No.:	J022188.01	
Location:	TPZ-164	
Sample No.:	ST164-5	
Depth (Feet):	3.0 - 5.0	
Height	5.570	(in)
Diameter	2.869	(in)
Weight	1061.5	(g)
Volume	590.08	(cc)
Bulk Density, Wet	1.799	(g/cc)
Bulk Density, Dry - ASTM D 2937	**1.469**	**(g/cc)**
Wet + Tare	1191.79	(gms)
Dry + Tare	996.94	(gms)
Tare	130.26	(gms)
Water Content - ASTM D 2216	**22.5**	**(%)**
Gravimetric Water Content	**0.225**	**(g/g)**
Volumetric Water Content	**0.330**	**(cc/cc)**

Volume of Voids	Volume (cc)		Mass (gms)
	71.84	AIR	0.00
266.69	194.85	WATER	194.85
	323.39	SOIL	866.68
	590.08	Total	1061.53

Specific Gravity - ASTM D 854 = 2.68 (g/cc)

Total Porosity (n) = Vv/V = 0.452 (cc/cc)

Water Filled Porosity (n) = Vw/V = 0.330 (cc/cc)

Air Filled Porosity (n) = Va/V = 0.122 (cc/cc)

NOTE: Values not representative of effective porosity.

Va = Volume of air
Vw = Volume of water
Vv = Volume of voids
Vd - Volume of dry soil
V = Total volume
Ma = Mass of air (=0)
Mw = Mass of water
Md = Mass of dry soil
M = Total mass

	Volume		Mass
Volume of Voids	Va	AIR	Ma=0
	Vw	WATER	Mw
	Vd	SOIL	Md
	V	Total	M

				Volume (cc)		Mass (gms)
Project No.:	J022188.01					
Location:	TPZ-167					
Sample No.:	SS167-30					
Depth (Feet):	29.0 - 30.0			20.02	AIR	0.00
			95.12			
Height	2.408	(in)		75.10	WATER	75.10
Diameter	2.835	(in)				
Weight	473.89	(g)		153.97	SOIL	398.79
Volume	249.09	(cc)				
				249.09	Total	473.89
Bulk Density, Wet	1.902	(g/cc)				
Bulk Density, Dry - ASTM D 2937	**1.601**	**(g/cc)**				
Wet + Tare	586.87	(gms)				
Dry + Tare	511.77	(gms)				
Tare	112.98	(gms)				
Water Content - ASTM D 2216	**18.8**	**(%)**				
Gravimetric Water Content	**0.188**	**(g/g)**				
Volumetric Water Content	**0.301**	**(cc/cc)**				

Specific Gravity - ASTM D 854 = 2.59 (g/cc)

Total Porosity (n) = Vv/V = 0.382 (cc/cc)

Water Filled Porosity (n) = Vw/V = 0.3015 (cc/cc)

Air Filled Porosity (n) = Va/V = 0.0804 (cc/cc)

Note: Sample Remolded in Laboratory

				Volume (cc)		Mass (gms)
Project No.:	J022188.01					
Location:	TPZ-168					
Sample No.:	ST168-5					
Depth (Feet):	3.0 - 5.0			25.80	AIR	0.00
			199.02			
Height	2.883	(in)		173.22	WATER	173.22
Diameter	2.874	(in)				
Weight	482.7	(g)		107.47	SOIL	309.50
Volume	306.48	(cc)				
				306.48	Total	482.72
Bulk Density, Wet	1.575	(g/cc)				
Bulk Density, Dry - ASTM D 2937	**1.010**	**(g/cc)**				
Wet + Tare	610.66	(gms)				
Dry + Tare	437.44	(gms)				
Tare	127.94	(gms)				
Water Content - ASTM D 2216	**56.0**	**(%)**				
Gravimetric Water Content	**0.560**	**(g/g)**				
Volumetric Water Content	**0.565**	**(cc/cc)**				

Specific Gravity - ASTM D 854 = 2.88 (g/cc)

Total Porosity (n) = Vv/V = 0.649 (cc/cc)

Water Filled Porosity (n) = Vw/V = 0.565 (cc/cc)

Air Filled Porosity (n) = Va/V = 0.084 (cc/cc)

NOTE: Values not representative of effective porosity.

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Rec'd 8/22/13

Serial No. SSSSD

Project Name Hydrogeologic Investigation – BEC Ash Pond System

Project No. 2013.009

Project Manager Stuart Cravens, Kelron Environmental

Phase.Task No.

Client Company Dynegy, Inc.

Site Name Baldwin Energy Complex

Site Address 10901 Baldwin Road, Baldwin, IL

Sampling Method
- ☒ Shelby Tube (ST)
- ☒ Split Spoon (SS)
- ☒ Macrocore (MC)
- ☐ Other

Reason For Collection
- ☐ Lab Analysis
- ☐ On-Site Headspace
- ☒ Geotechnical Lab
- ☐ Other

Portable Screening Instrument Used ☒ None

	Type	Manufacturer	Model
☐	PID (Lamp____eV)		
☐	FID		
☐	CGI		

Depth	Sample No.	Location	Date Collected	Sample Type ST	SS	MC	Analysis 1 (USCS Class)	Analysis 2 (USCS w/ Sieve / Hydrometer)	Analysis 3 (Moisture,Bulk Density,Hyd Cond, SpGr)**	Analysis 4 (Moisture)	Analysis 5 (Hyd Cond)
29-30'	SS167-30	TPZ-167	8-13-13		X			X	X		
32-34'	ST167-34	↓	8-13-13	X				X		X	X
47-48'	SS167-48	↓	8-13-13		X		X				
3-5	ST168-5	TPZ-168	8-15-13	X				X	X		
39-40	SS168-40	↓	8-14-13		X		X				
68.5-69	SS168-69	↓	8-14-13		X		X				
36.5-37	MC257-37	OW-257	8-15-13			X	X				
8-10	ST165-10	TPZ-165	8-19-13	X				X		X	X
13-14	MC165-14	↓	8-19-13			X	X				
17-18	MC262-18	MW-262	8-19-13				X				
33.5-35.5	ST262-35	↓	8-19-13	X				X		X	X
31.5-32.5	MC161-32	MW-161	8-20-13			X	X	X (sieve only)			
41-42	MC161-42	↓	8-20-13			X	X				
33-33.5	MC256-33	OW-256	8-22-13			X	X				

Chain-of-Custody Form Number

Comments **Calculation of total, water filled, and air filled porosity.

Ash samples: Analyses 1, 2, and 3. Soil samples: Analyses 1 or Analyses 2 or Analyses 2, 3, 5

Signature [signature] Date ~~8/23/13~~ 8/23/13 Reviewer Date

SOIL/SEDIMENT/SLUDGE SAMPLING DATA

Rec'd 8/27/13

Serial No. SSSSD

Project Name Hydrogeologic Investigation – BEC Ash Pond System   Project No. 2013.009

Project Manager Stuart Cravens, Kelron Environmental   Phase.Task No. ______

Client Company Dynegy, Inc.

Site Name Baldwin Energy Complex

Site Address 10901 Baldwin Road, Baldwin, IL

Sampling Method
- ☒ Shelby Tube (ST)
- ☐ Split Spoon (SS)
- ☐ Macrocore (MC)
- ☐ Other ______

Reason For Collection
- ☐ Lab Analysis
- ☐ On-Site Headspace
- ☒ Geotechnical Lab
- ☐ Other ______

Portable Screening Instrument Used ☒ None

	Type	Manufacturer	Model
☐	PID (Lamp ___ eV)		
☐	FID		
☐	CGI		

Sample No.	Location	Date Collected	Sample Type ST	Sample Type SS	Sample Type MC	Analysis 1 (USCS Class)	Analysis 2 (USCS w/ Sieve / Hydrometer)	Analysis 3 (Moisture, Bulk Density, Hyd Cond, SpGr)**	Analysis 4 (Moisture)	Analysis 5 (Hyd Cond)
ST164-5	TPZ-164 @ 3-5'	8/26/13	X				X	X		
ST164-12	TPZ-164 @ 10-12'	11	X				X		X	X
ST163-3	TPZ-163 @ 1.5'-3.5'	8/27/13	X				X	X		
ST163-30	TPZ-163 @ 28-30'	11	X				X		X	X

Chain-of-Custody Form Number ______

Comments **Calculation of total, water filled, and air filled porosity.

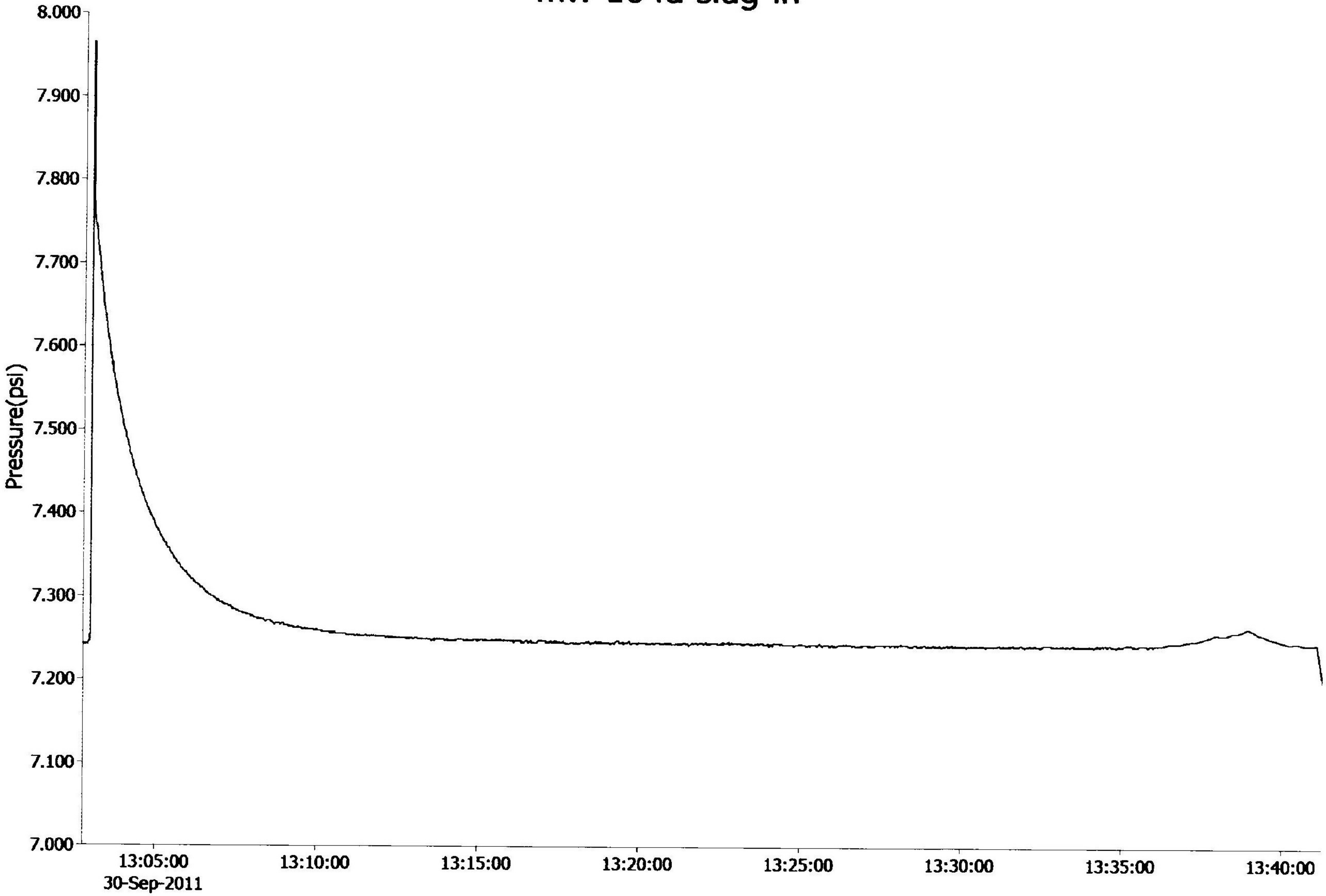
Ash samples: Analyses 2 and 3. Soil samples: Analyses 1 **or** Analyses 2 **or** Analyses 2, 4, 5

Signature [signature]   Date 8/27/13   Reviewer ______   Date ______

APPENDIX E

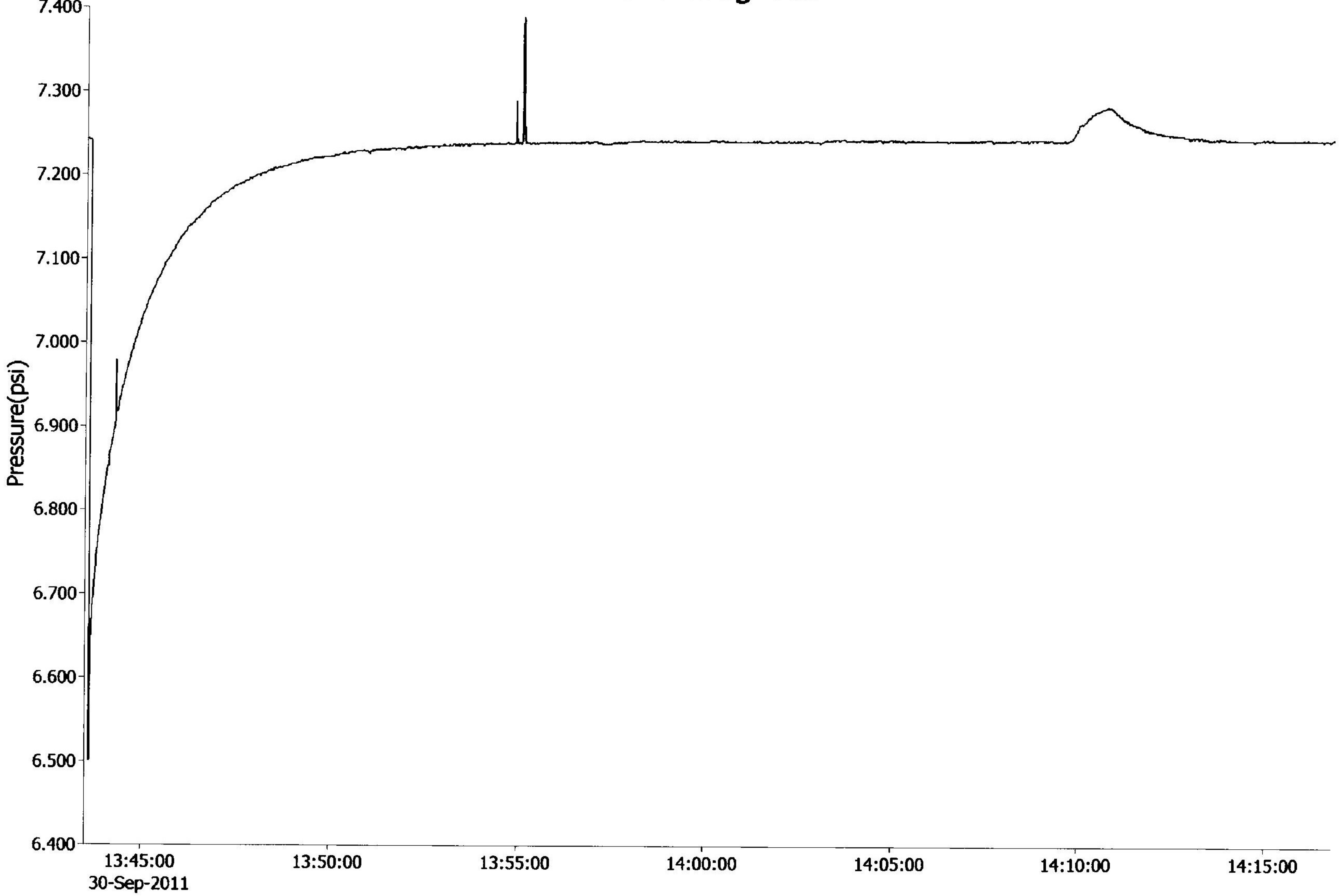
FIELD PERMEABILITY TEST DATA AND ANALYSES

mw-104d slug-in



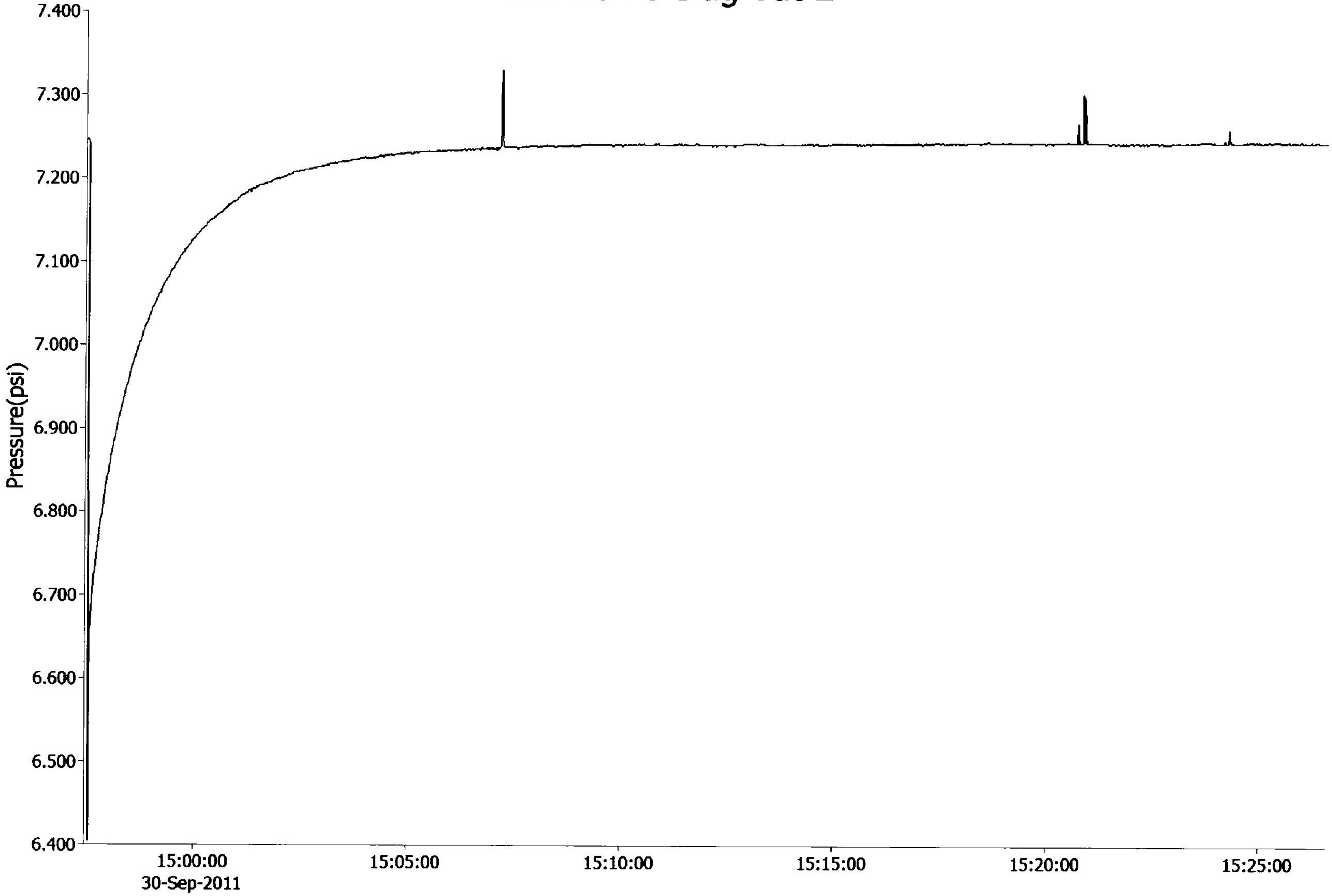
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	7.200	7.966	7.270	0.0057	0.0752	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.3	15.9	15.8	0.01	0.08	1.0000000	0.0000

mw-104d slug-out



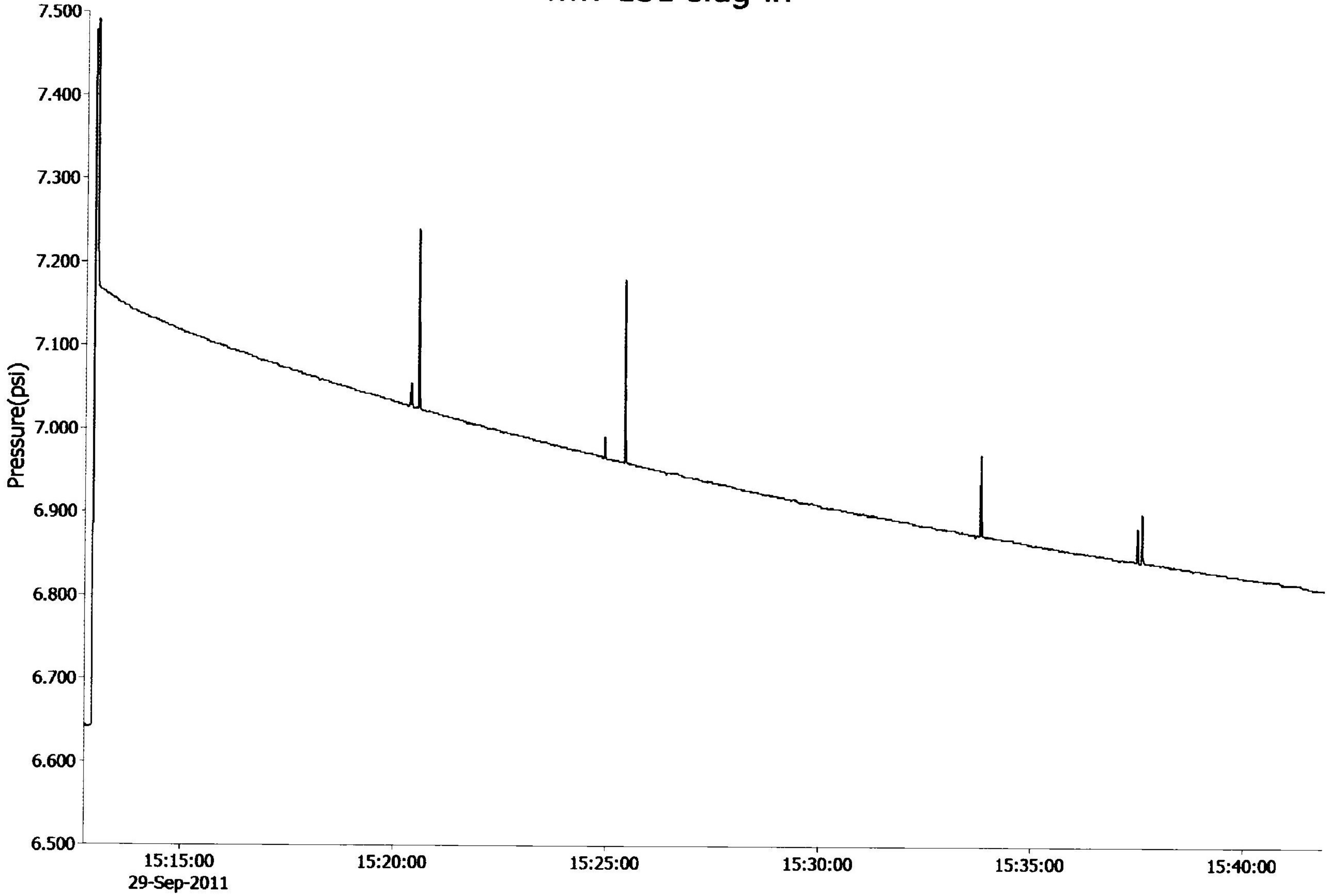
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	6.501	7.389	7.217	0.0065	0.0808	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.4	15.9	15.8	0.00	0.06	1.0000000	0.0000

mw-104 d slug-out 2



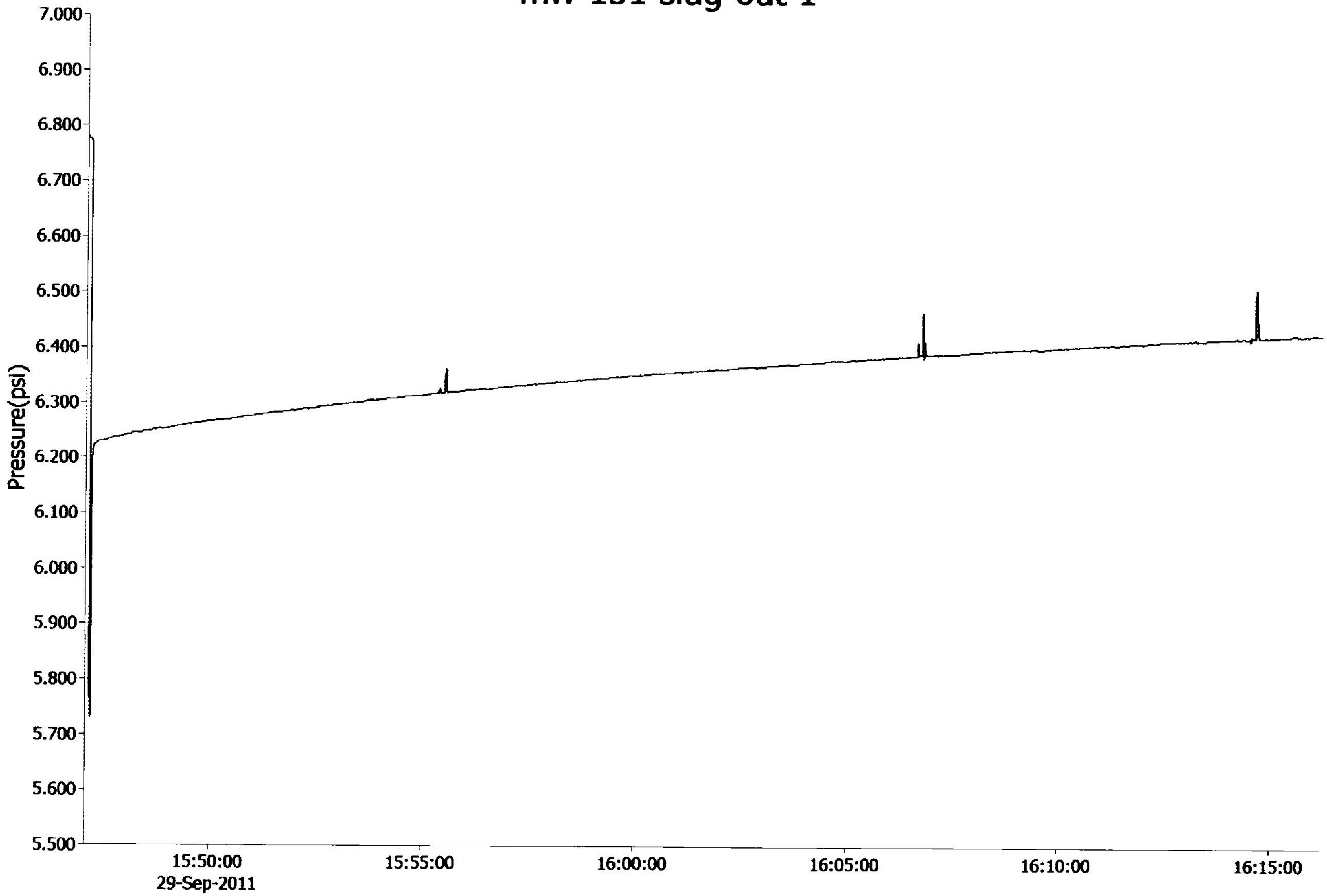
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	6.404	7.330	7.212	0.0072	0.0850	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.4	15.8	15.8	0.00	0.05	1.0000000	0.0000

mw-151 slug-in

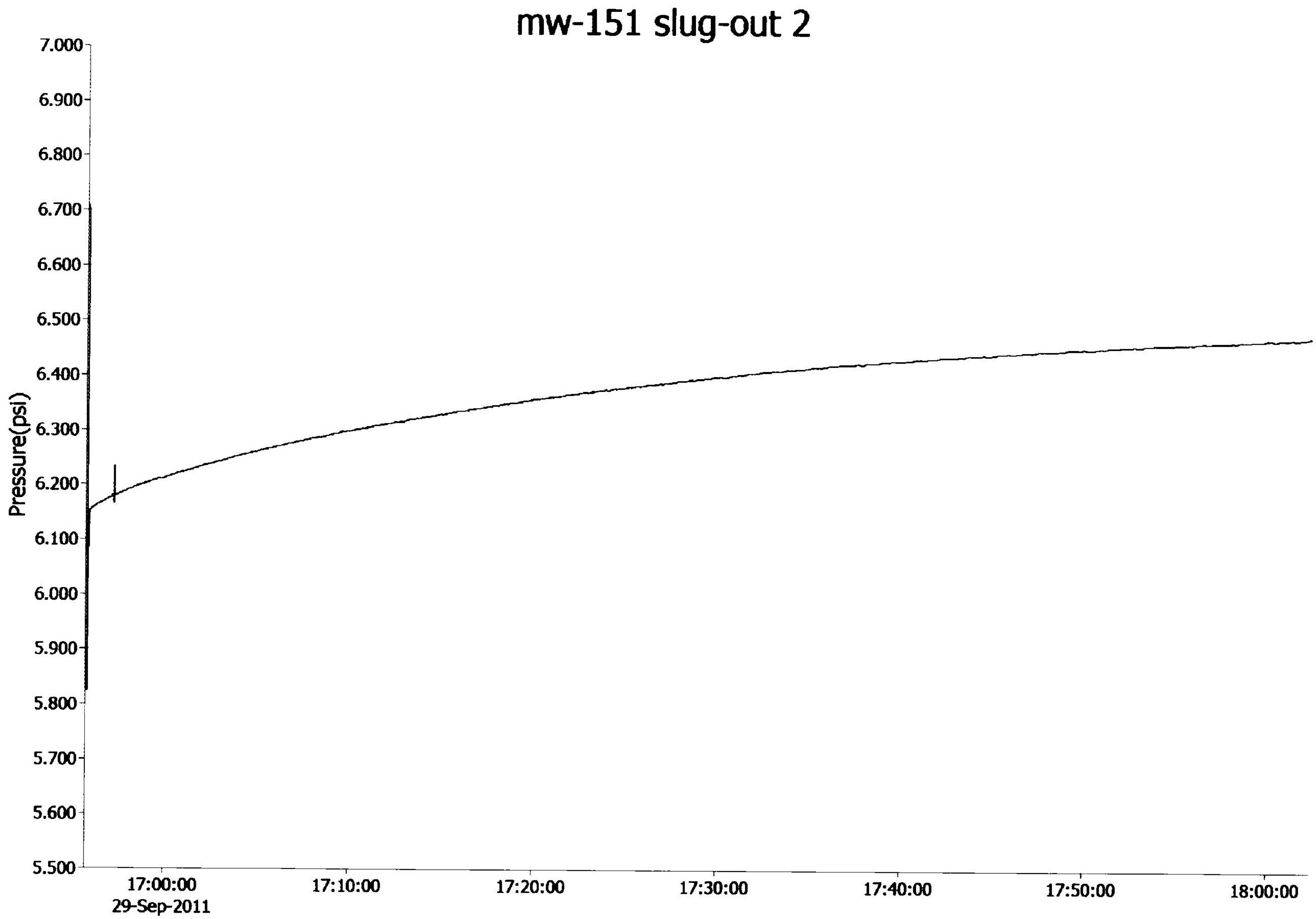


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	6.642	7.492	6.952	0.0108	0.1041	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.9	16.6	16.5	0.02	0.13	1.0000000	0.0000

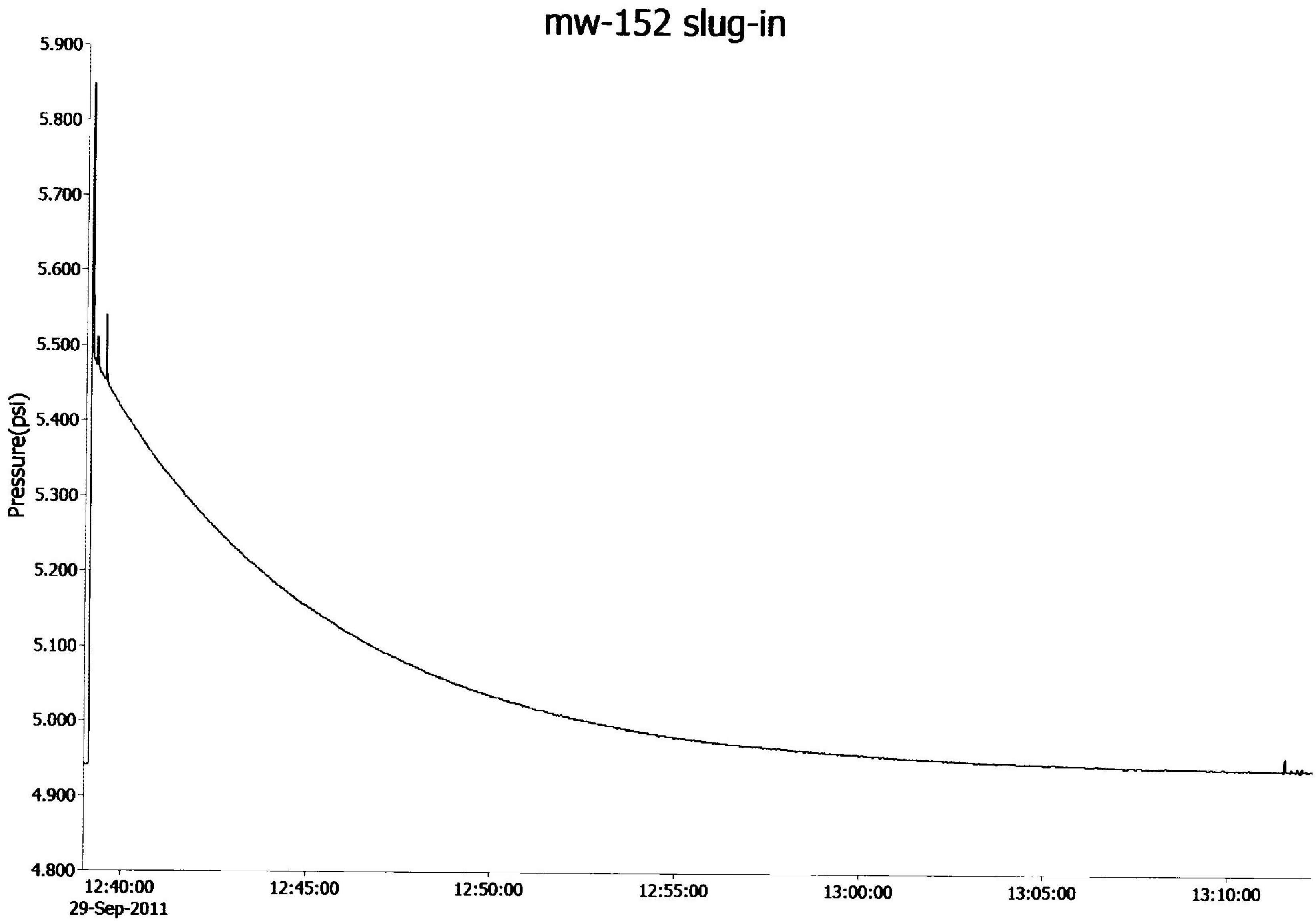
mw-151 slug-out 1



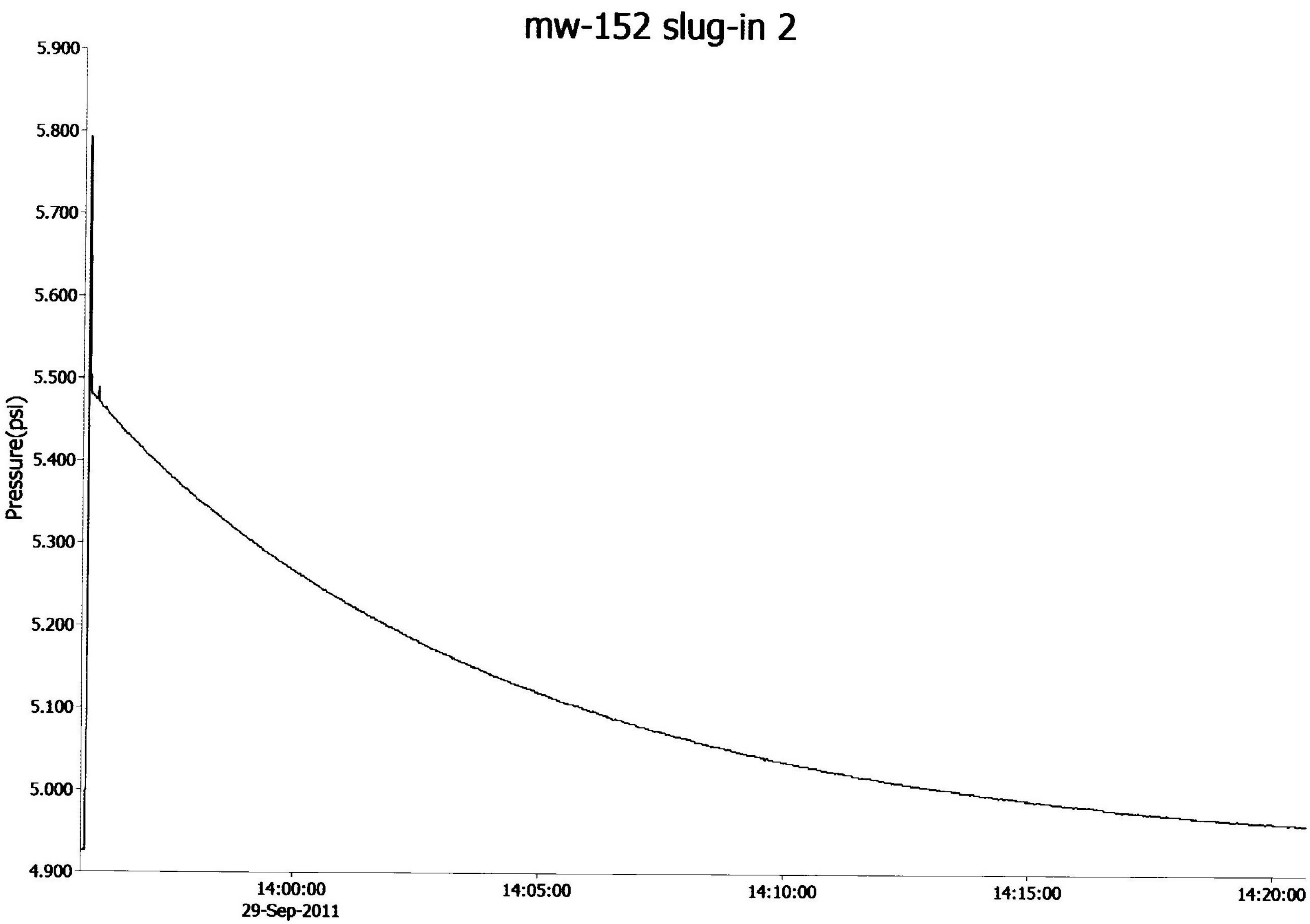
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	5.730	6.781	6.352	0.0041	0.0640	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.1	16.6	16.5	0.01	0.08	1.0000000	0.0000



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	5.825	6.711	6.317	0.0060	0.0773	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.8	16.7	16.4	0.04	0.21	1.0000000	0.0000

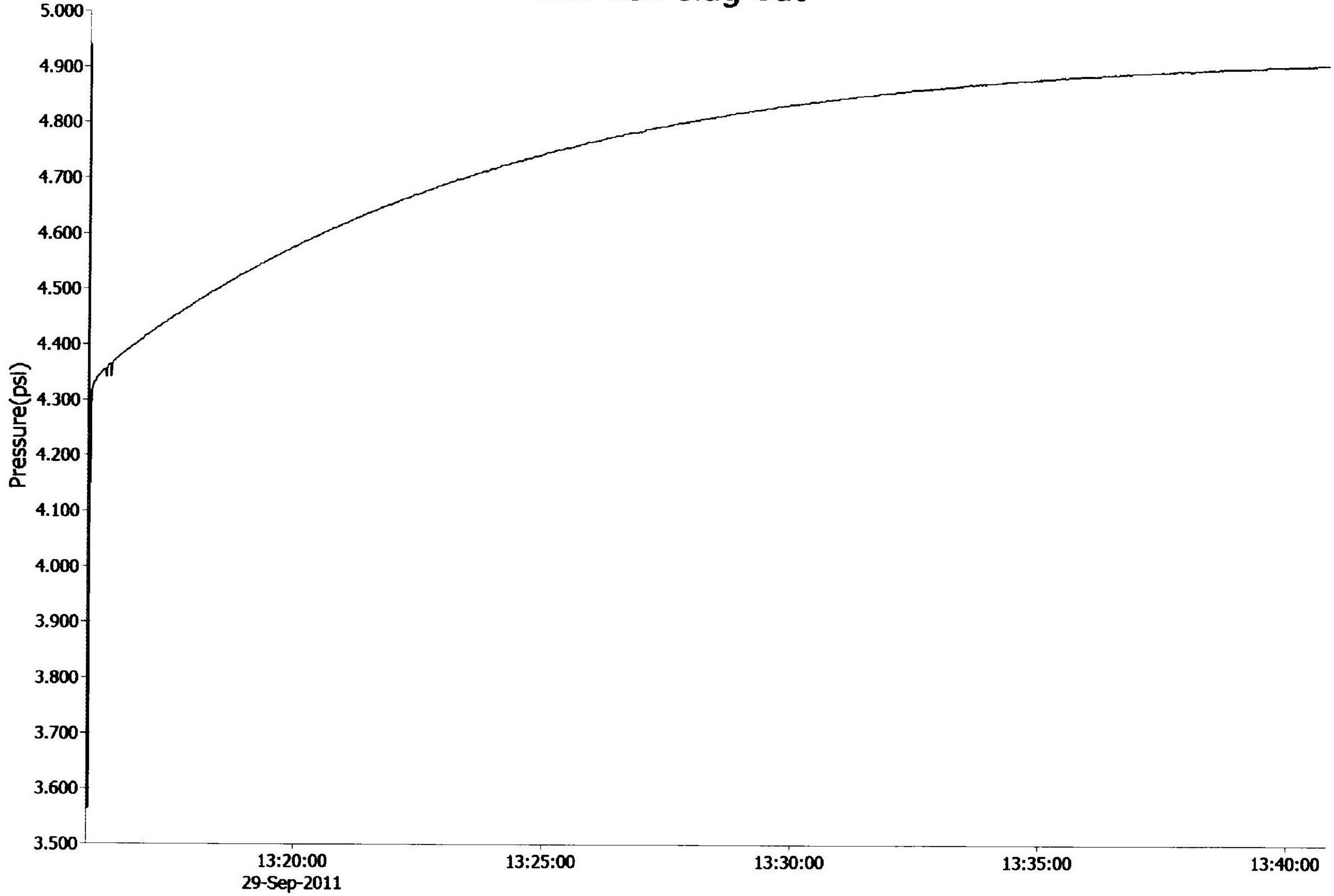


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	4.939	5.849	5.041	0.0181	0.1347	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.1	16.6	16.5	0.01	0.10	1.0000000	0.0000



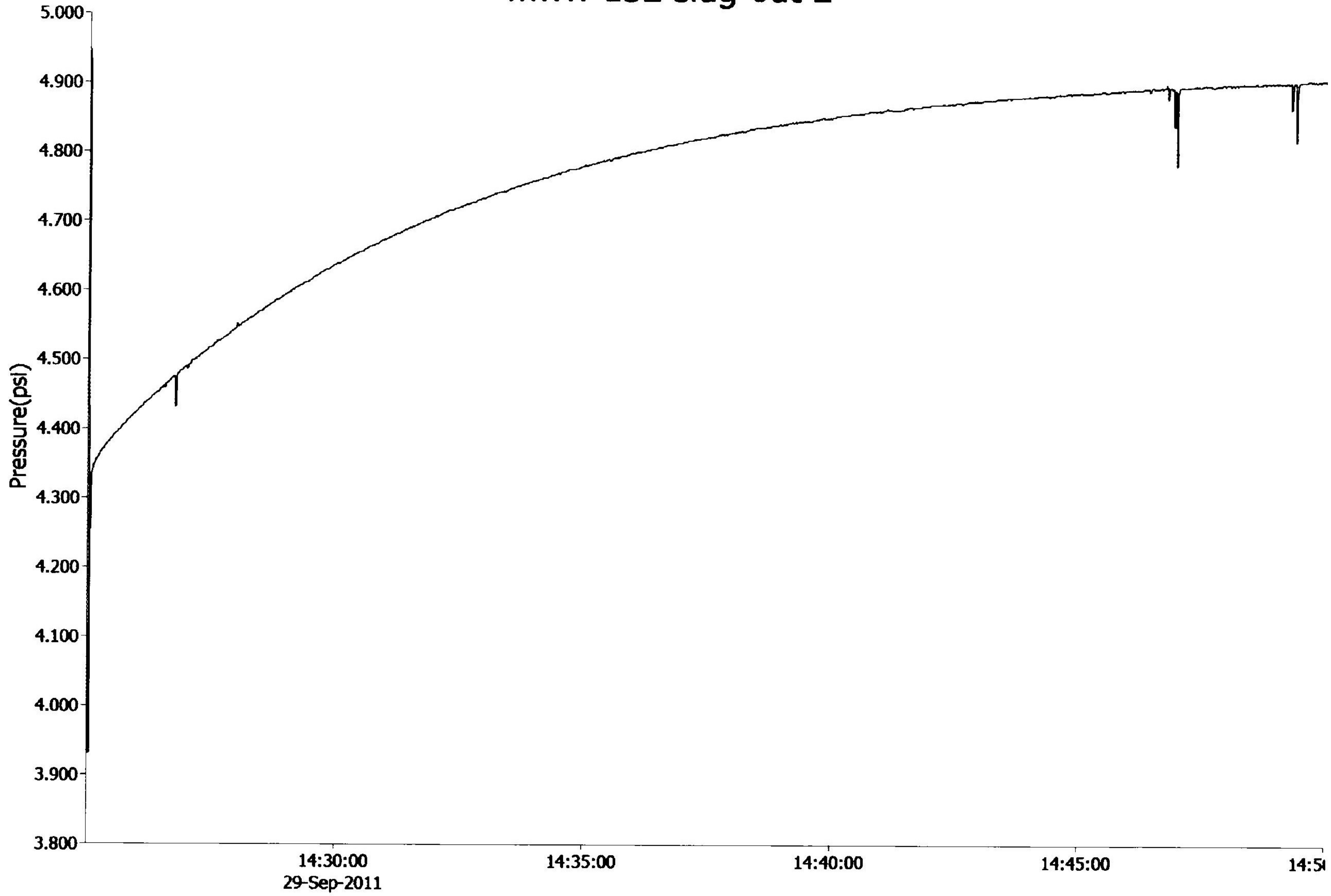
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	4.926	5.793	5.110	0.0203	0.1426	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.3	16.8	16.8	0.01	0.08	1.0000000	0.0000

mw-152 slug-out



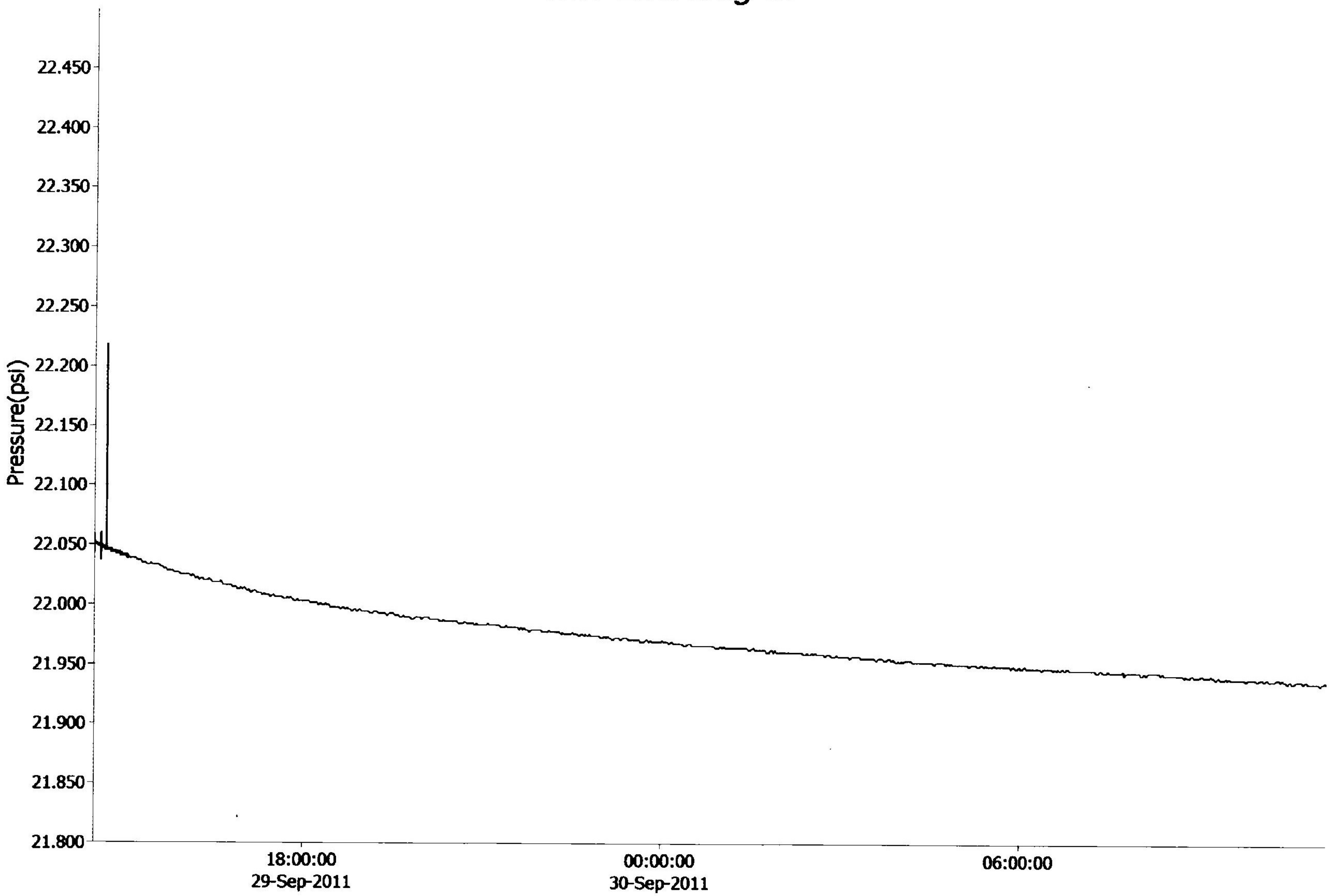
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	3.565	4.941	4.751	0.0248	0.1574	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.0	17.0	16.7	0.05	0.22	1.0000000	0.0000

mww-152 slug-out 2

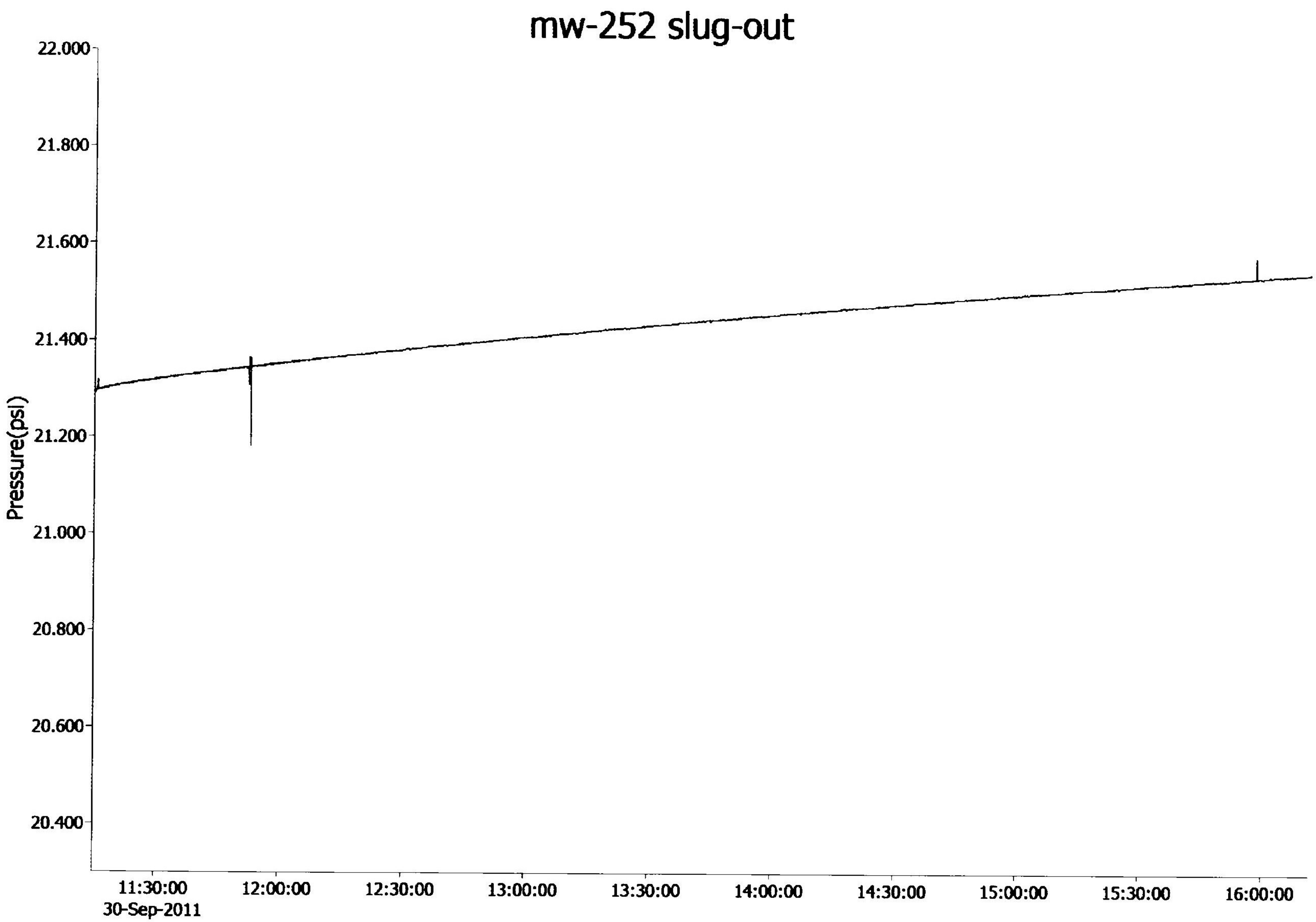


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	3.930	4.948	4.763	0.0217	0.1474	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.3	17.1	16.9	0.03	0.16	1.0000000	0.0000

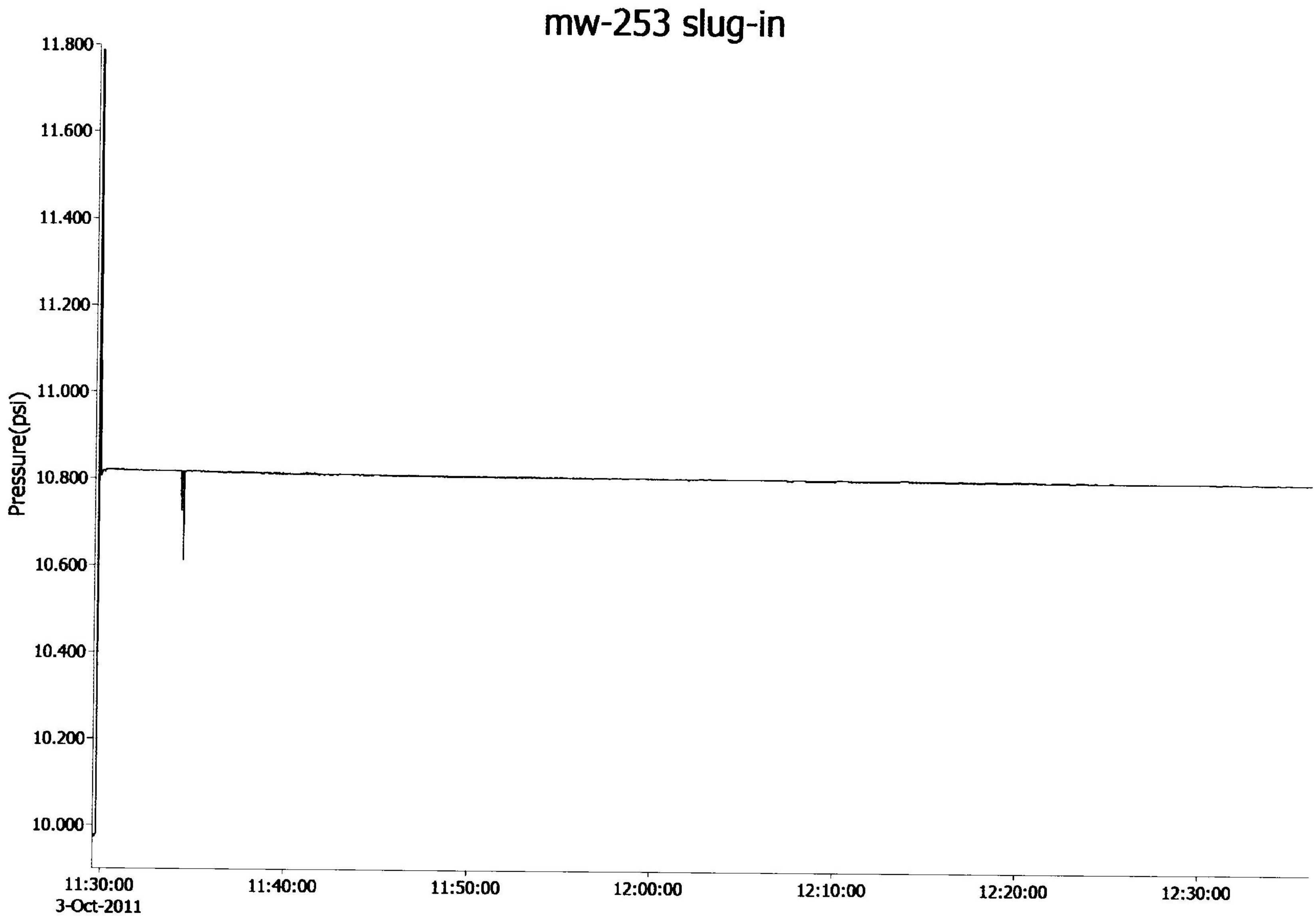
mw-252 slug-in



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	21.880	22.385	22.026	0.0014	0.0381	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	13.8	14.3	14.2	0.05	0.22	1.0000000	0.0000

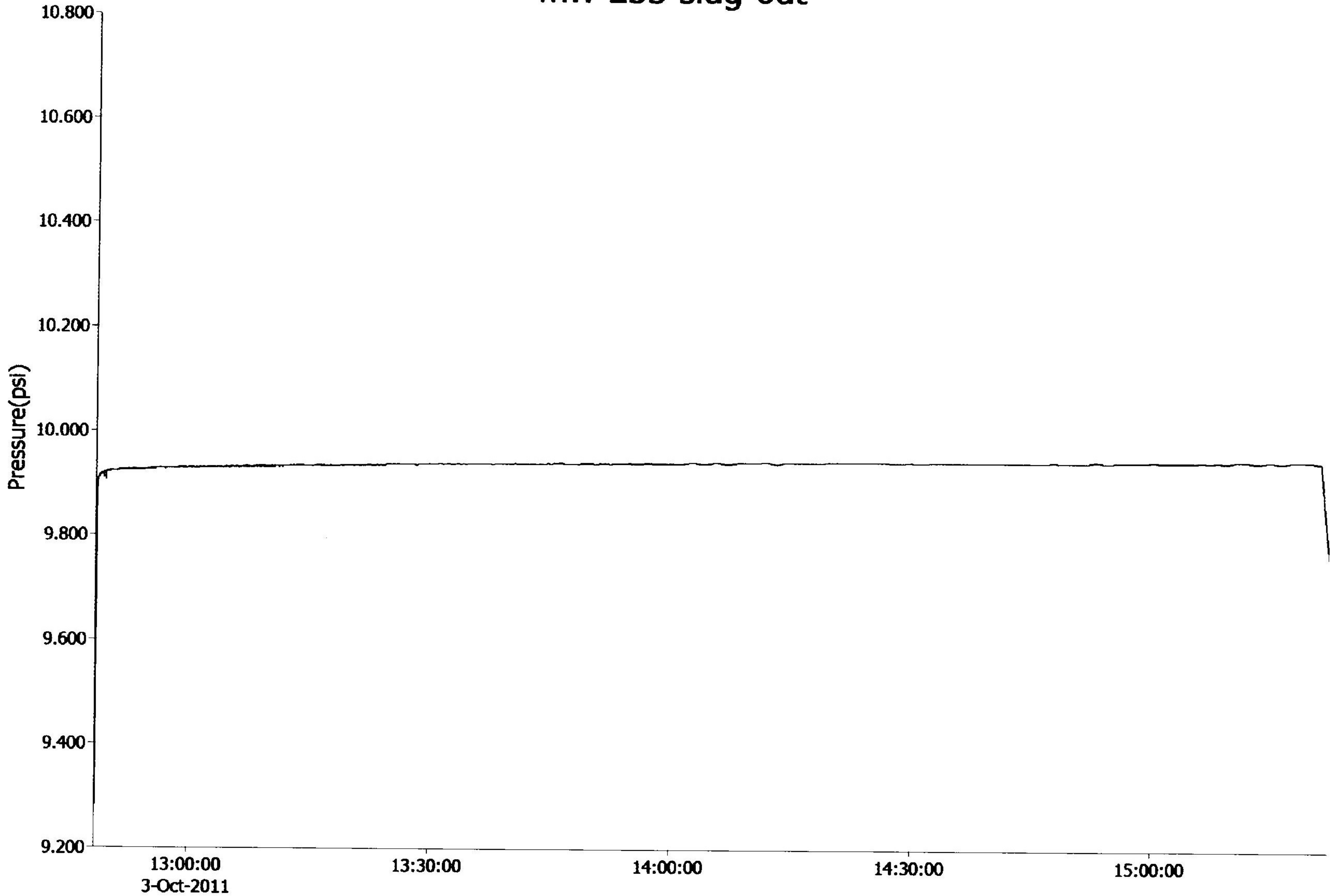


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	20.363	21.936	21.371	0.0050	0.0710	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	13.8	14.4	14.2	0.05	0.22	1.0000000	0.0000

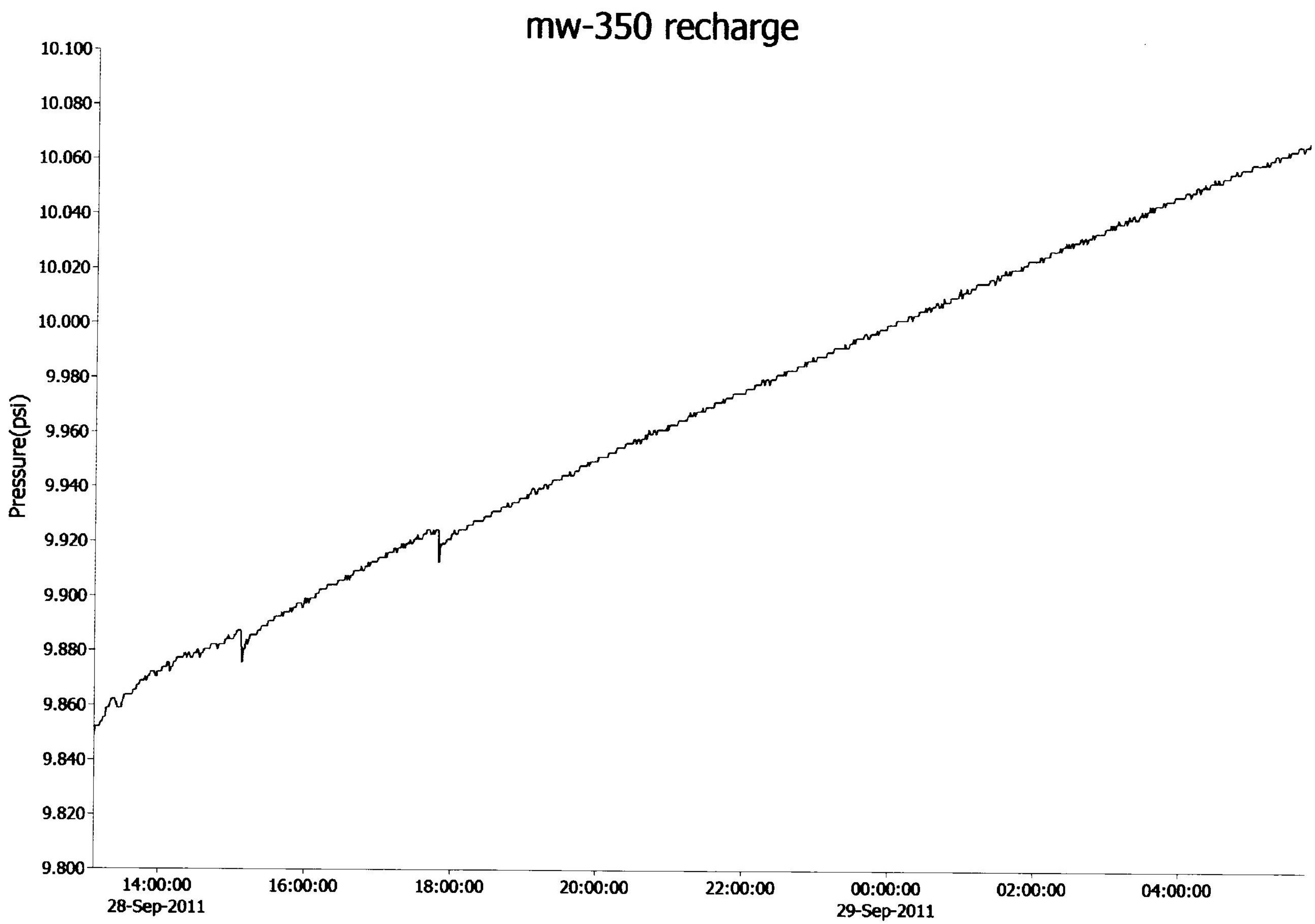


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	9.972	11.788	10.806	0.0050	0.0709	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.5	15.1	15.0	0.02	0.16	1.0000000	0.0000

mw-253 slug-out

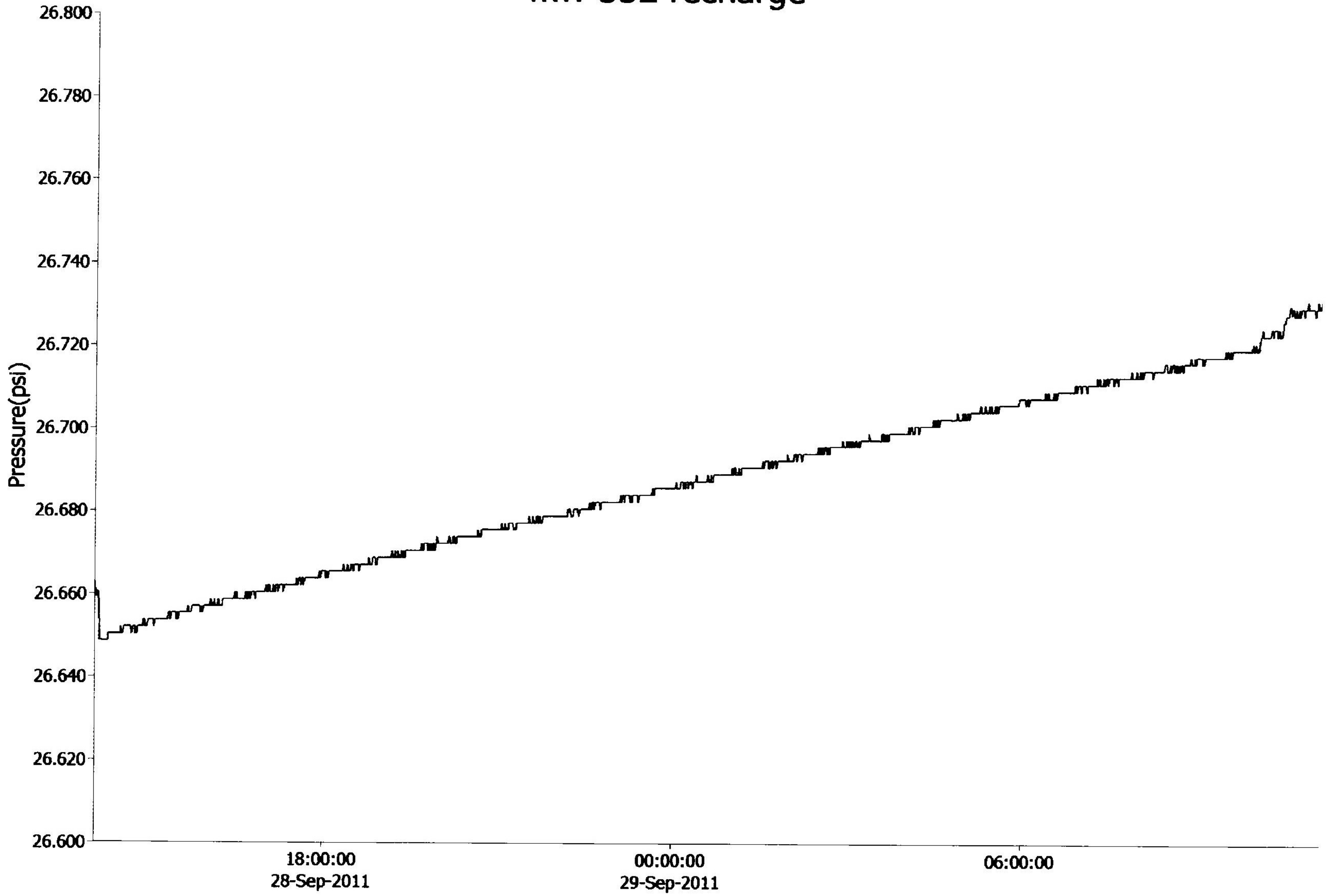


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	9.282	10.797	9.933	0.0020	0.0452	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.4	15.1	15.0	0.04	0.20	1.0000000	0.0000



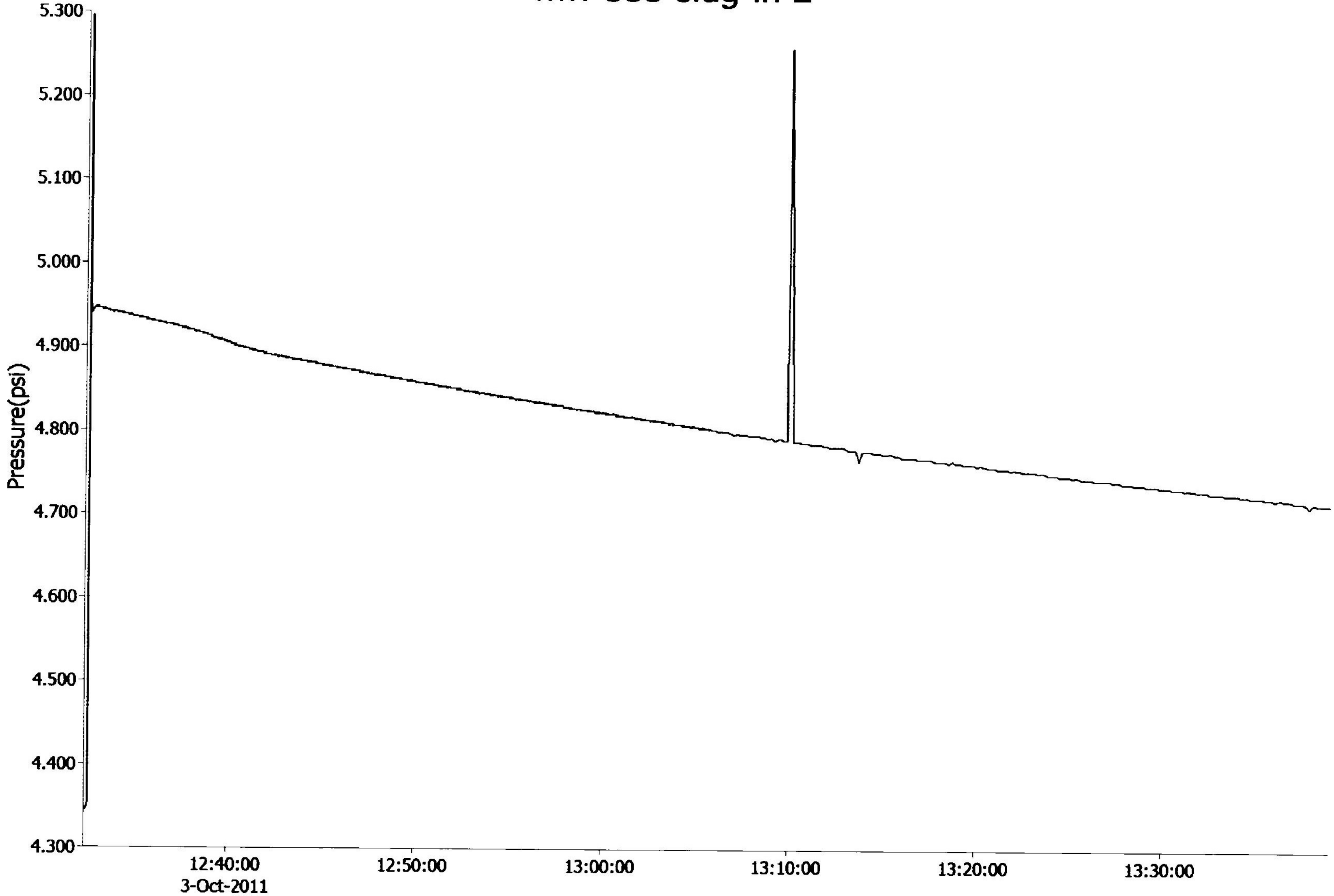
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	9.849	10.067	9.967	0.0036	0.0603	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.0	14.6	14.1	0.00	0.03	1.0000000	0.0000

mw-352 recharge

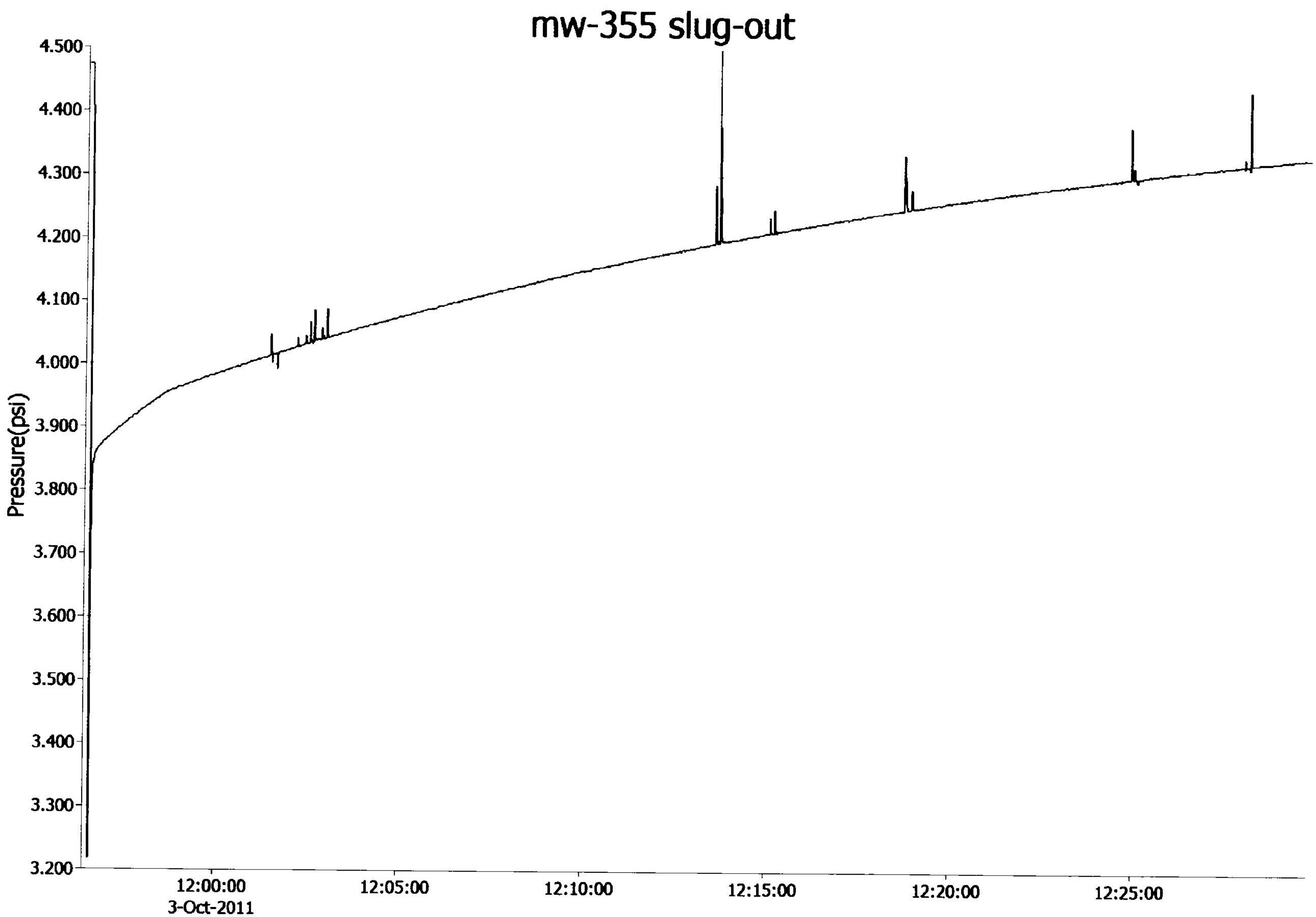


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	26.649	26.731	26.688	0.0005	0.0218	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.1	14.5	14.2	0.00	0.02	1.0000000	0.0000

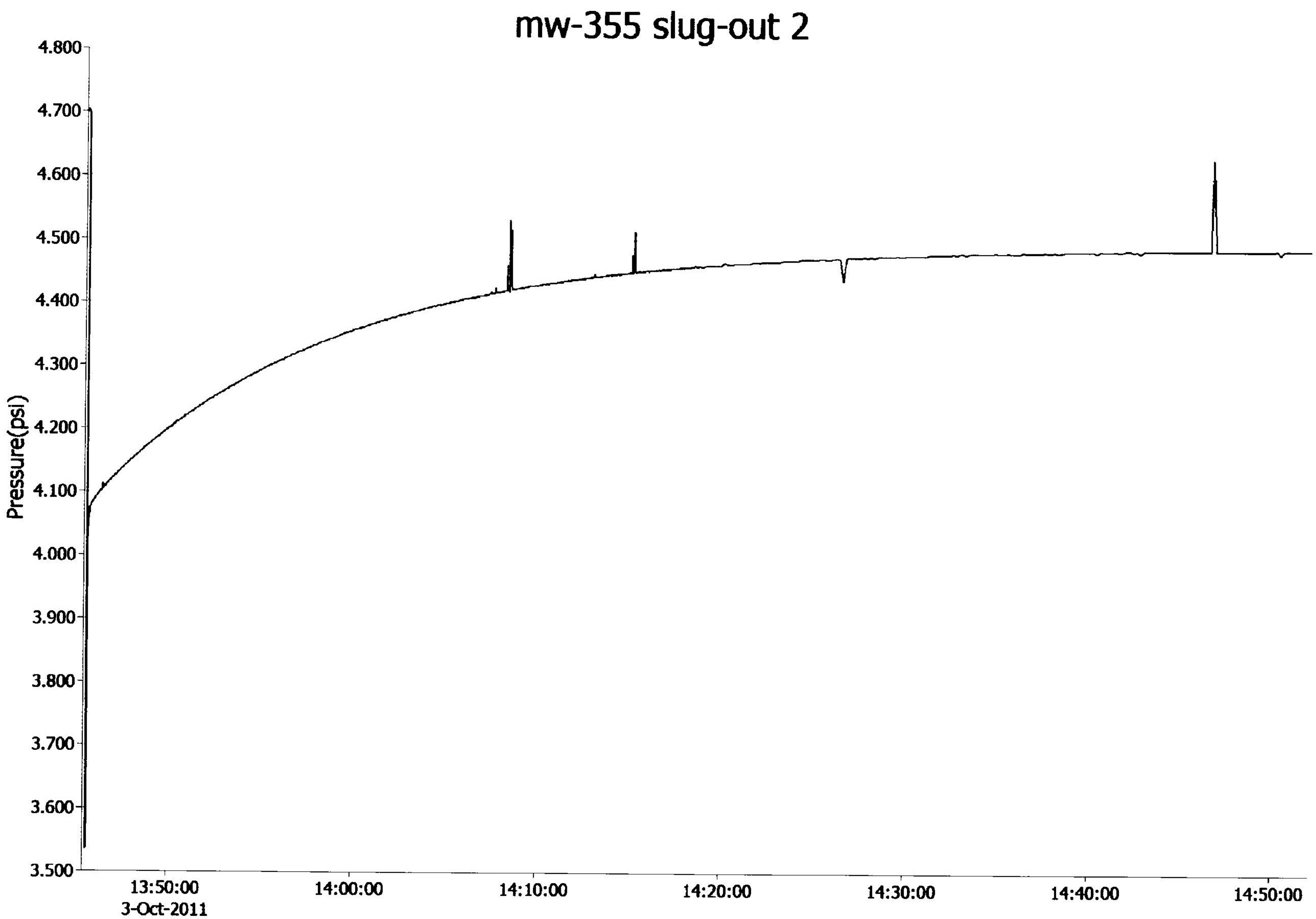
mw-355 slug-in 2



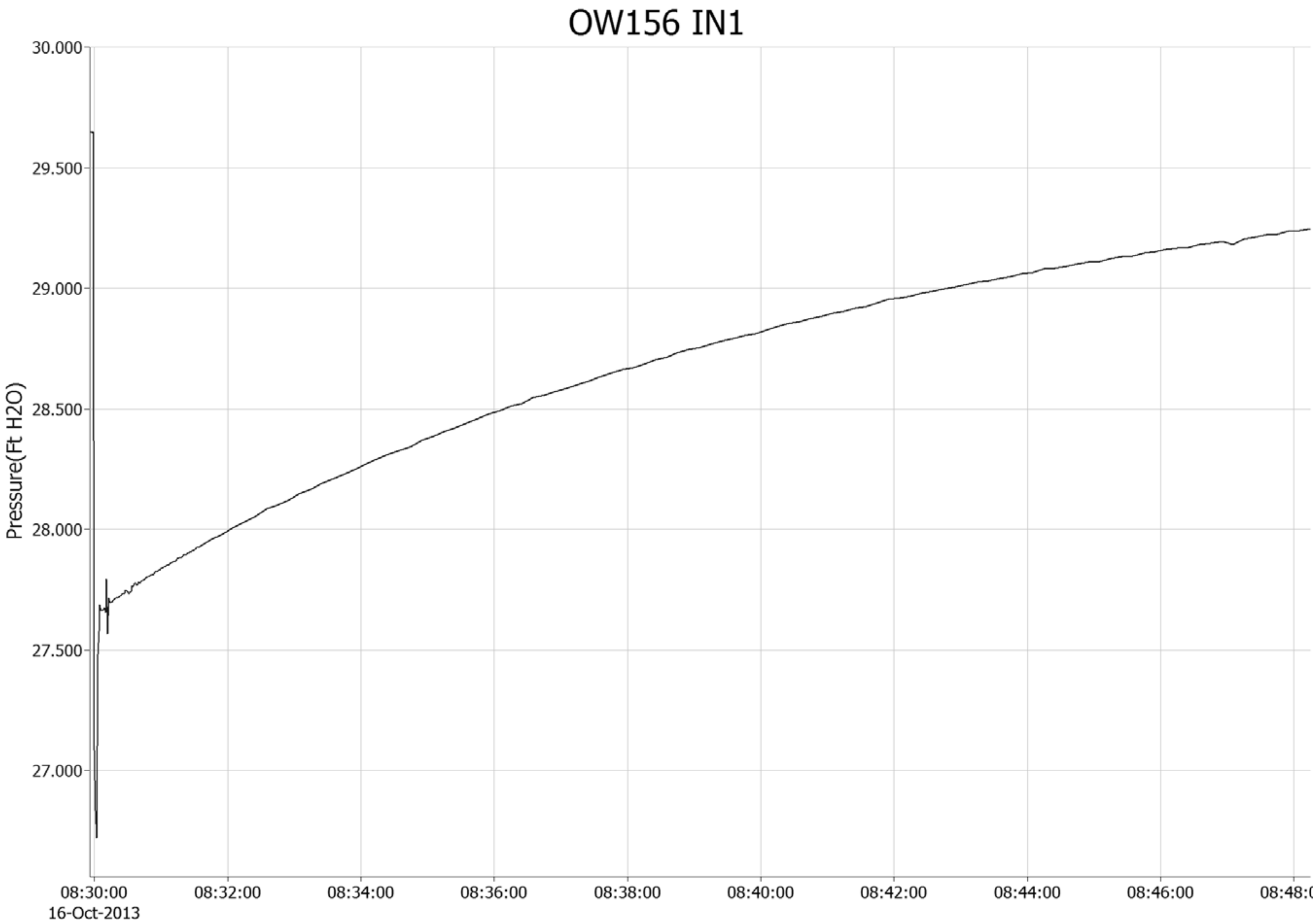
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	4.345	5.295	4.854	0.0044	0.0663	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	13.9	14.4	14.3	0.02	0.14	1.0000000	0.0000



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	3.218	4.500	4.167	0.0160	0.1264	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	13.9	14.4	14.4	0.00	0.06	1.0000000	0.0000

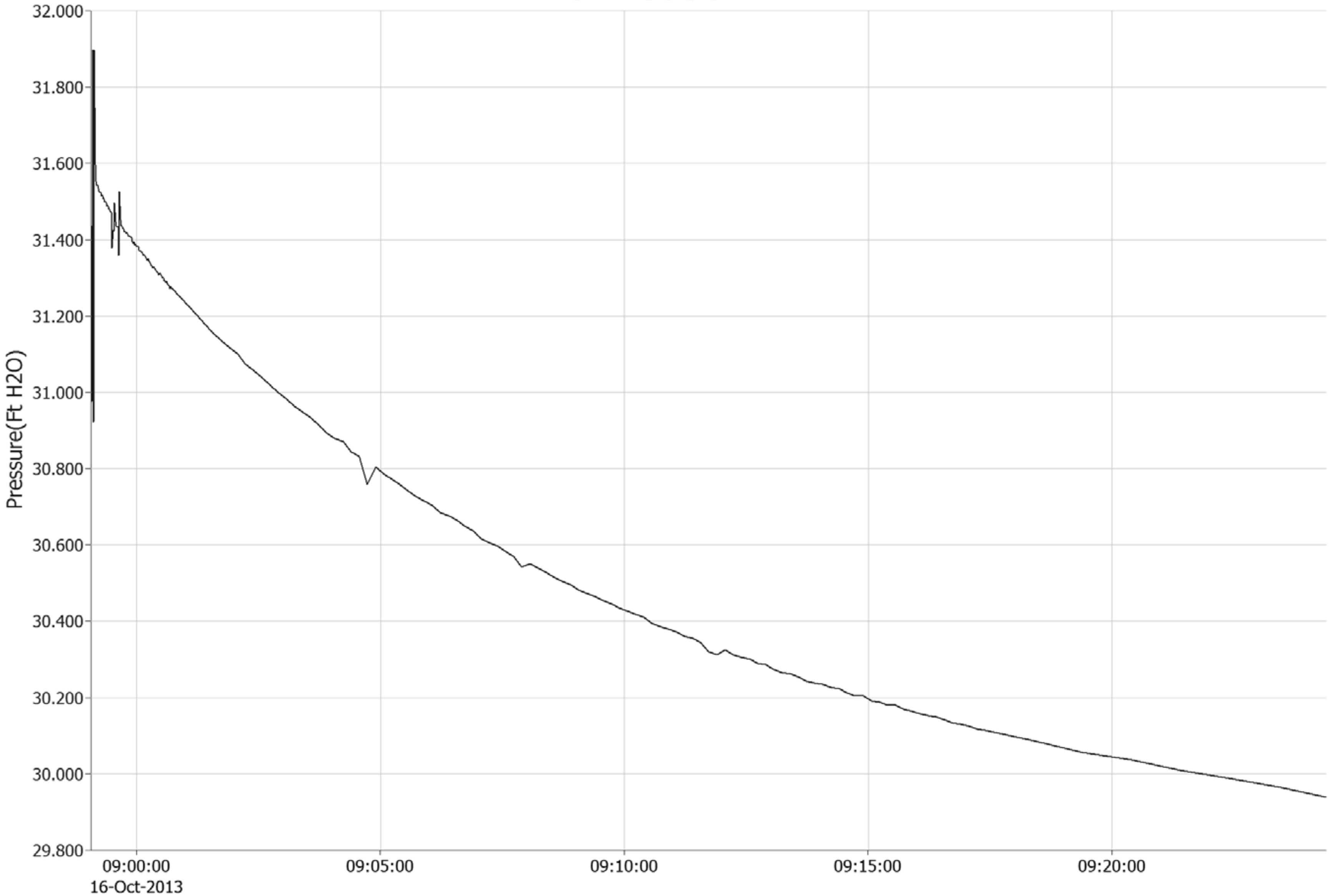


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(psi)	50 psig	3.536	4.707	4.357	0.0122	0.1104	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	13.9	14.4	14.4	0.02	0.14	1.0000000	0.0000

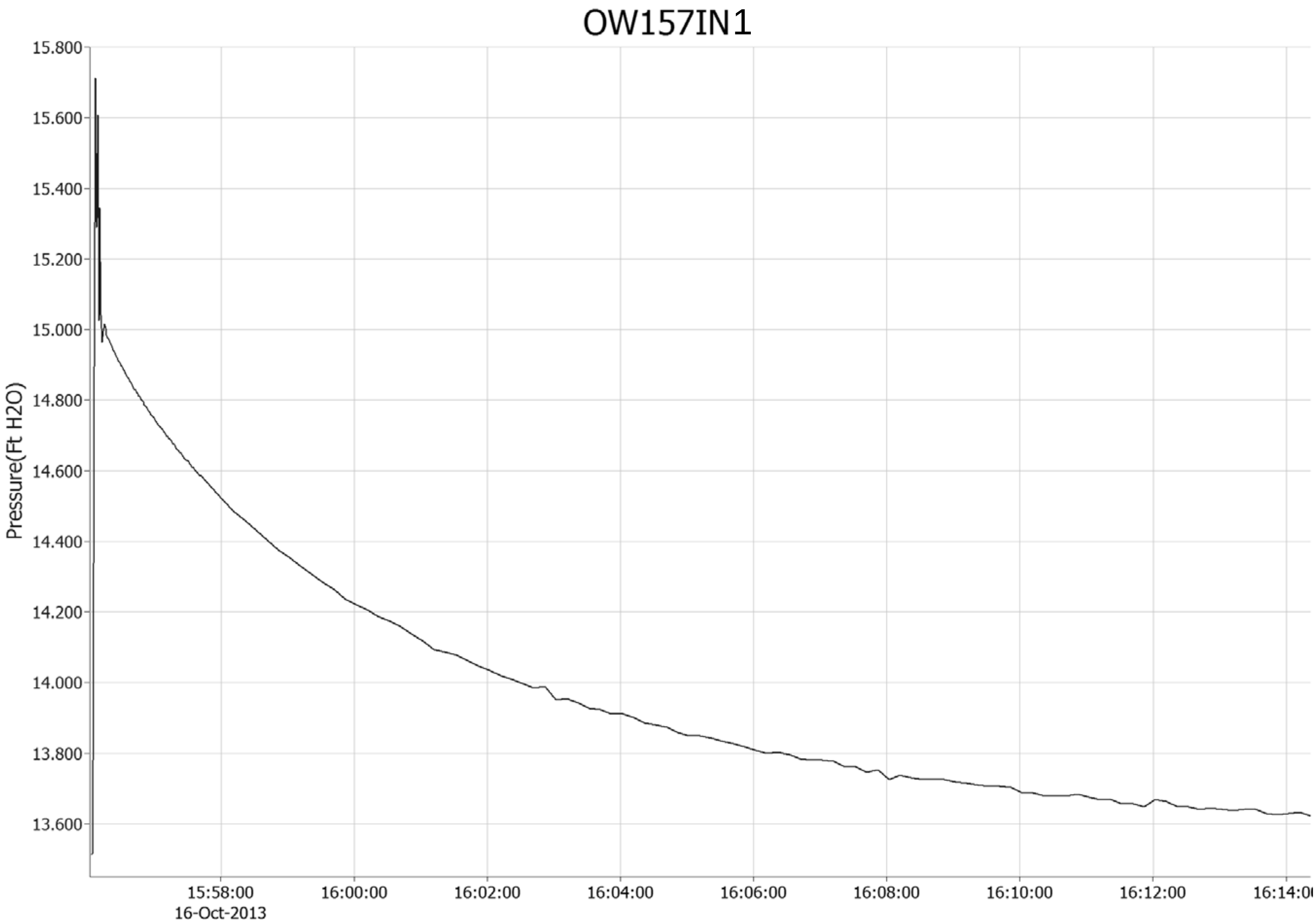


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	26.720	29.650	28.297	0.3562	0.5968	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	16.4	16.8	16.6	0.01	0.12	1.0000000	41.6354

OW156OUT1

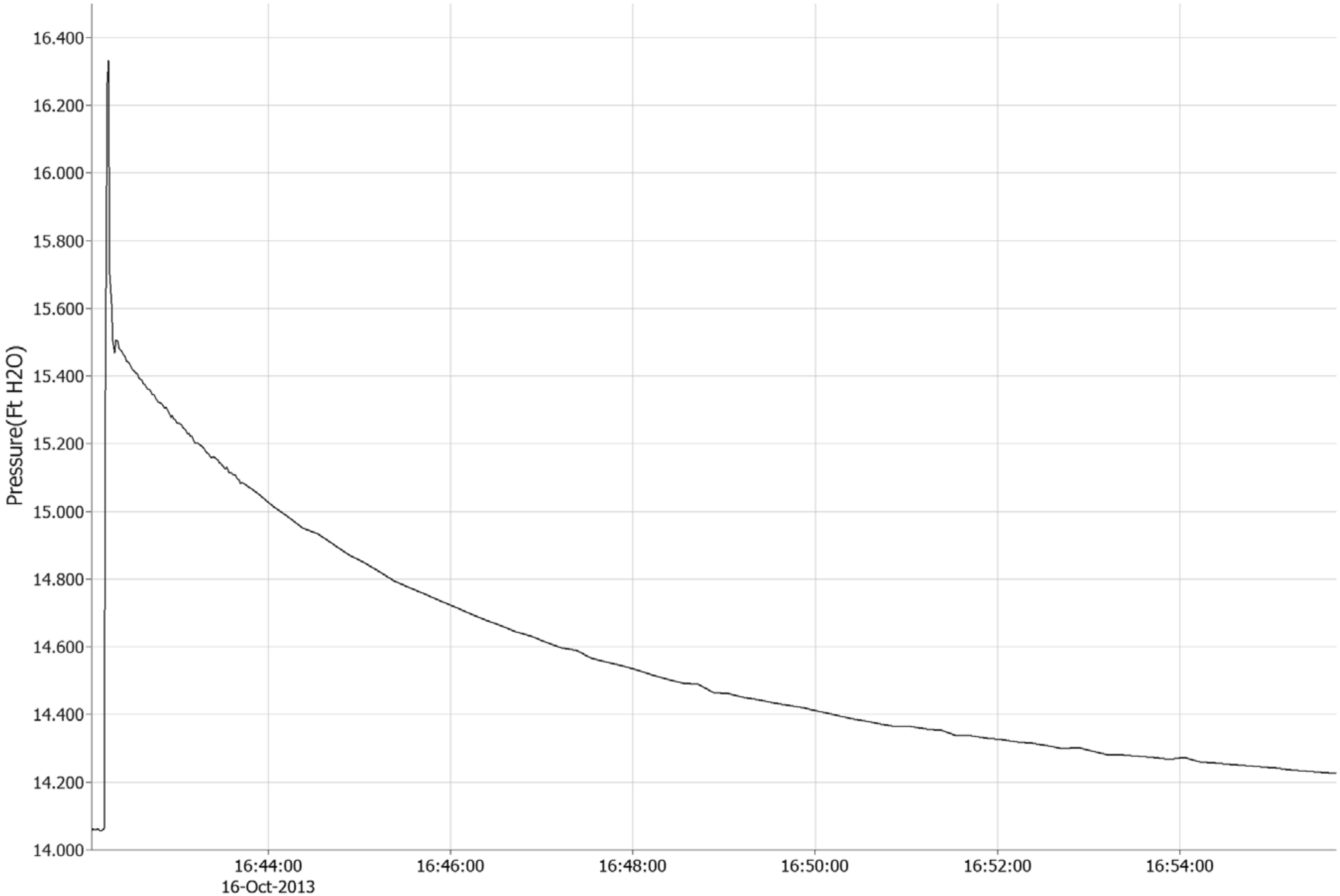


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	29.938	31.897	30.939	0.2632	0.5130	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	16.5	16.9	16.8	0.01	0.07	1.0000000	41.6354



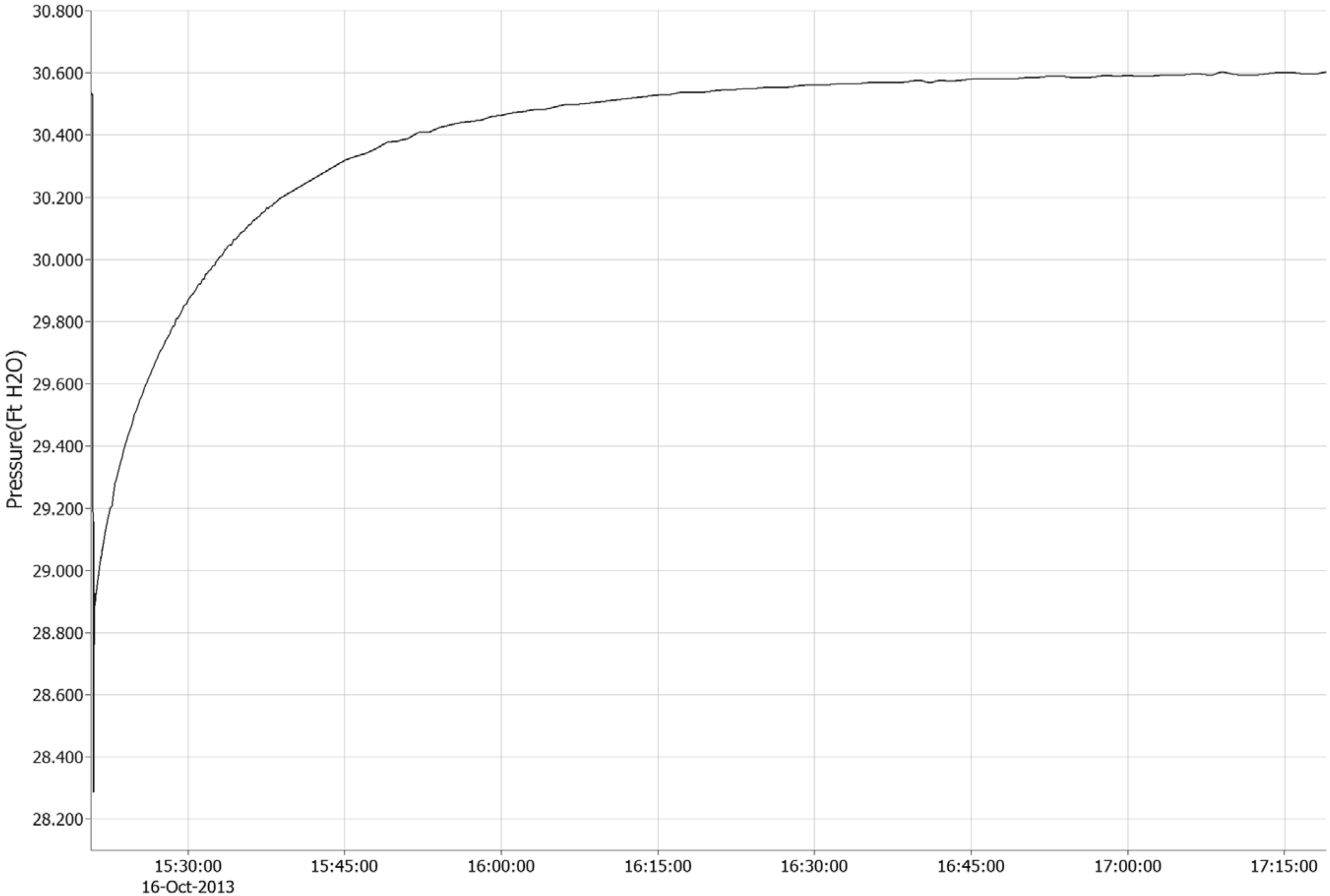
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	13.513	15.712	14.331	0.2630	0.5128	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.3	16.7	16.5	0.02	0.15	1.0000000	0.0000

OW157IN2

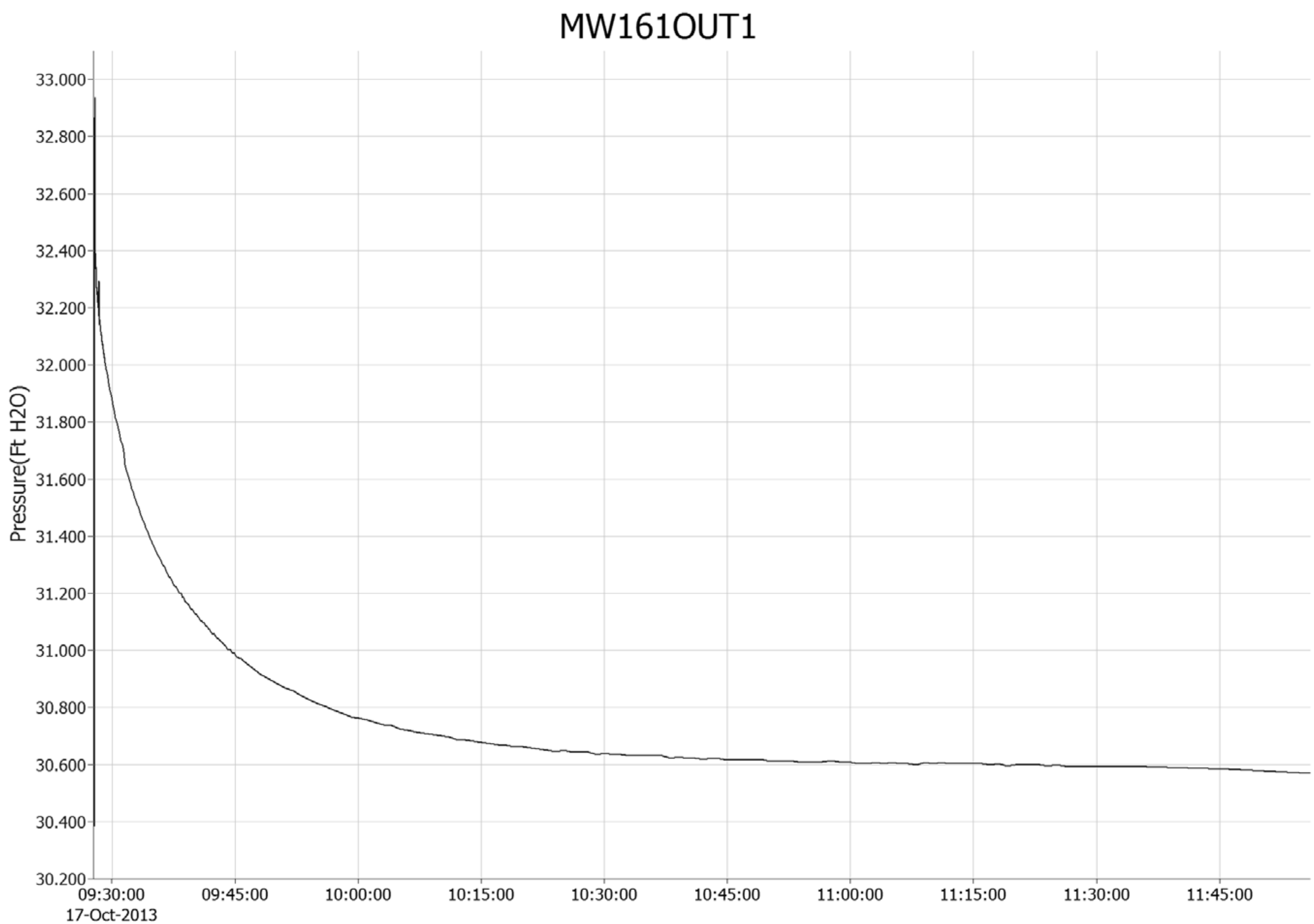


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	14.055	16.331	14.898	0.2372	0.4870	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	16.3	16.7	16.5	0.02	0.12	1.0000000	0.0000

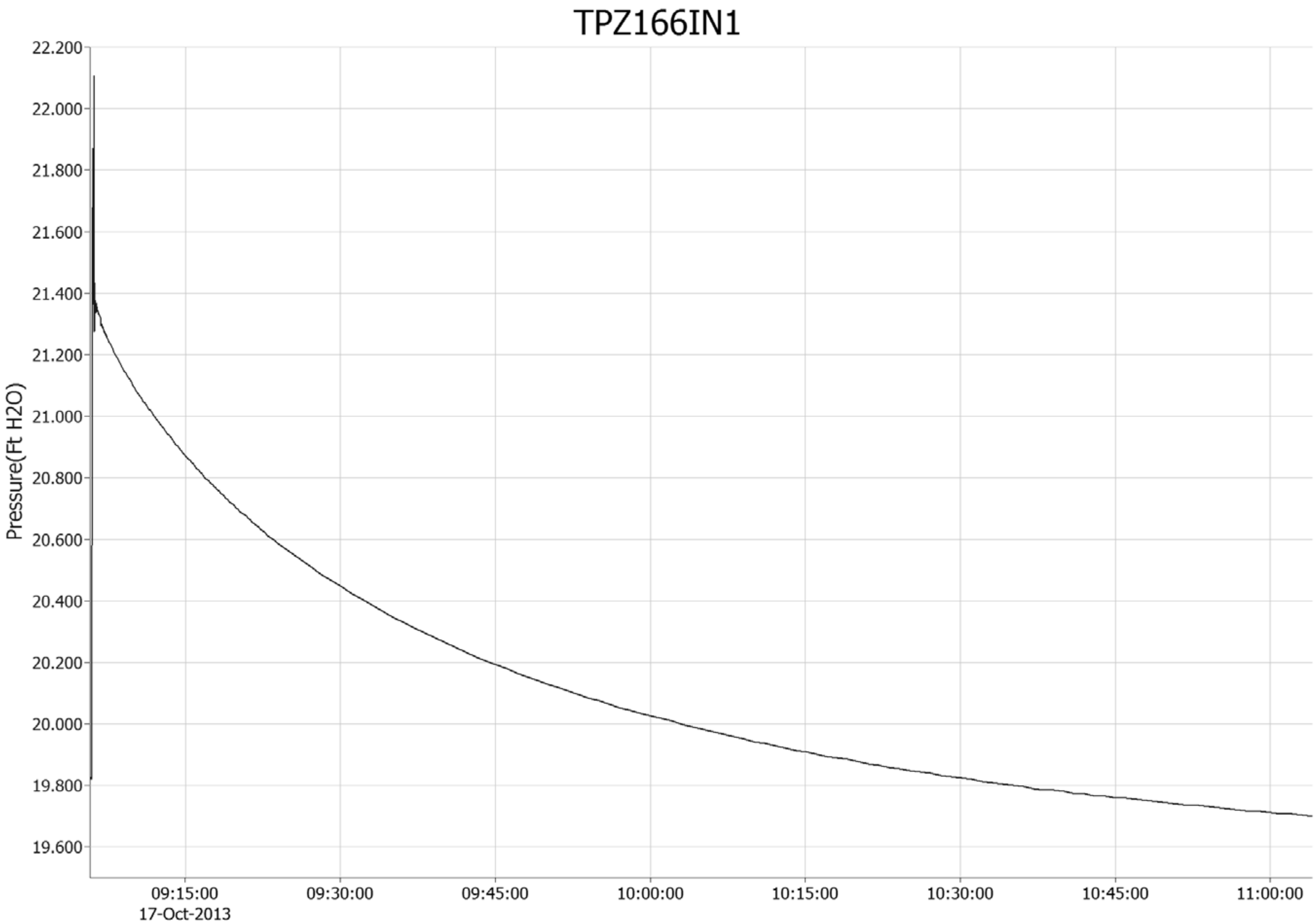
MW161IN1



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	28.286	30.604	29.852	0.4084	0.6391	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	14.7	15.3	14.9	0.04	0.21	1.0000000	41.6354

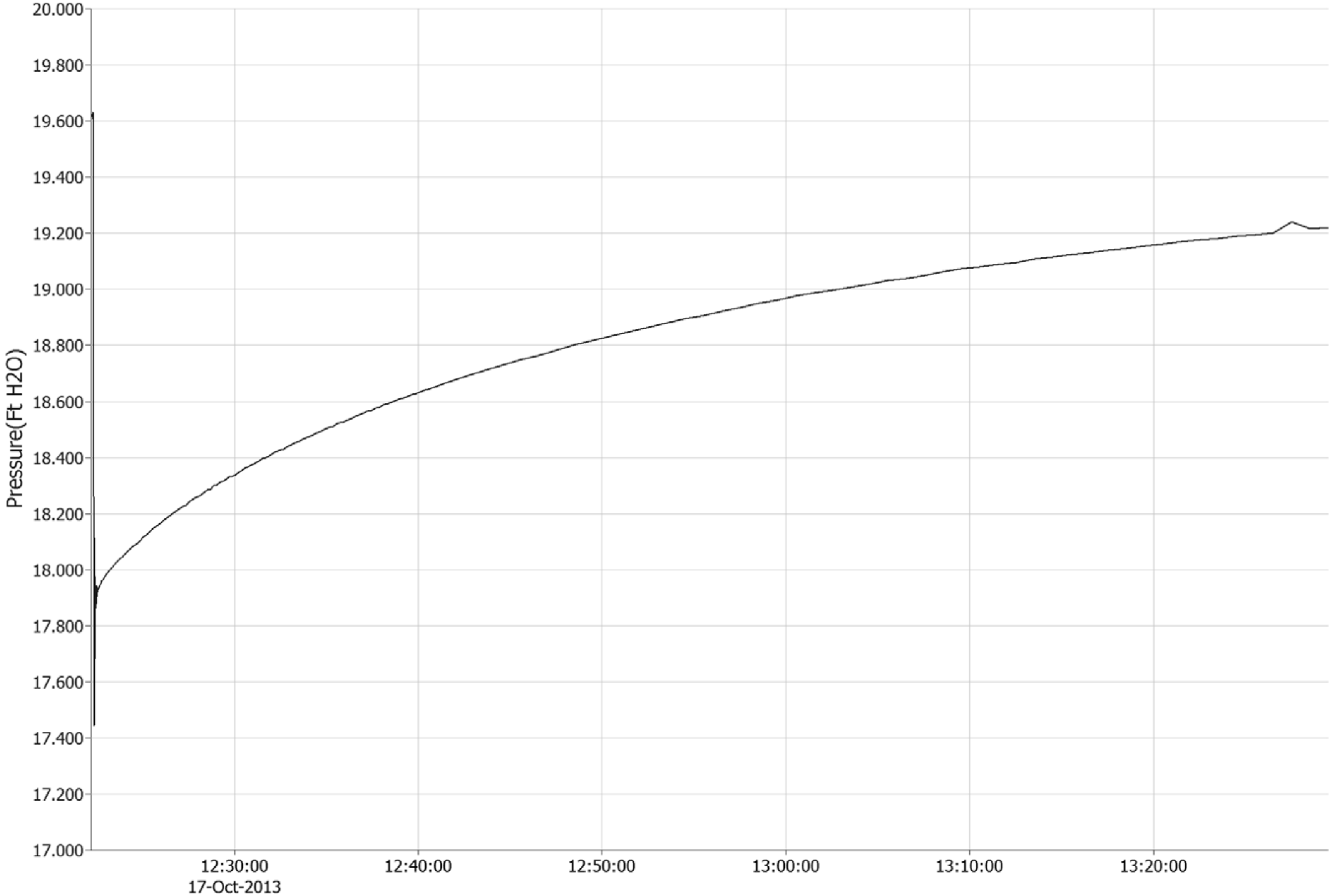


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	30.385	32.936	31.315	0.4038	0.6354	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	14.6	15.1	14.8	0.02	0.13	1.0000000	41.6354

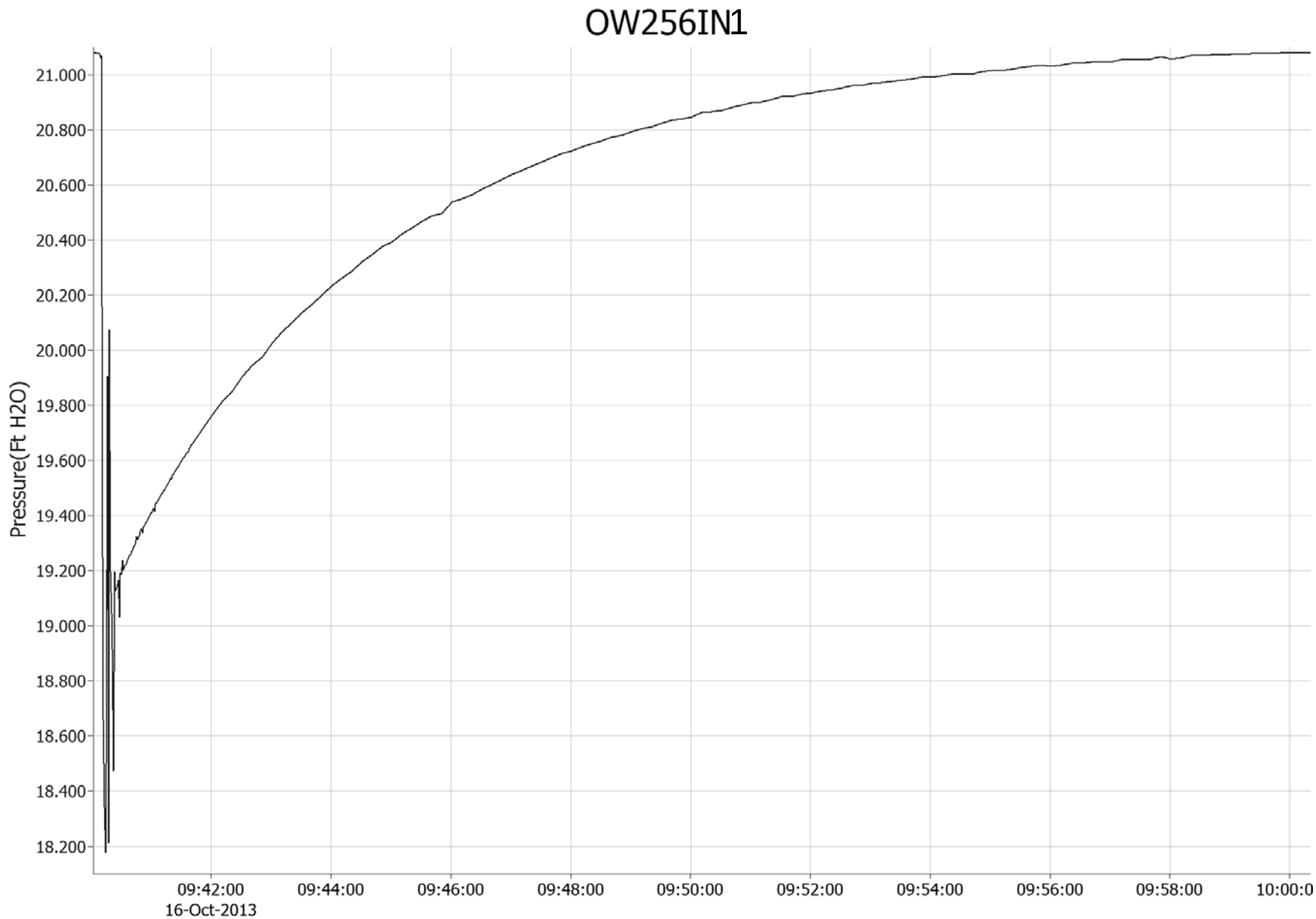


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	19.700	22.107	20.668	0.3710	0.6091	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.7	15.2	14.9	0.03	0.17	1.0000000	0.0000

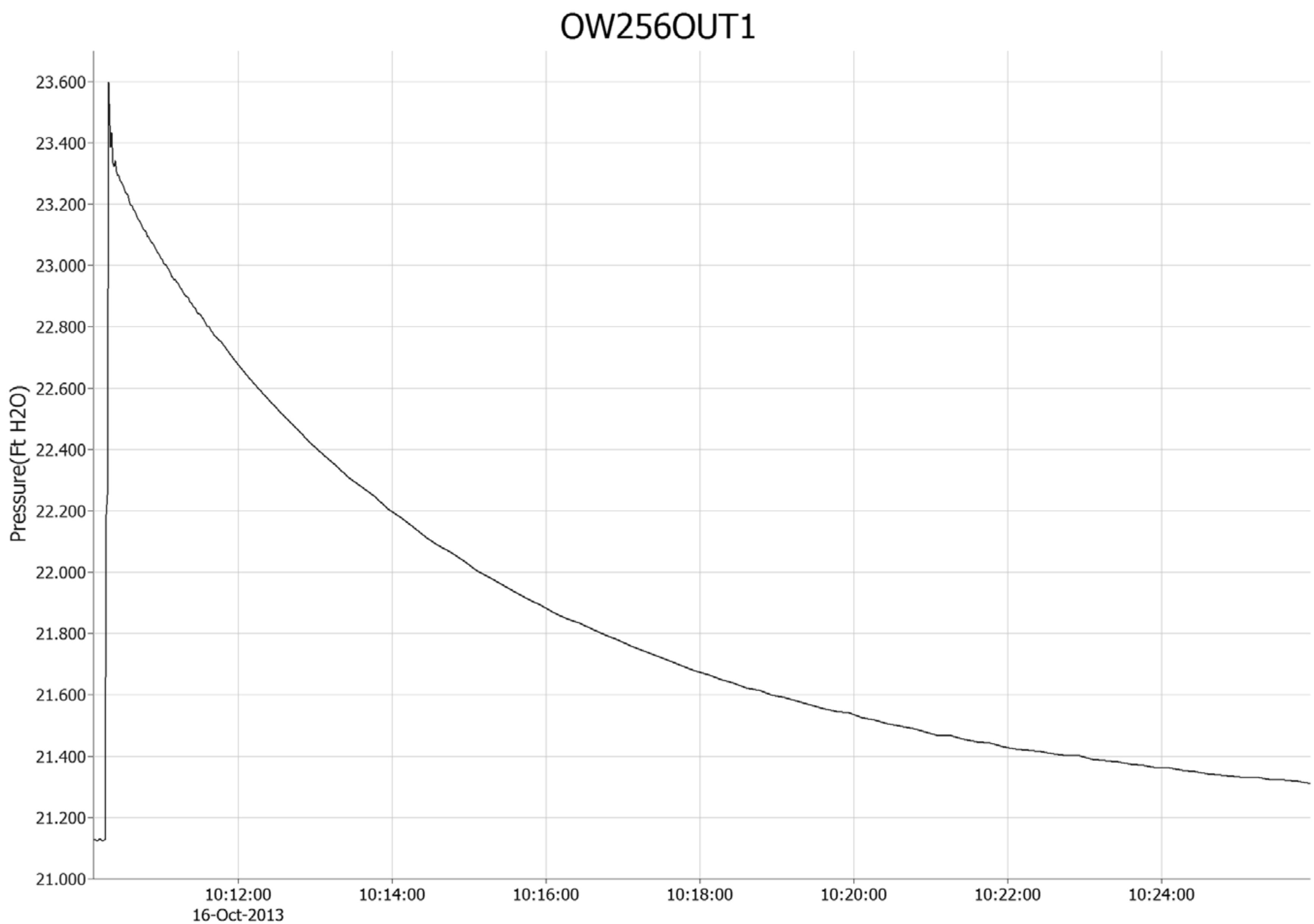
TPZ166OUT1



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	17.444	19.630	18.400	0.2006	0.4479	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	14.7	15.1	14.9	0.02	0.13	1.0000000	0.0000

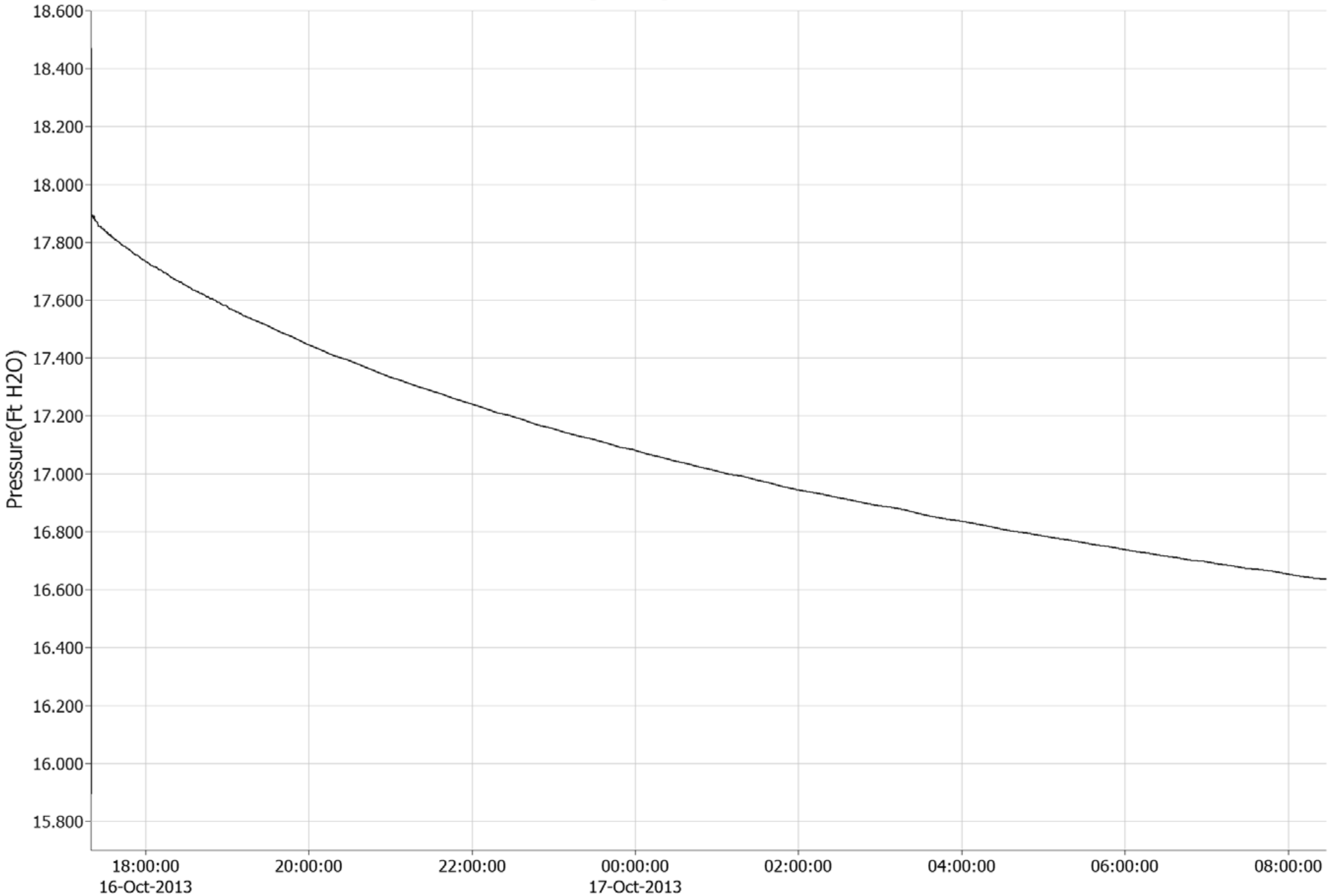


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	18.178	21.080	20.116	0.6029	0.7765	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	15.7	16.1	15.9	0.01	0.11	1.0000000	41.6354



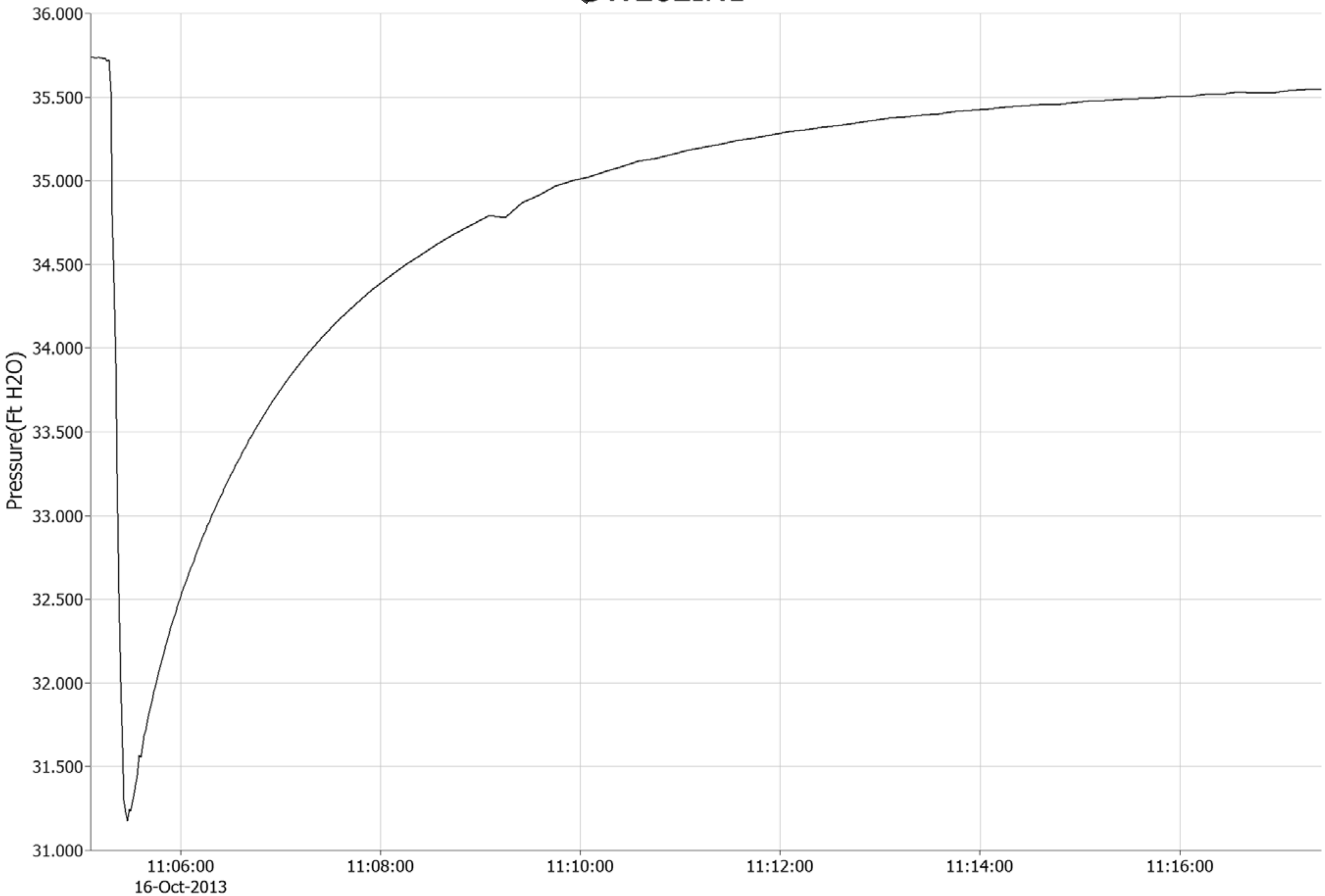
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	21.123	23.596	22.318	0.5585	0.7473	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	15.7	16.1	15.9	0.02	0.13	1.0000000	41.6354

OW257IN1



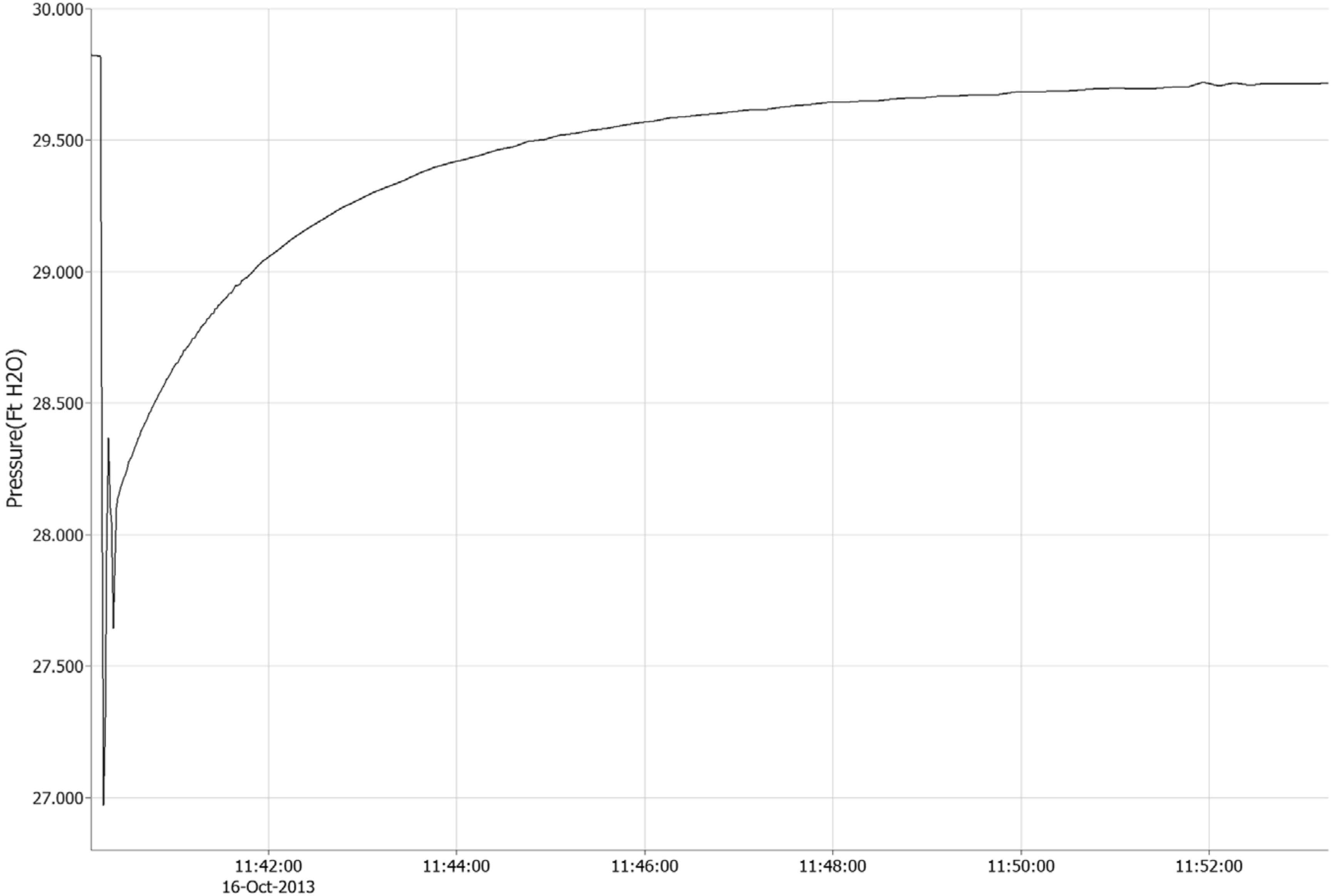
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	15.881	18.471	17.552	0.2473	0.4973	1.0000000	0.0000
Temperature(degC)	-40 - +125 degC	15.8	16.3	16.0	0.02	0.15	1.0000000	0.0000

M
OW262IN1



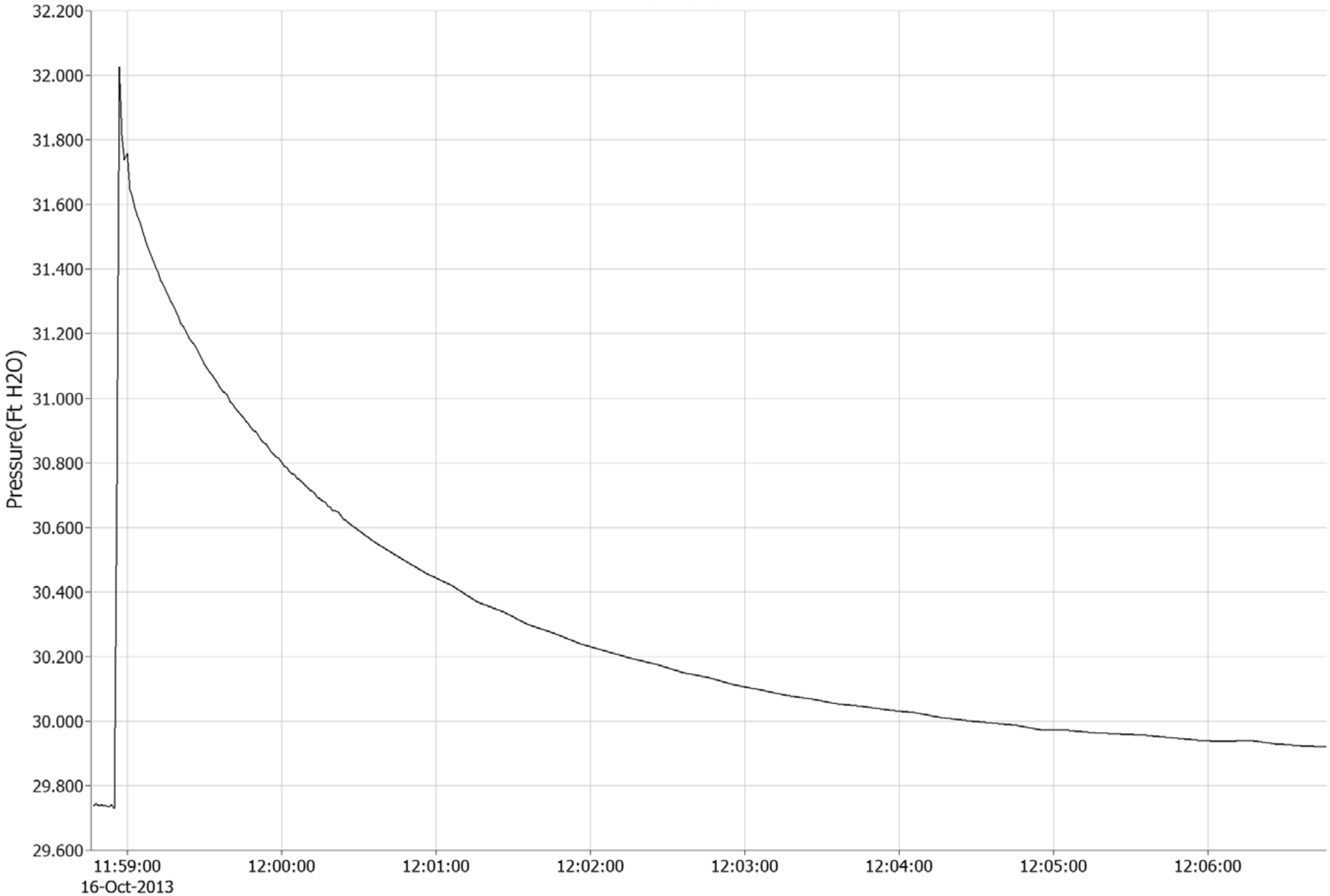
Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	31.177	35.741	33.824	2.1181	1.4554	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	15.1	16.0	15.4	0.03	0.16	1.0000000	41.6354

MW262IN2

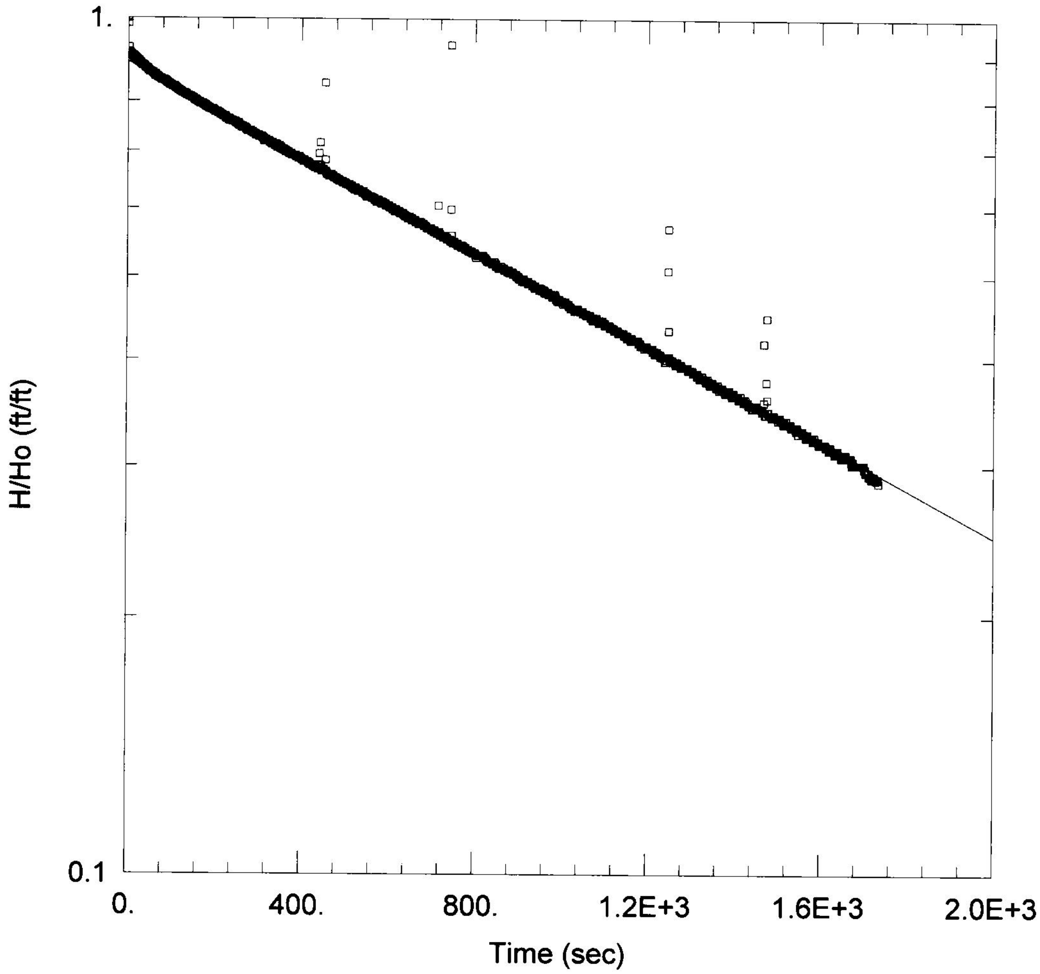


Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	26.971	29.827	29.019	0.3484	0.5902	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	15.1	15.5	15.3	0.02	0.13	1.0000000	41.6354

MW262OUT2



Channel	Range	Min	Max	Mean	Var	Std dev	Gain	Offset
Pressure(Ft H2O)	50 psig	29.729	32.027	30.700	0.3127	0.5592	-1.0000000	41.6354
Temperature(degC)	-40 - +125 degC	15.1	15.4	15.3	0.01	0.10	1.0000000	41.6354



MW-151 SLUG IN 1

Data Set: C:\...\MW-151 IN1.aqt
Date: 01/16/12 Time: 15:27:51

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-151
Test Date: 9-29-11

AQUIFER DATA

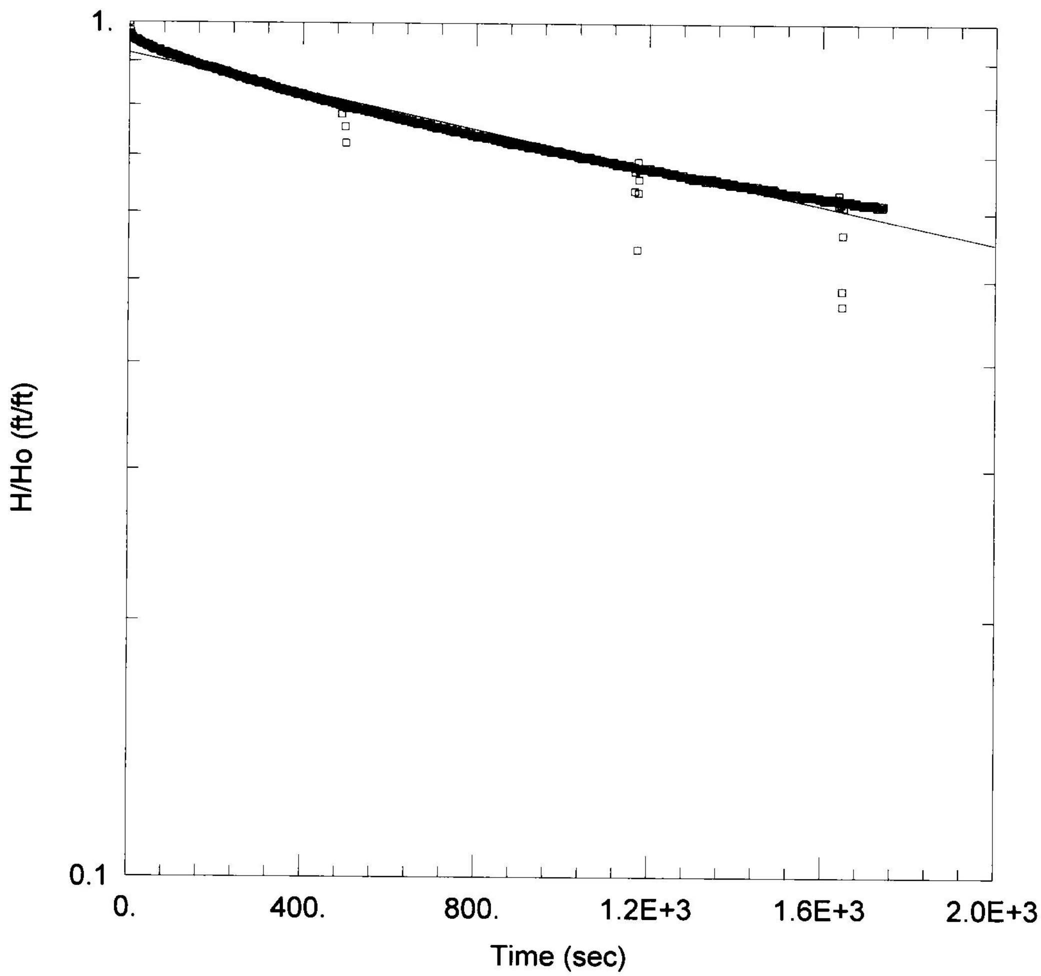
Saturated Thickness: 15.78 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-151)

Initial Displacement: 1.335 ft
Total Well Penetration Depth: 15.78 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 16.33 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.97E-5 cm/sec
y0 = 1.188 ft



MW-151 SLUG OUT1

Data Set: C:\...\MW-151 OUT1.aqt
Date: 01/16/12 Time: 15:32:46

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-151
Test Date: 9-29-11

AQUIFER DATA

Saturated Thickness: 15.78 ft Anisotropy Ratio (Kz/Kr): 1.

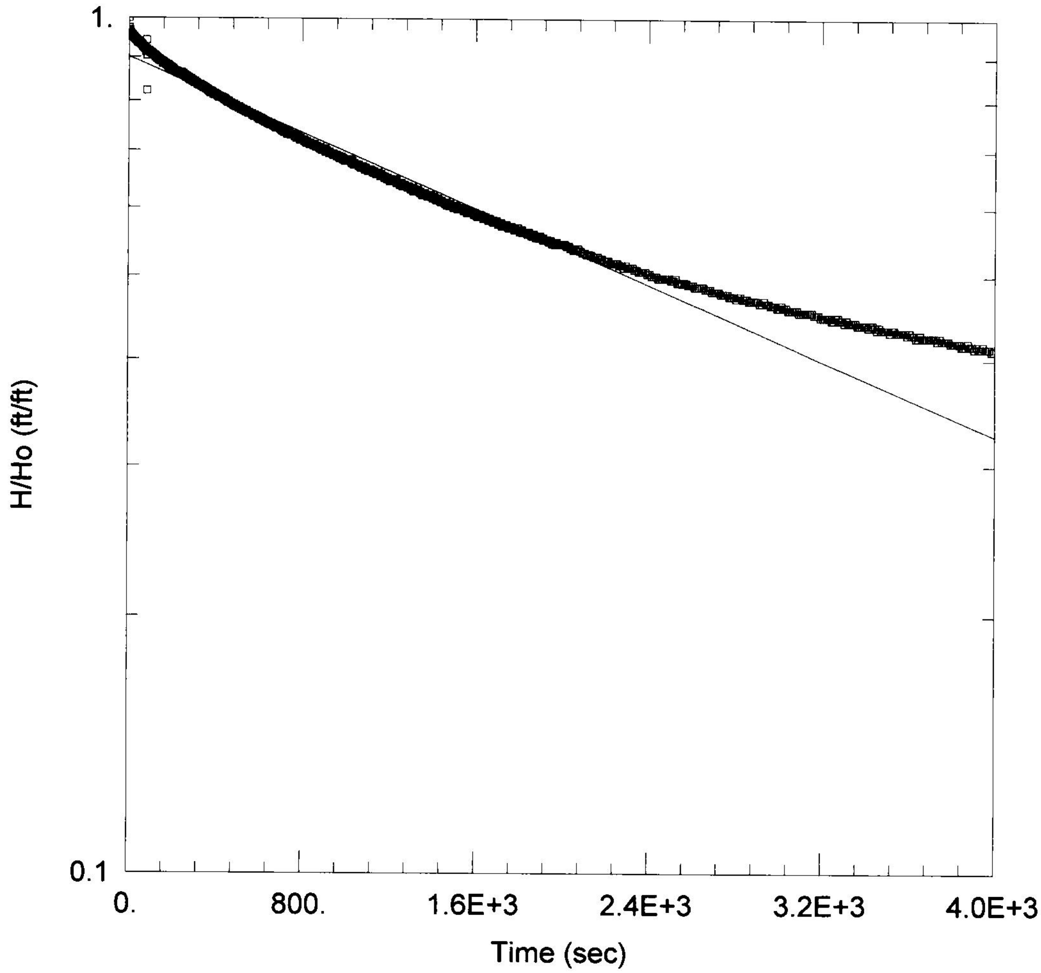
WELL DATA (MW-151)

Initial Displacement: 1.335 ft
Total Well Penetration Depth: 15.78 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 16.33 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 7.879E-6 cm/sec y0 = 1.228 ft



MW-151 SLUG OUT 2

Data Set: C:\...\MW-151 OUT2.aqt
Date: 01/16/12 Time: 15:34:31

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Energy, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-151
Test Date: 9-29-11

AQUIFER DATA

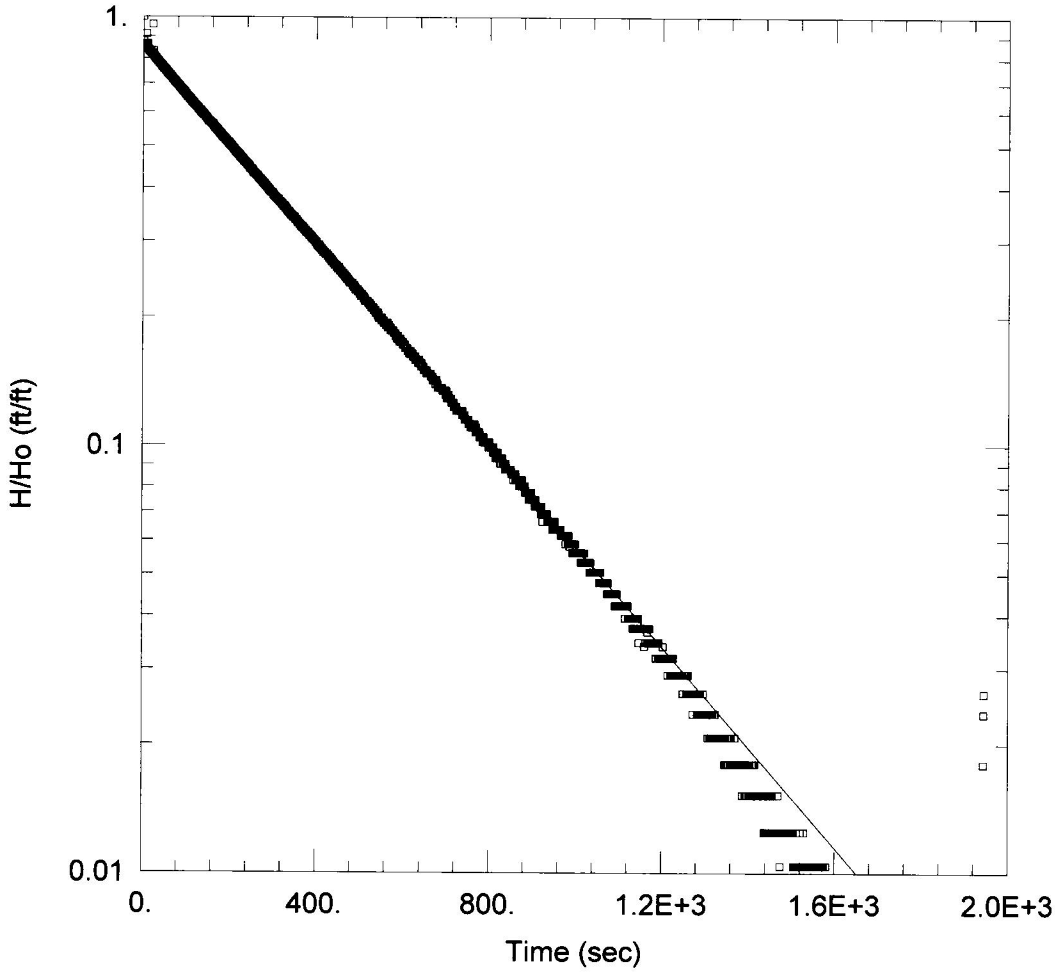
Saturated Thickness: 15.78 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-151)

Initial Displacement: 1.335 ft
Total Well Penetration Depth: 15.78 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 16.33 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.853E-6 cm/sec
y0 = 1.202 ft



MW-152 SLUG IN 1

Data Set: C:\...\MW-152 IN.aqt
Date: 01/17/12
Time: 08:49:48

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-152
Test Date: 9-29-11

AQUIFER DATA

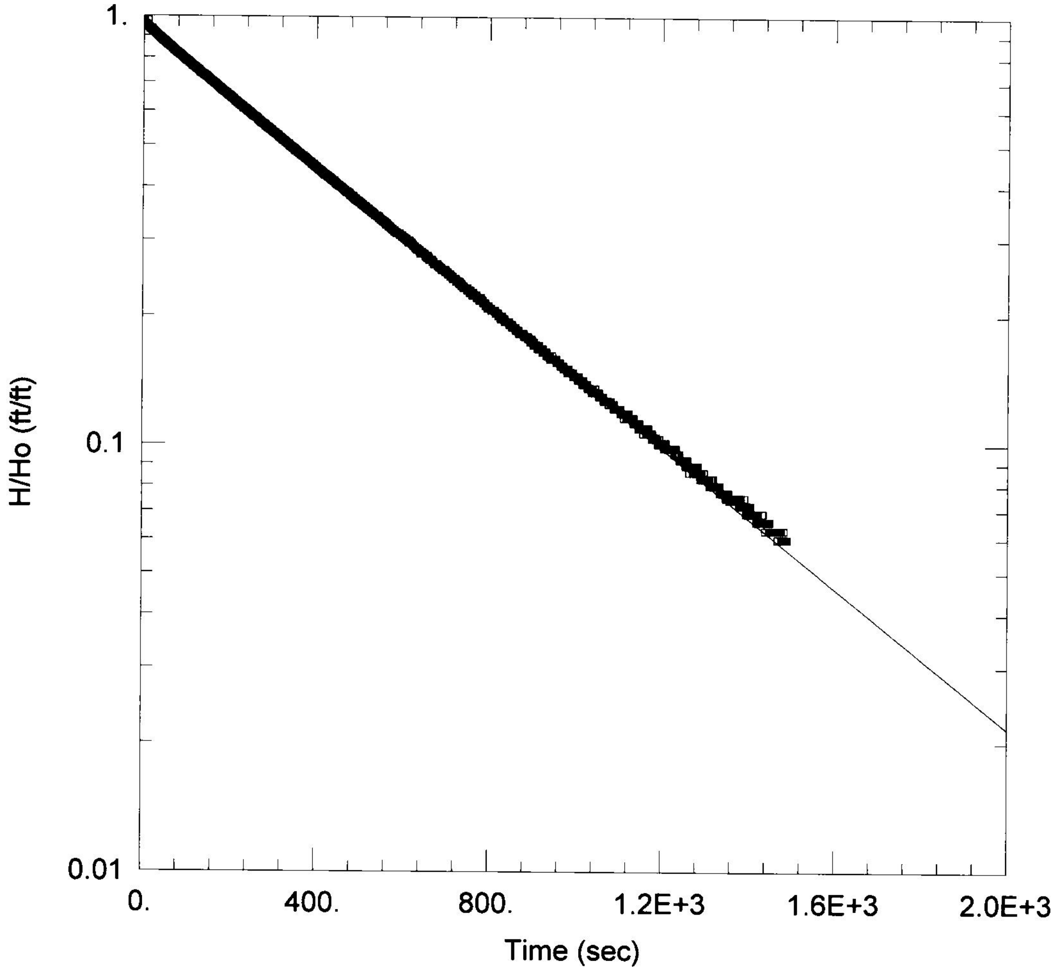
Saturated Thickness: 13.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-152)

Initial Displacement: 1.444 ft
Total Well Penetration Depth: 13.2 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.32 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.974E-5 cm/sec
y0 = 1.255 ft



MW-152 SLUG IN 2

Data Set: C:\...\MW-152 IN 2.aqt
Date: 01/17/12 Time: 08:56:55

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-152
Test Date: 9-29-11

AQUIFER DATA

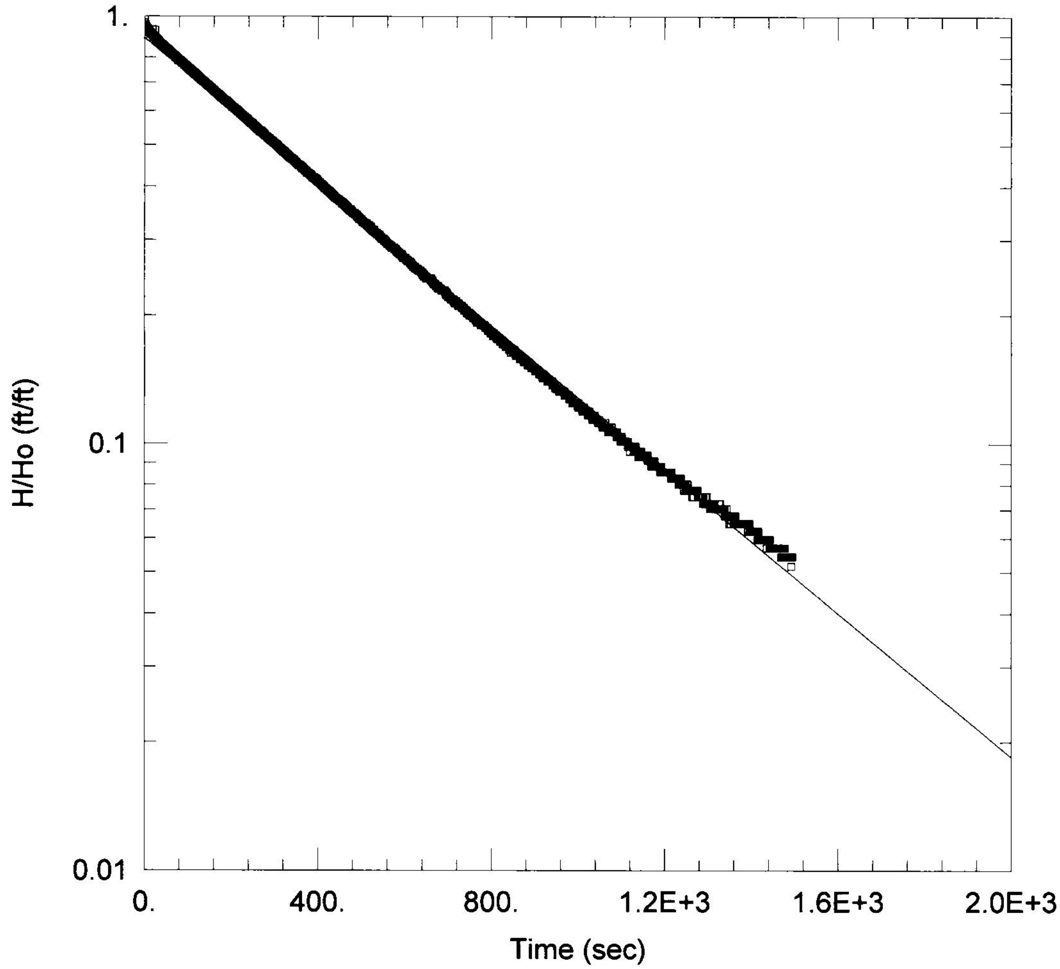
Saturated Thickness: 13.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-152)

Initial Displacement: 1.334 ft
Total Well Penetration Depth: 13.2 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.32 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.576E-5 cm/sec
y0 = 1.268 ft



MW-152 SLUG OUT 1

Data Set: C:\...\MW-152 OUT.aqt
Date: 01/17/12 Time: 08:37:33

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-152
Test Date: 9-29-11

AQUIFER DATA

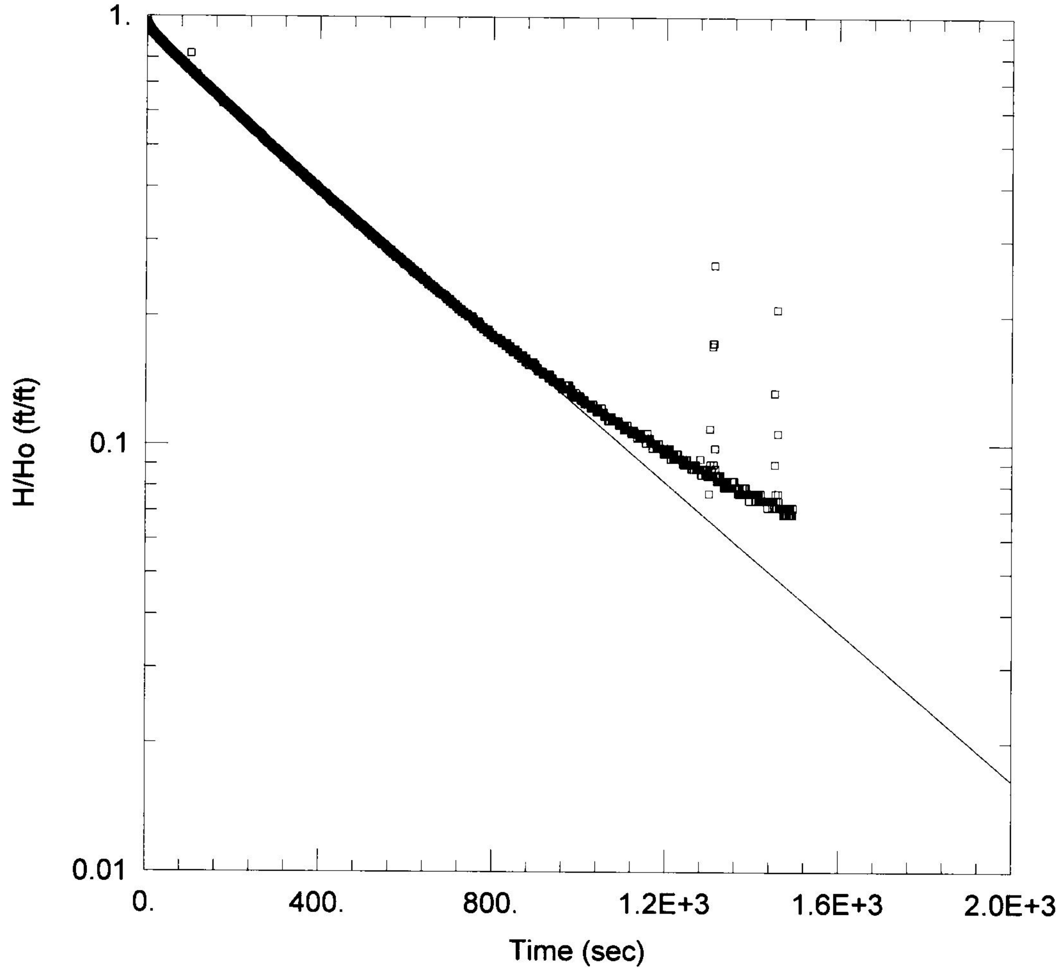
Saturated Thickness: 13.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-152)

Initial Displacement: 1.491 ft
Total Well Penetration Depth: 13.2 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.32 ft
Screen Length: 9.64 ft
Well Radius: 0.0833 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.154E-5 cm/sec
y0 = 1.328 ft



MW-152 SLUG OUT 2

Data Set: C:\...\MW-152 OUT 2.aqt
Date: 01/17/12
Time: 08:45:10

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-152
Test Date: 9-29-11

AQUIFER DATA

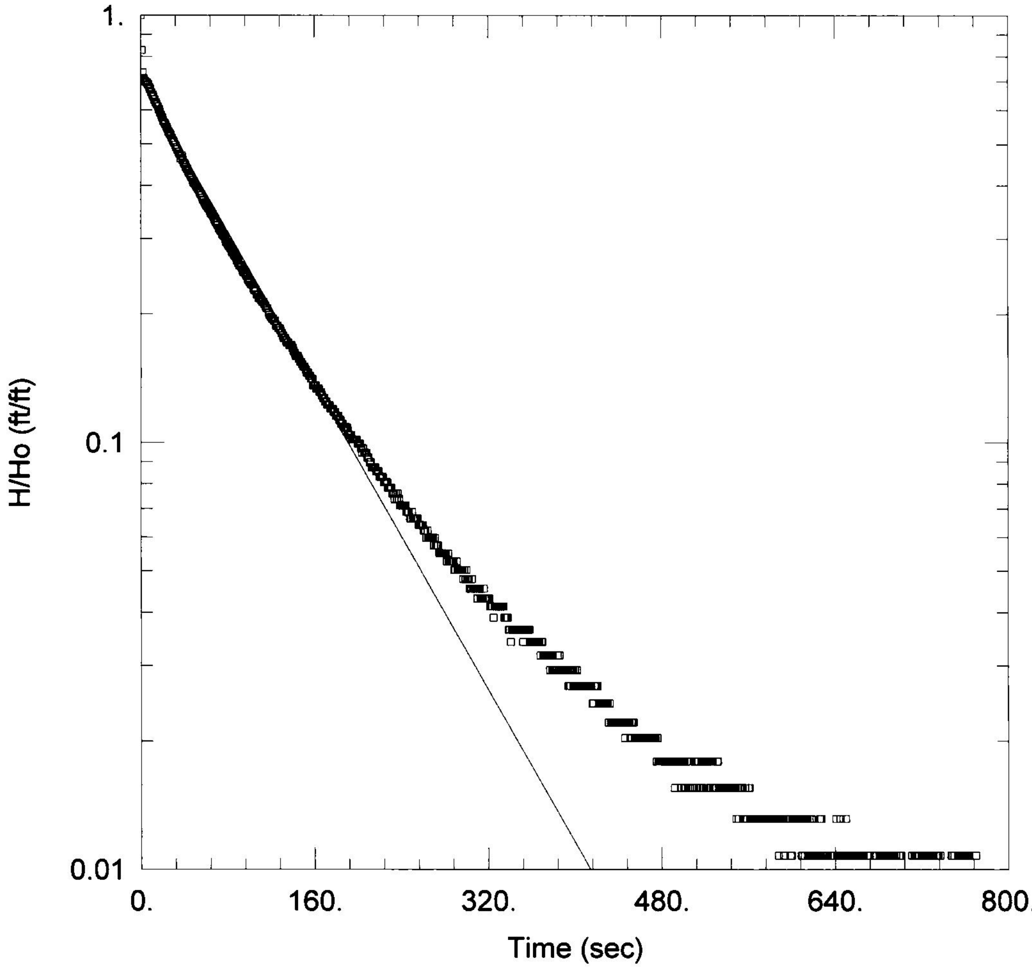
Saturated Thickness: 13.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-152)

Initial Displacement: 1.456 ft
Total Well Penetration Depth: 19.28 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 13.32 ft
Screen Length: 9.64 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 6.465E-5 cm/sec
y0 = 1.327 ft



MW-104DR SLUG IN 1

Data Set: C:\...\MW-104D IN1.aqt
Date: 01/16/12 Time: 15:00:28

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-104D
Test Date: 9-30-11

AQUIFER DATA

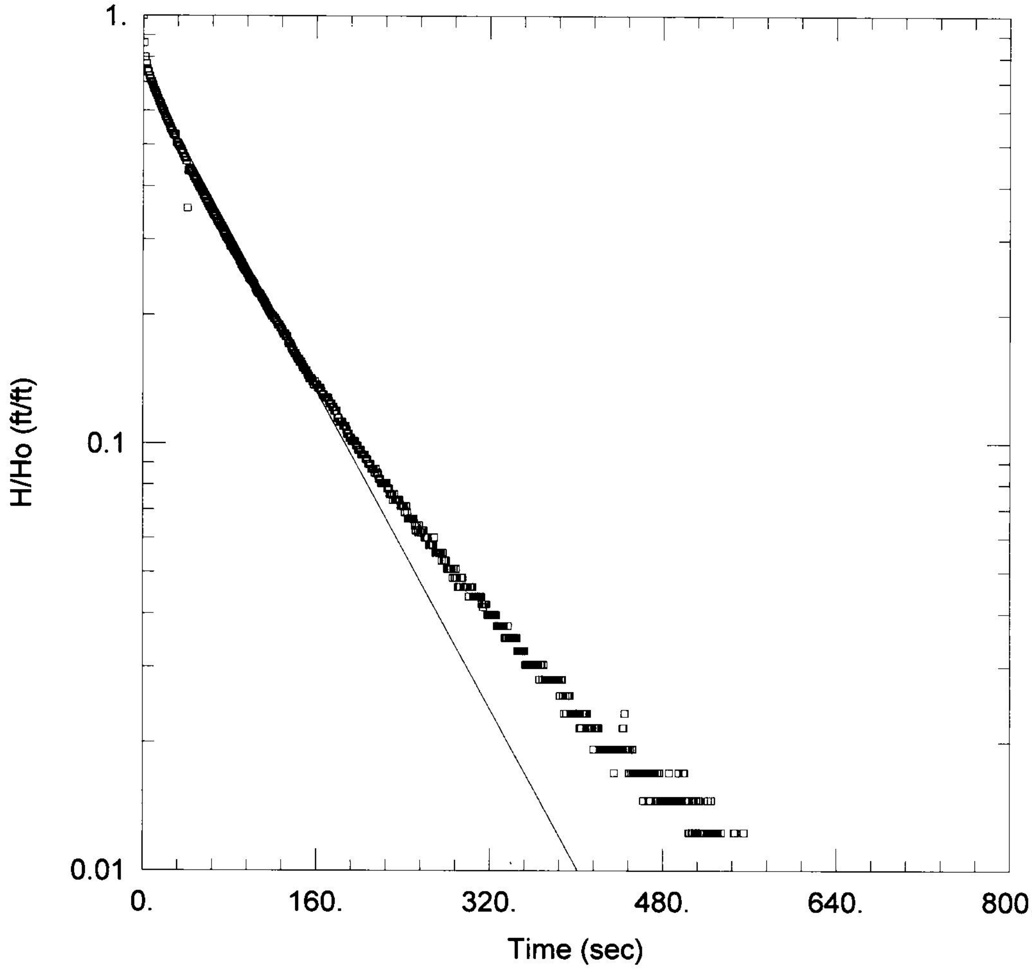
Saturated Thickness: 3.75 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-104DR)

Initial Displacement: 1.672 ft Static Water Column Height: 11.01 ft
Total Well Penetration Depth: 11.46 ft Screen Length: 4.52 ft
Casing Radius: 0.0833 ft Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.0006664 cm/sec y0 = 1.19 ft



MW-104DR SLUG OUT 1

Data Set: C:\...\MW-104D OUT1.aqt
Date: 01/16/12 Time: 15:01:51

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-104DR
Test Date: 9-30-11

AQUIFER DATA

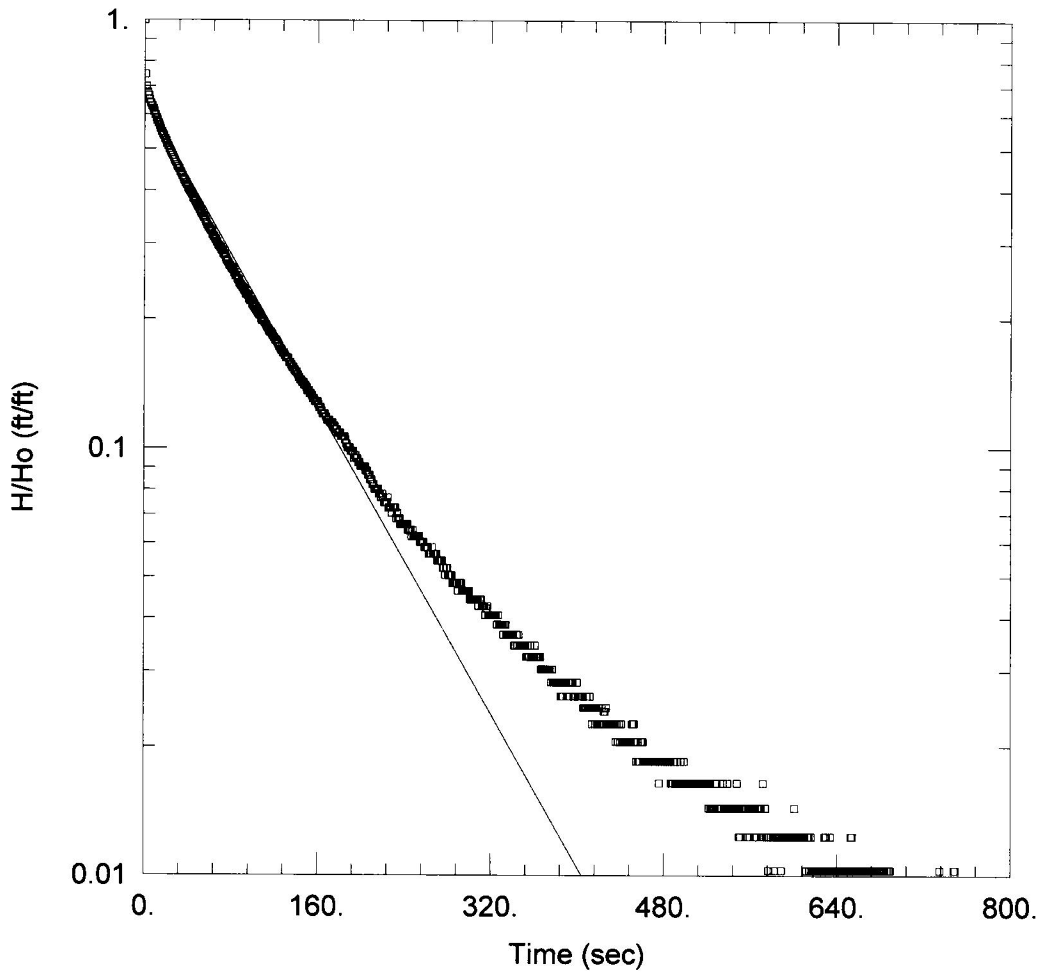
Saturated Thickness: 3.75 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-104DR)

Initial Displacement: 1.712 ft
Total Well Penetration Depth: 11.46 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 11.01 ft
Screen Length: 4.52 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.000694 cm/sec
y0 = 1.263 ft



MW-104DR SLUG OUT 2

Data Set: C:\...\MW-104 OUT2.aqt
Date: 01/16/12 Time: 14:59:48

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-104DR
Test Date: 9-30-11

AQUIFER DATA

Saturated Thickness: 3.75 ft
Anisotropy Ratio (Kz/Kr): 1.

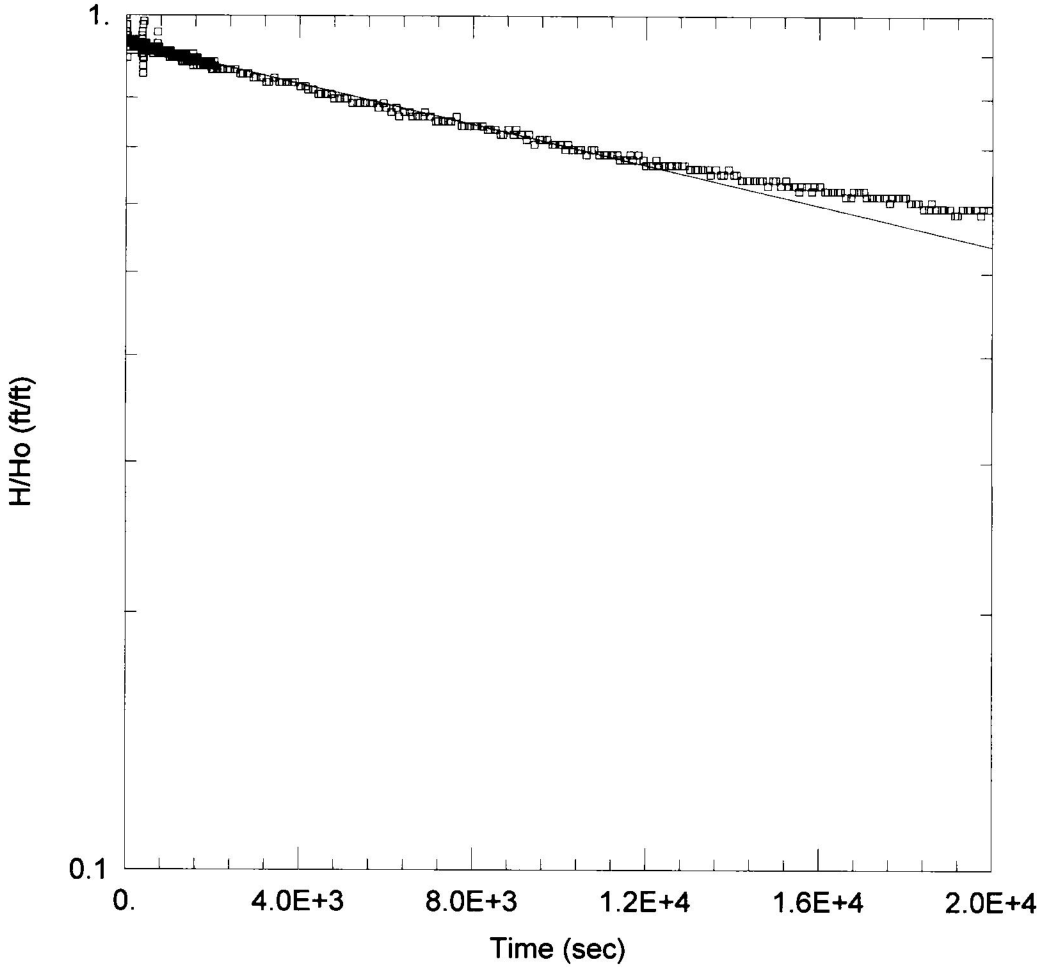
WELL DATA (MW-104DR)

Initial Displacement: 1.945 ft
Total Well Penetration Depth: 11.46 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 11.01 ft
Screen Length: 4.52 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0006686 cm/sec
y0 = 1.262 ft



MW-252 SLUG IN 1 (TRANSDUCER)

Data Set: C:\...\MW-252 IN.aqt
Date: 01/17/12 Time: 09:35:24

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Inc.
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-252
Test Date: 9-29-11

AQUIFER DATA

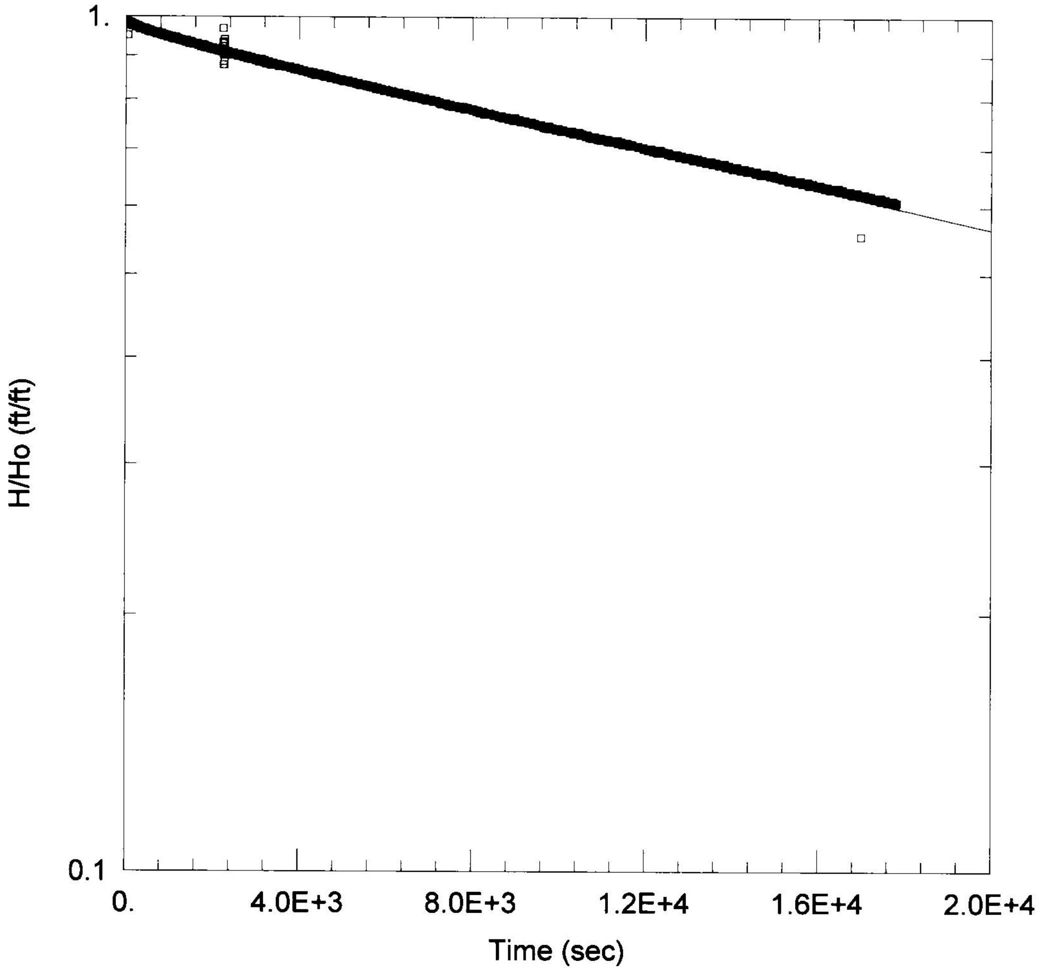
Saturated Thickness: 4.63 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-252)

Initial Displacement: 0.423 ft
Total Well Penetration Depth: 49.03 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 51.5 ft
Screen Length: 4.63 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.896E-6 cm/sec
y0 = 0.3926 ft



MW-252 SLUG OUT 1

Data Set: C:\...\MW-252 OUT.aqt
Date: 01/17/12 | Time: 09:19:05

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Energy, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-252
Test Date: 9-29-11

AQUIFER DATA

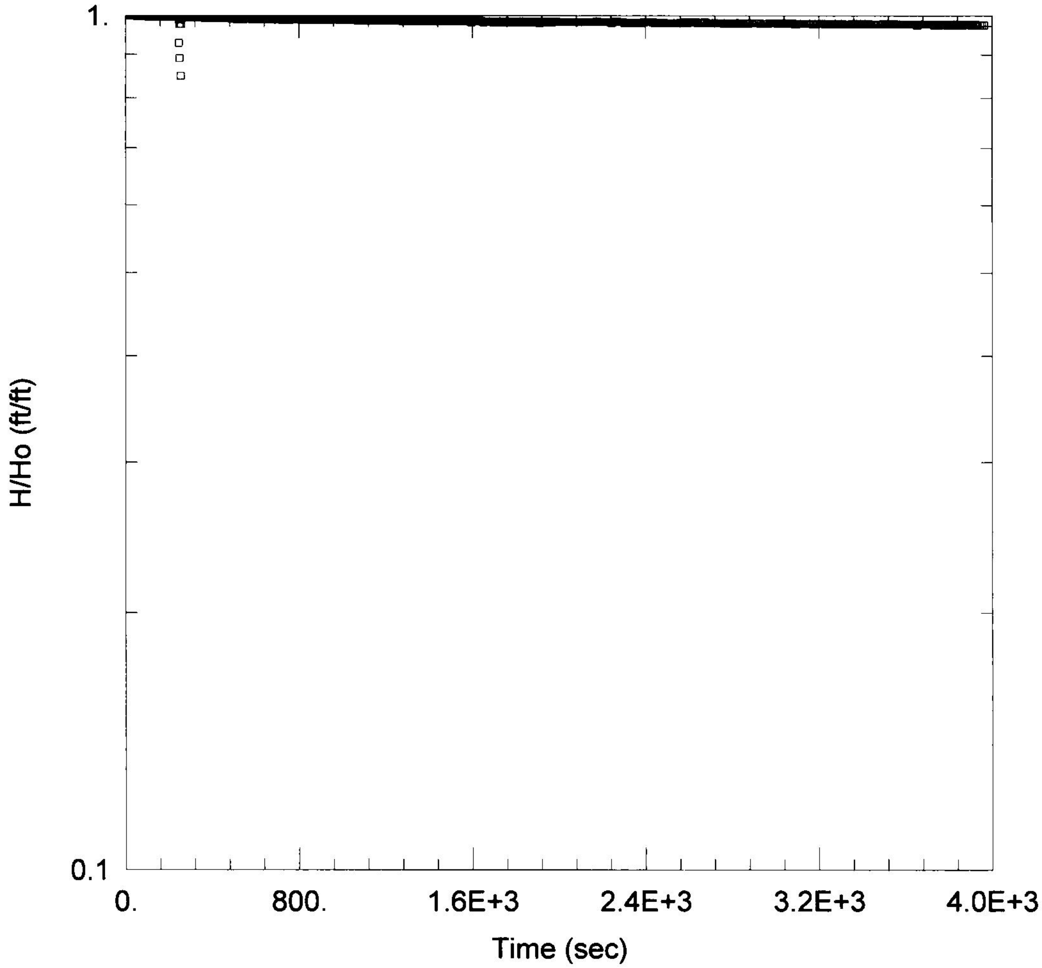
Saturated Thickness: 4.63 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-252)

Initial Displacement: 1.499 ft
Total Well Penetration Depth: 49.53 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 51.5 ft
Screen Length: 4.63 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.884E-6 cm/sec
y0 = 1.456 ft



MW-253 SLUG IN

Data Set: C:\...\MW-253 IN.aqt
Date: 01/17/12 Time: 10:06:18

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-253
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 4.63 ft Anisotropy Ratio (Kz/Kr): 1.

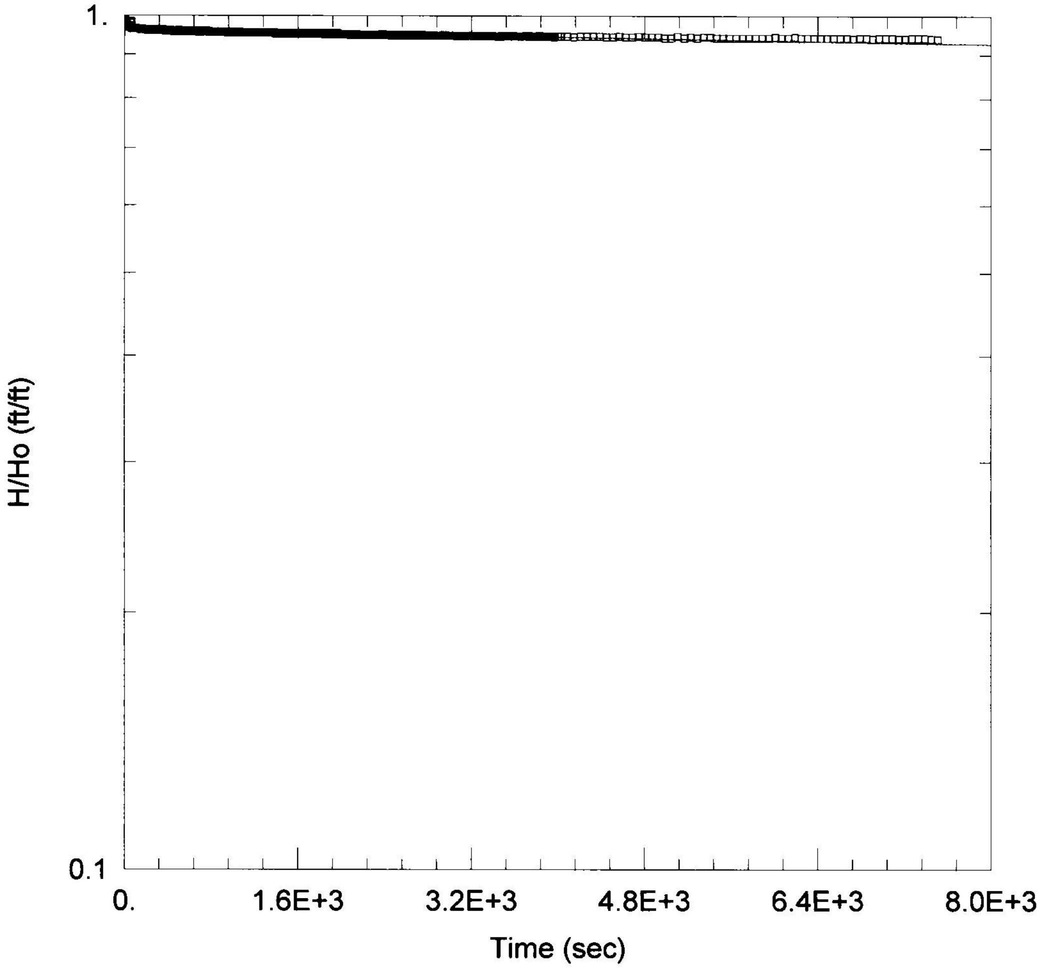
WELL DATA (MW-253)

Initial Displacement: 1.956 ft
Total Well Penetration Depth: 34.49 ft
Casing Radius: 0.083 ft
Static Water Column Height: 21.07 ft
Screen Length: 4.63 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 4.035E-7 cm/sec y0 = 1.947 ft



MW-253 SLUG OUT

Data Set: C:\...\MW-253 OUT.aqt
Date: 01/17/12 Time: 10:21:33

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-253
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 4.63 ft
Anisotropy Ratio (Kz/Kr): 1.

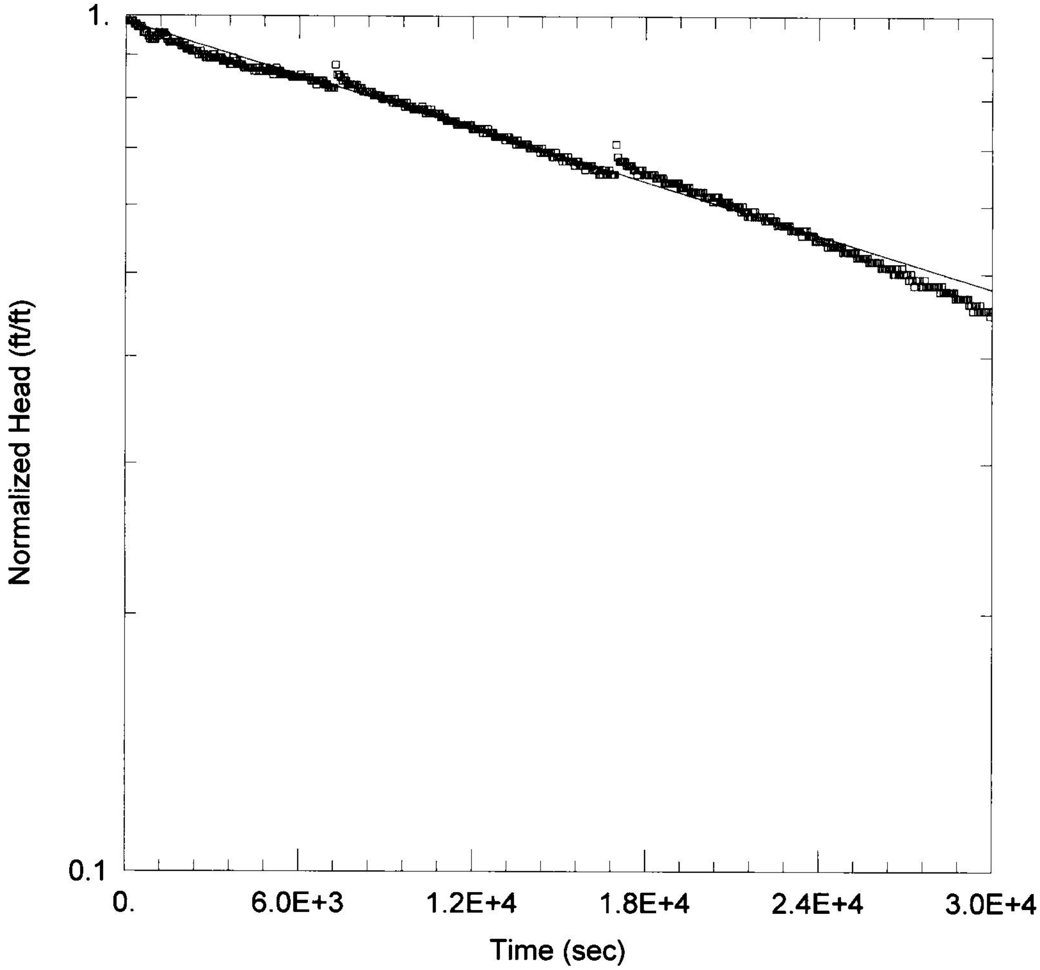
WELL DATA (MW-253)

Initial Displacement: 2.085 ft
Total Well Penetration Depth: 34.49 ft
Casing Radius: 0.083 ft
Static Water Column Height: 21.07 ft
Screen Length: 4.63 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.072E-7 cm/sec
y0 = 2.004 ft



MW-350 SLUG OUT

Data Set: C:\...\MW-350 RECHARGE.aqt
Date: 01/17/12 Time: 11:05:20

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-350
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 6.7 ft Anisotropy Ratio (Kz/Kr): 1.

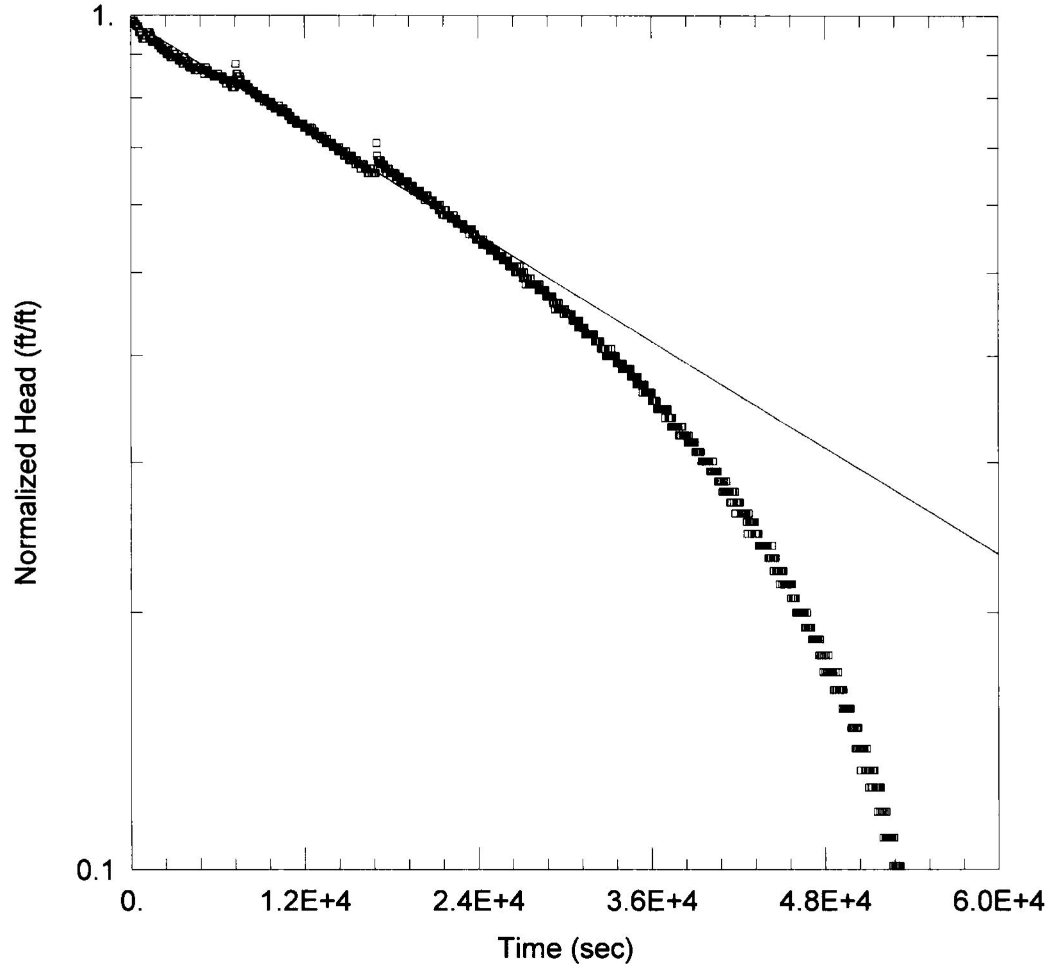
WELL DATA (MW-350)

Initial Displacement: 0.505 ft
Total Well Penetration Depth: 46.22 ft
Casing Radius: 0.083 ft
Static Water Column Height: 26.4 ft
Screen Length: 4.63 ft
Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 2.075E-6 cm/sec y0 = 0.497 ft



MW-350 SLUG OUT

Data Set: C:\...\MW-350 RECHARGE.aqt
Date: 01/17/12 Time: 11:05:47

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-350
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 6.7 ft Anisotropy Ratio (Kz/Kr): 1.

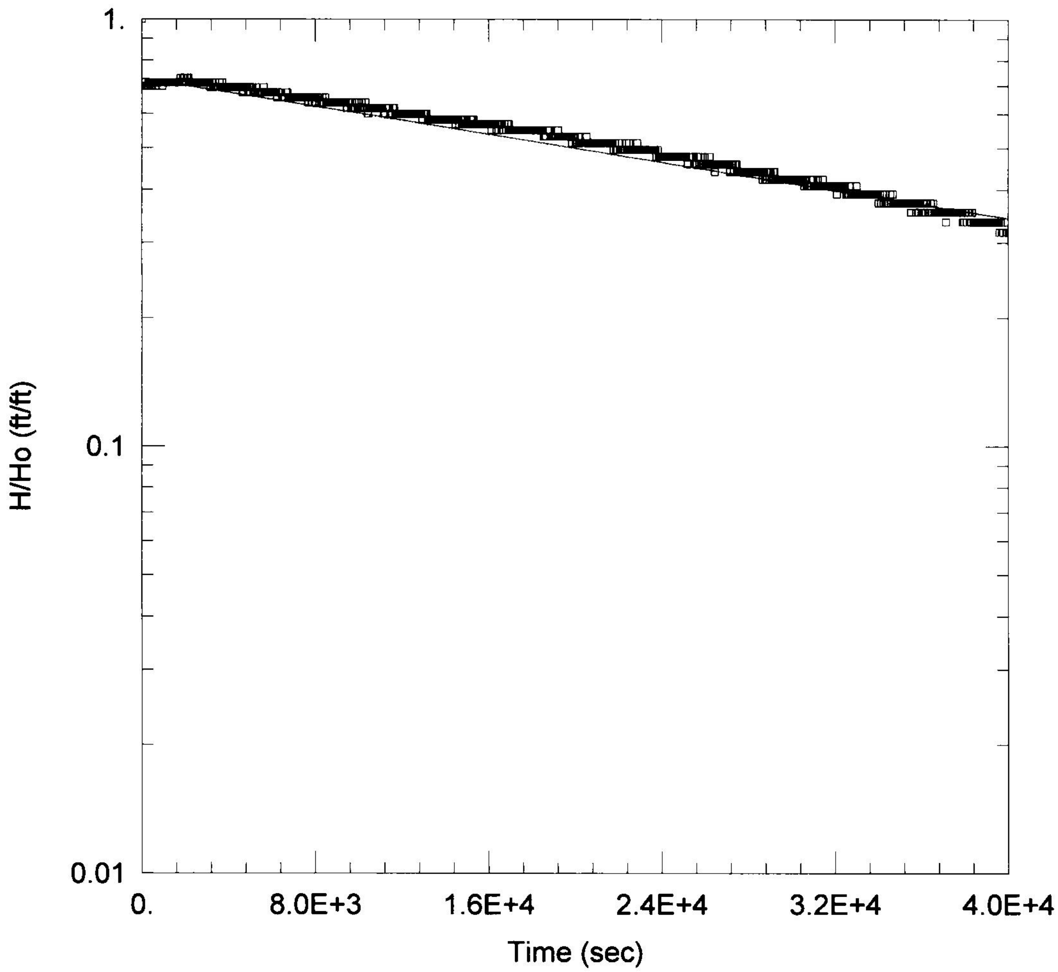
WELL DATA (MW-350)

Initial Displacement: 0.505 ft
Total Well Penetration Depth: 46.22 ft
Casing Radius: 0.083 ft
Static Water Column Height: 26.4 ft
Screen Length: 4.63 ft
Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 2.075E-6 cm/sec y0 = 0.497 ft



MW-352 SLUG OUT (TRANSDUCER)

Data Set: C:\...\MW-352 RECHARGE.aqt
Date: 01/17/12 Time: 11:29:13

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Inc.
Project: 62410020011
Location: Baldwin Energy Complex`
Test Well: MW-352
Test Date: 9-28-11

AQUIFER DATA

Saturated Thickness: 8.05 ft
Anisotropy Ratio (Kz/Kr): 1.

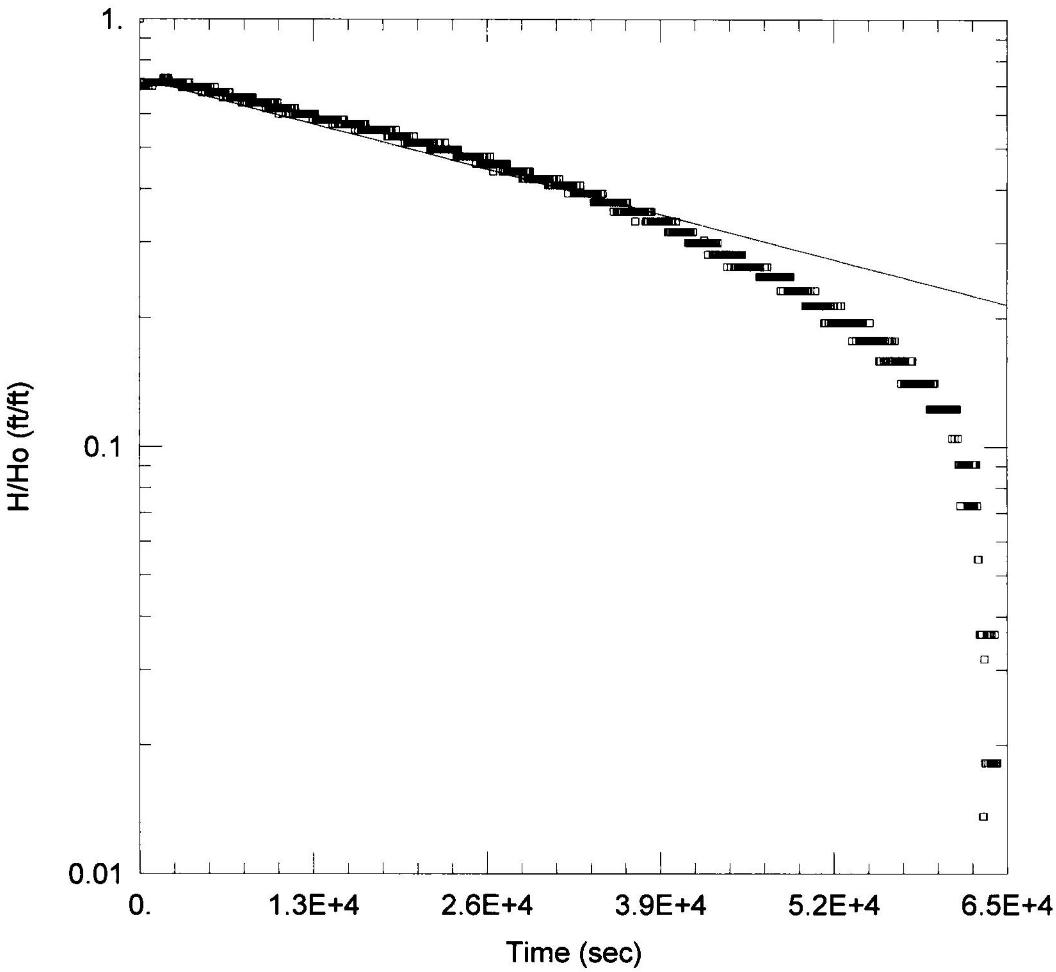
WELL DATA (MW-352)

Initial Displacement: 0.22 ft
Total Well Penetration Depth: 72.53 ft
Casing Radius: 0.083 ft
Static Water Column Height: 63.25 ft
Screen Length: 4.63 ft
Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.716E-6 cm/sec
y0 = 0.1593 ft



MW-352 SLUG OUT (TRANSDUCER)

Data Set: C:\...\MW-352 RECHARGE.aqt
Date: 01/17/12 Time: 11:29:54

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Inc.
Project: 62410020011
Location: Baldwin Energy Complex`
Test Well: MW-352
Test Date: 9-28-11

AQUIFER DATA

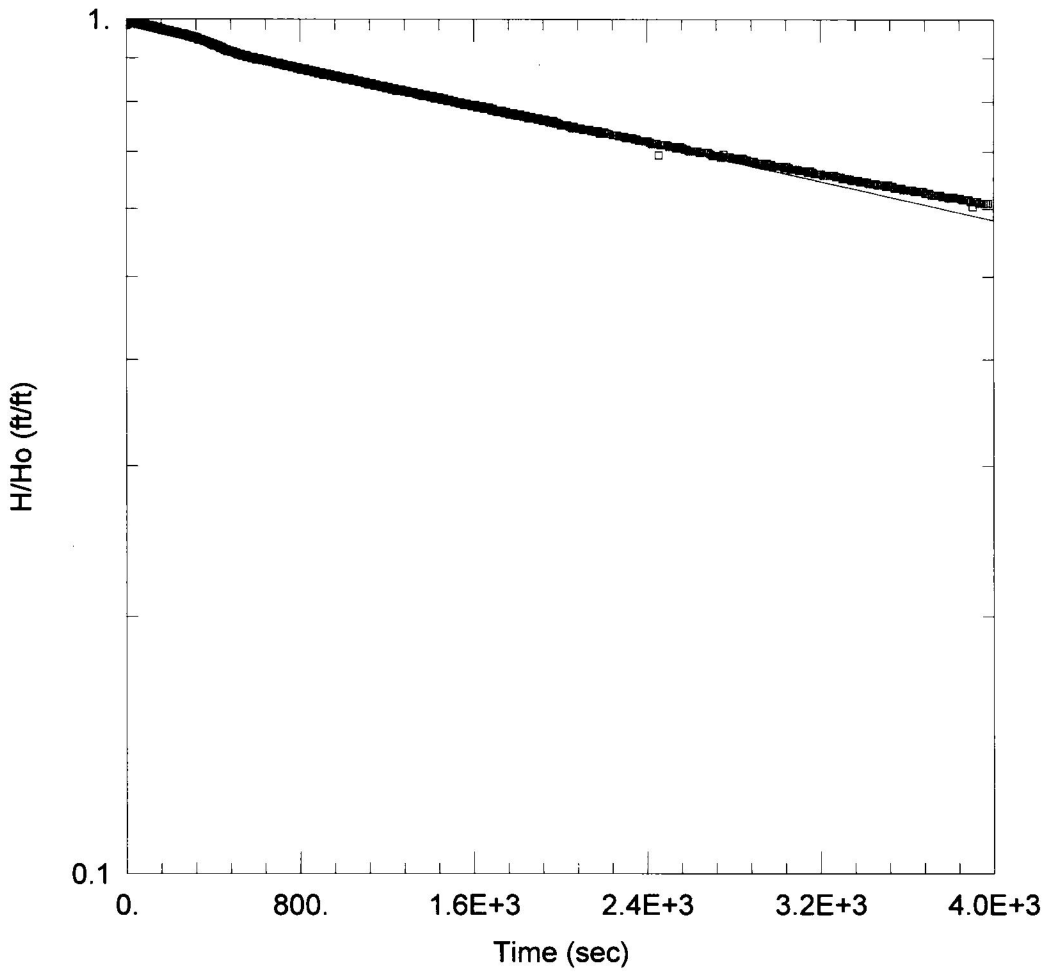
Saturated Thickness: 8.05 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-352)

Initial Displacement: 0.22 ft
Total Well Penetration Depth: 72.53 ft
Casing Radius: 0.083 ft
Static Water Column Height: 63.25 ft
Screen Length: 4.63 ft
Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 1.716E-6 cm/sec
y0 = 0.1593 ft



MW-355 SLUG IN 2

Data Set: C:\...\MW-355 IN 2.aqt
Date: 01/17/12 Time: 13:55:43

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-355
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 10.6 ft Anisotropy Ratio (Kz/Kr): 1.

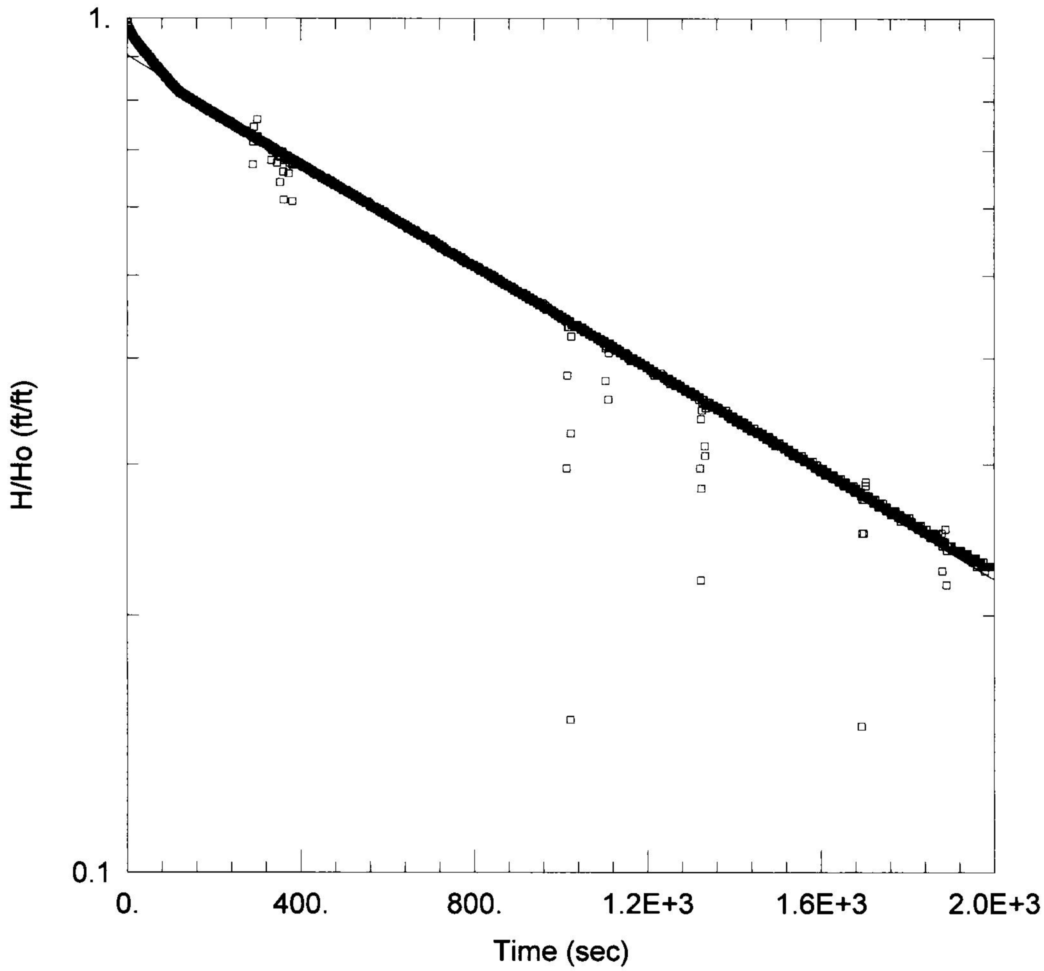
WELL DATA (MW-355)

Initial Displacement: 1.391 ft Static Water Column Height: 11.18 ft
Total Well Penetration Depth: 32.03 ft Screen Length: 4.63 ft
Casing Radius: 0.083 ft Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 1.077E-5 cm/sec y0 = 1.363 ft



MW-355 SLUG OUT 1

Data Set: C:\...\MW-355 OUT.aqt
Date: 01/17/12 Time: 13:28:46

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Baldwin Energy Complex
Test Well: MW-355
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 10.6 ft Anisotropy Ratio (Kz/Kr): 1.

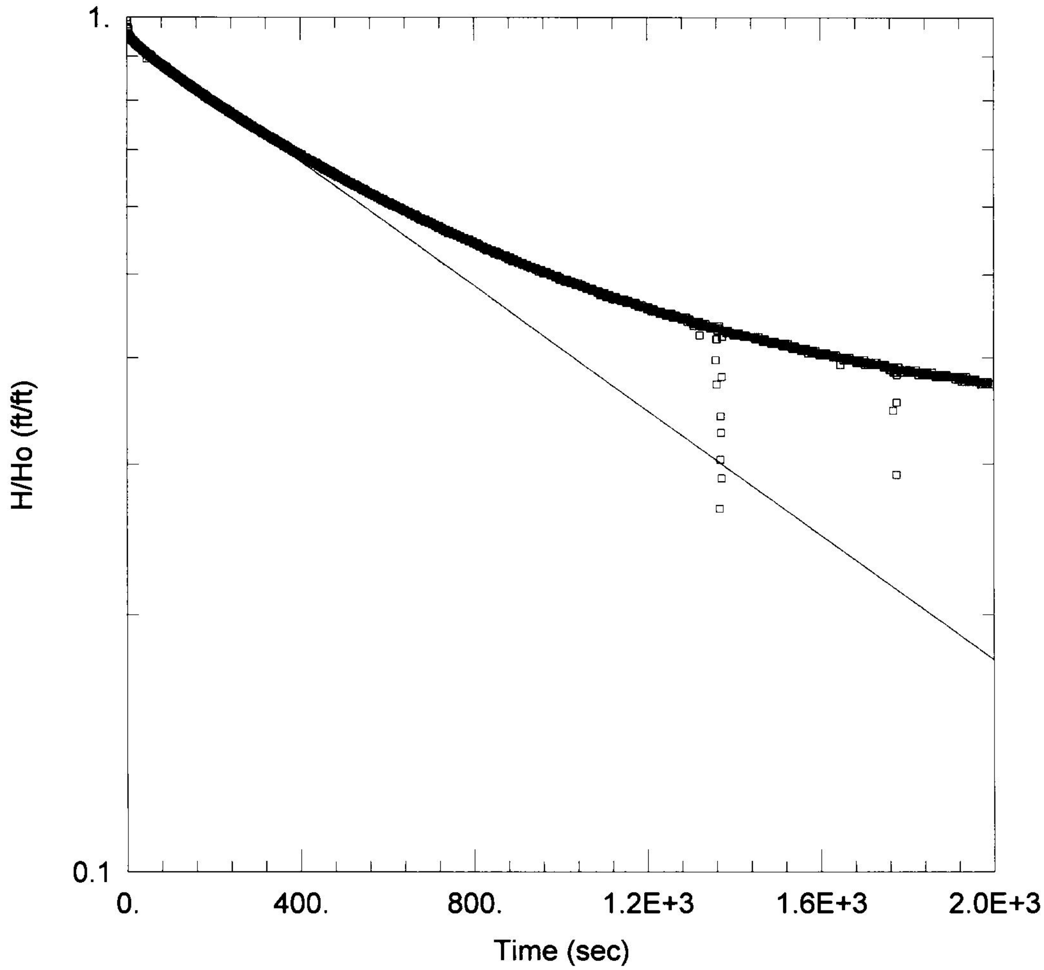
WELL DATA (MW-355)

Initial Displacement: 1.464 ft
Total Well Penetration Depth: 32.03 ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.18 ft
Screen Length: 4.63 ft
Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 5.818E-5 cm/sec y0 = 1.323 ft



MW-355 SLUG OUT 2

Data Set: C:\...\MW-355 OUT 2.aqt
Date: 01/17/12 Time: 13:35:11

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Midwest Generation, LLC
Project: 62410020011
Location: Bakdwin Energy Complex
Test Well: MW-355
Test Date: 10-3-11

AQUIFER DATA

Saturated Thickness: 10.6 ft Anisotropy Ratio (Kz/Kr): 1.

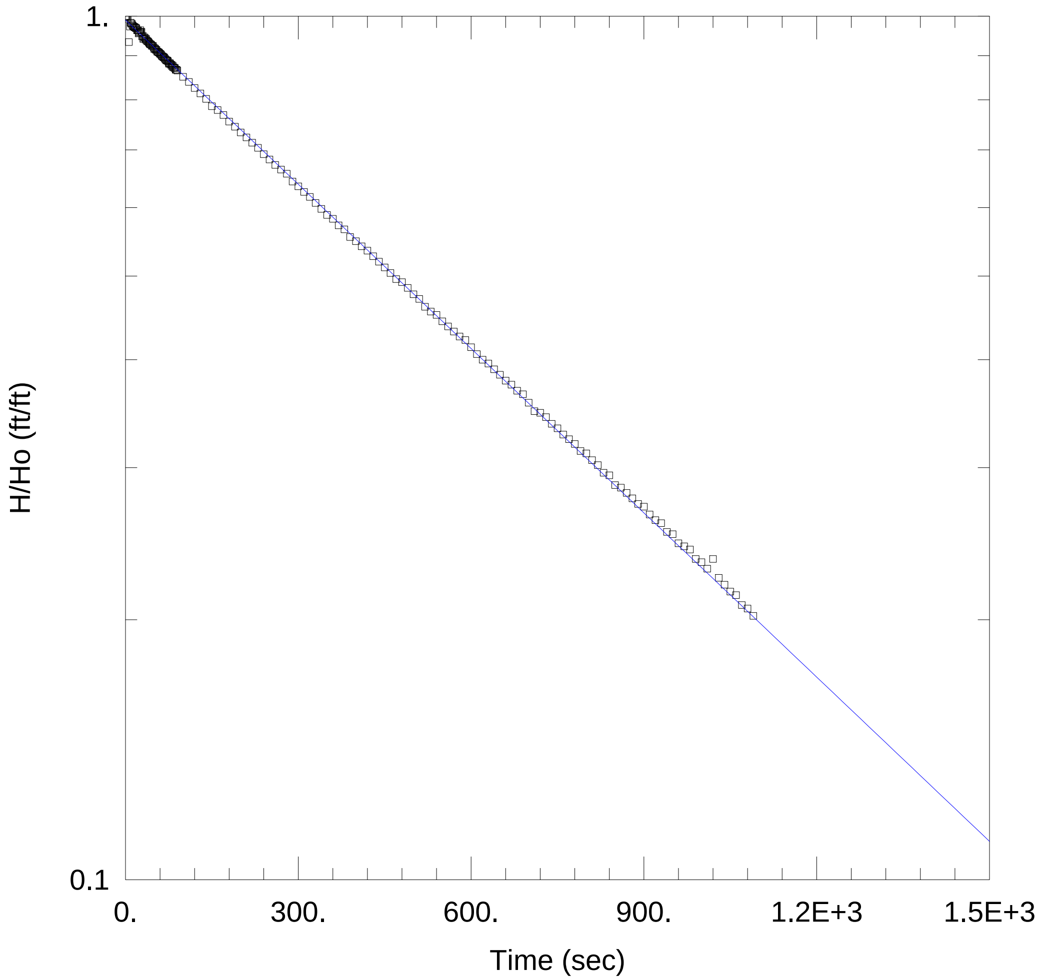
WELL DATA (MW-355)

Initial Displacement: 1.534 ft Static Water Column Height: 11.18 ft
Total Well Penetration Depth: 32.03 ft Screen Length: 4.63 ft
Casing Radius: 0.083 ft Well Radius: 0.1615 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 6.925E-5 cm/sec $y0$ = 1.457 ft



OW-156 SLUG IN

Data Set: C:\...\MW156IN1.aqt
Date: 04/08/14
Time: 14:42:57

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-156
Test Date: 10/16/2013

AQUIFER DATA

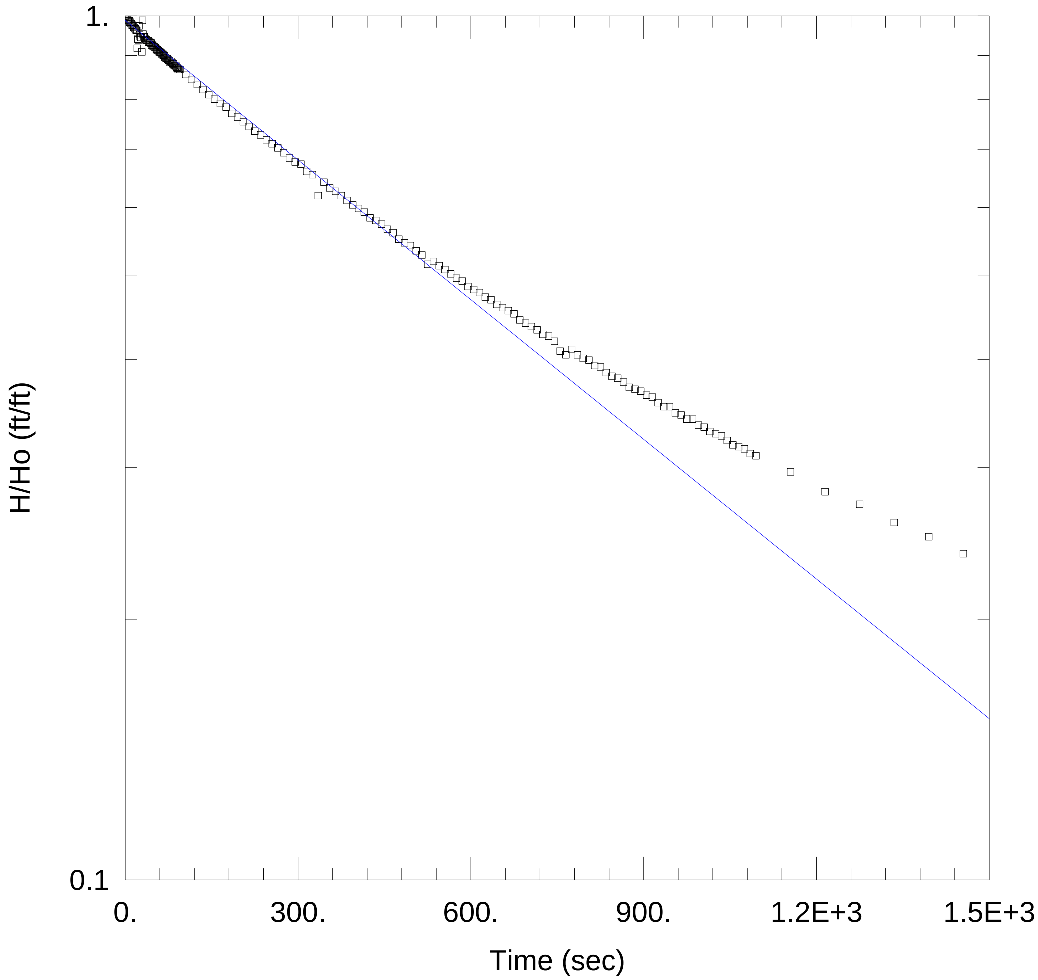
Saturated Thickness: 9.33 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-156)

Initial Displacement: 1.99 ft
Static Water Column Height: 11.73 ft
Total Well Penetration Depth: 17.21 ft
Screen Length: 9.33 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.688E-5 cm/sec
y0 = 1.969 ft



OW-156 SLUG OUT

Data Set: C:\...\MW156OUT1.aqt
Date: 04/08/14 Time: 14:43:39

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-156
Test Date: 10/16/2013

AQUIFER DATA

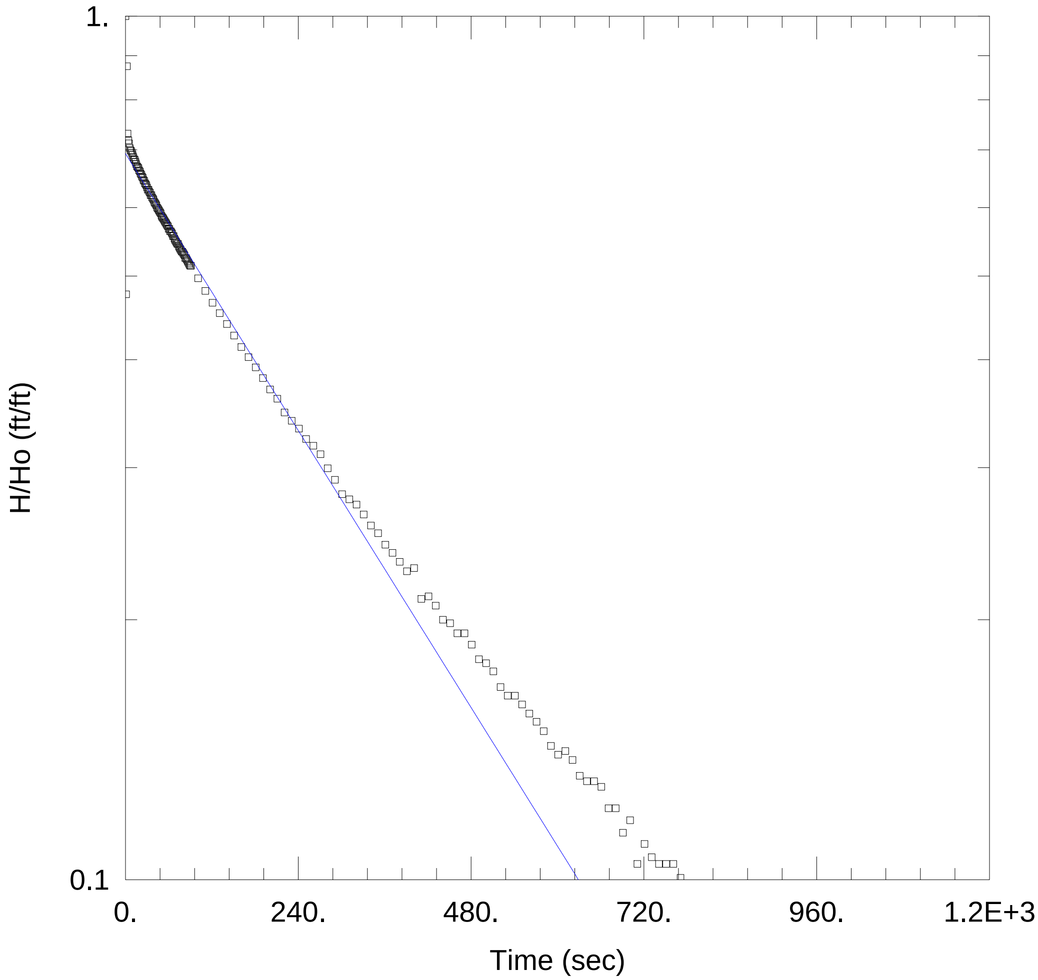
Saturated Thickness: 9.33 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-156)

Initial Displacement: 2.08 ft
Static Water Column Height: 11.73 ft
Total Well Penetration Depth: 17.21 ft
Screen Length: 9.33 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.984E-5 cm/sec
y0 = 2.055 ft



OW-157 SLUG IN 1

Data Set: C:\...\MW157IN1.aqt
Date: 04/08/14
Time: 14:44:34

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-157
Test Date: 10/16/2013

AQUIFER DATA

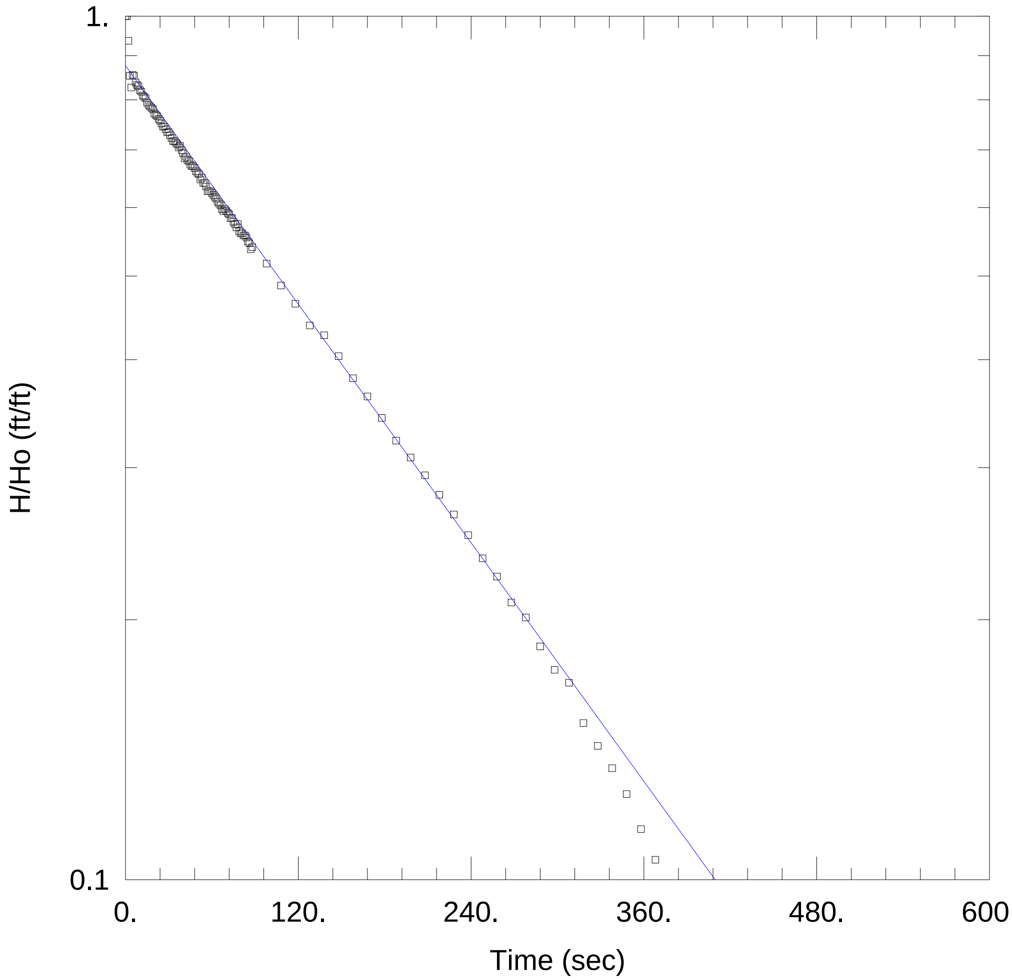
Saturated Thickness: 9.33 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (OW-157)

Initial Displacement: 2.1 ft
Total Well Penetration Depth: 17.13 ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.69 ft
Screen Length: 9.33 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.873E-5 cm/sec
y0 = 1.455 ft



OW-157 SLUG IN 2

Data Set: C:\...\MW157IN2.aqt
Date: 04/08/14
Time: 14:45:00

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-157
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 9.33 ft
Anisotropy Ratio (Kz/Kr): 1.

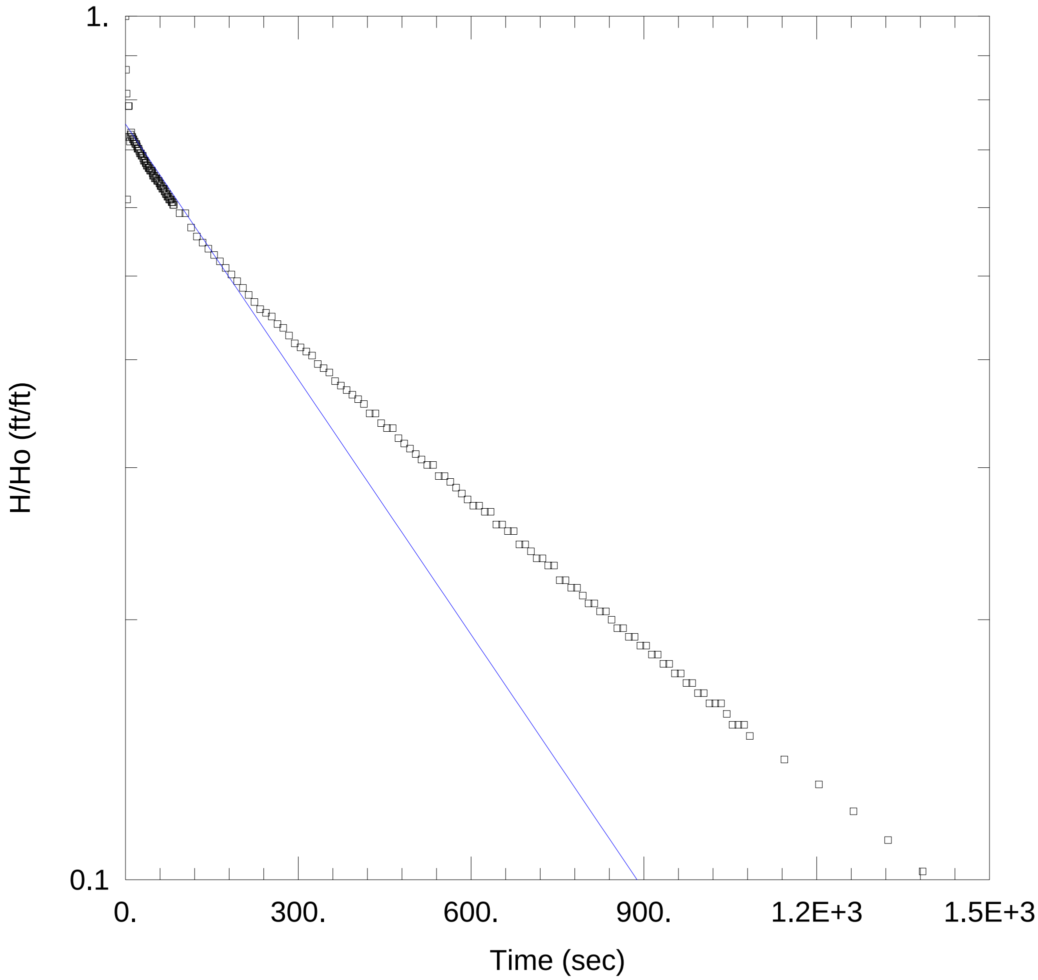
WELL DATA (OW-157)

Initial Displacement: 1.337 ft
Static Water Column Height: 13.69 ft
Total Well Penetration Depth: 17.13 ft
Screen Length: 9.33 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001701 cm/sec
y0 = 1.171 ft



MW-161 SLUG IN

Data Set: C:\...\MW161IN1.aqt
Date: 04/08/14
Time: 14:45:40

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: MW-161
Test Date: 10/16/2013

AQUIFER DATA

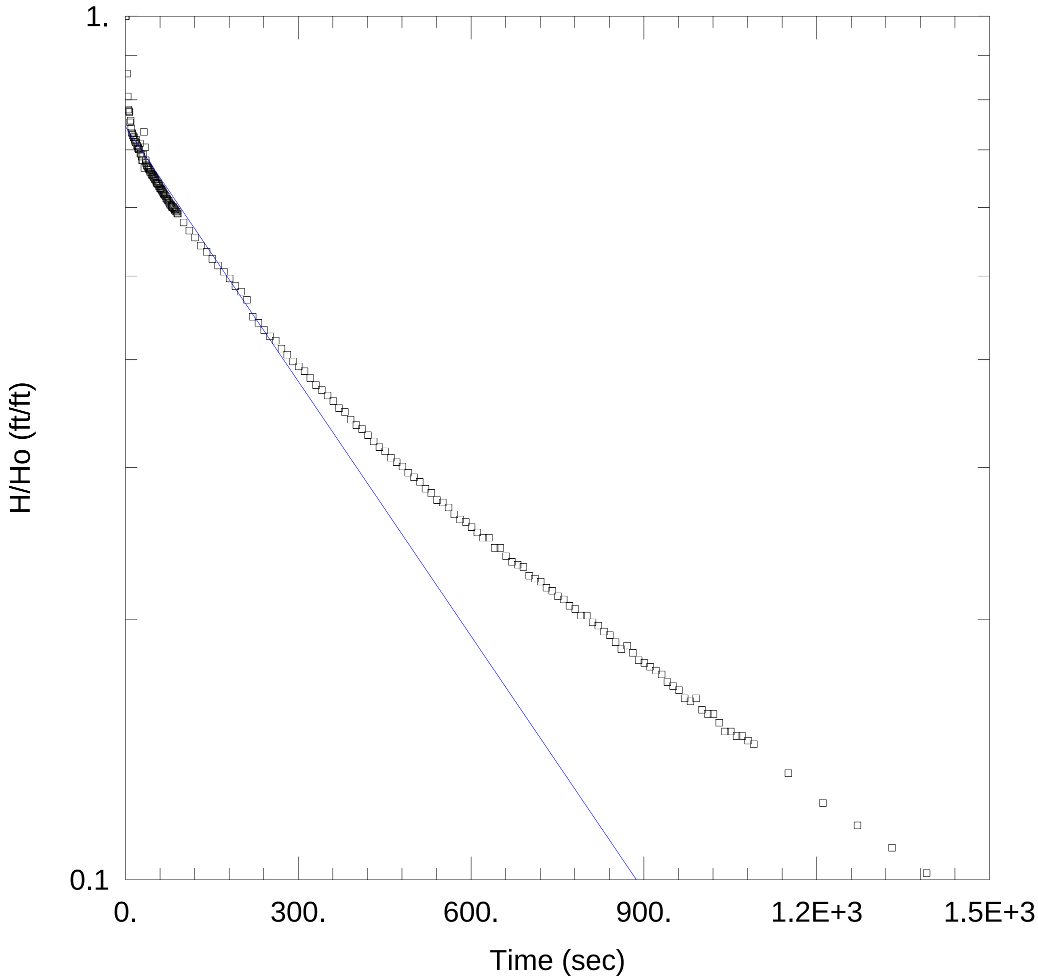
Saturated Thickness: 11.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-161)

Initial Displacement: 2.25 ft
Total Well Penetration Depth: 32.78 ft
Casing Radius: 0.083 ft
Static Water Column Height: 22.27 ft
Screen Length: 9.45 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.124E-5 cm/sec
y0 = 1.687 ft



MW-161 SLUG OUT

Data Set: C:\...\MW161OUT1.aqt
Date: 04/08/14 Time: 14:46:31

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: MW-161
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 11.1 ft
Anisotropy Ratio (Kz/Kr): 1.

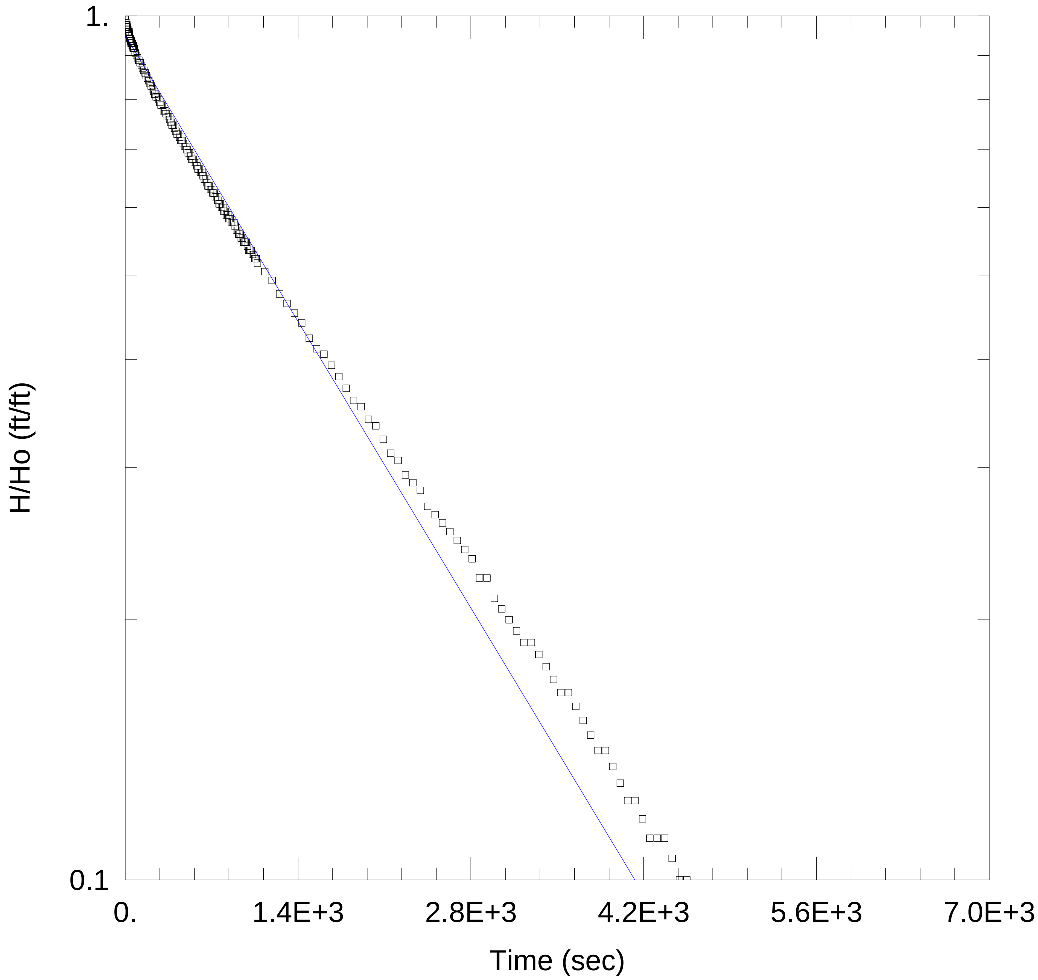
WELL DATA (MW-161)

Initial Displacement: 2.25 ft
Static Water Column Height: 22.27 ft
Total Well Penetration Depth: 32.78 ft
Screen Length: 9.45 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 8.108E-5 cm/sec
y0 = 1.675 ft



TPZ-166 SLUG IN 1

Data Set: C:\...\TPZ166IN1.aqt
Date: 04/08/14 Time: 14:54:41

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: TPZ-166
Test Date: 10/17/2013

AQUIFER DATA

Saturated Thickness: 9.45 ft Anisotropy Ratio (Kz/Kr): 1.

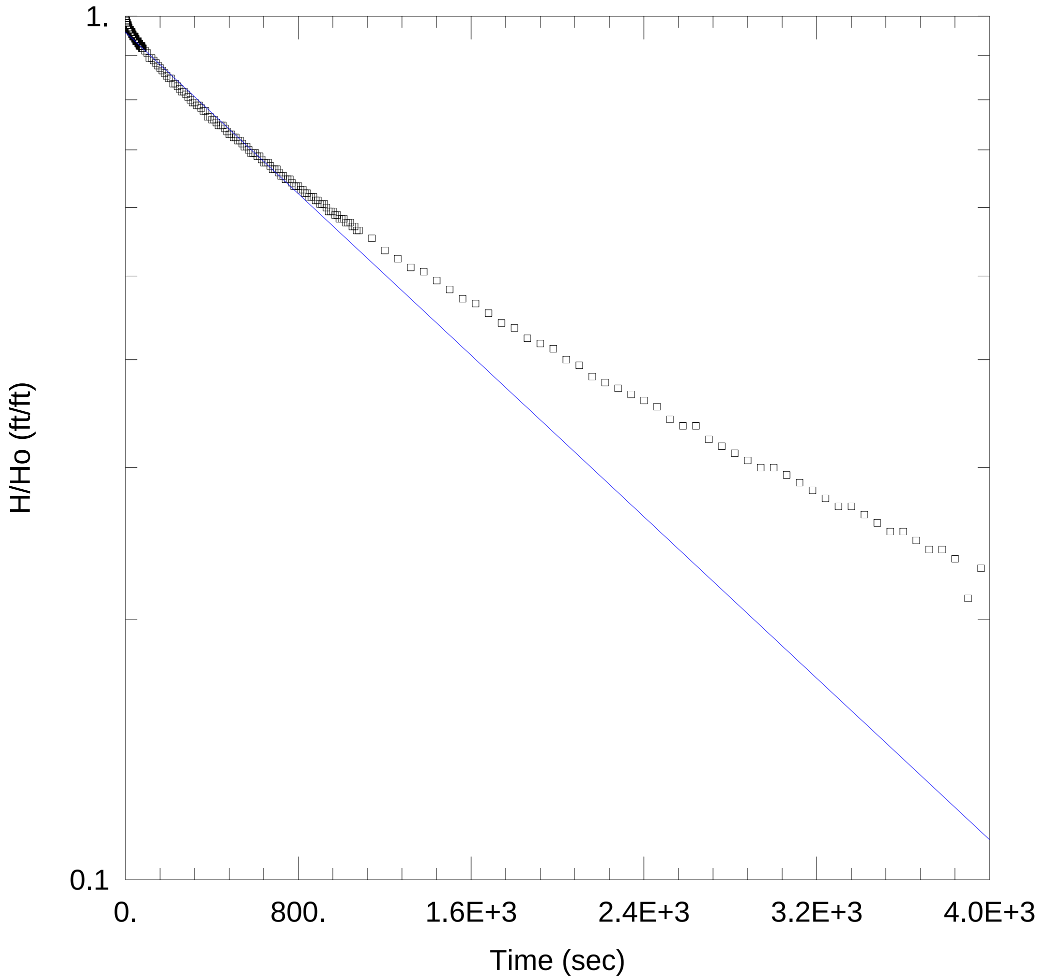
WELL DATA (TPZ-166)

Initial Displacement: 1.7 ft Static Water Column Height: 16.72 ft
Total Well Penetration Depth: 24.7 ft Screen Length: 9.45 ft
Casing Radius: 0.083 ft Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.857E-5 cm/sec y0 = 1.615 ft



TPZ-166 SLUG OUT 1

Data Set: C:\...\TPZ166OUT1.aqt
Date: 04/08/14 Time: 14:55:02

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: TPZ-166
Test Date: 10/17/2013

AQUIFER DATA

Saturated Thickness: 9.45 ft
Anisotropy Ratio (Kz/Kr): 1.

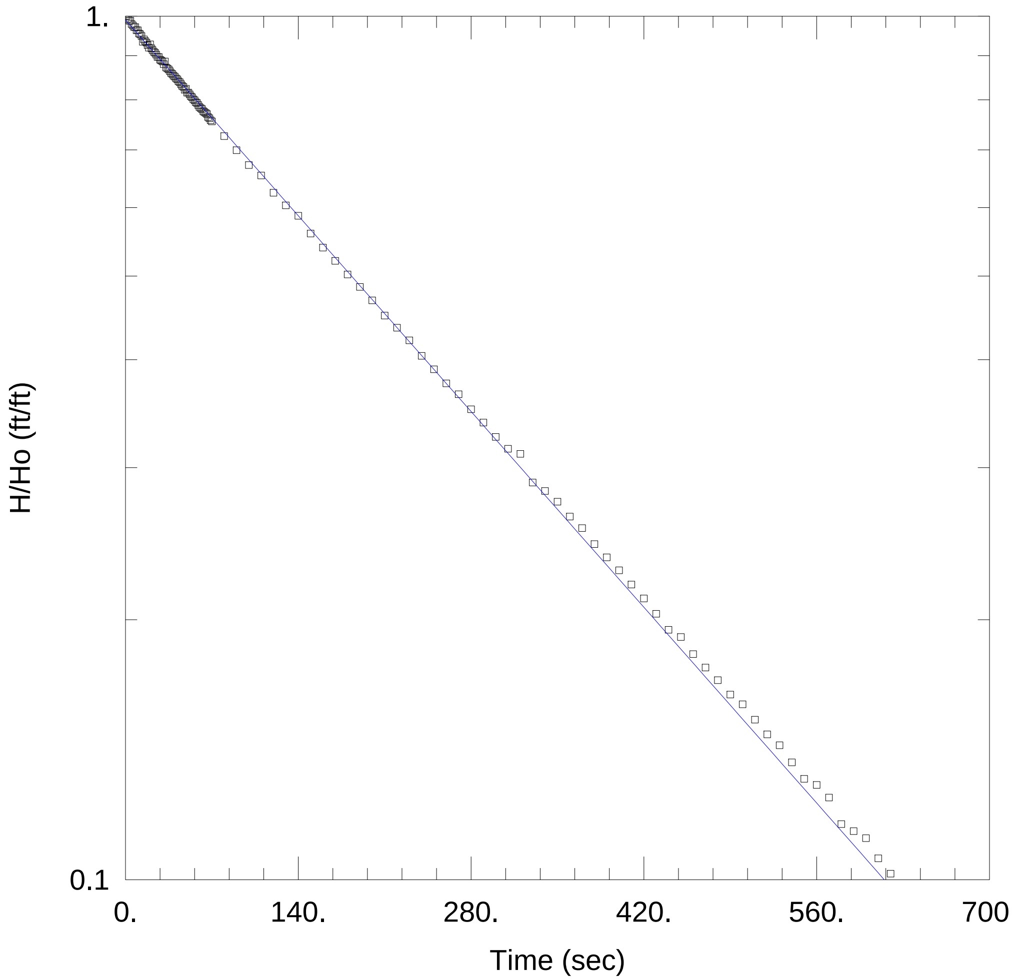
WELL DATA (TPZ-166)

Initial Displacement: 1.7 ft
Static Water Column Height: 16.72 ft
Total Well Penetration Depth: 24.7 ft
Screen Length: 9.45 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.833E-5 cm/sec
y0 = 1.628 ft



OW-256 SLUG IN 1

Data Set: C:\...\OW256IN1.aqt
Date: 04/08/14 Time: 14:50:02

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-256
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 4.5 ft Anisotropy Ratio (Kz/Kr): 1.

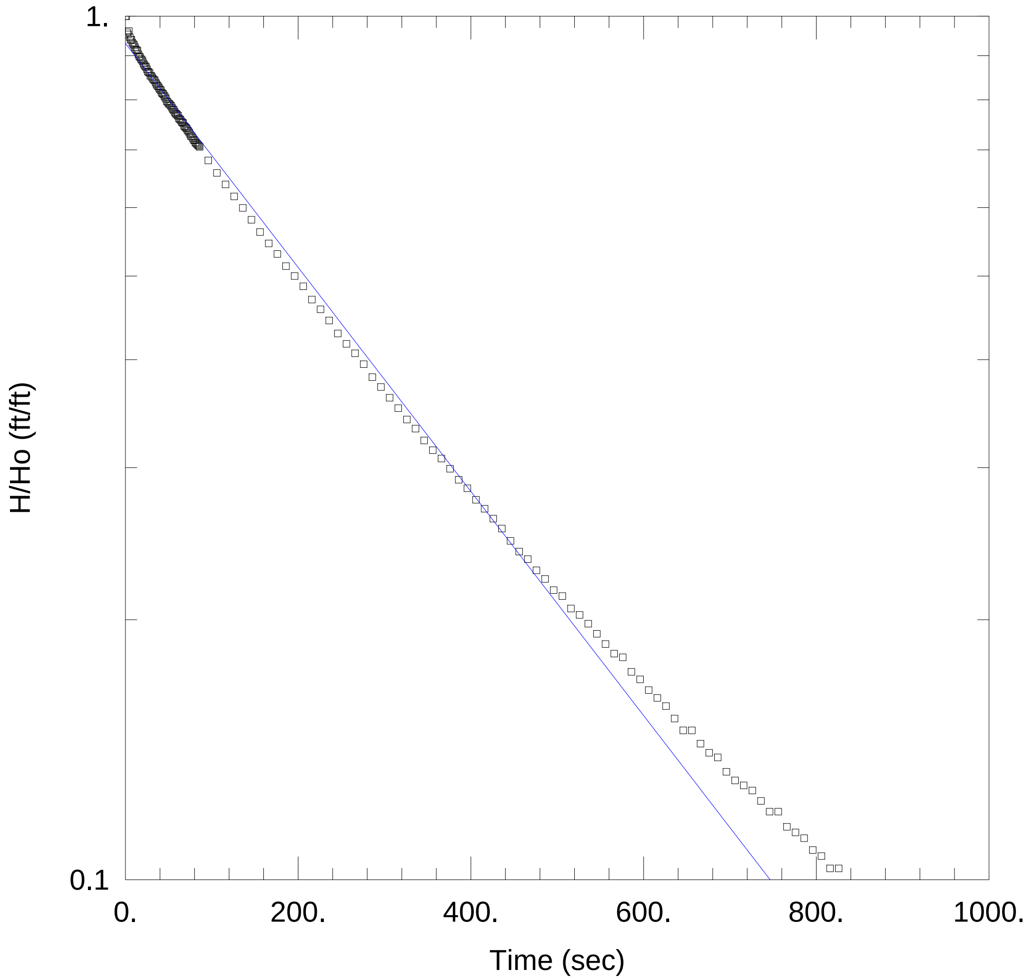
WELL DATA (OW-256)

Initial Displacement: 1.88 ft Static Water Column Height: 24.93 ft
Total Well Penetration Depth: 32.49 ft Screen Length: 4.5 ft
Casing Radius: 0.083 ft Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.0002479 cm/sec y0 = 1.86 ft



OW-256 SLUG OUT 1

Data Set: C:\...\OW256OUT1.aqt
Date: 04/08/14
Time: 14:51:12

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-256
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

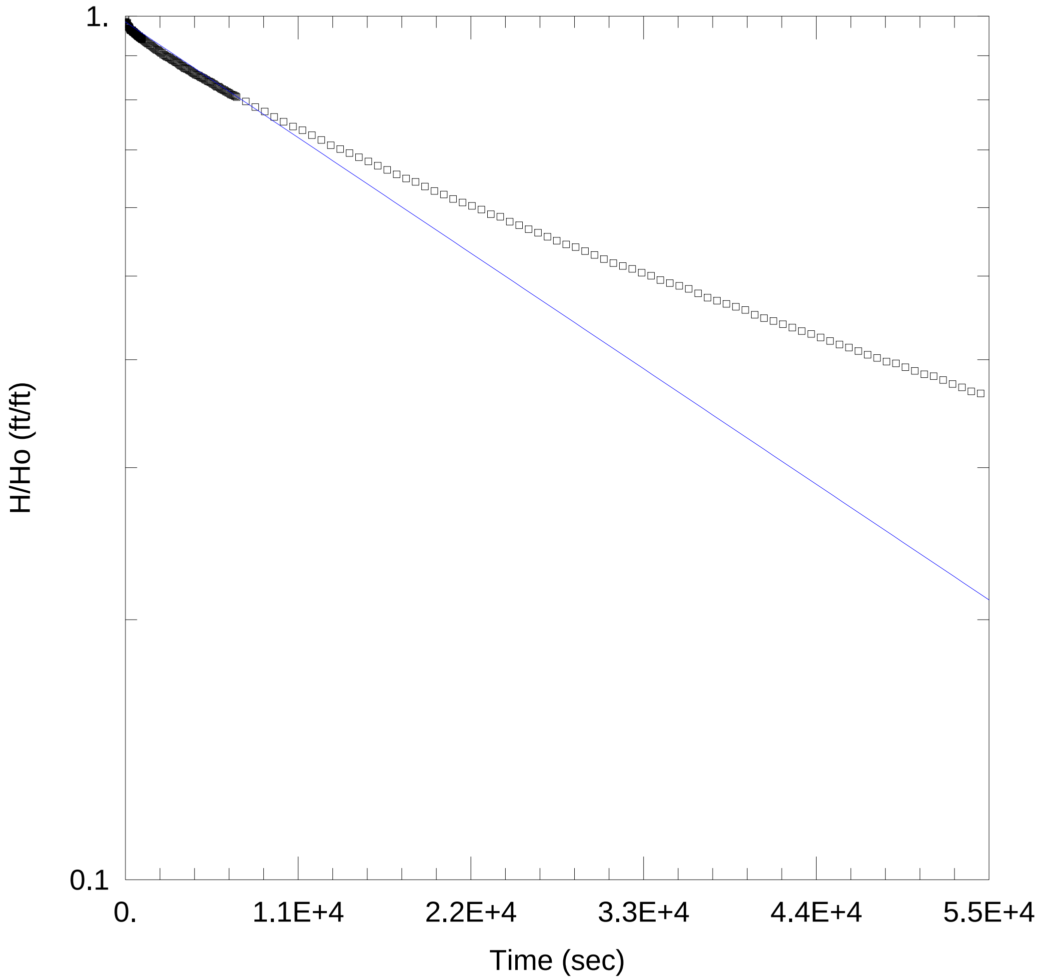
WELL DATA (OW-256)

Initial Displacement: 2.31 ft
Static Water Column Height: 24.93 ft
Total Well Penetration Depth: 32.49 ft
Screen Length: 4.5 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0001986 cm/sec
y0 = 2.148 ft



OW-257 SLUG IN 1

Data Set: C:\...\OW257IN1 BR soln.aqt
Date: 04/08/14 | Time: 14:51:45

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-257
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 2.32 ft | Anisotropy Ratio (Kz/Kr): 1.

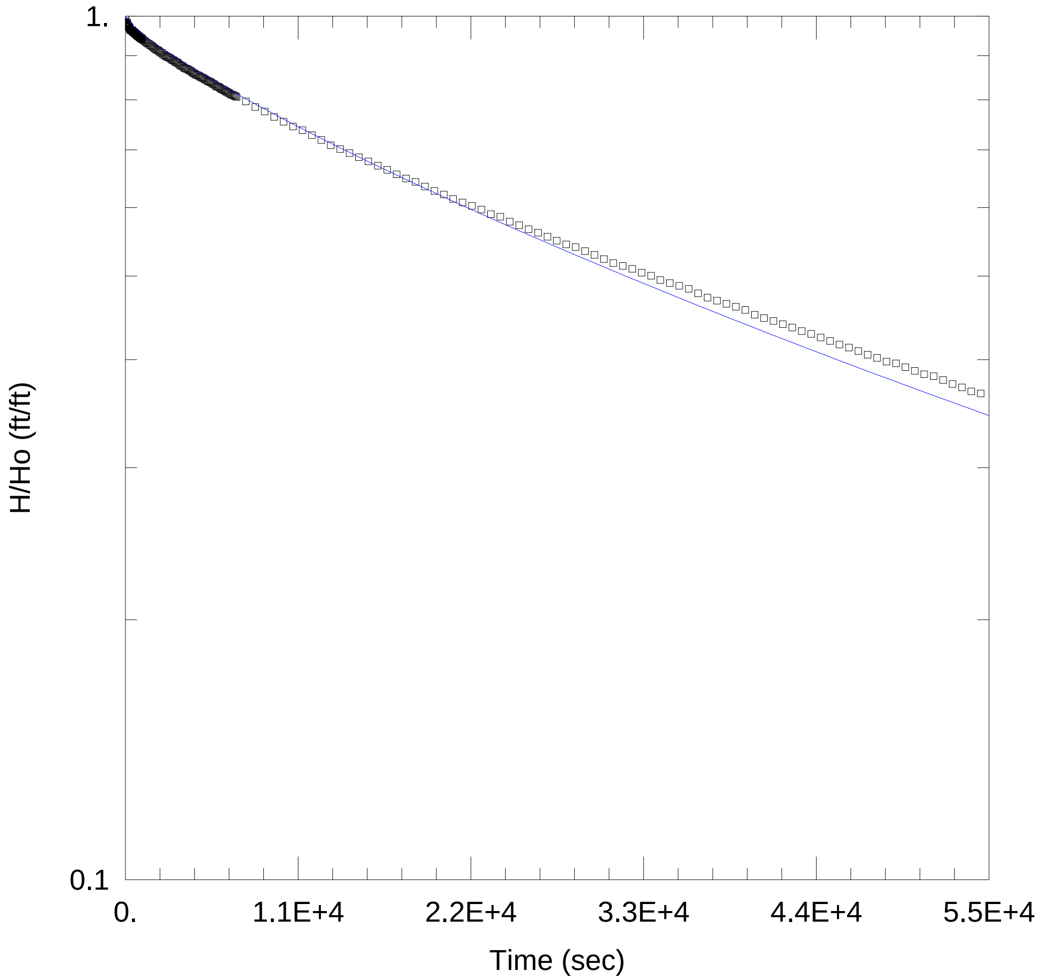
WELL DATA (OW-257)

Initial Displacement: 2.04 ft | Static Water Column Height: 36.15 ft
Total Well Penetration Depth: 38.48 ft | Screen Length: 4.5 ft
Casing Radius: 0.083 ft | Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined | Solution Method: Bouwer-Rice

K = 3.257E-6 cm/sec | y0 = 2.008 ft



OW-257 SLUG IN 1

Data Set: C:\...\OW257IN1 KGS soln.aqt
Date: 04/08/14
Time: 14:52:08

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: OW-257
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 2.32 ft

WELL DATA (OW-257)

Initial Displacement: 2.04 ft
Total Well Penetration Depth: 38.48 ft
Casing Radius: 0.083 ft

Static Water Column Height: 36.15 ft
Screen Length: 4.5 ft
Well Radius: 0.344 ft

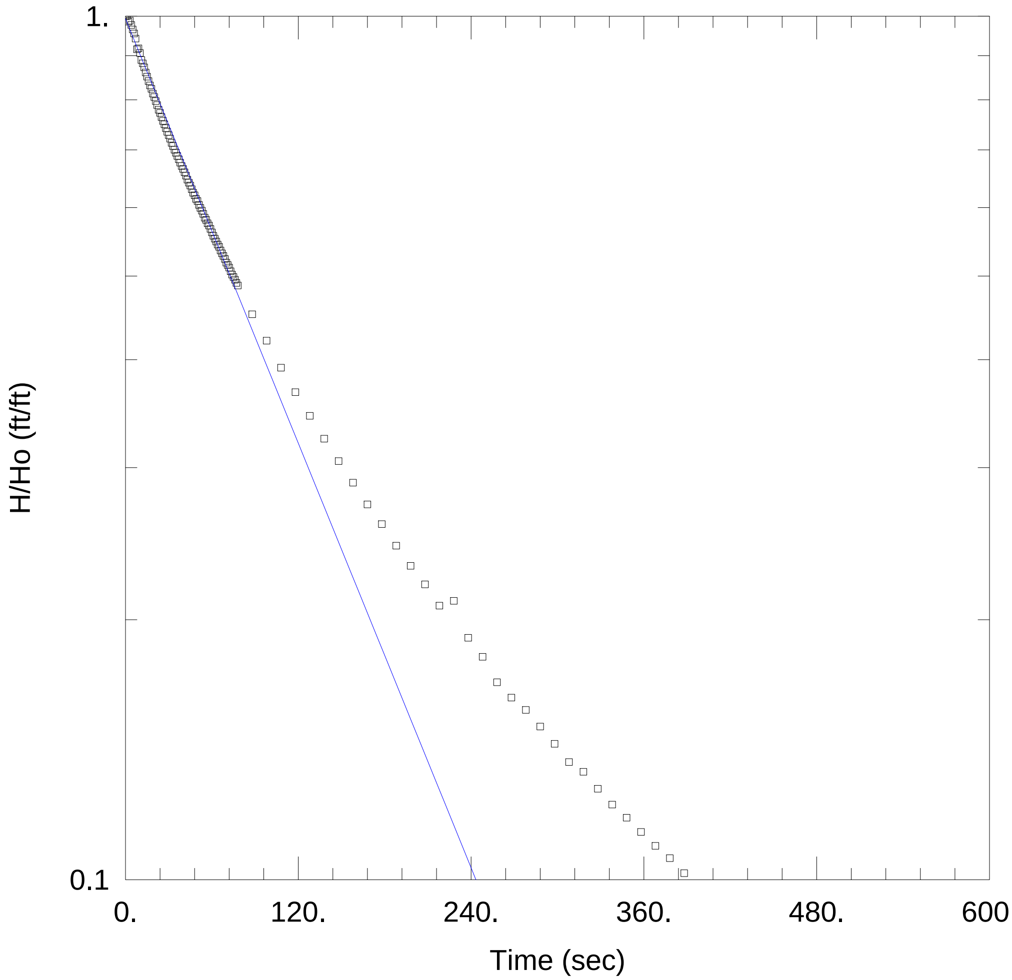
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 3.257E-6 cm/sec
Kz/Kr = 1.

Ss = 0.0002738 ft^{-1}



MW-262 SLUG IN 1

Data Set: C:\...\MW262IN1.aqt
Date: 04/08/14 Time: 14:48:44

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: MW-262
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

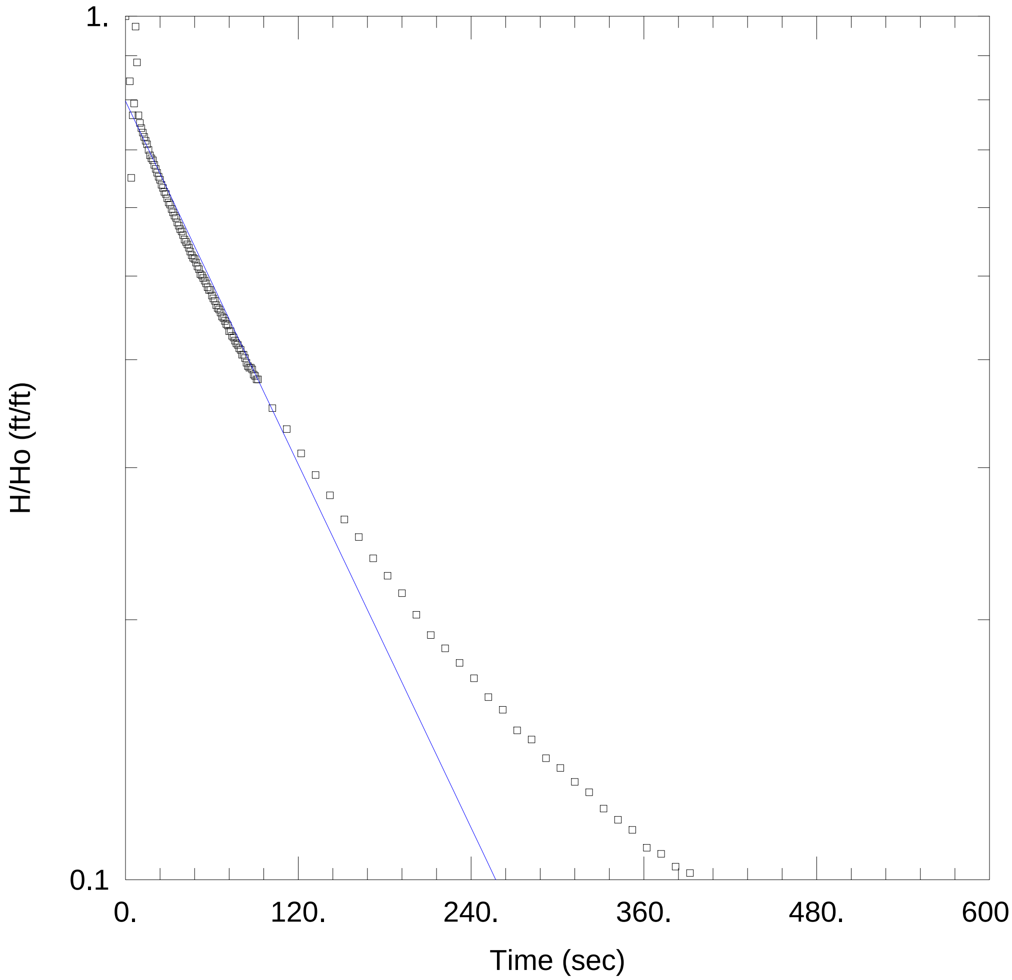
WELL DATA (MW-262)

Initial Displacement: 4.56 ft
Static Water Column Height: 12.16 ft
Total Well Penetration Depth: 46.63 ft
Screen Length: 4.5 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0006606 cm/sec
y0 = 4.528 ft



MW-262 SLUG IN 2

Data Set: C:\...\MW262IN2.aqt
Date: 04/08/14 Time: 14:49:03

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: MW-262
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 4.5 ft Anisotropy Ratio (Kz/Kr): 1.

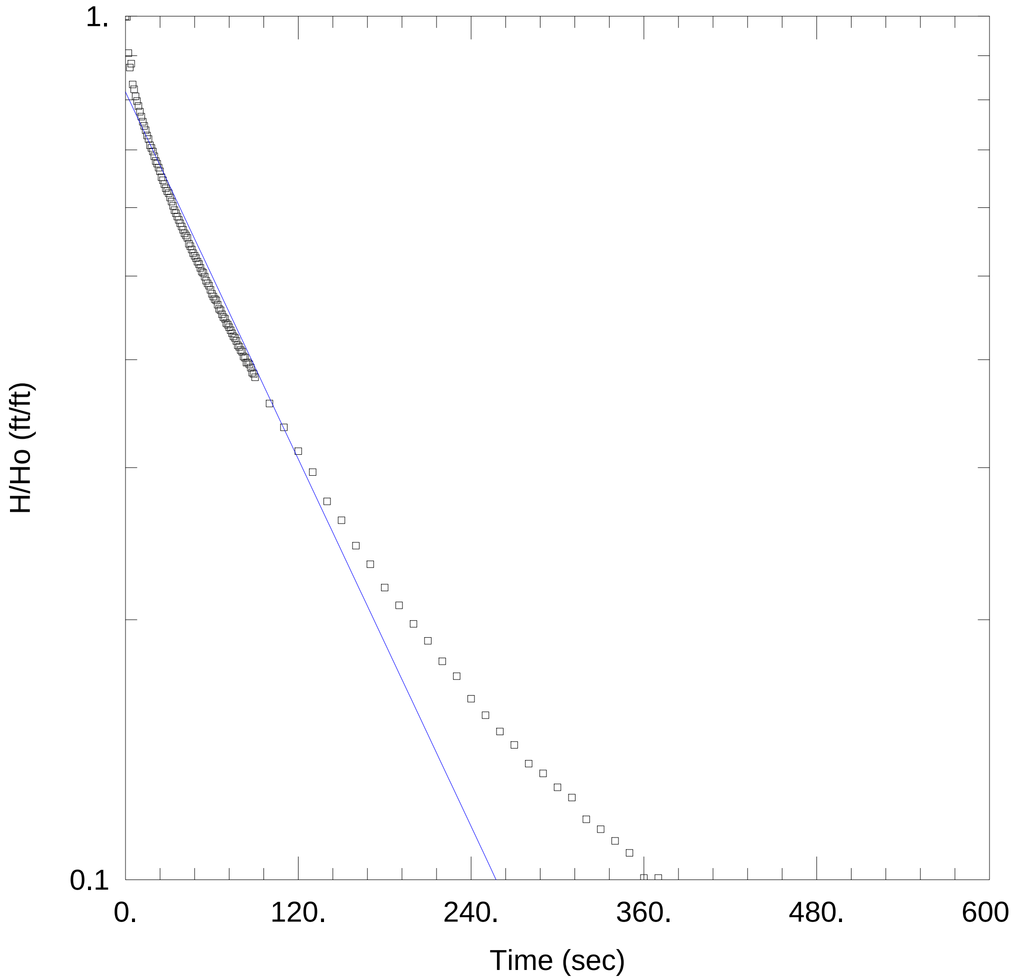
WELL DATA (MW-262)

Initial Displacement: 2.25 ft Static Water Column Height: 12.16 ft
Total Well Penetration Depth: 46.63 ft Screen Length: 4.5 ft
Casing Radius: 0.083 ft Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.0005654 cm/sec y0 = 1.794 ft



MW-262 SLUG OUT 2

Data Set: C:\...\MW262OUT2.aqt
Date: 04/08/14
Time: 14:49:43

PROJECT INFORMATION

Company: Kelron Environmental
Client: Dynegy Operating Company
Project: 66001-51972
Location: Baldwin Energy Complex
Test Well: MW-262
Test Date: 10/16/2013

AQUIFER DATA

Saturated Thickness: 4.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-262)

Initial Displacement: 2.29 ft
Static Water Column Height: 12.16 ft
Total Well Penetration Depth: 46.63 ft
Screen Length: 4.5 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0005714 cm/sec
y0 = 1.87 ft

APPENDIX F

LABORATORY ANALYTICAL REPORTS: SEPTEMBER 2013, NOVEMBER 2013, AND FEBRUARY 2014

October 02, 2013

Brian Voelker
Dynegy Midwest Generation, LLC
604 Pierce Blvd.
O'Fallon, IL 62269
TEL: (618) 206-5800
FAX:

RE: Baldwin - Groundwater Monitoring **WorkOrder:** 13090807

Dear Brian Voelker:

TEKLAB, INC received 32 samples on 9/18/2013 8:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

This reporting package includes the following:

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Abbr Definition

Abbr	Definition
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
J -	Analyte detected below quantitation limits	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	X -	Value exceeds Maximum Contaminant Level

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Cooler Receipt Temp: 1.6 °C

MW 162 not sampled, Well Dry.

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road	3920 Pintail Dr	8421 Nieman Road	5445 Horseshoe Lake Road
	Collinsville, IL 62234-7425	Springfield, IL 62711-9415	Lenexa, KS 66214	Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2014	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2014	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2014	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		5/31/2015	Collinsville
Kentucky	UST	0073		4/5/2014	Collinsville
Missouri	MDNR	00930		5/31/2015	Collinsville
Oklahoma	ODEQ	9978		8/31/2014	Collinsville

Teklab Inc. Environmental Laboratory

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-001
Client Sample ID: MW104D
Matrix: GROUNDWATER
Collection Date: 09/16/2013 9:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**14.97**	ft	1	09/16/2013 9:50	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.5**	℃	1	09/16/2013 9:50	R182124
SW-846 9040B								
pH, Field		1		**6.9**		1	09/16/2013 9:50	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1130**	µmhos/cm	1	09/16/2013 9:50	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**676**	mg/L	1	09/19/2013 11:45	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**198**	mg/L	10	09/18/2013 18:52	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**20**	mg/L	1	09/18/2013 18:47	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.018**	mg/L	1	09/19/2013 18:24	92049
Iron	NELAP	0.02		**4.82**	mg/L	1	09/19/2013 18:24	92049
Manganese	NELAP	0.005		**0.933**	mg/L	1	09/19/2013 18:24	92049

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-002 **Client Sample ID:** MW104S

Matrix: GROUNDWATER **Collection Date:** 09/16/2013 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**13.96**	ft	1	09/16/2013 9:45	R182124
STANDARD METHODS 2550 B								
Temperature		0		**17**	℃	1	09/16/2013 9:45	R182124
SW-846 9040B								
pH, Field		1		**6.72**		1	09/16/2013 9:45	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1310**	µmhos/cm	1	09/16/2013 9:45	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**724**	mg/L	1	09/19/2013 11:46	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10	S	**43**	mg/L	1	09/18/2013 19:11	R181951
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 9251 (TOTAL)								
Chloride	NELAP	5	S	**19**	mg/L	1	09/18/2013 19:11	R181953
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.141**	mg/L	1	09/19/2013 18:27	92049
Iron	NELAP	0.02		**3.18**	mg/L	1	09/19/2013 18:27	92049
Manganese	NELAP	0.005		**4.97**	mg/L	1	09/19/2013 18:27	92049

Laboratory Results

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13
Lab ID: 13090807-003 **Client Sample ID:** MW150
Matrix: GROUNDWATER **Collection Date:** 09/16/2013 11:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**21.03**	ft	1	09/16/2013 11:15	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.8**	°C	1	09/16/2013 11:15	R182124
SW-846 9040B								
pH, Field		1		**7.55**		1	09/16/2013 11:15	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1350**	µmhos/cm	1	09/16/2013 11:15	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1090**	mg/L	1	09/19/2013 11:46	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200		**570**	mg/L	20	09/19/2013 23:30	R182015
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**54**	mg/L	10	09/18/2013 19:38	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.682**	mg/L	1	09/19/2013 18:38	92049
Iron	NELAP	0.02		**20.1**	mg/L	1	09/19/2013 18:38	92049
Manganese	NELAP	0.005		**0.32**	mg/L	1	09/19/2013 18:38	92049

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-004
Client Sample ID: MW151
Matrix: GROUNDWATER
Collection Date: 09/16/2013 10:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.09**	ft	1	09/16/2013 10:45	R182124
STANDARD METHODS 2550 B								
Temperature		0		**17.3**	℃	1	09/16/2013 10:45	R182124
SW-846 9040B								
pH, Field		1		**7.17**		1	09/16/2013 10:45	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**855**	µmhos/cm	1	09/16/2013 10:45	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**526**	mg/L	1	09/19/2013 11:46	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**90**	mg/L	5	09/19/2013 23:32	R182015
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**36**	mg/L	1	09/18/2013 19:41	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.246**	mg/L	1	09/19/2013 18:42	92049
Iron	NELAP	0.02		**19.3**	mg/L	1	09/19/2013 18:42	92049
Manganese	NELAP	0.005		**1.53**	mg/L	1	09/19/2013 18:42	92049

Teklab, Inc. Environmental Laboratory

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-005
Client Sample ID: MW152
Matrix: GROUNDWATER
Collection Date: 09/16/2013 10:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**8.25**	ft	1	09/16/2013 10:15	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.2**	°C	1	09/16/2013 10:15	R182124
SW-846 9040B								
pH, Field		1		**6.96**		1	09/16/2013 10:15	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1920**	µmhos/cm	1	09/16/2013 10:15	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1620**	mg/L	1	09/19/2013 11:46	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200		**873**	mg/L	20	09/19/2013 23:38	R182015
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**49**	mg/L	1	09/18/2013 20:05	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**9.09**	mg/L	1	09/19/2013 18:46	92049
Iron	NELAP	0.02		**19.4**	mg/L	1	09/19/2013 18:46	92049
Manganese	NELAP	0.005		**1.37**	mg/L	1	09/19/2013 18:46	92049

Teklab, Inc. Environmental Laboratory

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-006 **Client Sample ID:** MW153

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 9:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**16.32**	ft	1	09/17/2013 9:25	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.5**	°C	1	09/17/2013 9:25	R182124
SW-846 9040B								
pH, Field		1		**7.32**		1	09/17/2013 9:25	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**778**	µmhos/cm	1	09/17/2013 9:25	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**448**	mg/L	1	09/19/2013 11:47	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**75**	mg/L	5	09/20/2013 18:39	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**23**	mg/L	1	09/18/2013 20:13	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.02**	mg/L	1	09/19/2013 18:50	92049
Iron	NELAP	0.02		**7.34**	mg/L	1	09/19/2013 18:50	92049
Manganese	NELAP	0.005		**0.163**	mg/L	1	09/19/2013 18:50	92049

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-007
Client Sample ID: MW154
Matrix: GROUNDWATER
Collection Date: 09/17/2013 9:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**13.86**	ft	1	09/17/2013 9:00	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16**	℃	1	09/17/2013 9:00	R182124
SW-846 9040B								
pH, Field		1		**7.31**		1	09/17/2013 9:00	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**869**	µmhos/cm	1	09/17/2013 9:00	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**516**	mg/L	1	09/19/2013 11:47	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**64**	mg/L	5	09/19/2013 23:46	R182015
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**6**	mg/L	1	09/18/2013 20:22	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.019**	mg/L	1	09/19/2013 18:53	92049
Iron	NELAP	0.02		**7.1**	mg/L	1	09/19/2013 18:53	92049
Manganese	NELAP	0.005		**0.194**	mg/L	1	09/19/2013 18:53	92049

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-008 **Client Sample ID:** MW155

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 8:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**21.28**	ft	1	09/17/2013 8:25	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.1**	℃	1	09/17/2013 8:25	R182124
SW-846 9040B								
pH, Field		1		**7.41**		1	09/17/2013 8:25	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**773**	µmhos/cm	1	09/17/2013 8:25	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**470**	mg/L	1	09/19/2013 11:48	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**49**	mg/L	1	09/18/2013 20:30	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**9**	mg/L	1	09/18/2013 20:30	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	09/19/2013 18:57	92049
Iron	NELAP	0.02		**48.3**	mg/L	1	09/20/2013 19:26	92049
Manganese	NELAP	0.005		**24.4**	mg/L	1	09/20/2013 19:26	92049

Laboratory Results

Client: Dynegy Midwest Generation, LLC | **Work Order:** 13090807
Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 02-Oct-13
Lab ID: 13090807-009 | **Client Sample ID:** MW252
Matrix: GROUNDWATER | **Collection Date:** 09/16/2013 10:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**19.7**	ft	1	09/16/2013 10:25	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.1**	℃	1	09/16/2013 10:25	R182124
SW-846 9040B								
pH, Field		1		**7.01**		1	09/16/2013 10:25	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1650**	µmhos/cm	1	09/16/2013 10:25	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1260**	mg/L	1	09/19/2013 11:48	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**500**	mg/L	10	09/18/2013 20:43	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**39**	mg/L	1	09/18/2013 20:39	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.243**	mg/L	1	09/19/2013 19:08	92049
Iron	NELAP	0.02		**9.04**	mg/L	1	09/19/2013 19:08	92049
Manganese	NELAP	0.005		**1.3**	mg/L	1	09/19/2013 19:08	92049

Laboratory Results

Teklab, Inc. Environmental Laboratory

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-010
Client Sample ID: MW253
Matrix: GROUNDWATER
Collection Date: 09/17/2013 9:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**13.69**	ft	1	09/17/2013 9:35	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.6**	°C	1	09/17/2013 9:35	R182124
SW-846 9040B								
pH, Field		1		**10.6**		1	09/17/2013 9:35	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**833**	µmhos/cm	1	09/17/2013 9:35	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**546**	mg/L	1	09/19/2013 11:49	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200	SR	**349**	mg/L	20	09/20/2013 18:44	R182065
RPD, MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**15**	mg/L	1	09/18/2013 21:04	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.064**	mg/L	1	09/19/2013 19:12	92049
Iron	NELAP	0.02		**0.16**	mg/L	1	09/19/2013 19:12	92049
Manganese	NELAP	0.005		**0.025**	mg/L	1	09/19/2013 19:12	92049

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-011
Client Sample ID: MW350
Matrix: GROUNDWATER
Collection Date: 09/16/2013 11:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**22.75**	ft	1	09/16/2013 11:00	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.6**	°C	1	09/16/2013 11:00	R182124
SW-846 9040B								
pH, Field		1		**12.3**		1	09/16/2013 11:00	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**5190**	µmhos/cm	1	09/16/2013 11:00	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1640**	mg/L	1	09/19/2013 11:49	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**< 10**	mg/L	1	09/18/2013 21:26	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**33**	mg/L	1	09/18/2013 21:26	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.029**	mg/L	1	09/23/2013 16:10	92055
Iron	NELAP	0.02		**0.143**	mg/L	1	09/20/2013 18:20	92055
Manganese	NELAP	0.005	J	**0.004**	mg/L	1	09/20/2013 18:20	92055

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-012 **Client Sample ID:** MW352

Matrix: GROUNDWATER **Collection Date:** 09/16/2013 10:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**9.18**	ft	1	09/16/2013 10:35	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.6**	°C	1	09/16/2013 10:35	R182124
SW-846 9040B								
pH, Field		1		**9.36**		1	09/16/2013 10:35	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1740**	µmhos/cm	1	09/16/2013 10:35	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1130**	mg/L	1	09/19/2013 11:49	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**< 10**	mg/L	1	09/18/2013 21:32	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	100		**580**	mg/L	20	09/26/2013 15:22	R182243
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**1.42**	mg/L	1	09/23/2013 16:16	92055
Iron	NELAP	0.02		**0.179**	mg/L	1	09/20/2013 15:27	92055
Manganese	NELAP	0.005		**0.007**	mg/L	1	09/20/2013 15:27	92055

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-013
Client Sample ID: MW355
Matrix: GROUNDWATER
Collection Date: 09/17/2013 8:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**24.42**	ft	1	09/17/2013 8:35	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.1**	°C	1	09/17/2013 8:35	R182124
SW-846 9040B								
pH, Field		1		**7.37**		1	09/17/2013 8:35	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**811**	µmhos/cm	1	09/17/2013 8:35	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**468**	mg/L	1	09/19/2013 11:50	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**70**	mg/L	5	09/20/2013 18:58	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**12**	mg/L	1	09/18/2013 21:56	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.034**	mg/L	1	09/23/2013 16:41	92055
Iron	NELAP	0.02		**3.82**	mg/L	1	09/20/2013 18:26	92055
Manganese	NELAP	0.005		**0.586**	mg/L	1	09/20/2013 18:26	92055

Laboratory Results

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-014
Client Sample ID: OW156
Matrix: GROUNDWATER
Collection Date: 09/16/2013 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**9.18**	ft	1	09/16/2013 12:30	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.4**	℃	1	09/16/2013 12:30	R182124
SW-846 9040B								
pH, Field		1		**6.69**		1	09/16/2013 12:30	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**814**	µmhos/cm	1	09/16/2013 12:30	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**480**	mg/L	1	09/19/2013 11:50	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**94**	mg/L	5	09/20/2013 19:00	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**58**	mg/L	10	09/18/2013 22:10	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.04**	mg/L	1	09/20/2013 16:01	92055
Iron	NELAP	0.02		**2.04**	mg/L	1	09/20/2013 16:01	92055
Manganese	NELAP	0.005		**0.079**	mg/L	1	09/20/2013 16:01	92055

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-015
Client Sample ID: OW157
Matrix: GROUNDWATER
Collection Date: 09/16/2013 13:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.72**	ft	1	09/16/2013 13:20	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.4**	°C	1	09/16/2013 13:20	R182124
SW-846 9040B								
pH, Field		1		**7.63**		1	09/16/2013 13:20	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**3270**	µmhos/cm	1	09/16/2013 13:20	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**3170**	mg/L	1	09/19/2013 11:50	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	1000		**1750**	mg/L	100	09/20/2013 19:06	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**117**	mg/L	10	09/18/2013 22:18	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.2		**48.6**	mg/L	10	09/23/2013 16:47	92055
Iron	NELAP	0.02		**12.7**	mg/L	1	09/20/2013 16:07	92055
Manganese	NELAP	0.005		**0.26**	mg/L	1	09/20/2013 16:07	92055

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-016
Client Sample ID: MW161
Matrix: GROUNDWATER
Collection Date: 09/16/2013 11:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**23.11**	ft	1	09/16/2013 11:50	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.1**	℃	1	09/16/2013 11:50	R182124
SW-846 9040B								
pH, Field		1		**6.91**		1	09/16/2013 11:50	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**746**	µmhos/cm	1	09/16/2013 11:50	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**446**	mg/L	1	09/19/2013 11:51	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**42**	mg/L	1	09/26/2013 14:50	R182263
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**6**	mg/L	1	09/18/2013 22:20	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.011**	mg/L	1	09/23/2013 16:53	92055
Iron	NELAP	0.02		**11.8**	mg/L	1	09/20/2013 16:13	92055
Manganese	NELAP	0.005		**1.84**	mg/L	1	09/20/2013 16:13	92055

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Laboratory Results

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Client: Dynegy Midwest Generation, LLC

Work Order: 13090807

Client Project: Baldwin - Groundwater Monitoring

Report Date: 02-Oct-13

Lab ID: 13090807-017

Client Sample ID: MW262

Matrix: GROUNDWATER

Collection Date: 09/16/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**35.95**	ft	1	09/16/2013 11:30	R182124
STANDARD METHODS 2550 B								
Temperature		0		**14.8**	℃	1	09/16/2013 11:30	R182124
SW-846 9040B								
pH, Field		1		**6.99**		1	09/16/2013 11:30	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**448**	µmhos/cm	1	09/16/2013 11:30	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**318**	mg/L	1	09/19/2013 11:51	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**42**	mg/L	1	09/18/2013 22:28	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5	J	**4**	mg/L	1	09/18/2013 22:28	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.015**	mg/L	1	09/20/2013 16:19	92055
Iron	NELAP	0.02		**69.4**	mg/L	1	09/20/2013 16:19	92055
Manganese	NELAP	0.005		**2.42**	mg/L	1	09/20/2013 16:19	92055

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-018
Client Sample ID: OW256
Matrix: GROUNDWATER
Collection Date: 09/16/2013 12:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**11.95**	ft	1	09/16/2013 12:15	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.1**	℃	1	09/16/2013 12:15	R182124
SW-846 9040B								
pH, Field		1		**7.11**		1	09/16/2013 12:15	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**862**	µmhos/cm	1	09/16/2013 12:15	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**520**	mg/L	1	09/19/2013 11:52	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**92**	mg/L	5	09/20/2013 19:11	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**65**	mg/L	10	09/18/2013 22:58	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.153**	mg/L	1	09/20/2013 16:25	92055
Iron	NELAP	0.02		**4.6**	mg/L	1	09/20/2013 16:25	92055
Manganese	NELAP	0.005		**0.446**	mg/L	1	09/20/2013 16:25	92055

Laboratory Results

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-019
Client Sample ID: OW257
Matrix: GROUNDWATER
Collection Date: 09/16/2013 12:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.66**	ft	1	09/16/2013 12:50	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.7**	℃	1	09/16/2013 12:50	R182124
SW-846 9040B								
pH, Field		1		**6.99**		1	09/16/2013 12:50	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1430**	µmhos/cm	1	09/16/2013 12:50	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**960**	mg/L	1	09/19/2013 11:53	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**328**	mg/L	10	09/18/2013 23:06	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**20**	mg/L	1	09/18/2013 23:02	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**3.68**	mg/L	1	09/20/2013 16:31	92055
Iron	NELAP	0.02		**0.245**	mg/L	1	09/20/2013 16:31	92055
Manganese	NELAP	0.005		**0.996**	mg/L	1	09/20/2013 16:31	92055

Client: Dynegy Midwest Generation, LLC | **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 02-Oct-13

Lab ID: 13090807-020 | **Client Sample ID:** TPZ158

Matrix: GROUNDWATER | **Collection Date:** 09/17/2013 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**12.89**	ft	1	09/17/2013 10:10	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.4**	°C	1	09/17/2013 10:10	R182124
SW-846 9040B								
pH, Field		1		**7.1**		1	09/17/2013 10:10	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**720**	µmhos/cm	1	09/17/2013 10:10	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**394**	mg/L	1	09/19/2013 11:53	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**38**	mg/L	1	09/18/2013 23:09	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**61**	mg/L	10	09/18/2013 23:14	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02	J	**0.012**	mg/L	1	09/20/2013 16:37	92055
Iron	NELAP	0.02		**6.93**	mg/L	1	09/20/2013 16:37	92055
Manganese	NELAP	0.005		**0.125**	mg/L	1	09/20/2013 16:37	92055

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-021 **Client Sample ID:** TPZ159

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 13:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**18.34**	ft	1	09/17/2013 13:35	R182124
STANDARD METHODS 2550 B								
Temperature		0		**17.9**	℃	1	09/17/2013 13:35	R182124
SW-846 9040B								
pH, Field		1		**6.63**		1	09/17/2013 13:35	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**849**	µmhos/cm	1	09/17/2013 13:35	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**588**	mg/L	1	09/19/2013 11:54	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**103**	mg/L	10	09/18/2013 23:22	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**34**	mg/L	1	09/18/2013 23:17	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.106**	mg/L	1	09/20/2013 16:43	92055
Iron	NELAP	0.02		**1.77**	mg/L	1	09/20/2013 16:43	92055
Manganese	NELAP	0.005		**0.475**	mg/L	1	09/20/2013 16:43	92055

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-022
Client Sample ID: TPZ160
Matrix: GROUNDWATER
Collection Date: 09/17/2013 13:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**15.76**	ft	1	09/17/2013 13:15	R182124
STANDARD METHODS 2550 B								
Temperature		0		**17.7**	℃	1	09/17/2013 13:15	R182124
SW-846 9040B								
pH, Field		1		**7.2**		1	09/17/2013 13:15	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**880**	µmhos/cm	1	09/17/2013 13:15	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**490**	mg/L	1	09/19/2013 11:54	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		**60**	mg/L	5	09/20/2013 19:30	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**44**	mg/L	1	09/18/2013 23:25	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.259**	mg/L	1	09/23/2013 16:59	92055
Iron	NELAP	0.02		**8.62**	mg/L	1	09/20/2013 17:01	92055
Manganese	NELAP	0.005		**0.361**	mg/L	1	09/20/2013 17:01	92055

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Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-023 **Client Sample ID:** TPZ163

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 10:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**12.45**	ft	1	09/17/2013 10:55	R182124
STANDARD METHODS 2550 B								
Temperature		0		**15.6**	°C	1	09/17/2013 10:55	R182124
SW-846 9040B								
pH, Field		1		**9.69**		1	09/17/2013 10:55	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**1650**	µmhos/cm	1	09/17/2013 10:55	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1410**	mg/L	1	09/19/2013 11:54	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200		**750**	mg/L	20	09/20/2013 19:33	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**32**	mg/L	1	09/18/2013 23:49	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.2		**39.7**	mg/L	10	09/23/2013 17:05	92055
Iron	NELAP	0.02		**7.86**	mg/L	1	09/20/2013 17:07	92055
Manganese	NELAP	0.005		**0.133**	mg/L	1	09/20/2013 17:07	92055

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Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-024 **Client Sample ID:** TPZ164

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 14:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.73**	ft	1	09/17/2013 14:00	R182124
STANDARD METHODS 2550 B								
Temperature		0		**19.3**	℃	1	09/17/2013 14:00	R182124
SW-846 9040B								
pH, Field		1		**7.03**		1	09/17/2013 14:00	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**941**	µmhos/cm	1	09/17/2013 14:00	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**586**	mg/L	1	09/19/2013 11:55	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**172**	mg/L	10	09/19/2013 0:03	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**55**	mg/L	10	09/19/2013 0:03	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**2.64**	mg/L	1	09/23/2013 17:23	92055
Iron	NELAP	0.02		**20.8**	mg/L	1	09/20/2013 17:13	92055
Manganese	NELAP	0.005		**1.45**	mg/L	1	09/20/2013 17:13	92055

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-025 **Client Sample ID:** TPZ165

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 12:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**13.42**	ft	1	09/17/2013 12:45	R182124
STANDARD METHODS 2550 B								
Temperature		0		**18.3**	℃	1	09/17/2013 12:45	R182124
SW-846 9040B								
pH, Field		1		**6.62**		1	09/17/2013 12:45	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**2400**	µmhos/cm	1	09/17/2013 12:45	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1800**	mg/L	1	09/19/2013 11:55	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200	S	**472**	mg/L	20	09/20/2013 19:38	R182065
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**84**	mg/L	10	09/19/2013 0:19	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.295**	mg/L	1	09/23/2013 17:29	92055
Iron	NELAP	0.02		**6.04**	mg/L	1	09/20/2013 17:19	92055
Manganese	NELAP	0.005		**1.91**	mg/L	1	09/20/2013 17:19	92055

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-026 **Client Sample ID:** TPZ166

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 12:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**8.72**	ft	1	09/17/2013 12:20	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.5**	°C	1	09/17/2013 12:20	R182124
SW-846 9040B								
pH, Field		1		**7.05**		1	09/17/2013 12:20	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**612**	µmhos/cm	1	09/17/2013 12:20	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**396**	mg/L	1	09/19/2013 11:56	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**103**	mg/L	10	09/19/2013 0:49	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**12**	mg/L	1	09/19/2013 0:43	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**0.228**	mg/L	1	09/23/2013 17:35	92055
Iron	NELAP	0.02		**0.093**	mg/L	1	09/20/2013 17:25	92055
Manganese	NELAP	0.005		**0.234**	mg/L	1	09/20/2013 17:25	92055

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-027
Client Sample ID: TPZ167
Matrix: GROUNDWATER
Collection Date: 09/17/2013 11:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**15.23**	ft	1	09/17/2013 11:55	R182124
STANDARD METHODS 2550 B								
Temperature		0		**17.7**	°C	1	09/17/2013 11:55	R182124
SW-846 9040B								
pH, Field		1		**9.91**		1	09/17/2013 11:55	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**3830**	µmhos/cm	1	09/17/2013 11:55	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**3250**	mg/L	1	09/19/2013 11:56	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	1000		**1740**	mg/L	100	09/20/2013 19:49	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**102**	mg/L	10	09/19/2013 0:57	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.2		**64.4**	mg/L	10	09/23/2013 17:53	92055
Iron	NELAP	0.02		**0.575**	mg/L	1	09/20/2013 17:44	92055
Manganese	NELAP	0.005		**0.01**	mg/L	1	09/20/2013 17:44	92055

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-028 **Client Sample ID:** TPZ168

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**17.64**	ft	1	09/17/2013 11:30	R182124
STANDARD METHODS 2550 B								
Temperature		0		**16.4**	℃	1	09/17/2013 11:30	R182124
SW-846 9040B								
pH, Field		1		**10.8**		1	09/17/2013 11:30	R182124
SW-846 9050A								
Spec. Conductance, Field		1		**5330**	µmhos/cm	1	09/17/2013 11:30	R182124
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**3910**	mg/L	1	09/19/2013 11:56	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	1000		**2630**	mg/L	100	09/20/2013 19:52	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	50		**110**	mg/L	10	09/19/2013 1:05	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.2		**102**	mg/L	10	09/23/2013 18:00	92055
Iron	NELAP	0.02		**90.6**	mg/L	1	09/20/2013 17:50	92055
Manganese	NELAP	0.005		**1.58**	mg/L	1	09/20/2013 17:50	92055

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-029 **Client Sample ID:** DUP 1

Matrix: GROUNDWATER **Collection Date:** 09/16/2013 12:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1030**	mg/L	1	09/19/2013 11:57	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		**339**	mg/L	10	09/19/2013 1:13	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5		**22**	mg/L	1	09/19/2013 1:08	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**3.59**	mg/L	1	09/23/2013 18:06	92055
Iron	NELAP	0.02		**0.428**	mg/L	1	09/20/2013 17:56	92055
Manganese	NELAP	0.005		**0.936**	mg/L	1	09/20/2013 17:56	92055

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-030 **Client Sample ID:** DUP 2

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 10:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20		**1390**	mg/L	1	09/19/2013 11:57	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200		**757**	mg/L	20	09/20/2013 20:00	R182065
SW-846 9251 (TOTAL)								
Chloride	NELAP	20		**34**	mg/L	2	09/23/2013 16:59	R182109
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.2		**39.3**	mg/L	10	09/23/2013 18:12	92055
Iron	NELAP	0.02		**11.5**	mg/L	1	09/20/2013 18:14	92055
Manganese	NELAP	0.005		**0.205**	mg/L	1	09/20/2013 18:14	92055

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13090807
Client Project: Baldwin - Groundwater Monitoring
Report Date: 02-Oct-13
Lab ID: 13090807-031
Client Sample ID: Field Blank 1
Matrix: GROUNDWATER
Collection Date: 09/16/2013 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20	J	**14**	mg/L	1	09/19/2013 11:58	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**< 10**	mg/L	1	09/19/2013 1:39	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5	J	**2**	mg/L	1	09/19/2013 1:39	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	09/19/2013 19:23	92061
Iron	NELAP	0.02		**< 0.02**	mg/L	1	09/19/2013 19:23	92061
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	09/19/2013 19:23	92061

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

Lab ID: 13090807-032 **Client Sample ID:** Field Blank 2

Matrix: GROUNDWATER **Collection Date:** 09/17/2013 14:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL)								
Total Dissolved Solids	NELAP	20	J	**10**	mg/L	1	09/19/2013 11:58	R182010
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		**< 10**	mg/L	1	09/19/2013 1:41	R181951
SW-846 9251 (TOTAL)								
Chloride	NELAP	5	J	**2**	mg/L	1	09/19/2013 1:41	R181953
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	09/19/2013 19:26	92061
Iron	NELAP	0.02		**< 0.02**	mg/L	1	09/19/2013 19:26	92061
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	09/19/2013 19:26	92061

Sample Summary

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13090807-001	MW104D	Groundwater	4	09/16/2013 9:50
13090807-002	MW104S	Groundwater	4	09/16/2013 9:45
13090807-003	MW150	Groundwater	4	09/16/2013 11:15
13090807-004	MW151	Groundwater	4	09/16/2013 10:45
13090807-005	MW152	Groundwater	4	09/16/2013 10:15
13090807-006	MW153	Groundwater	4	09/17/2013 9:25
13090807-007	MW154	Groundwater	4	09/17/2013 9:00
13090807-008	MW155	Groundwater	4	09/17/2013 8:25
13090807-009	MW252	Groundwater	4	09/16/2013 10:25
13090807-010	MW253	Groundwater	4	09/17/2013 9:35
13090807-011	MW350	Groundwater	4	09/16/2013 11:00
13090807-012	MW352	Groundwater	4	09/16/2013 10:35
13090807-013	MW355	Groundwater	4	09/17/2013 8:35
13090807-014	OW156	Groundwater	4	09/16/2013 12:30
13090807-015	OW157	Groundwater	4	09/16/2013 13:20
13090807-016	MW161	Groundwater	4	09/16/2013 11:50
13090807-017	MW262	Groundwater	4	09/16/2013 11:30
13090807-018	OW256	Groundwater	4	09/16/2013 12:15
13090807-019	OW257	Groundwater	4	09/16/2013 12:50
13090807-020	TPZ158	Groundwater	4	09/17/2013 10:10
13090807-021	TPZ159	Groundwater	4	09/17/2013 13:35
13090807-022	TPZ160	Groundwater	4	09/17/2013 13:15
13090807-023	TPZ163	Groundwater	4	09/17/2013 10:55
13090807-024	TPZ164	Groundwater	4	09/17/2013 14:00
13090807-025	TPZ165	Groundwater	4	09/17/2013 12:45
13090807-026	TPZ166	Groundwater	4	09/17/2013 12:20
13090807-027	TPZ167	Groundwater	4	09/17/2013 11:55
13090807-028	TPZ168	Groundwater	4	09/17/2013 11:30
13090807-029	DUP 1	Groundwater	3	09/16/2013 12:50
13090807-030	DUP 2	Groundwater	3	09/17/2013 10:55
13090807-031	Field Blank 1	Groundwater	3	09/16/2013 13:50
13090807-032	Field Blank 2	Groundwater	3	09/17/2013 14:40

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13090807-001A	MW104D	09/16/2013 9:50	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:45
13090807-001B	MW104D	09/16/2013 9:50	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 9:50
	Standard Methods 2550 B				09/16/2013 9:50
	SW-846 9040B				09/16/2013 9:50
	SW-846 9050A				09/16/2013 9:50
13090807-001C	MW104D	09/16/2013 9:50	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 18:52
	SW-846 9251 (Total)				09/18/2013 18:47
13090807-001D	MW104D	09/16/2013 9:50	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:24
13090807-002A	MW104S	09/16/2013 9:45	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:46
13090807-002B	MW104S	09/16/2013 9:45	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 9:45
	Standard Methods 2550 B				09/16/2013 9:45
	SW-846 9040B				09/16/2013 9:45
	SW-846 9050A				09/16/2013 9:45
13090807-002C	MW104S	09/16/2013 9:45	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 19:11
	SW-846 9251 (Total)				09/18/2013 19:11
13090807-002D	MW104S	09/16/2013 9:45	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:27
13090807-003A	MW150	09/16/2013 11:15	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:46
13090807-003B	MW150	09/16/2013 11:15	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 11:15
	Standard Methods 2550 B				09/16/2013 11:15
	SW-846 9040B				09/16/2013 11:15
	SW-846 9050A				09/16/2013 11:15
13090807-003C	MW150	09/16/2013 11:15	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 23:30
	SW-846 9251 (Total)				09/18/2013 19:38
13090807-003D	MW150	09/16/2013 11:15	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:38

Dates Report

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807

Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13090807-004A	MW151	09/16/2013 10:45	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:46
13090807-004B	MW151	09/16/2013 10:45	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 10:45
	Standard Methods 2550 B				09/16/2013 10:45
	SW-846 9040B				09/16/2013 10:45
	SW-846 9050A				09/16/2013 10:45
13090807-004C	MW151	09/16/2013 10:45	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 23:32
	SW-846 9251 (Total)				09/18/2013 19:41
13090807-004D	MW151	09/16/2013 10:45	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:42
13090807-005A	MW152	09/16/2013 10:15	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:46
13090807-005B	MW152	09/16/2013 10:15	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 10:15
	Standard Methods 2550 B				09/16/2013 10:15
	SW-846 9040B				09/16/2013 10:15
	SW-846 9050A				09/16/2013 10:15
13090807-005C	MW152	09/16/2013 10:15	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 23:38
	SW-846 9251 (Total)				09/18/2013 20:05
13090807-005D	MW152	09/16/2013 10:15	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:46
13090807-006A	MW153	09/17/2013 9:25	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:47
13090807-006B	MW153	09/17/2013 9:25	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 9:25
	Standard Methods 2550 B				09/17/2013 9:25
	SW-846 9040B				09/17/2013 9:25
	SW-846 9050A				09/17/2013 9:25
13090807-006C	MW153	09/17/2013 9:25	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 18:39
	SW-846 9251 (Total)				09/18/2013 20:13
13090807-006D	MW153	09/17/2013 9:25	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:50

Dates Report

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13090807-007A	MW154	09/17/2013 9:00	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:47
13090807-007B	MW154	09/17/2013 9:00	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 9:00
	Standard Methods 2550 B				09/17/2013 9:00
	SW-846 9040B				09/17/2013 9:00
	SW-846 9050A				09/17/2013 9:00
13090807-007C	MW154	09/17/2013 9:00	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 23:46
	SW-846 9251 (Total)				09/18/2013 20:22
13090807-007D	MW154	09/17/2013 9:00	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:53
13090807-008A	MW155	09/17/2013 8:25	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:48
13090807-008B	MW155	09/17/2013 8:25	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 8:25
	Standard Methods 2550 B				09/17/2013 8:25
	SW-846 9040B				09/17/2013 8:25
	SW-846 9050A				09/17/2013 8:25
13090807-008C	MW155	09/17/2013 8:25	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 20:30
	SW-846 9251 (Total)				09/18/2013 20:30
13090807-008D	MW155	09/17/2013 8:25	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 18:57
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/20/2013 19:26
13090807-009A	MW252	09/16/2013 10:25	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:48
13090807-009B	MW252	09/16/2013 10:25	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 10:25
	Standard Methods 2550 B				09/16/2013 10:25
	SW-846 9040B				09/16/2013 10:25
	SW-846 9050A				09/16/2013 10:25
13090807-009C	MW252	09/16/2013 10:25	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 20:43
	SW-846 9251 (Total)				09/18/2013 20:39
13090807-009D	MW252	09/16/2013 10:25	09/18/2013 8:00		

Dates Report

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 19:08
13090807-010A	MW253	09/17/2013 9:35	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:49
13090807-010B	MW253	09/17/2013 9:35	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 9:35
	Standard Methods 2550 B				09/17/2013 9:35
	SW-846 9040B				09/17/2013 9:35
	SW-846 9050A				09/17/2013 9:35
13090807-010C	MW253	09/17/2013 9:35	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 18:44
	SW-846 9251 (Total)				09/18/2013 21:04
13090807-010D	MW253	09/17/2013 9:35	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 14:15	09/19/2013 19:12
13090807-011A	MW350	09/16/2013 11:00	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:49
13090807-011B	MW350	09/16/2013 11:00	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 11:00
	Standard Methods 2550 B				09/16/2013 11:00
	SW-846 9040B				09/16/2013 11:00
	SW-846 9050A				09/16/2013 11:00
13090807-011C	MW350	09/16/2013 11:00	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 21:26
	SW-846 9251 (Total)				09/18/2013 21:26
13090807-011D	MW350	09/16/2013 11:00	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 18:20
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:10
13090807-012A	MW352	09/16/2013 10:35	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:49
13090807-012B	MW352	09/16/2013 10:35	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 10:35
	Standard Methods 2550 B				09/16/2013 10:35
	SW-846 9040B				09/16/2013 10:35
	SW-846 9050A				09/16/2013 10:35
13090807-012C	MW352	09/16/2013 10:35	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 21:32
	SW-846 9251 (Total)				09/26/2013 15:22

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13090807-012D	MW352	09/16/2013 10:35	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 15:27
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:16
13090807-013A	MW355	09/17/2013 8:35	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:50
13090807-013B	MW355	09/17/2013 8:35	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 8:35
	Standard Methods 2550 B				09/17/2013 8:35
	SW-846 9040B				09/17/2013 8:35
	SW-846 9050A				09/17/2013 8:35
13090807-013C	MW355	09/17/2013 8:35	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 18:58
	SW-846 9251 (Total)				09/18/2013 21:56
13090807-013D	MW355	09/17/2013 8:35	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 18:26
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:41
13090807-014A	OW156	09/16/2013 12:30	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:50
13090807-014B	OW156	09/16/2013 12:30	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 12:30
	Standard Methods 2550 B				09/16/2013 12:30
	SW-846 9040B				09/16/2013 12:30
	SW-846 9050A				09/16/2013 12:30
13090807-014C	OW156	09/16/2013 12:30	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:00
	SW-846 9251 (Total)				09/18/2013 22:10
13090807-014D	OW156	09/16/2013 12:30	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:01
13090807-015A	OW157	09/16/2013 13:20	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:50
13090807-015B	OW157	09/16/2013 13:20	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 13:20
	Standard Methods 2550 B				09/16/2013 13:20
	SW-846 9040B				09/16/2013 13:20
	SW-846 9050A				09/16/2013 13:20
13090807-015C	OW157	09/16/2013 13:20	09/18/2013 8:00		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Total)				09/20/2013 19:06
	SW-846 9251 (Total)				09/18/2013 22:18
13090807-015D	OW157	09/16/2013 13:20	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:07
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:47
13090807-016A	MW161	09/16/2013 11:50	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:51
13090807-016B	MW161	09/16/2013 11:50	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 11:50
	Standard Methods 2550 B				09/16/2013 11:50
	SW-846 9040B				09/16/2013 11:50
	SW-846 9050A				09/16/2013 11:50
13090807-016C	MW161	09/16/2013 11:50	09/18/2013 8:00		
	SW-846 9036 (Total)				09/26/2013 14:50
	SW-846 9251 (Total)				09/18/2013 22:20
13090807-016D	MW161	09/16/2013 11:50	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:13
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:53
13090807-017A	MW262	09/16/2013 11:30	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:51
13090807-017B	MW262	09/16/2013 11:30	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 11:30
	Standard Methods 2550 B				09/16/2013 11:30
	SW-846 9040B				09/16/2013 11:30
	SW-846 9050A				09/16/2013 11:30
13090807-017C	MW262	09/16/2013 11:30	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 22:28
	SW-846 9251 (Total)				09/18/2013 22:28
13090807-017D	MW262	09/16/2013 11:30	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:19
13090807-018A	OW256	09/16/2013 12:15	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:52
13090807-018B	OW256	09/16/2013 12:15	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 12:15
	Standard Methods 2550 B				09/16/2013 12:15
	SW-846 9040B				09/16/2013 12:15

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9050A				09/16/2013 12:15
13090807-018C	OW256	09/16/2013 12:15	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:11
	SW-846 9251 (Total)				09/18/2013 22:58
13090807-018D	OW256	09/16/2013 12:15	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:25
13090807-019A	OW257	09/16/2013 12:50	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:53
13090807-019B	OW257	09/16/2013 12:50	09/18/2013 8:00		
	Field Elevation Measurements				09/16/2013 12:50
	Standard Methods 2550 B				09/16/2013 12:50
	SW-846 9040B				09/16/2013 12:50
	SW-846 9050A				09/16/2013 12:50
13090807-019C	OW257	09/16/2013 12:50	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 23:06
	SW-846 9251 (Total)				09/18/2013 23:02
13090807-019D	OW257	09/16/2013 12:50	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:31
13090807-020A	TPZ158	09/17/2013 10:10	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:53
13090807-020B	TPZ158	09/17/2013 10:10	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 10:10
	Standard Methods 2550 B				09/17/2013 10:10
	SW-846 9040B				09/17/2013 10:10
	SW-846 9050A				09/17/2013 10:10
13090807-020C	TPZ158	09/17/2013 10:10	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 23:09
	SW-846 9251 (Total)				09/18/2013 23:14
13090807-020D	TPZ158	09/17/2013 10:10	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:37
13090807-021A	TPZ159	09/17/2013 13:35	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:54
13090807-021B	TPZ159	09/17/2013 13:35	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 13:35
	Standard Methods 2550 B				09/17/2013 13:35
	SW-846 9040B				09/17/2013 13:35

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9050A				09/17/2013 13:35
13090807-021C	TPZ159	09/17/2013 13:35	09/18/2013 8:00		
	SW-846 9036 (Total)				09/18/2013 23:22
	SW-846 9251 (Total)				09/18/2013 23:17
13090807-021D	TPZ159	09/17/2013 13:35	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 16:43
13090807-022A	TPZ160	09/17/2013 13:15	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:54
13090807-022B	TPZ160	09/17/2013 13:15	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 13:15
	Standard Methods 2550 B				09/17/2013 13:15
	SW-846 9040B				09/17/2013 13:15
	SW-846 9050A				09/17/2013 13:15
13090807-022C	TPZ160	09/17/2013 13:15	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:30
	SW-846 9251 (Total)				09/18/2013 23:25
13090807-022D	TPZ160	09/17/2013 13:15	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:01
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 16:59
13090807-023A	TPZ163	09/17/2013 10:55	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:54
13090807-023B	TPZ163	09/17/2013 10:55	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 10:55
	Standard Methods 2550 B				09/17/2013 10:55
	SW-846 9040B				09/17/2013 10:55
	SW-846 9050A				09/17/2013 10:55
13090807-023C	TPZ163	09/17/2013 10:55	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:33
	SW-846 9251 (Total)				09/18/2013 23:49
13090807-023D	TPZ163	09/17/2013 10:55	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:07
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 17:05
13090807-024A	TPZ164	09/17/2013 14:00	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:55
13090807-024B	TPZ164	09/17/2013 14:00	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 14:00

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2550 B				09/17/2013 14:00
	SW-846 9040B				09/17/2013 14:00
	SW-846 9050A				09/17/2013 14:00
13090807-024C	TPZ164	09/17/2013 14:00	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 0:03
	SW-846 9251 (Total)				09/19/2013 0:03
13090807-024D	TPZ164	09/17/2013 14:00	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:13
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 17:23
13090807-025A	TPZ165	09/17/2013 12:45	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:55
13090807-025B	TPZ165	09/17/2013 12:45	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 12:45
	Standard Methods 2550 B				09/17/2013 12:45
	SW-846 9040B				09/17/2013 12:45
	SW-846 9050A				09/17/2013 12:45
13090807-025C	TPZ165	09/17/2013 12:45	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:38
	SW-846 9251 (Total)				09/19/2013 0:19
13090807-025D	TPZ165	09/17/2013 12:45	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:19
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 17:29
13090807-026A	TPZ166	09/17/2013 12:20	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:56
13090807-026B	TPZ166	09/17/2013 12:20	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 12:20
	Standard Methods 2550 B				09/17/2013 12:20
	SW-846 9040B				09/17/2013 12:20
	SW-846 9050A				09/17/2013 12:20
13090807-026C	TPZ166	09/17/2013 12:20	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 0:49
	SW-846 9251 (Total)				09/19/2013 0:43
13090807-026D	TPZ166	09/17/2013 12:20	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:25
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 17:35
13090807-027A	TPZ167	09/17/2013 11:55	09/18/2013 8:00		

Dates Report

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total)				09/19/2013 11:56
13090807-027B	TPZ167	09/17/2013 11:55	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 11:55
	Standard Methods 2550 B				09/17/2013 11:55
	SW-846 9040B				09/17/2013 11:55
	SW-846 9050A				09/17/2013 11:55
13090807-027C	TPZ167	09/17/2013 11:55	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:49
	SW-846 9251 (Total)				09/19/2013 0:57
13090807-027D	TPZ167	09/17/2013 11:55	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:44
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 17:53
13090807-028A	TPZ168	09/17/2013 11:30	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:56
13090807-028B	TPZ168	09/17/2013 11:30	09/18/2013 8:00		
	Field Elevation Measurements				09/17/2013 11:30
	Standard Methods 2550 B				09/17/2013 11:30
	SW-846 9040B				09/17/2013 11:30
	SW-846 9050A				09/17/2013 11:30
13090807-028C	TPZ168	09/17/2013 11:30	09/18/2013 8:00		
	SW-846 9036 (Total)				09/20/2013 19:52
	SW-846 9251 (Total)				09/19/2013 1:05
13090807-028D	TPZ168	09/17/2013 11:30	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:50
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 18:00
13090807-029A	DUP 1	09/16/2013 12:50	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:57
13090807-029B	DUP 1	09/16/2013 12:50	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 1:13
	SW-846 9251 (Total)				09/19/2013 1:08
13090807-029C	DUP 1	09/16/2013 12:50	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 17:56
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 18:06
13090807-030A	DUP 2	09/17/2013 10:55	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:57
13090807-030B	DUP 2	09/17/2013 10:55	09/18/2013 8:00		

Dates Report

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Total)				09/20/2013 20:00
	SW-846 9251 (Total)				09/23/2013 16:59
13090807-030C	DUP 2	09/17/2013 10:55	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/20/2013 18:14
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 15:53	09/23/2013 18:12
13090807-031A	Field Blank 1	09/16/2013 13:50	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:58
13090807-031B	Field Blank 1	09/16/2013 13:50	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 1:39
	SW-846 9251 (Total)				09/19/2013 1:39
13090807-031C	Field Blank 1	09/16/2013 13:50	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 18:04	09/19/2013 19:23
13090807-032A	Field Blank 2	09/17/2013 14:40	09/18/2013 8:00		
	Standard Methods 2540 C (Total)				09/19/2013 11:58
13090807-032B	Field Blank 2	09/17/2013 14:40	09/18/2013 8:00		
	SW-846 9036 (Total)				09/19/2013 1:41
	SW-846 9251 (Total)				09/19/2013 1:41
13090807-032C	Field Blank 2	09/17/2013 14:40	09/18/2013 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Total)			09/18/2013 18:04	09/19/2013 19:26

SW-846 9040B

Batch R182124 **SampType:** LCSD Units RPD Limit **1.8**
SampID: LCSD-R182124

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH, Field	1		**7.05**	7	0	100.7	7.05	0.00	09/16/2013
pH, Field	1		**7.05**	7	0	100.7	7.05	0.00	09/17/2013

Batch R182124 **SampType:** LCS Units
SampID: LCS-R182124

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH, Field	1		**7.04**	7	0	100.6	99.1	101	09/17/2013
pH, Field	1		**7.05**	7	0	100.7	99.1	101	09/16/2013

SW-846 9050A

Batch R182124 **SampType:** LCSD Units **µmhos/cm** RPD Limit **10**
SampID: LCSD-R182124

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Spec. Conductance, Field	1		**1420**	1409	0	100.8	1411	0.64	09/17/2013
Spec. Conductance, Field	1		**1440**	1409	0	101.9	1411	1.76	09/16/2013

Batch R182124 **SampType:** LCS Units **µmhos/cm**
SampID: LCS-R182124

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	1		**1410**	1409	0	100.1	90	110	09/16/2013
Spec. Conductance, Field	1		**1410**	1409	0	100.2	90	110	09/17/2013

STANDARD METHODS 2540 C (TOTAL)

Batch R182010 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**< 20**						09/19/2013
Total Dissolved Solids	20		**< 20**						09/19/2013
Total Dissolved Solids	20		**< 20**						09/19/2013

Batch R182010 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**916**	1000	0	91.6	90	110	09/19/2013

Batch R182010 **SampType:** LCSQC Units **mg/L**
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**976**	1000	0	97.6	90	110	09/19/2013
Total Dissolved Solids	20		**988**	1000	0	98.8	90	110	09/19/2013

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

STANDARD METHODS 2540 C (TOTAL)

Batch R182010 **SampType:** MS Units **mg/L**

SampID: 13090807-001A MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**1190**	500	676	102.8	85	115	09/19/2013

Batch R182010 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 13090807-001A MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1200**	500	676	104.4	1190	0.67	09/19/2013

Batch R182010 **SampType:** MS Units **mg/L**

SampID: 13090807-020A MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**910**	500	394	103.2	85	115	09/19/2013

Batch R182010 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 13090807-020A MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**898**	500	394	100.8	910	1.33	09/19/2013

Batch R182010 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13090807-011A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1650**				1638	0.49	09/19/2013

Batch R182010 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13090807-025A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1980**				1804	9.20	09/19/2013

Batch R182010 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13090807-030A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1390**				1390	0.00	09/19/2013

SW-846 9036 (TOTAL)

Batch R181951 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						09/18/2013

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

SW-846 9036 (TOTAL)

Batch R181951 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20	0	99.2	90	110	09/18/2013

Batch R181951 **SampType:** MS Units **mg/L**

SampID: 13090807-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	SE	**56**	10	42.89	135.2	85	115	09/18/2013

Batch R181951 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 13090807-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	10	SE	**60**	10	42.89	169.9	56.41	5.97	09/18/2013

Batch R182015 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						09/19/2013

Batch R182015 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	96.4	90	110	09/19/2013

Batch R182065 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						09/20/2013

Batch R182065 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	94.1	90	110	09/20/2013

Batch R182065 **SampType:** MS Units **mg/L**

SampID: 13090807-010CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	200		**562**	200	349.1	106.4	85	115	09/20/2013

Batch R182065 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 13090807-010CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	200	SR	**623**	200	349.1	137.1	561.9	10.37	09/20/2013

SW-846 9036 (TOTAL)

Batch R182065 **SampType:** MS Units **mg/L**
SampID: 13090807-025CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	200	S	**732**	200	471.8	130	85	115	09/20/2013

Batch R182065 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13090807-025CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	200	S	**775**	200	471.8	151.5	731.9	5.71	09/20/2013

Batch R182102 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						09/23/2013

Batch R182102 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**18**	20	0	91.8	90	110	09/23/2013

Batch R182263 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	J	**6**						09/26/2013

Batch R182263 **SampType:** MBLK Units **mg/L**
SampID: MBLK 130923

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	J	**10**						09/26/2013

Batch R182263 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	94.6	90	110	09/26/2013

Batch R182396 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	J	**5**						10/01/2013

Batch R182396 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	95.8	90	110	10/01/2013

SW-846 9251 (TOTAL)

Batch R181953 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						09/18/2013

Batch R181953 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**19**	20	0	96	90	110	09/18/2013

Batch R181953 **SampType:** MS Units **mg/L**
SampID: 13090807-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**40**	20	18.73	106.8	85	115	09/18/2013

Batch R181953 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 13090807-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5	S	**43**	20	18.73	119	40.1	5.88	09/18/2013

Batch R181953 **SampType:** MS Units **mg/L**
SampID: 13090807-010CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**34**	20	15.03	93	85	115	09/18/2013

Batch R181953 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 13090807-010CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**34**	20	15.03	96.4	33.63	2.00	09/18/2013

Batch R181953 **SampType:** MS Units **mg/L**
SampID: 13090807-025CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	50		**268**	200	84.38	91.7	85	115	09/19/2013

Batch R181953 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 13090807-025CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	50		**274**	200	84.38	94.8	267.8	2.29	09/19/2013

Batch R182030 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						09/19/2013

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

SW-846 9251 (TOTAL)

Batch R182030 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**18**	20	0	90.6	90	110	09/19/2013

Batch R182109 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	10	J	**3**						09/23/2013

Batch R182109 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	10		**20**	20	0	98.8	90	110	09/23/2013

Batch R182243 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**1**						09/26/2013

Batch R182243 **SampType:** MBLK Units **mg/L**
SampID: MBLK 130923

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**3**						09/26/2013

Batch R182243 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20	0	99.8	90	110	09/26/2013

Batch R182394 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						10/01/2013

Batch R182394 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20	0	101.7	90	110	10/01/2013

Client: Dynegy Midwest Generation, LLC **Work Order:** 13090807

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 02-Oct-13

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 92049 **SampType:** MBLK Units **mg/L**

SampID: MBLK-92049

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	09/19/2013
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	09/20/2013
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	09/19/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	09/19/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	09/20/2013

Batch 92049 **SampType:** LCS Units **mg/L**

SampID: LCS-92049

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.52**	0.5	0	104.1	85	115	09/19/2013
Iron	0.02		**1.04**	1	0	103.7	85	115	09/20/2013
Iron	0.02		**1.03**	1	0	102.9	85	115	09/19/2013
Manganese	0.005		**0.516**	0.5	0	103.2	85	115	09/19/2013
Manganese	0.005		**0.53**	0.5	0	106	85	115	09/20/2013

Batch 92049 **SampType:** MS Units **mg/L**

SampID: 13090807-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.659**	0.5	0.141	103.6	75	125	09/19/2013
Iron	0.02		**4.22**	1	3.18	104.4	75	125	09/19/2013
Manganese	0.005		**5.48**	0.5	4.97	103	75	125	09/19/2013

Batch 92049 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 13090807-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.661**	0.5	0.141	103.9	0.659	0.27	09/19/2013
Iron	0.02		**4.2**	1	3.18	102.8	4.22	0.38	09/19/2013
Manganese	0.005		**5.45**	0.5	4.97	96.2	5.48	0.62	09/19/2013

Batch 92055 **SampType:** MBLK Units **mg/L**

SampID: MBLK-92055

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	09/20/2013
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	09/20/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	09/20/2013

Batch 92055 **SampType:** LCS Units **mg/L**

SampID: LCS-92055

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.5**	0.5	0	99.9	85	115	09/20/2013
Iron	0.02		**1.05**	1	0	105.2	85	115	09/20/2013
Manganese	0.005		**0.505**	0.5	0	101	85	115	09/20/2013

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807

Report Date: 02-Oct-13

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 92055 **SampType:** MS Units **mg/L**

SampID: 13090807-012DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**1.98**	0.5	1.42	112.2	75	125	09/23/2013
Iron	0.02		**1.24**	1	0.179	106	75	125	09/20/2013
Manganese	0.005		**0.526**	0.5	0.007	103.8	75	125	09/20/2013

Batch 92055 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 13090807-012DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**1.95**	0.5	1.42	105	1.98	1.83	09/23/2013
Iron	0.02		**1.25**	1	0.179	106.8	1.24	0.64	09/20/2013
Manganese	0.005		**0.534**	0.5	0.007	105.4	0.526	1.47	09/20/2013

Batch 92055 **SampType:** MS Units **mg/L**

SampID: 13090807-026DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.765**	0.5	0.228	107.6	75	125	09/23/2013
Iron	0.02		**1.11**	1	0.093	101.4	75	125	09/20/2013
Manganese	0.005		**0.755**	0.5	0.234	104.1	75	125	09/20/2013

Batch 92055 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 13090807-026DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.744**	0.5	0.228	103.3	0.765	2.85	09/23/2013
Iron	0.02		**1.1**	1	0.093	100.6	1.11	0.73	09/20/2013
Manganese	0.005		**0.746**	0.5	0.234	102.3	0.755	1.17	09/20/2013

Batch 92061 **SampType:** MBLK Units **mg/L**

SampID: MBLK-92061

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	09/19/2013
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	09/19/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	09/19/2013

Batch 92061 **SampType:** LCS Units **mg/L**

SampID: LCS-92061

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.523**	0.5	0	104.6	85	115	09/19/2013
Iron	0.02		**1.04**	1	0	103.9	85	115	09/19/2013
Manganese	0.005		**0.52**	0.5	0	104.1	85	115	09/19/2013

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13090807
Report Date: 02-Oct-13

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 92061 **SampType:** MS Units **mg/L**
SampID: 13090807-032CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.515**	0.5	0	103.1	75	125	09/19/2013
Iron	0.02		**1.03**	1	0	102.8	75	125	09/19/2013
Manganese	0.005		**0.514**	0.5	0	102.9	75	125	09/19/2013

Batch 92061 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 13090807-032CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.521**	0.5	0	104.2	0.515	1.12	09/19/2013
Iron	0.02		**1.03**	1	0	103.3	1.03	0.49	09/19/2013
Manganese	0.005		**0.518**	0.5	0	103.5	0.514	0.62	09/19/2013

Receiving Check List

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 13090807
Report Date: 02-Oct-13

Carrier: Rick Schmidt
Received By: EEP

Completed by:
On:
18-Sep-13
Emily E. Pohlman

Reviewed by:
On:
18-Sep-13
Michael L. Austin

Pages to follow: Chain of custody 4 Extra pages included 35

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp ℃	***1.6***
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐	
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1℃ - 6.0℃, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

Additional nitric acid was needed in the metals container for TPZ159 upon arrival at the laboratory. EEP 9/18/13

CHAIN OF CUSTODY

 Work order # 13090807

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 1.4 °C
Preserved in: ☒ LAB ☐ FIELD
FOR LAB USE ONLY
Lab Notes:

Client Comments Add HNO3 to TPZ/59 250 Metals Bottle. SRH 9/18/13

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Matrix: Groundwater	Boron, Iron, Manganese	Chloride	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	Sulfate	TDS
13090807-001	MW104D	9-16-13 9:50	3	1	X	X	X	X	X	X	X	X	X
-002	MW104S	9-16-13 9:45	3	1	X	X	X	X	X	X	X	X	X
-003	MW150	9-16-13 11:15	3	1	X	X	X	X	X	X	X	X	X
-004	MW151	9-16-13 10:45	3	1	X	X	X	X	X	X	X	X	X
-005	MW152	9-16-13 10:15	3	1	X	X	X	X	X	X	X	X	X
-006	MW153	9-17-13 9:25	3	1	X	X	X	X	X	X	X	X	X
-007	MW154	9-17-13 9:00	3	1	X	X	X	X	X	X	X	X	X
-008	MW155	9-17-13 8:25	3	1	X	X	X	X	X	X	X	X	X
-009	MW252	9-16-13 10:25	3	1	X	X	X	X	X	X	X	X	X
-010	MW253	9-17-13 9:35	3	1	X	X	X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	9-18-13 08:00	[signature]	9/18/13 8:00

BottleOrder: 16402

CHAIN OF CUSTODY

pg. 2 of 4 Work order # 13090807

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ICE BLUE ICE NO ICE ____ °C
Preserved in: LAB FIELD
FOR LAB USE ONLY
Lab Notes:

Client Comments

* well MW162 Dry - no sample

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Groundwater	Boron, Iron, Manganese	Chloride	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	Sulfate	TDS
-011	MW350	9-16-13 11:00	3	1	X	X	X	X	X	X	X	X	X
-012	MW352	9-16-13 10:35	3	1	X	X	X	X	X	X	X	X	X
-013	MW355	9-17-13 8:35	3	1	X	X	X	X	X	X	X	X	X
-014	OW156	9-16-13 12:30	3	1	X	X	X	X	X	X	X	X	X
-015	OW157	9-16-13 13:20	3	1	X	X	X	X	X	X	X	X	X
-016	MW161	9-16-13 11:50	3	1	X	X	X	X	X	X	X	X	X
*	MW162	9-16-13 11:25	3	1	X	X	X	X	X	X	X	X	X
-017	MW262	9-16-13 11:30	3	1	X	X	X	X	X	X	X	X	X
-018	OW256	9-16-13 12:15	3	1	X	X	X	X	X	X	X	X	X
-019	OW257	9-16-13 12:50	3	1	X	X	X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	9-18-13 08:00	[signature]	9/18/13 8:00

BottleOrder: 16402

CHAIN OF CUSTODY

pg. 3 of 4 Work order # 13090807

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ____ °C
Preserved in: ☐ LAB ☐ FIELD
FOR LAB USE ONLY
Lab Notes:
★ only one 250 mL w/ preserved 9/18/13

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number: Baldwin - Groundwater Monitoring
Sample Collector's Name: Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Matrix: Groundwater	Boron, Iron, Manganese	Chloride	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	Sulfate	TDS
-020	TPZ158	9-17-13 10:10	3	1	X	X	X	X	X	X	X	X	X
-021	TPZ159 ★	13:35	3	1	X	X	X	X	X	X	X	X	X
-022	TPZ160	13:15	3	1	X	X	X	X	X	X	X	X	X
-023	TPZ163	10:55	3	1	X	X	X	X	X	X	X	X	X
-024	TPZ164	14:00	3	1	X	X	X	X	X	X	X	X	X
-025	TPZ165	12:45	3	1	X	X	X	X	X	X	X	X	X
-026	TPZ166	12:20	3	1	X	X	X	X	X	X	X	X	X
-027	TPZ167	11:55	3	1	X	X	X	X	X	X	X	X	X
-028	TPZ168	11:30	3	1	X	X	X	X	X	X	X	X	X
-029	DUP 1	9-16-13 12:50	2	1	X	X	X					X	X

Relinquished By	Date/Time	Received By	Date/Time
	9-18-13 08:00		9/18/13 8:00

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 16402

CHAIN OF CUSTODY

pg. 4 of 4 Work order # 13090807

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ICE BLUE ICE NO ICE ____ °C
Preserved in: LAB FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Matrix: Groundwater	Boron, Iron, Manganese	Chloride	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	Sulfate	TDS
-030	DUP 2	9-17-13 10:55	2	1	X	X	X					X	X
	DUP 3		2	1	X	X	X					X	X
	DUP 4		2	1	X	X	X					X	X
	DUP 5		2	1	X	X	X					X	X
-031	Field Blank 1	9-16-13 13:50	2	1	X	X	X					X	X
-032	Field Blank 2	9-17-13 14:40	2	1	X	X	X					X	X
	Field Blank 3		2	1	X	X	X					X	X
	Field Blank 4		2	1	X	X	X					X	X
	Field Blank 5		2	1	X	X	X					X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	9-18-13 8:00	[signature]	9/18/13 8:00

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 16402

December 06, 2013

Brian Voelker
Dynegy Midwest Generation, LLC
604 Pierce Blvd.
O'Fallon, IL 62269
TEL: (618) 206-5800
FAX:

RE: Baldwin - Groundwater Monitoring

WorkOrder: 13111129

Dear Brian Voelker:

TEKLAB, INC received 30 samples on 11/21/2013 3:15:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129

Report Date: 06-Dec-13

This reporting package includes the following:

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Abbr Definition

Abbr	Definition
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- E - Value above quantitation range
- J - Analyte detected below quantitation limits
- ND - Not Detected at the Reporting Limit
- S - Spike Recovery outside recovery limits
- B - Analyte detected in associated Method Blank
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- R - RPD outside accepted recovery limits
- X - Value exceeds Maximum Contaminant Level

Case Narrative

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
Report Date: 06-Dec-13

Cooler Receipt Temp: 3.0 °C

An employee of Teklab, Inc. collected the sample(s).

Monitoring Wells MW154, MW155, and MW162 not sampled, Wells Dry.

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2014	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2014	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2014	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		5/31/2015	Collinsville
Kentucky	UST	0073		4/5/2014	Collinsville
Missouri	MDNR	00930		5/31/2015	Collinsville
Oklahoma	ODEQ	9978		8/31/2014	Collinsville

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-001
Client Sample ID: MW104D
Matrix: GROUNDWATER
Collection Date: 11/20/2013 10:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**14.68**	ft	1	11/20/2013 1:00	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.6**	°C	1	11/20/2013 1:00	R184648
SW-846 9040B								
pH, Field		1		**6.82**		1	11/20/2013 1:00	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1250**	µmhos/cm	1	11/20/2013 1:00	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**630**	mg/L	1	11/25/2013 14:39	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**194**	mg/L	5	11/26/2013 23:42	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**16**	mg/L	1	11/26/2013 23:36	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.025**	mg/L	1	11/22/2013 22:15	94025
Iron	NELAP	0.02		**0.073**	mg/L	1	11/22/2013 22:15	94025
Manganese	NELAP	0.005		**0.294**	mg/L	1	11/22/2013 22:15	94025

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-002
Client Sample ID: MW104S
Matrix: GROUNDWATER
Collection Date: 11/20/2013 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**14.68**	ft	1	11/20/2013 10:10	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.1**	℃	1	11/20/2013 10:10	R184648
SW-846 9040B								
pH, Field		1		**6.71**		1	11/20/2013 10:10	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1320**	µmhos/cm	1	11/20/2013 10:10	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**770**	mg/L	1	11/25/2013 14:43	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**134**	mg/L	5	11/27/2013 0:12	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**19**	mg/L	1	11/27/2013 0:01	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.044**	mg/L	1	11/22/2013 22:26	94025
Iron	NELAP	0.02		**1.44**	mg/L	1	11/22/2013 22:26	94025
Manganese	NELAP	0.005		**2.2**	mg/L	1	11/22/2013 22:26	94025

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-003
Client Sample ID: MW150
Matrix: GROUNDWATER
Collection Date: 11/20/2013 11:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**19.68**	ft	1	11/20/2013 11:50	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.3**	℃	1	11/20/2013 11:50	R184648
SW-846 9040B								
pH, Field		1		**7.07**		1	11/20/2013 11:50	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1530**	µmhos/cm	1	11/20/2013 11:50	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1090**	mg/L	1	11/25/2013 14:43	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**502**	mg/L	20	11/27/2013 0:28	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**51**	mg/L	2	11/27/2013 0:22	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.656**	mg/L	1	11/22/2013 22:30	94025
Iron	NELAP	0.02		**0.078**	mg/L	1	11/22/2013 22:30	94025
Manganese	NELAP	0.005		**0.035**	mg/L	1	11/22/2013 22:30	94025

Laboratory Results

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC | **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 06-Dec-13

Lab ID: 13111129-004 | **Client Sample ID:** MW151

Matrix: GROUNDWATER | **Collection Date:** 11/20/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**2.93**	ft	1	11/20/2013 11:30	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.2**	℃	1	11/20/2013 11:30	R184648
SW-846 9040B								
pH, Field		1		**7.13**		1	11/20/2013 11:30	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**970**	µmhos/cm	1	11/20/2013 11:30	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**542**	mg/L	1	11/25/2013 14:45	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**78**	mg/L	2	11/27/2013 0:36	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**36**	mg/L	1	11/27/2013 0:30	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.249**	mg/L	1	11/22/2013 22:33	94025
Iron	NELAP	0.02	J	**0.01**	mg/L	1	11/22/2013 22:33	94025
Manganese	NELAP	0.005	J	**0.004**	mg/L	1	11/22/2013 22:33	94025

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Work Order: 13111129

Client Project: Baldwin - Groundwater Monitoring

Report Date: 06-Dec-13

Lab ID: 13111129-005

Client Sample ID: MW152

Matrix: GROUNDWATER

Collection Date: 11/20/2013 11:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.67**	ft	1	11/20/2013 11:05	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.7**	℃	1	11/20/2013 11:05	R184648
SW-846 9040B								
pH, Field		1		**7.22**		1	11/20/2013 11:05	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1950**	µmhos/cm	1	11/20/2013 11:05	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1720**	mg/L	1	11/25/2013 14:47	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	400		**857**	mg/L	40	11/27/2013 1:00	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**55**	mg/L	2	11/27/2013 0:55	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**9.92**	mg/L	1	11/22/2013 22:37	94025
Iron	NELAP	0.02		**0.076**	mg/L	1	11/22/2013 22:37	94025
Manganese	NELAP	0.005	J	**0.005**	mg/L	1	11/22/2013 22:37	94025

Laboratory Results

Client: Dynegy Midwest Generation, LLC — **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring — **Report Date:** 06-Dec-13
Lab ID: 13111129-006 — **Client Sample ID:** MW153
Matrix: GROUNDWATER — **Collection Date:** 11/21/2013 8:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**15.05**	ft	1	11/21/2013 8:20	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.1**	℃	1	11/21/2013 8:20	R184648
SW-846 9040B								
pH, Field		1		**6.58**		1	11/21/2013 8:20	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**730**	µmhos/cm	1	11/21/2013 8:20	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**384**	mg/L	1	11/25/2013 14:48	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**98**	mg/L	2	11/27/2013 1:08	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**28**	mg/L	1	11/27/2013 1:03	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	11/25/2013 18:31	94025
Iron	NELAP	0.02	J	**0.009**	mg/L	1	11/22/2013 22:41	94025
Manganese	NELAP	0.005		**0.034**	mg/L	1	11/22/2013 22:41	94025

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-007 **Client Sample ID:** MW252

Matrix: GROUNDWATER **Collection Date:** 11/20/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**2.14**	ft	1	11/20/2013 11:30	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.8**	℃	1	11/20/2013 11:30	R184648
SW-846 9040B								
pH, Field		1		**7.07**		1	11/20/2013 11:30	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1670**	µmhos/cm	1	11/20/2013 11:30	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1250**	mg/L	1	11/25/2013 15:08	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**463**	mg/L	20	11/27/2013 1:16	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**41**	mg/L	1	11/27/2013 1:10	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.237**	mg/L	1	11/22/2013 22:44	94025
Iron	NELAP	0.02		**0.078**	mg/L	1	11/22/2013 22:44	94025
Manganese	NELAP	0.005		**0.11**	mg/L	1	11/22/2013 22:44	94025

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-008 **Client Sample ID:** MW253

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 8:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**12.99**	ft	1	11/21/2013 8:35	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.9**	°C	1	11/21/2013 8:35	R184648
SW-846 9040B								
pH, Field		1		**8.6**		1	11/21/2013 8:35	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**735**	µmhos/cm	1	11/21/2013 8:35	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**602**	mg/L	1	11/25/2013 15:08	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**405**	mg/L	10	11/27/2013 1:24	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**18**	mg/L	1	11/27/2013 1:19	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.092**	mg/L	1	11/22/2013 22:48	94025
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/22/2013 22:48	94025
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	11/22/2013 22:48	94025

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-009
Client Sample ID: MW350
Matrix: GROUNDWATER
Collection Date: 11/20/2013 12:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**22.52**	ft	1	11/20/2013 12:00	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.5**	℃	1	11/20/2013 12:00	R184648
SW-846 9040B								
pH, Field		1		**11.8**		1	11/20/2013 12:00	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**4140**	µmhos/cm	1	11/20/2013 12:00	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1370**	mg/L	1	11/25/2013 15:10	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**11**	mg/L	1	11/27/2013 1:26	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**34**	mg/L	1	11/27/2013 1:26	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.034**	mg/L	1	11/22/2013 22:59	94025
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/22/2013 22:59	94025
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	11/22/2013 22:59	94025

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-010 **Client Sample ID:** MW352

Matrix: GROUNDWATER **Collection Date:** 11/20/2013 11:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**2.49**	ft	1	11/20/2013 11:15	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.3**	°C	1	11/20/2013 11:15	R184648
SW-846 9040B								
pH, Field		1		**7.34**		1	11/20/2013 11:15	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1740**	µmhos/cm	1	11/20/2013 11:15	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**996**	mg/L	1	11/25/2013 15:10	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**11**	mg/L	1	11/27/2013 1:57	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	100		**583**	mg/L	20	11/27/2013 2:02	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**1.47**	mg/L	1	11/22/2013 23:03	94025
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/22/2013 23:03	94025
Manganese	NELAP	0.005	J	**0.003**	mg/L	1	11/22/2013 23:03	94025

Teklab, Inc. Environmental Laboratory

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-011 **Client Sample ID:** MW355

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 9:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**24.19**	ft	1	11/21/2013 9:20	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.1**	℃	1	11/21/2013 9:20	R184648
SW-846 9040B								
pH, Field		1		**7.24**		1	11/21/2013 9:20	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**682**	µmhos/cm	1	11/21/2013 9:20	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**450**	mg/L	1	11/25/2013 15:11	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**61**	mg/L	2	11/27/2013 2:10	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**11**	mg/L	1	11/27/2013 2:05	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.034**	mg/L	1	11/22/2013 23:06	94025
Iron	NELAP	0.02		**0.62**	mg/L	1	11/22/2013 23:06	94025
Manganese	NELAP	0.005		**0.064**	mg/L	1	11/22/2013 23:06	94025

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13
Lab ID: 13111129-012 **Client Sample ID:** OW156
Matrix: GROUNDWATER **Collection Date:** 11/21/2013 10:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.51**	ft	1	11/21/2013 10:25	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.2**	℃	1	11/21/2013 10:25	R184648
SW-846 9040B								
pH, Field		1		**6.61**		1	11/21/2013 10:25	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**684**	µmhos/cm	1	11/21/2013 10:25	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**466**	mg/L	1	11/25/2013 15:11	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**93**	mg/L	5	11/27/2013 2:19	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**60**	mg/L	2	11/27/2013 2:13	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.018**	mg/L	1	11/22/2013 23:10	94025
Iron	NELAP	0.02		**0.068**	mg/L	1	11/22/2013 23:10	94025
Manganese	NELAP	0.005		**0.052**	mg/L	1	11/22/2013 23:10	94025

Laboratory Results

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Client: Dynegy Midwest Generation, LLC | **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 06-Dec-13
Lab ID: 13111129-013 | **Client Sample ID:** OW157
Matrix: GROUNDWATER | **Collection Date:** 11/21/2013 11:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**5.64**	ft	1	11/21/2013 11:10	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.1**	℃	1	11/21/2013 11:10	R184648
SW-846 9040B								
pH, Field		1		**6.37**		1	11/21/2013 11:10	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**2940**	µmhos/cm	1	11/21/2013 11:10	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**3160**	mg/L	1	11/25/2013 15:11	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**1870**	mg/L	50	11/27/2013 2:40	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**121**	mg/L	5	11/27/2013 2:21	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	2		**45.2**	mg/L	100	11/25/2013 18:35	94025
Iron	NELAP	0.02		**0.059**	mg/L	1	11/22/2013 23:14	94025
Manganese	NELAP	0.005		**0.145**	mg/L	1	11/22/2013 23:14	94025

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-014 **Client Sample ID:** MW161

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 12:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**29.13**	ft	1	11/21/2013 12:40	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.2**	℃	1	11/21/2013 12:40	R184648
SW-846 9040B								
pH, Field		1		**7.08**		1	11/21/2013 12:40	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**625**	µmhos/cm	1	11/21/2013 12:40	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**756**	mg/L	1	11/25/2013 15:12	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**44**	mg/L	1	11/27/2013 2:43	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**6**	mg/L	1	11/27/2013 2:43	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.008**	mg/L	1	11/25/2013 18:38	94025
Iron	NELAP	0.02		**0.097**	mg/L	1	11/22/2013 23:17	94025
Manganese	NELAP	0.005		**1.28**	mg/L	1	11/22/2013 23:17	94025

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Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-015 **Client Sample ID:** MW262

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**37.25**	ft	1	11/21/2013 11:30	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.4**	℃	1	11/21/2013 11:30	R184648
SW-846 9040B								
pH, Field		1		**7.15**		1	11/21/2013 11:30	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**369**	µmhos/cm	1	11/21/2013 11:30	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**228**	mg/L	1	11/25/2013 15:12	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20	S	**40**	mg/L	2	11/27/2013 3:02	R184591
MS and/or MSD did not recover within control limits due to matrix interference.								
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**3**	mg/L	1	11/27/2013 2:51	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.007**	mg/L	1	11/25/2013 18:42	94025
Iron	NELAP	0.02		**0.126**	mg/L	1	11/22/2013 23:21	94025
Manganese	NELAP	0.005		**0.01**	mg/L	1	11/22/2013 23:21	94025

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-016
Client Sample ID: OW256
Matrix: GROUNDWATER
Collection Date: 11/21/2013 10:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**9.77**	ft	1	11/21/2013 10:50	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.7**	℃	1	11/21/2013 10:50	R184648
SW-846 9040B								
pH, Field		1		**6.63**		1	11/21/2013 10:50	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**723**	µmhos/cm	1	11/21/2013 10:50	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**488**	mg/L	1	11/25/2013 15:12	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**88**	mg/L	2	11/27/2013 3:12	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**65**	mg/L	2	11/27/2013 3:12	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.166**	mg/L	1	11/22/2013 23:25	94025
Iron	NELAP	0.02		**0.024**	mg/L	1	11/22/2013 23:25	94025
Manganese	NELAP	0.005		**0.131**	mg/L	1	11/22/2013 23:25	94025

Laboratory Results

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13
Lab ID: 13111129-017 **Client Sample ID:** OW257
Matrix: GROUNDWATER **Collection Date:** 11/21/2013 11:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**5.18**	ft	1	11/21/2013 11:25	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.6**	℃	1	11/21/2013 11:25	R184648
SW-846 9040B								
pH, Field		1		**7.07**		1	11/21/2013 11:25	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1180**	µmhos/cm	1	11/21/2013 11:25	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**958**	mg/L	1	11/25/2013 15:13	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**312**	mg/L	10	11/27/2013 3:39	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**21**	mg/L	1	11/27/2013 3:34	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**3.28**	mg/L	1	11/22/2013 23:28	94025
Iron	NELAP	0.02		**0.021**	mg/L	1	11/22/2013 23:28	94025
Manganese	NELAP	0.005		**0.686**	mg/L	1	11/22/2013 23:28	94025

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-018
Client Sample ID: TPZ158
Matrix: GROUNDWATER
Collection Date: 11/20/2013 15:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**14.35**	ft	1	11/20/2013 15:05	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.9**	℃	1	11/20/2013 15:05	R184648
SW-846 9040B								
pH, Field		1		**7.27**		1	11/20/2013 15:05	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**984**	µmhos/cm	1	11/20/2013 15:05	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**976**	mg/L	1	11/25/2013 15:15	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**39**	mg/L	1	11/27/2013 3:42	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**81**	mg/L	2	11/27/2013 3:47	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.012**	mg/L	1	11/25/2013 18:46	94025
Iron	NELAP	0.02		**1.43**	mg/L	1	11/22/2013 23:32	94025
Manganese	NELAP	0.005		**0.352**	mg/L	1	11/22/2013 23:32	94025

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Laboratory Results

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Client: Dynegy Midwest Generation, LLC | **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 06-Dec-13

Lab ID: 13111129-019 | **Client Sample ID:** TPZ159

Matrix: GROUNDWATER | **Collection Date:** 11/21/2013 10:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**18.36**	ft	1	11/21/2013 10:05	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.5**	°C	1	11/21/2013 10:05	R184648
SW-846 9040B								
pH, Field		1		**6.47**		1	11/21/2013 10:05	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**642**	µmhos/cm	1	11/21/2013 10:05	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**448**	mg/L	1	11/25/2013 15:16	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**96**	mg/L	5	11/27/2013 3:56	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**35**	mg/L	1	11/27/2013 3:50	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.116**	mg/L	1	11/22/2013 23:43	94025
Iron	NELAP	0.02		**0.064**	mg/L	1	11/22/2013 23:43	94025
Manganese	NELAP	0.005		**0.687**	mg/L	1	11/22/2013 23:43	94025

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-020 **Client Sample ID:** TPZ160

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 13:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.85**	ft	1	11/21/2013 13:15	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.6**	℃	1	11/21/2013 13:15	R184648
SW-846 9040B								
pH, Field		1		**7.3**		1	11/21/2013 13:15	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**659**	µmhos/cm	1	11/21/2013 13:15	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**454**	mg/L	1	11/25/2013 15:16	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**60**	mg/L	2	11/27/2013 4:04	R184591
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**42**	mg/L	1	11/27/2013 3:58	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.241**	mg/L	1	11/23/2013 1:44	94027
Iron	NELAP	0.02		**0.05**	mg/L	1	11/23/2013 1:44	94027
Manganese	NELAP	0.005		**0.126**	mg/L	1	11/23/2013 1:44	94027

Laboratory Results

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Client: Dynegy Midwest Generation, LLC | **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 06-Dec-13
Lab ID: 13111129-021 | **Client Sample ID:** TPZ163
Matrix: GROUNDWATER | **Collection Date:** 11/20/2013 10:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**11.24**	ft	1	11/20/2013 10:40	R184648
STANDARD METHODS 2550 B								
Temperature		0		**13.3**	℃	1	11/20/2013 10:40	R184648
SW-846 9040B								
pH, Field		1		**8.81**		1	11/20/2013 10:40	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1350**	µmhos/cm	1	11/20/2013 10:40	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1130**	mg/L	1	11/25/2013 15:16	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**626**	mg/L	20	11/27/2013 19:53	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**19**	mg/L	1	11/27/2013 4:06	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	2		**37.2**	mg/L	100	11/25/2013 18:49	94027
Iron	NELAP	0.02	J	**0.009**	mg/L	1	11/23/2013 2:03	94027
Manganese	NELAP	0.005	J	**0.003**	mg/L	1	11/23/2013 2:03	94027

Laboratory Results

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-022 **Client Sample ID:** TPZ164

Matrix: GROUNDWATER **Collection Date:** 11/20/2013 14:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.52**	ft	1	11/20/2013 14:35	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.5**	℃	1	11/20/2013 14:35	R184648
SW-846 9040B								
pH, Field		1		**7.46**		1	11/20/2013 14:35	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**952**	µmhos/cm	1	11/20/2013 14:35	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**592**	mg/L	1	11/25/2013 15:18	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**218**	mg/L	10	11/27/2013 19:56	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**81**	mg/L	2	11/27/2013 4:28	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**2.64**	mg/L	1	11/23/2013 2:06	94027
Iron	NELAP	0.02		**6.86**	mg/L	1	11/23/2013 2:06	94027
Manganese	NELAP	0.005		**0.565**	mg/L	1	11/23/2013 2:06	94027

Laboratory Results

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Client: Dynegy Midwest Generation, LLC   **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring   **Report Date:** 06-Dec-13
Lab ID: 13111129-023   **Client Sample ID:** TPZ165
Matrix: GROUNDWATER   **Collection Date:** 11/20/2013 12:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.83**	ft	1	11/20/2013 12:25	R184648
STANDARD METHODS 2550 B								
Temperature		0		**15.2**	℃	1	11/20/2013 12:25	R184648
SW-846 9040B								
pH, Field		1		**7.18**		1	11/20/2013 12:25	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**1730**	µmhos/cm	1	11/20/2013 12:25	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1420**	mg/L	1	11/25/2013 15:18	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**342**	mg/L	10	11/27/2013 19:59	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**71**	mg/L	2	11/27/2013 4:36	R184599
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.246**	mg/L	1	11/25/2013 18:53	94027
Iron	NELAP	0.02	J	**0.015**	mg/L	1	11/23/2013 2:10	94027
Manganese	NELAP	0.005		**1.09**	mg/L	1	11/23/2013 2:10	94027

Laboratory Results

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13
Lab ID: 13111129-024 **Client Sample ID:** TPZ166
Matrix: GROUNDWATER **Collection Date:** 11/20/2013 13:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.85**	ft	1	11/20/2013 13:25	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.7**	°C	1	11/20/2013 13:25	R184648
SW-846 9040B								
pH, Field		1		**7.7**		1	11/20/2013 13:25	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**951**	µmhos/cm	1	11/20/2013 13:25	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**304**	mg/L	1	11/25/2013 15:18	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**56**	mg/L	2	12/02/2013 17:11	R184674
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**12**	mg/L	1	11/27/2013 20:04	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.101**	mg/L	1	11/25/2013 18:57	94027
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/23/2013 2:14	94027
Manganese	NELAP	0.005		**0.024**	mg/L	1	11/23/2013 2:14	94027

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-025
Client Sample ID: TPZ167
Matrix: GROUNDWATER
Collection Date: 11/20/2013 12:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.36**	ft	1	11/20/2013 12:55	R184648
STANDARD METHODS 2550 B								
Temperature		0		**16**	℃	1	11/20/2013 12:55	R184648
SW-846 9040B								
pH, Field		1		**8.15**		1	11/20/2013 12:55	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**2920**	µmhos/cm	1	11/20/2013 12:55	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**3010**	mg/L	1	11/25/2013 15:18	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**1850**	mg/L	50	11/27/2013 20:12	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**100**	mg/L	5	11/27/2013 20:07	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	2		**53**	mg/L	100	11/25/2013 19:01	94027
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/23/2013 2:17	94027
Manganese	NELAP	0.005	J	**0.004**	mg/L	1	11/23/2013 2:17	94027

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-026 **Client Sample ID:** TPZ168

Matrix: GROUNDWATER **Collection Date:** 11/20/2013 13:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**13.88**	ft	1	11/20/2013 13:55	R184648
STANDARD METHODS 2550 B								
Temperature		0		**14.4**	℃	1	11/20/2013 13:55	R184648
SW-846 9040B								
pH, Field		1		**9.17**		1	11/20/2013 13:55	R184648
SW-846 9050A								
Spec. Conductance, Field		1		**5140**	µmhos/cm	1	11/20/2013 13:55	R184648
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**3680**	mg/L	1	11/25/2013 15:19	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	2000		**2760**	mg/L	200	12/02/2013 17:13	R184674
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**109**	mg/L	5	11/27/2013 20:15	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	2		**87.2**	mg/L	100	11/25/2013 19:04	94027
Iron	NELAP	0.02	J	**0.009**	mg/L	1	11/23/2013 2:21	94027
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	11/23/2013 2:21	94027

Laboratory Results

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-027 **Client Sample ID:** DUP 1

Matrix: GROUNDWATER **Collection Date:** 11/20/2013 10:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**678**	mg/L	1	11/25/2013 15:19	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**200**	mg/L	5	12/02/2013 17:19	R184674
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**16**	mg/L	1	11/27/2013 20:36	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.018**	mg/L	1	11/25/2013 19:15	94027
Iron	NELAP	0.02		**0.043**	mg/L	1	11/23/2013 2:25	94027
Manganese	NELAP	0.005		**0.316**	mg/L	1	11/23/2013 2:25	94027

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Lab ID: 13111129-028 **Client Sample ID:** DUP 2

Matrix: GROUNDWATER **Collection Date:** 11/21/2013 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**234**	mg/L	1	11/25/2013 15:19	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**40**	mg/L	1	11/27/2013 20:44	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**3**	mg/L	1	11/27/2013 20:44	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.007**	mg/L	1	11/25/2013 19:19	94027
Iron	NELAP	0.02		**0.095**	mg/L	1	11/23/2013 2:28	94027
Manganese	NELAP	0.005		**0.008**	mg/L	1	11/23/2013 2:28	94027

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13
Lab ID: 13111129-029 **Client Sample ID:** Field Blank 1
Matrix: GROUNDWATER **Collection Date:** 11/20/2013 15:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20	J	**18**	mg/L	1	11/25/2013 15:20	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10	J	**6**	mg/L	1	11/27/2013 20:56	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**2**	mg/L	1	11/27/2013 20:56	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	11/25/2013 19:23	94027
Iron	NELAP	0.02		**< 0.02**	mg/L	1	11/23/2013 2:39	94027
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	11/23/2013 2:39	94027

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13
Lab ID: 13111129-030
Client Sample ID: Field Blank 2
Matrix: GROUNDWATER
Collection Date: 11/21/2013 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20	J	**16**	mg/L	1	11/25/2013 15:20	R184530
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10	J	**5**	mg/L	1	11/27/2013 21:00	R184625
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**1**	mg/L	1	11/27/2013 21:00	R184631
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	11/25/2013 19:26	94027
Iron	NELAP	0.02	J	**0.008**	mg/L	1	11/23/2013 2:43	94027
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	11/23/2013 2:43	94027

Sample Summary

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
Report Date: 06-Dec-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13111129-001	MW104D	Groundwater	4	11/20/2013 10:00
13111129-002	MW104S	Groundwater	4	11/20/2013 10:10
13111129-003	MW150	Groundwater	4	11/20/2013 11:50
13111129-004	MW151	Groundwater	4	11/20/2013 11:30
13111129-005	MW152	Groundwater	4	11/20/2013 11:05
13111129-006	MW153	Groundwater	4	11/21/2013 8:20
13111129-007	MW252	Groundwater	4	11/20/2013 11:30
13111129-008	MW253	Groundwater	4	11/21/2013 8:35
13111129-009	MW350	Groundwater	4	11/20/2013 12:00
13111129-010	MW352	Groundwater	4	11/20/2013 11:15
13111129-011	MW355	Groundwater	4	11/21/2013 9:20
13111129-012	OW156	Groundwater	4	11/21/2013 10:25
13111129-013	OW157	Groundwater	4	11/21/2013 11:10
13111129-014	MW161	Groundwater	4	11/21/2013 12:40
13111129-015	MW262	Groundwater	4	11/21/2013 11:30
13111129-016	OW256	Groundwater	4	11/21/2013 10:50
13111129-017	OW257	Groundwater	4	11/21/2013 11:25
13111129-018	TPZ158	Groundwater	4	11/20/2013 15:05
13111129-019	TPZ159	Groundwater	4	11/21/2013 10:05
13111129-020	TPZ160	Groundwater	4	11/21/2013 13:15
13111129-021	TPZ163	Groundwater	4	11/20/2013 10:40
13111129-022	TPZ164	Groundwater	4	11/20/2013 14:35
13111129-023	TPZ165	Groundwater	4	11/20/2013 12:25
13111129-024	TPZ166	Groundwater	4	11/20/2013 13:25
13111129-025	TPZ167	Groundwater	4	11/20/2013 12:55
13111129-026	TPZ168	Groundwater	4	11/20/2013 13:55
13111129-027	DUP 1	Groundwater	3	11/20/2013 10:00
13111129-028	DUP 2	Groundwater	3	11/21/2013 11:30
13111129-029	Field Blank 1	Groundwater	3	11/20/2013 15:30
13111129-030	Field Blank 2	Groundwater	3	11/21/2013 13:50

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
Report Date: 06-Dec-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13111129-001A	MW104D	11/20/2013 10:00	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 1:00
	Standard Methods 2550 B				11/20/2013 1:00
	SW-846 9040B				11/20/2013 1:00
	SW-846 9050A				11/20/2013 1:00
13111129-001B	MW104D	11/20/2013 10:00	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:39
13111129-001C	MW104D	11/20/2013 10:00	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/26/2013 23:42
	SW-846 9251 (Dissolved)				11/26/2013 23:36
13111129-001D	MW104D	11/20/2013 10:00	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:15
13111129-002A	MW104S	11/20/2013 10:10	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 10:10
	Standard Methods 2550 B				11/20/2013 10:10
	SW-846 9040B				11/20/2013 10:10
	SW-846 9050A				11/20/2013 10:10
13111129-002B	MW104S	11/20/2013 10:10	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:43
13111129-002C	MW104S	11/20/2013 10:10	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 0:12
	SW-846 9251 (Dissolved)				11/27/2013 0:01
13111129-002D	MW104S	11/20/2013 10:10	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:26
13111129-003A	MW150	11/20/2013 11:50	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 11:50
	Standard Methods 2550 B				11/20/2013 11:50
	SW-846 9040B				11/20/2013 11:50
	SW-846 9050A				11/20/2013 11:50
13111129-003B	MW150	11/20/2013 11:50	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:43
13111129-003C	MW150	11/20/2013 11:50	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 0:28
	SW-846 9251 (Dissolved)				11/27/2013 0:22
13111129-003D	MW150	11/20/2013 11:50	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:30

Dates Report

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129

Report Date: 06-Dec-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13111129-004A	MW151	11/20/2013 11:30	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 11:30
	Standard Methods 2550 B				11/20/2013 11:30
	SW-846 9040B				11/20/2013 11:30
	SW-846 9050A				11/20/2013 11:30
13111129-004B	MW151	11/20/2013 11:30	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:45
13111129-004C	MW151	11/20/2013 11:30	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 0:36
	SW-846 9251 (Dissolved)				11/27/2013 0:30
13111129-004D	MW151	11/20/2013 11:30	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:33
13111129-005A	MW152	11/20/2013 11:05	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 11:05
	Standard Methods 2550 B				11/20/2013 11:05
	SW-846 9040B				11/20/2013 11:05
	SW-846 9050A				11/20/2013 11:05
13111129-005B	MW152	11/20/2013 11:05	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:47
13111129-005C	MW152	11/20/2013 11:05	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:00
	SW-846 9251 (Dissolved)				11/27/2013 0:55
13111129-005D	MW152	11/20/2013 11:05	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:37
13111129-006A	MW153	11/21/2013 8:20	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 8:20
	Standard Methods 2550 B				11/21/2013 8:20
	SW-846 9040B				11/21/2013 8:20
	SW-846 9050A				11/21/2013 8:20
13111129-006B	MW153	11/21/2013 8:20	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 14:48
13111129-006C	MW153	11/21/2013 8:20	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:08
	SW-846 9251 (Dissolved)				11/27/2013 1:03
13111129-006D	MW153	11/21/2013 8:20	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:41

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/25/2013 18:31
13111129-007A	MW252	11/20/2013 11:30	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 11:30
	Standard Methods 2550 B				11/20/2013 11:30
	SW-846 9040B				11/20/2013 11:30
	SW-846 9050A				11/20/2013 11:30
13111129-007B	MW252	11/20/2013 11:30	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:08
13111129-007C	MW252	11/20/2013 11:30	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:16
	SW-846 9251 (Dissolved)				11/27/2013 1:10
13111129-007D	MW252	11/20/2013 11:30	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:44
13111129-008A	MW253	11/21/2013 8:35	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 8:35
	Standard Methods 2550 B				11/21/2013 8:35
	SW-846 9040B				11/21/2013 8:35
	SW-846 9050A				11/21/2013 8:35
13111129-008B	MW253	11/21/2013 8:35	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:08
13111129-008C	MW253	11/21/2013 8:35	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:24
	SW-846 9251 (Dissolved)				11/27/2013 1:19
13111129-008D	MW253	11/21/2013 8:35	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:48
13111129-009A	MW350	11/20/2013 12:00	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 12:00
	Standard Methods 2550 B				11/20/2013 12:00
	SW-846 9040B				11/20/2013 12:00
	SW-846 9050A				11/20/2013 12:00
13111129-009B	MW350	11/20/2013 12:00	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:10
13111129-009C	MW350	11/20/2013 12:00	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:26
	SW-846 9251 (Dissolved)				11/27/2013 1:26
13111129-009D	MW350	11/20/2013 12:00	11/21/2013 15:15		

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
Report Date: 06-Dec-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 22:59
13111129-010A	MW352	11/20/2013 11:15	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 11:15
	Standard Methods 2550 B				11/20/2013 11:15
	SW-846 9040B				11/20/2013 11:15
	SW-846 9050A				11/20/2013 11:15
13111129-010B	MW352	11/20/2013 11:15	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:10
13111129-010C	MW352	11/20/2013 11:15	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 1:57
	SW-846 9251 (Dissolved)				11/27/2013 2:02
13111129-010D	MW352	11/20/2013 11:15	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:03
13111129-011A	MW355	11/21/2013 9:20	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 9:20
	Standard Methods 2550 B				11/21/2013 9:20
	SW-846 9040B				11/21/2013 9:20
	SW-846 9050A				11/21/2013 9:20
13111129-011B	MW355	11/21/2013 9:20	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:11
13111129-011C	MW355	11/21/2013 9:20	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 2:10
	SW-846 9251 (Dissolved)				11/27/2013 2:05
13111129-011D	MW355	11/21/2013 9:20	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:06
13111129-012A	OW156	11/21/2013 10:25	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 10:25
	Standard Methods 2550 B				11/21/2013 10:25
	SW-846 9040B				11/21/2013 10:25
	SW-846 9050A				11/21/2013 10:25
13111129-012B	OW156	11/21/2013 10:25	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:11
13111129-012C	OW156	11/21/2013 10:25	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 2:19
	SW-846 9251 (Dissolved)				11/27/2013 2:13
13111129-012D	OW156	11/21/2013 10:25	11/21/2013 15:15		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:10
13111129-013A	OW157	11/21/2013 11:10	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 11:10
	Standard Methods 2550 B				11/21/2013 11:10
	SW-846 9040B				11/21/2013 11:10
	SW-846 9050A				11/21/2013 11:10
13111129-013B	OW157	11/21/2013 11:10	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:11
13111129-013C	OW157	11/21/2013 11:10	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 2:40
	SW-846 9251 (Dissolved)				11/27/2013 2:21
13111129-013D	OW157	11/21/2013 11:10	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:14
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/25/2013 18:35
13111129-014A	MW161	11/21/2013 12:40	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 12:40
	Standard Methods 2550 B				11/21/2013 12:40
	SW-846 9040B				11/21/2013 12:40
	SW-846 9050A				11/21/2013 12:40
13111129-014B	MW161	11/21/2013 12:40	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:12
13111129-014C	MW161	11/21/2013 12:40	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 2:43
	SW-846 9251 (Dissolved)				11/27/2013 2:43
13111129-014D	MW161	11/21/2013 12:40	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:17
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/25/2013 18:38
13111129-015A	MW262	11/21/2013 11:30	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 11:30
	Standard Methods 2550 B				11/21/2013 11:30
	SW-846 9040B				11/21/2013 11:30
	SW-846 9050A				11/21/2013 11:30
13111129-015B	MW262	11/21/2013 11:30	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:12
13111129-015C	MW262	11/21/2013 11:30	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 3:02

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Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

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Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9251 (Dissolved)				11/27/2013 2:51
13111129-015D	MW262	11/21/2013 11:30	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:21
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/25/2013 18:42
13111129-016A	OW256	11/21/2013 10:50	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 10:50
	Standard Methods 2550 B				11/21/2013 10:50
	SW-846 9040B				11/21/2013 10:50
	SW-846 9050A				11/21/2013 10:50
13111129-016B	OW256	11/21/2013 10:50	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:12
13111129-016C	OW256	11/21/2013 10:50	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 3:12
	SW-846 9251 (Dissolved)				11/27/2013 3:12
13111129-016D	OW256	11/21/2013 10:50	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:25
13111129-017A	OW257	11/21/2013 11:25	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 11:25
	Standard Methods 2550 B				11/21/2013 11:25
	SW-846 9040B				11/21/2013 11:25
	SW-846 9050A				11/21/2013 11:25
13111129-017B	OW257	11/21/2013 11:25	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:13
13111129-017C	OW257	11/21/2013 11:25	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 3:39
	SW-846 9251 (Dissolved)				11/27/2013 3:34
13111129-017D	OW257	11/21/2013 11:25	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:28
13111129-018A	TPZ158	11/20/2013 15:05	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 15:05
	Standard Methods 2550 B				11/20/2013 15:05
	SW-846 9040B				11/20/2013 15:05
	SW-846 9050A				11/20/2013 15:05
13111129-018B	TPZ158	11/20/2013 15:05	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:15
13111129-018C	TPZ158	11/20/2013 15:05	11/21/2013 15:15		

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Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

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Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Dissolved)				11/27/2013 3:42
	SW-846 9251 (Dissolved)				11/27/2013 3:47
13111129-018D	TPZ158	11/20/2013 15:05	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:32
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/25/2013 18:46
13111129-019A	TPZ159	11/21/2013 10:05	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 10:05
	Standard Methods 2550 B				11/21/2013 10:05
	SW-846 9040B				11/21/2013 10:05
	SW-846 9050A				11/21/2013 10:05
13111129-019B	TPZ159	11/21/2013 10:05	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:16
13111129-019C	TPZ159	11/21/2013 10:05	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 3:56
	SW-846 9251 (Dissolved)				11/27/2013 3:50
13111129-019D	TPZ159	11/21/2013 10:05	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 10:50	11/22/2013 23:43
13111129-020A	TPZ160	11/21/2013 13:15	11/21/2013 15:15		
	Field Elevation Measurements				11/21/2013 13:15
	Standard Methods 2550 B				11/21/2013 13:15
	SW-846 9040B				11/21/2013 13:15
	SW-846 9050A				11/21/2013 13:15
13111129-020B	TPZ160	11/21/2013 13:15	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:16
13111129-020C	TPZ160	11/21/2013 13:15	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 4:04
	SW-846 9251 (Dissolved)				11/27/2013 3:58
13111129-020D	TPZ160	11/21/2013 13:15	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 1:44
13111129-021A	TPZ163	11/20/2013 10:40	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 10:40
	Standard Methods 2550 B				11/20/2013 10:40
	SW-846 9040B				11/20/2013 10:40
	SW-846 9050A				11/20/2013 10:40
13111129-021B	TPZ163	11/20/2013 10:40	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:16

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Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13111129-021C	TPZ163	11/20/2013 10:40	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 19:53
	SW-846 9251 (Dissolved)				11/27/2013 4:06
13111129-021D	TPZ163	11/20/2013 10:40	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:03
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 18:49
13111129-022A	TPZ164	11/20/2013 14:35	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 14:35
	Standard Methods 2550 B				11/20/2013 14:35
	SW-846 9040B				11/20/2013 14:35
	SW-846 9050A				11/20/2013 14:35
13111129-022B	TPZ164	11/20/2013 14:35	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:18
13111129-022C	TPZ164	11/20/2013 14:35	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 19:56
	SW-846 9251 (Dissolved)				11/27/2013 4:28
13111129-022D	TPZ164	11/20/2013 14:35	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:06
13111129-023A	TPZ165	11/20/2013 12:25	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 12:25
	Standard Methods 2550 B				11/20/2013 12:25
	SW-846 9040B				11/20/2013 12:25
	SW-846 9050A				11/20/2013 12:25
13111129-023B	TPZ165	11/20/2013 12:25	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:18
13111129-023C	TPZ165	11/20/2013 12:25	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 19:59
	SW-846 9251 (Dissolved)				11/27/2013 4:36
13111129-023D	TPZ165	11/20/2013 12:25	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:10
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 18:53
13111129-024A	TPZ166	11/20/2013 13:25	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 13:25
	Standard Methods 2550 B				11/20/2013 13:25
	SW-846 9040B				11/20/2013 13:25
	SW-846 9050A				11/20/2013 13:25

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Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
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Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13111129-024B	TPZ166	11/20/2013 13:25	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:18
13111129-024C	TPZ166	11/20/2013 13:25	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				12/02/2013 17:11
	SW-846 9251 (Dissolved)				11/27/2013 20:04
13111129-024D	TPZ166	11/20/2013 13:25	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:14
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 18:57
13111129-025A	TPZ167	11/20/2013 12:55	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 12:55
	Standard Methods 2550 B				11/20/2013 12:55
	SW-846 9040B				11/20/2013 12:55
	SW-846 9050A				11/20/2013 12:55
13111129-025B	TPZ167	11/20/2013 12:55	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:18
13111129-025C	TPZ167	11/20/2013 12:55	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 20:12
	SW-846 9251 (Dissolved)				11/27/2013 20:07
13111129-025D	TPZ167	11/20/2013 12:55	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:17
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:01
13111129-026A	TPZ168	11/20/2013 13:55	11/21/2013 15:15		
	Field Elevation Measurements				11/20/2013 13:55
	Standard Methods 2550 B				11/20/2013 13:55
	SW-846 9040B				11/20/2013 13:55
	SW-846 9050A				11/20/2013 13:55
13111129-026B	TPZ168	11/20/2013 13:55	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:19
13111129-026C	TPZ168	11/20/2013 13:55	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				12/02/2013 17:13
	SW-846 9251 (Dissolved)				11/27/2013 20:15
13111129-026D	TPZ168	11/20/2013 13:55	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:21
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:04
13111129-027A	DUP 1	11/20/2013 10:00	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:19

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Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129
Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
13111129-027B	DUP 1	11/20/2013 10:00	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				12/02/2013 17:19
	SW-846 9251 (Dissolved)				11/27/2013 20:36
13111129-027C	DUP 1	11/20/2013 10:00	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:25
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:15
13111129-028A	DUP 2	11/21/2013 11:30	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:19
13111129-028B	DUP 2	11/21/2013 11:30	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 20:44
	SW-846 9251 (Dissolved)				11/27/2013 20:44
13111129-028C	DUP 2	11/21/2013 11:30	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:28
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:19
13111129-029A	Field Blank 1	11/20/2013 15:30	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:20
13111129-029B	Field Blank 1	11/20/2013 15:30	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 20:56
	SW-846 9251 (Dissolved)				11/27/2013 20:56
13111129-029C	Field Blank 1	11/20/2013 15:30	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:39
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:23
13111129-030A	Field Blank 2	11/21/2013 13:50	11/21/2013 15:15		
	Standard Methods 2540 C (Dissolved)				11/25/2013 15:20
13111129-030B	Field Blank 2	11/21/2013 13:50	11/21/2013 15:15		
	SW-846 9036 (Dissolved)				11/27/2013 21:00
	SW-846 9251 (Dissolved)				11/27/2013 21:00
13111129-030C	Field Blank 2	11/21/2013 13:50	11/21/2013 15:15		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/23/2013 2:43
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			11/22/2013 11:29	11/25/2013 19:26

Client: Dynegy Midwest Generation, LLC **Work Order:** 13111129

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 06-Dec-13

SW-846 9040B

Batch R184648 **SampType:** LCSD Units RPD Limit **1.8**

SampID: LCSD-R184648

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH, Field	1		**7.05**	7	0	100.7	7.03	0.28	11/20/2013
pH, Field	1		**7.04**	7	0	100.6	7.03	0.14	11/21/2013

Batch R184648 **SampType:** LCS Units

SampID: LCS-R184648

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH, Field	1		**6.99**	7	0	99.9	99.1	101	11/21/2013
pH, Field	1		**7.03**	7	0	100.4	99.1	101	11/20/2013

SW-846 9050A

Batch R184648 **SampType:** LCSD Units **µmhos/cm** RPD Limit **10**

SampID: LCSD-R184648

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Spec. Conductance, Field	1		**1430**	1409	0	101.2	1411	1.06	11/21/2013
Spec. Conductance, Field	1		**1420**	1409	0	100.6	1411	0.42	11/20/2013

Batch R184648 **SampType:** LCS Units **µmhos/cm**

SampID: LCS-R184648

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	1		**1410**	1409	0	100.1	90	110	11/20/2013
Spec. Conductance, Field	1		**1410**	1409	0	100.1	90	110	11/21/2013

STANDARD METHODS 2540 C (DISSOLVED)

Batch R184530 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**< 20**						11/25/2013
Total Dissolved Solids	20		**< 20**						11/25/2013
Total Dissolved Solids	20		**< 20**						11/25/2013
Total Dissolved Solids	20		**< 20**						11/25/2013

Batch R184530 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**936**	1000	0	93.6	90	110	11/25/2013

Batch R184530 **SampType:** LCSQC Units **mg/L**

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**960**	1000	0	96	90	110	11/25/2013
Total Dissolved Solids	20		**1000**	1000	0	100.4	90	110	11/25/2013
Total Dissolved Solids	20		**986**	1000	0	98.6	90	110	11/25/2013

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STANDARD METHODS 2540 C (DISSOLVED)

Batch R184530 **SampType:** MS Units **mg/L**

SampID: 13111129-001B MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**1160**	500	630	106.4	85	115	11/25/2013

Batch R184530 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 13111129-001B MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1170**	500	630	108	1162	0.69	11/25/2013

Batch R184530 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13111129-004B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**534**				542	1.49	11/25/2013

Batch R184530 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13111129-005B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1740**				1722	1.04	11/25/2013

SW-846 9036 (DISSOLVED)

Batch R184591 **SampType:** MBLK Units **mg/L**

SampID: MB-R184591

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	J	**7**						11/26/2013

Batch R184591 **SampType:** LCS Units **mg/L**

SampID: LCS-R184591

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	96.3	90	110	11/26/2013

Batch R184591 **SampType:** MS Units **mg/L**

SampID: 13111129-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	50		**180**	50	133.7	91.8	85	115	11/27/2013

Batch R184591 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 13111129-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	50		**184**	50	133.7	101.2	179.6	2.60	11/27/2013

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SW-846 9036 (DISSOLVED)

Batch R184591 **SampType:** MS Units **mg/L**
SampID: 13111129-015CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	20	S	**56**	20	40.34	76.2	85	115	11/27/2013

Batch R184591 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13111129-015CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	20		**59**	20	40.34	92.2	55.58	5.60	11/27/2013

Batch R184625 **SampType:** MBLK Units **mg/L**
SampID: MB-R184625

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10	J	**6**						11/27/2013

Batch R184625 **SampType:** LCS Units **mg/L**
SampID: LCS-R184625

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20	0	99	90	110	11/27/2013

Batch R184674 **SampType:** MBLK Units **mg/L**
SampID: MB-R184674

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						12/02/2013

Batch R184674 **SampType:** LCS Units **mg/L**
SampID: LCS-R184674

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	96.7	90	110	12/02/2013

SW-846 9251 (DISSOLVED)

Batch R184599 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						11/26/2013

Batch R184599 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20	0	100.8	90	110	11/26/2013

SW-846 9251 (DISSOLVED)

Batch R184599 **SampType:** MS Units **mg/L**
SampID: 13111129-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**40**	20	18.77	103.7	85	115	11/27/2013

Batch R184599 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 13111129-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**40**	20	18.77	107.7	39.51	2.00	11/27/2013

Batch R184599 **SampType:** MS Units **mg/L**
SampID: 13111129-015CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**22**	20	3.25	94.8	85	115	11/27/2013

Batch R184599 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 13111129-015CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**22**	20	3.25	94.7	22.22	0.14	11/27/2013

Batch R184631 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						11/27/2013

Batch R184631 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20	0	97.6	90	110	11/27/2013

Batch R184684 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						12/02/2013

Batch R184684 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**20**	20	0	98.9	90	110	12/02/2013

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 94025 **SampType:** MBLK Units **mg/L**
SampID: MBLK-94025

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	11/22/2013
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	11/22/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	11/22/2013

Batch 94025 **SampType:** LCS Units **mg/L**
SampID: LCS-94025

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.47**	0.5	0	94	85	115	11/22/2013
Iron	0.02		**0.931**	1	0	93.1	85	115	11/22/2013
Manganese	0.005		**0.477**	0.5	0	95.5	85	115	11/22/2013

Batch 94025 **SampType:** MS Units **mg/L**
SampID: 13111129-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.484**	0.5	0.025	91.8	75	125	11/22/2013
Iron	0.02		**0.977**	1	0.073	90.4	75	125	11/22/2013
Manganese	0.005		**0.753**	0.5	0.294	91.8	75	125	11/22/2013

Batch 94025 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 13111129-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.486**	0.5	0.025	92.3	0.484	0.54	11/22/2013
Iron	0.02		**0.981**	1	0.073	90.8	0.977	0.43	11/22/2013
Manganese	0.005		**0.755**	0.5	0.294	92.2	0.753	0.25	11/22/2013

Batch 94027 **SampType:** MBLK Units **mg/L**
SampID: MBLK-94027

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	11/23/2013
Iron	0.02	J	**0.007**	0.02	0	35.5	-100	100	11/23/2013
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	11/23/2013

Batch 94027 **SampType:** LCS Units **mg/L**
SampID: LCS-94027

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.458**	0.5	0	91.6	85	115	11/23/2013
Iron	0.02		**0.91**	1	0	91	85	115	11/23/2013
Manganese	0.005		**0.471**	0.5	0	94.1	85	115	11/23/2013

Quality Control Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 13111129
Report Date: 06-Dec-13

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 94027 **SampType:** **MS** Units **mg/L**

SampID: 13111129-020DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.7**	0.5	0.241	91.9	75	125	11/23/2013
Iron	0.02		**0.961**	1	0.05	91	75	125	11/23/2013
Manganese	0.005		**0.596**	0.5	0.126	94	75	125	11/23/2013

Batch 94027 **SampType:** **MSD** Units **mg/L** RPD Limit **20**

SampID: 13111129-020DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.715**	0.5	0.241	94.8	0.7	2.08	11/23/2013
Iron	0.02		**0.988**	1	0.05	93.7	0.961	2.76	11/23/2013
Manganese	0.005		**0.606**	0.5	0.126	96.1	0.596	1.70	11/23/2013

Receiving Check List

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 13111129
Client Project: Baldwin - Groundwater Monitoring
Report Date: 06-Dec-13

Carrier: Rick Schmidt
Received By: EEP

Completed by: Emily E. Pohlman
On: 21-Nov-13

Reviewed by: Michael L. Austin
On: 21-Nov-13

Pages to follow: Chain of custody 4 Extra pages included 35

Question				
Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp ℃ ***3.0***
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		

When thermal preservation is required, samples are compliant with a temperature between 0.1℃ - 6.0℃, or when samples are received on ice the same day as collected.

Question				
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

CHAIN OF COUSTODY

pg. 1 of 4 Work order # 1311129

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip: O'Fallon, IL 62269
Contact: Brian Voelker
Phone: (618) 206-5800
E-Mail:
Fax:

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 3.0 °C
Preserved in: ☐ LAB ☒ FIELD EGP 11/21/13
FOR LAB USE ONLY
Lab Notes:

Client Comments

* no sample collected

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled		UNP	HNO3	Groundwater	Dissolved (B Fe Mn)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS
1311129-001	MW104D	11/20/13	10:00	3	1	X	X	X	X	X	X	X	X	X
-002	MW104S	11/20/13	10:10	3	1	X	X	X	X	X	X	X	X	X
-003	MW150	11/20/13	11:50	3	1	X	X	X	X	X	X	X	X	X
-004	MW151	11/20/13	11:30	3	1	X	X	X	X	X	X	X	X	X
-005	MW152	11/20/13	11:05	3	1	X	X	X	X	X	X	X	X	X
-006	MW153	11/21/13	8:20	3	1	X	X	X	X	X	X	X	X	X
*	MW154	11/21/13	8:50	3	1	X	X	X	X	X	X	X	X	X
*	MW155	11/21/13	9:10	3	1	X	X	X	X	X	X	X	X	X
-007	MW252	11/20/13	11:30	3	1	X	X	X	X	X	X	X	X	X
-008	MW253	11/21/13	8:35	3	1	X	X	X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	11-21-13 15:15	[signature]	11/21/13 1515

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 17315

CHAIN OF CUSTODY

pg. 2 of 4 Work order # 1311129

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ____ °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

*No sample collected

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3						Matrix: Groundwater					Dissolved (B Fe Mn)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS					
-009	MW350	11/20/13 12:00	3	1						X					X	X	X	X	X	X	X	X					
-010	MW352	11/20/13 11:15	3	1						X					X	X	X	X	X	X	X	X					
-011	MW355	11/21/13 9:20	3	1						X					X	X	X	X	X	X	X	X					
-012	OW156	11/21/13 10:25 ~~10:35~~	3	1						X					X	X	X	X	X	X	X	X					
-013	OW157	11/21/13 11:10	3	1						X					X	X	X	X	X	X	X	X					
-014	MW161	11/21/13 12:40	3	1						X					X	X	X	X	X	X	X	X					
*	MW162	11/21/13 11:40	3	1						X					X	X	X	X	X	X	X	X					
-015	MW262	11/21/13 11:30	3	1						X					X	X	X	X	X	X	X	X					
-016	OW256	11/21/13 10:50	3	1						X					X	X	X	X	X	X	X	X					
-017	OW257	11/21/13 11:25	3	1						X					X	X	X	X	X	X	X	X					

Relinquished By	Date/Time	Received By	Date/Time
[signature]	11-21-13 15:15	[signature]	11/21/13 1515

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BottleOrder: 17315

CHAIN OF CUSTODY

pg. 3 of 4 Work order # 1311129

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ______ °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Groundwater	Dissolved (B Fe Mn)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS
-018	TPZ158	11/20/13 15:05	3	1	X	X	X	X	X	X	X	X	X
-019	TPZ159	11/21/13 10:05	3	1	X	X	X	X	X	X	X	X	X
-020	TPZ160	11/21/13 13:15	3	1	X	X	X	X	X	X	X	X	X
-021	TPZ163	11/20/13 10:40	3	1	X	X	X	X	X	X	X	X	X
-022	TPZ164	11/20/13 14:35	3	1	X	X	X	X	X	X	X	X	X
-023	TPZ165	11/20/13 12:25	3	1	X	X	X	X	X	X	X	X	X
-024	TPZ166	11/20/13 13:25	3	1	X	X	X	X	X	X	X	X	X
-025	TPZ167	11/20/13 12:55	3	1	X	X	X	X	X	X	X	X	X
-026	TPZ168	11/20/13 13:55	3	1	X	X	X	X	X	X	X	X	X
-027	DUP 1	11/20/13 10:00	2	1	X	X	X	X					X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	11-21-13 15:15	[signature]	11/21/13 1515

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BottleOrder: 17315

CHAIN OF CUSTODY

pg. 4 of 4 Work order # 1311129

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ______ °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number	Sample Collector's Name
Baldwin - Groundwater Monitoring	Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	Groundwater	Dissolved (B Fe Mn)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS
-028	DUP 2	11/21/13 11:30 to 10:50	2	1	X	X	X	X					X
	DUP 3		2	1	X	X	X	X					X
	DUP 4		2	1	X	X	X	X					X
	DUP 5		2	1	X	X	X	X					X
-029	Field Blank 1	11/20/13 15:30	2	1	X	X	X	X					X
-030	Field Blank 2	11/21/13 13:50	2	1	X	X	X	X					X
	Field Blank 3		2	1	X	X	X	X					X
	Field Blank 4		2	1	X	X	X	X					X
	Field Blank 5		2	1	X	X	X	X					X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	11-21-13 1545	[signature]	11/21/13 1515

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 17315

February 27, 2014

Brian Voelker
Dynegy Midwest Generation, LLC
604 Pierce Blvd.
O'Fallon, IL 62269
TEL: (618) 206-5800
FAX:

NELAP ACCREDITED TNI LABORATORY

RE: Baldwin - Groundwater Monitoring **WorkOrder:** 14020560

Dear Brian Voelker:

TEKLAB, INC received 33 samples on 2/20/2014 8:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560

Report Date: 27-Feb-14

This reporting package includes the following:

Abbr Definition

Abbr	Definition
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
E -	Value above quantitation range	H -	Holding times exceeded
J -	Analyte detected below quantitation limits	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	X -	Value exceeds Maximum Contaminant Level

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Cooler Receipt Temp: 3.6 °C

An employee of Teklab, Inc. collected the sample(s).

Monitoring Well MW162 not sampled, Wells Dry.

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2015	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2014	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2014	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2014	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		5/31/2015	Collinsville
Kentucky	UST	0073		1/31/2015	Collinsville
Missouri	MDNR	00930		5/31/2015	Collinsville
Oklahoma	ODEQ	9978		8/31/2014	Collinsville

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-001 **Client Sample ID:** MW104D

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 9:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**9.2**	ft	1	02/18/2014 9:33	R187610
STANDARD METHODS 2550 B								
Temperature		0		**12.2**	°C	1	02/18/2014 9:33	R187610
SW-846 9040B								
pH, Field		1		**6.75**		1	02/18/2014 9:33	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**991**	µmhos/cm	1	02/18/2014 9:33	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**652**	mg/L	1	02/20/2014 13:23	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**175**	mg/L	5	02/21/2014 11:11	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**18**	mg/L	1	02/21/2014 11:05	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.015**	mg/L	1	02/21/2014 14:38	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 14:38	96224
Manganese	NELAP	0.005		**0.041**	mg/L	1	02/21/2014 14:38	96224

Teklab, Inc. Environmental Laboratory

Laboratory Results

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Client: Dynegy Midwest Generation, LLC

Work Order: 14020560

Client Project: Baldwin - Groundwater Monitoring

Report Date: 27-Feb-14

Lab ID: 14020560-002

Client Sample ID: MW104S

Matrix: GROUNDWATER

Collection Date: 02/18/2014 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**9.19**	ft	1	02/18/2014 9:45	R187610
STANDARD METHODS 2550 B								
Temperature		0		**12.8**	°C	1	02/18/2014 9:45	R187610
SW-846 9040B								
pH, Field		1		**6.73**		1	02/18/2014 9:45	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**809**	µmhos/cm	1	02/18/2014 9:45	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**792**	mg/L	1	02/20/2014 13:24	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**138**	mg/L	5	02/21/2014 11:19	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**18**	mg/L	1	02/21/2014 11:14	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.059**	mg/L	1	02/21/2014 14:56	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 14:56	96224
Manganese	NELAP	0.005		**0.59**	mg/L	1	02/21/2014 14:56	96224

Teklab Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-003
Client Sample ID: MW150
Matrix: GROUNDWATER
Collection Date: 02/19/2014 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**18.49**	ft	1	02/19/2014 10:10	R187610
STANDARD METHODS 2550 B								
Temperature		0		**12.7**	°C	1	02/19/2014 10:10	R187610
SW-846 9040B								
pH, Field		1		**6.99**		1	02/19/2014 10:10	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1330**	µmhos/cm	1	02/19/2014 10:10	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1200**	mg/L	1	02/20/2014 13:24	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**521**	mg/L	20	02/21/2014 11:41	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**51**	mg/L	2	02/21/2014 11:22	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.808**	mg/L	1	02/21/2014 15:02	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:02	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 15:02	96224

Laboratory Results

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-004
Client Sample ID: MW151
Matrix: GROUNDWATER
Collection Date: 02/19/2014 9:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**2.2**	ft	1	02/19/2014 9:40	R187610
STANDARD METHODS 2550 B								
Temperature		0		**8.5**	°C	1	02/19/2014 9:40	R187610
SW-846 9040B								
pH, Field		1		**7.12**		1	02/19/2014 9:40	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**852**	µmhos/cm	1	02/19/2014 9:40	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**538**	mg/L	1	02/20/2014 13:24	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**74**	mg/L	2	02/21/2014 11:49	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**35**	mg/L	1	02/21/2014 11:43	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.239**	mg/L	1	02/21/2014 15:20	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:20	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 15:20	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-005 **Client Sample ID:** MW152

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 9:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**5.13**	ft	1	02/19/2014 9:05	R187610
STANDARD METHODS 2550 B								
Temperature		0		**9.5**	°C	1	02/19/2014 9:05	R187610
SW-846 9040B								
pH, Field		1		**6.36**		1	02/19/2014 9:05	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1880**	µmhos/cm	1	02/19/2014 9:05	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1770**	mg/L	1	02/20/2014 13:24	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**898**	mg/L	50	02/21/2014 11:57	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**56**	mg/L	2	02/21/2014 11:51	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**12.7**	mg/L	1	02/21/2014 15:26	96224
Iron	NELAP	0.02		**0.054**	mg/L	1	02/21/2014 15:26	96224
Manganese	NELAP	0.005	J	**0.003**	mg/L	1	02/21/2014 15:26	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-006 **Client Sample ID:** MW153

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 11:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**11.41**	ft	1	02/19/2014 11:35	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.7**	°C	1	02/19/2014 11:35	R187610
SW-846 9040B								
pH, Field		1		**7.16**		1	02/19/2014 11:35	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**561**	µmhos/cm	1	02/19/2014 11:35	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**402**	mg/L	1	02/20/2014 13:25	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**81**	mg/L	5	02/21/2014 12:05	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**22**	mg/L	1	02/21/2014 12:00	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	02/24/2014 17:57	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:32	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 15:32	96224

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-007
Client Sample ID: MW154
Matrix: GROUNDWATER
Collection Date: 02/19/2014 12:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.38**	ft	1	02/19/2014 12:05	R187610
STANDARD METHODS 2550 B								
Temperature		0		**11.3**	°C	1	02/19/2014 12:05	R187610
SW-846 9040B								
pH, Field		1		**7.4**		1	02/19/2014 12:05	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**713**	µmhos/cm	1	02/19/2014 12:05	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**454**	mg/L	1	02/20/2014 13:25	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**48**	mg/L	1	02/21/2014 12:08	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**8**	mg/L	1	02/21/2014 12:08	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.021**	mg/L	1	02/21/2014 15:38	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:38	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 15:38	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-008 **Client Sample ID:** MW155

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 12:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**21.16**	ft	1	02/19/2014 12:35	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.7**	°C	1	02/19/2014 12:35	R187610
SW-846 9040B								
pH, Field		1		**7.02**		1	02/19/2014 12:35	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**3890**	µmhos/cm	1	02/19/2014 12:35	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1080**	mg/L	1	02/20/2014 13:26	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**54**	mg/L	2	02/21/2014 12:35	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**8**	mg/L	1	02/21/2014 12:16	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.009**	mg/L	1	02/21/2014 15:44	96224
Iron	NELAP	0.02		**0.482**	mg/L	1	02/21/2014 15:44	96224
Manganese	NELAP	0.005		**0.359**	mg/L	1	02/21/2014 15:44	96224

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Work Order: 14020560

Client Project: Baldwin - Groundwater Monitoring

Report Date: 27-Feb-14

Lab ID: 14020560-009

Client Sample ID: MW252

Matrix: GROUNDWATER

Collection Date: 02/19/2014 9:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**0.25**	ft	1	02/19/2014 9:15	R187610
STANDARD METHODS 2550 B								
Temperature		0		**10.9**	°C	1	02/19/2014 9:15	R187610
SW-846 9040B								
pH, Field		1		**8.05**		1	02/19/2014 9:15	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1320**	µmhos/cm	1	02/19/2014 9:15	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1310**	mg/L	1	02/20/2014 13:26	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**480**	mg/L	20	02/21/2014 12:43	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**41**	mg/L	2	02/21/2014 12:37	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.236**	mg/L	1	02/21/2014 15:51	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:51	96224
Manganese	NELAP	0.005		**0.012**	mg/L	1	02/21/2014 15:51	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-010 **Client Sample ID:** MW253

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 11:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**11.26**	ft	1	02/19/2014 11:20	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14.4**	°C	1	02/19/2014 11:20	R187610
SW-846 9040B								
pH, Field		1		**7.85**		1	02/19/2014 11:20	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**833**	µmhos/cm	1	02/19/2014 11:20	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**564**	mg/L	1	02/20/2014 13:26	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**368**	mg/L	20	02/21/2014 12:51	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**16**	mg/L	1	02/21/2014 12:45	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.068**	mg/L	1	02/21/2014 15:57	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 15:57	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 15:57	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-011 **Client Sample ID:** MW350

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 10:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**22.31**	ft	1	02/19/2014 10:20	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.3**	°C	1	02/19/2014 10:20	R187610
SW-846 9040B								
pH, Field		1		**8.08**		1	02/19/2014 10:20	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**4170**	µmhos/cm	1	02/19/2014 10:20	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1420**	mg/L	1	02/20/2014 13:27	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10	J	**7**	mg/L	1	02/21/2014 12:54	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**33**	mg/L	2	02/24/2014 15:50	R187511
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.03**	mg/L	1	02/21/2014 16:15	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 16:15	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 16:15	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-012 **Client Sample ID:** MW352

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 9:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**0.85**	ft	1	02/19/2014 9:25	R187610
STANDARD METHODS 2550 B								
Temperature		0		**11.5**	°C	1	02/19/2014 9:25	R187610
SW-846 9040B								
pH, Field		1		**6.51**		1	02/19/2014 9:25	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1530**	µmhos/cm	1	02/19/2014 9:25	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**768**	mg/L	1	02/20/2014 13:28	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**18**	mg/L	1	02/21/2014 13:29	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	100		**390**	mg/L	20	02/21/2014 13:34	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.826**	mg/L	1	02/21/2014 16:33	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 16:33	96224
Manganese	NELAP	0.005	J	**0.002**	mg/L	1	02/21/2014 16:33	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-013 **Client Sample ID:** MW355

Matrix: GROUNDWATER **Collection Date:** 02/19/2014 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**23.7**	ft	1	02/19/2014 13:00	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.5**	°C	1	02/19/2014 13:00	R187610
SW-846 9040B								
pH, Field		1		**7.05**		1	02/19/2014 13:00	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**691**	µmhos/cm	1	02/19/2014 13:00	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**458**	mg/L	1	02/20/2014 13:28	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**65**	mg/L	2	02/21/2014 13:42	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**11**	mg/L	1	02/21/2014 13:37	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.024**	mg/L	1	02/21/2014 16:39	96224
Iron	NELAP	0.02		**0.034**	mg/L	1	02/21/2014 16:39	96224
Manganese	NELAP	0.005		**0.051**	mg/L	1	02/21/2014 16:39	96224

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-014
Client Sample ID: OW156
Matrix: GROUNDWATER
Collection Date: 02/18/2014 13:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.19**	ft	1	02/18/2014 13:45	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.3**	°C	1	02/18/2014 13:45	R187610
SW-846 9040B								
pH, Field		1		**6.82**		1	02/18/2014 13:45	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**662**	µmhos/cm	1	02/18/2014 13:45	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**470**	mg/L	1	02/20/2014 13:29	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**88**	mg/L	5	02/21/2014 14:09	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**55**	mg/L	5	02/21/2014 14:09	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.032**	mg/L	1	02/21/2014 16:45	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 16:45	96224
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 16:45	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-015 **Client Sample ID:** OW157

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 11:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**3.83**	ft	1	02/18/2014 11:55	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13**	°C	1	02/18/2014 11:55	R187610
SW-846 9040B								
pH, Field		1		**6.63**		1	02/18/2014 11:55	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**3150**	µmhos/cm	1	02/18/2014 11:55	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**3180**	mg/L	1	02/20/2014 13:53	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**2050**	mg/L	50	02/21/2014 14:25	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**124**	mg/L	5	02/21/2014 14:19	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.2		**45.3**	mg/L	10	02/24/2014 18:15	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 16:51	96224
Manganese	NELAP	0.005		**0.134**	mg/L	1	02/21/2014 16:51	96224

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-016 **Client Sample ID:** MW161

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 14:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**21.05**	ft	1	02/18/2014 14:45	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14.2**	°C	1	02/18/2014 14:45	R187610
SW-846 9040B								
pH, Field		1		**6.95**		1	02/18/2014 14:45	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**603**	µmhos/cm	1	02/18/2014 14:45	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**430**	mg/L	1	02/20/2014 13:55	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**44**	mg/L	2	02/21/2014 14:33	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**5**	mg/L	1	02/21/2014 14:28	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.012**	mg/L	1	02/24/2014 18:03	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 16:57	96224
Manganese	NELAP	0.005		**0.834**	mg/L	1	02/21/2014 16:57	96224

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-018
Client Sample ID: MW262
Matrix: GROUNDWATER
Collection Date: 02/19/2014 10:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**37.61**	ft	1	02/19/2014 10:50	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14.7**	°C	1	02/19/2014 10:50	R187610
SW-846 9040B								
pH, Field		1		**7.48**		1	02/19/2014 10:50	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**301**	µmhos/cm	1	02/19/2014 10:50	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**188**	mg/L	1	02/20/2014 13:56	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**24**	mg/L	2	02/21/2014 15:01	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**3**	mg/L	1	02/21/2014 14:36	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.016**	mg/L	1	02/24/2014 18:09	96224
Iron	NELAP	0.02		**0.026**	mg/L	1	02/21/2014 17:03	96224
Manganese	NELAP	0.005		**0.024**	mg/L	1	02/21/2014 17:03	96224

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Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-019 **Client Sample ID:** OW256

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 13:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.2**	ft	1	02/18/2014 13:35	R187610
STANDARD METHODS 2550 B								
Temperature		0		**10.7**	°C	1	02/18/2014 13:35	R187610
SW-846 9040B								
pH, Field		1		**6.77**		1	02/18/2014 13:35	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**723**	µmhos/cm	1	02/18/2014 13:35	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**508**	mg/L	1	02/20/2014 13:56	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**90**	mg/L	2	02/21/2014 15:11	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**57**	mg/L	2	02/21/2014 15:11	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.154**	mg/L	1	02/21/2014 17:09	96224
Iron	NELAP	0.02	J	**0.011**	mg/L	1	02/21/2014 17:09	96224
Manganese	NELAP	0.005	J	**0.002**	mg/L	1	02/21/2014 17:09	96224

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-020
Client Sample ID: OW257
Matrix: GROUNDWATER
Collection Date: 02/18/2014 11:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**3.96**	ft	1	02/18/2014 11:40	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.1**	°C	1	02/18/2014 11:40	R187610
SW-846 9040B								
pH, Field		1		**7.12**		1	02/18/2014 11:40	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1120**	µmhos/cm	1	02/18/2014 11:40	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**900**	mg/L	1	02/20/2014 13:56	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**310**	mg/L	10	02/21/2014 15:25	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**18**	mg/L	1	02/21/2014 15:19	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**2.88**	mg/L	1	02/21/2014 17:15	96224
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 17:15	96224
Manganese	NELAP	0.005		**0.013**	mg/L	1	02/21/2014 17:15	96224

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Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-021 **Client Sample ID:** TPZ158

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 9:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**18.24**	ft	1	02/18/2014 9:05	R187610
STANDARD METHODS 2550 B								
Temperature		0		**10.2**	°C	1	02/18/2014 9:05	R187610
SW-846 9040B								
pH, Field		1		**6.73**		1	02/18/2014 9:05	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**584**	µmhos/cm	1	02/18/2014 9:05	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**380**	mg/L	1	02/20/2014 13:57	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**44**	mg/L	1	02/21/2014 15:27	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**65**	mg/L	2	02/24/2014 16:01	R187511
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.006**	mg/L	1	02/25/2014 11:22	96224
Iron	NELAP	0.02	J	**0.008**	mg/L	1	02/21/2014 17:21	96224
Manganese	NELAP	0.005	J	**0.004**	mg/L	1	02/21/2014 17:21	96224

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Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-022 **Client Sample ID:** TPZ159

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 13:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**18.12**	ft	1	02/18/2014 13:15	R187610
STANDARD METHODS 2550 B								
Temperature		0		**15.1**	°C	1	02/18/2014 13:15	R187610
SW-846 9040B								
pH, Field		1		**6.55**		1	02/18/2014 13:15	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**593**	µmhos/cm	1	02/18/2014 13:15	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**480**	mg/L	1	02/20/2014 13:57	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**98**	mg/L	5	02/21/2014 15:54	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**35**	mg/L	1	02/21/2014 15:35	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.121**	mg/L	1	02/24/2014 18:27	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 17:52	96227
Manganese	NELAP	0.005		**0.512**	mg/L	1	02/21/2014 17:52	96227

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-023 **Client Sample ID:** TPZ160

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 14:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.16**	ft	1	02/18/2014 14:20	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.4**	°C	1	02/18/2014 14:20	R187610
SW-846 9040B								
pH, Field		1		**7.02**		1	02/18/2014 14:20	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**682**	µmhos/cm	1	02/18/2014 14:20	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**510**	mg/L	1	02/20/2014 13:58	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	20		**63**	mg/L	2	02/21/2014 16:02	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**44**	mg/L	1	02/21/2014 15:57	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.219**	mg/L	1	02/24/2014 18:45	96227
Iron	NELAP	0.02		**0.399**	mg/L	1	02/21/2014 17:58	96227
Manganese	NELAP	0.005		**0.167**	mg/L	1	02/21/2014 17:58	96227

Client: Dynegy Midwest Generation, LLC | **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 27-Feb-14

Lab ID: 14020560-024 | **Client Sample ID:** TPZ163

Matrix: GROUNDWATER | **Collection Date:** 02/18/2014 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.35**	ft	1	02/18/2014 10:10	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.4**	°C	1	02/18/2014 10:10	R187610
SW-846 9040B								
pH, Field		1		**7.59**		1	02/18/2014 10:10	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1070**	µmhos/cm	1	02/18/2014 10:10	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1160**	mg/L	1	02/20/2014 13:58	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	200		**610**	mg/L	20	02/21/2014 16:11	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**15**	mg/L	1	02/21/2014 16:05	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.2		**37.8**	mg/L	10	02/24/2014 19:58	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 18:04	96227
Manganese	NELAP	0.005	J	**0.003**	mg/L	1	02/21/2014 18:04	96227

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560

Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14

Lab ID: 14020560-025
Client Sample ID: TPZ164

Matrix: GROUNDWATER
Collection Date: 02/18/2014 12:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.39**	ft	1	02/18/2014 12:35	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14**	°C	1	02/18/2014 12:35	R187610
SW-846 9040B								
pH, Field		1		**7.32**		1	02/18/2014 12:35	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**1430**	µmhos/cm	1	02/18/2014 12:35	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**504**	mg/L	1	02/20/2014 13:58	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	50		**173**	mg/L	5	02/21/2014 16:13	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**67**	mg/L	5	02/21/2014 16:13	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**1.76**	mg/L	1	02/24/2014 18:51	96227
Iron	NELAP	0.02		**5.52**	mg/L	1	02/21/2014 18:10	96227
Manganese	NELAP	0.005		**0.582**	mg/L	1	02/21/2014 18:10	96227

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-026 **Client Sample ID:** TPZ165

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 15:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**4.52**	ft	1	02/18/2014 15:05	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14**	°C	1	02/18/2014 15:05	R187610
SW-846 9040B								
pH, Field		1		**6.45**		1	02/18/2014 15:05	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**3170**	µmhos/cm	1	02/18/2014 15:05	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**2290**	mg/L	1	02/20/2014 13:59	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**1070**	mg/L	50	02/24/2014 16:47	R187510
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**91**	mg/L	2	02/21/2014 16:21	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**1.35**	mg/L	1	02/24/2014 19:09	96227
Iron	NELAP	0.02		**3.89**	mg/L	1	02/21/2014 18:28	96227
Manganese	NELAP	0.005		**12.7**	mg/L	1	02/21/2014 18:28	96227

Laboratory Results

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Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-027
Client Sample ID: TPZ166
Matrix: GROUNDWATER
Collection Date: 02/18/2014 11:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**6.37**	ft	1	02/18/2014 11:15	R187610
STANDARD METHODS 2550 B								
Temperature		0		**13.5**	°C	1	02/18/2014 11:15	R187610
SW-846 9040B								
pH, Field		1		**7.24**		1	02/18/2014 11:15	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**423**	µmhos/cm	1	02/18/2014 11:15	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**306**	mg/L	1	02/20/2014 14:00	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**38**	mg/L	1	02/21/2014 16:29	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**12**	mg/L	1	02/21/2014 16:29	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**0.066**	mg/L	1	02/24/2014 19:15	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 18:34	96227
Manganese	NELAP	0.005		**0.282**	mg/L	1	02/21/2014 18:34	96227

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-028
Client Sample ID: TPZ167
Matrix: GROUNDWATER
Collection Date: 02/18/2014 10:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**5.11**	ft	1	02/18/2014 10:35	R187610
STANDARD METHODS 2550 B								
Temperature		0		**14.3**	°C	1	02/18/2014 10:35	R187610
SW-846 9040B								
pH, Field		1		**7.7**		1	02/18/2014 10:35	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**3540**	µmhos/cm	1	02/18/2014 10:35	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**3040**	mg/L	1	02/20/2014 14:00	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**1840**	mg/L	50	02/21/2014 16:57	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**100**	mg/L	5	02/21/2014 16:51	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.2		**54.5**	mg/L	10	02/24/2014 20:04	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 18:40	96227
Manganese	NELAP	0.005	J	**0.002**	mg/L	1	02/21/2014 18:40	96227

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Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-029 **Client Sample ID:** TPZ168

Matrix: GROUNDWATER **Collection Date:** 02/18/2014 10:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS								
Depth to water from measuring point		0		**7.88**	ft	1	02/18/2014 10:50	R187610
STANDARD METHODS 2550 B								
Temperature		0		**15.3**	°C	1	02/18/2014 10:50	R187610
SW-846 9040B								
pH, Field		1		**8.08**		1	02/18/2014 10:50	R187610
SW-846 9050A								
Spec. Conductance, Field		1		**6020**	µmhos/cm	1	02/18/2014 10:50	R187610
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	100		**5120**	mg/L	5	02/24/2014 11:44	R187527
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	1000		**2820**	mg/L	100	02/21/2014 17:05	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	25		**103**	mg/L	5	02/21/2014 16:59	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.2		**78.8**	mg/L	10	02/24/2014 20:10	96227
Iron	NELAP	0.02		**0.061**	mg/L	1	02/21/2014 18:58	96227
Manganese	NELAP	0.005	J	**0.003**	mg/L	1	02/21/2014 18:58	96227

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-030
Client Sample ID: DUP 1
Matrix: GROUNDWATER
Collection Date: 02/18/2014 9:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**666**	mg/L	1	02/20/2014 14:01	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	100		**190**	mg/L	10	02/21/2014 17:13	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5		**19**	mg/L	1	02/21/2014 17:07	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.018**	mg/L	1	02/24/2014 19:22	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 19:04	96227
Manganese	NELAP	0.005		**0.042**	mg/L	1	02/21/2014 19:04	96227

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Work Order: 14020560
Client Project: Baldwin - Groundwater Monitoring
Report Date: 27-Feb-14
Lab ID: 14020560-031
Client Sample ID: DUP 2
Matrix: GROUNDWATER
Collection Date: 02/19/2014 9:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**1820**	mg/L	1	02/20/2014 14:03	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	500		**901**	mg/L	50	02/24/2014 17:14	R187510
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	10		**56**	mg/L	2	02/24/2014 16:50	R187511
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**12.5**	mg/L	1	02/24/2014 19:28	96227
Iron	NELAP	0.02	J	**0.015**	mg/L	1	02/21/2014 19:10	96227
Manganese	NELAP	0.005	J	**0.004**	mg/L	1	02/21/2014 19:10	96227

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Laboratory Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-033 **Client Sample ID:** Field Blank 1

Matrix: AQUEOUS **Collection Date:** 02/18/2014 8:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20		**< 20**	mg/L	1	02/20/2014 14:03	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**< 10**	mg/L	1	02/21/2014 17:25	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**2**	mg/L	1	02/21/2014 17:25	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02		**< 0.02**	mg/L	1	02/25/2014 11:16	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 19:17	96227
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 19:17	96227

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

Lab ID: 14020560-034 **Client Sample ID:** Field Blank 2

Matrix: AQUEOUS **Collection Date:** 02/19/2014 8:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (DISSOLVED)								
Total Dissolved Solids	NELAP	20	J	**12**	mg/L	1	02/20/2014 14:03	R187421
SW-846 9036 (DISSOLVED)								
Sulfate	NELAP	10		**< 10**	mg/L	1	02/21/2014 17:44	R187442
SW-846 9251 (DISSOLVED)								
Chloride	NELAP	5	J	**2**	mg/L	1	02/21/2014 17:44	R187451
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Boron	NELAP	0.02	J	**0.017**	mg/L	1	02/24/2014 19:40	96227
Iron	NELAP	0.02		**< 0.02**	mg/L	1	02/21/2014 19:23	96227
Manganese	NELAP	0.005		**< 0.005**	mg/L	1	02/21/2014 19:23	96227

Sample Summary

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560
Report Date: 27-Feb-14

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
14020560-001	MW104D	Groundwater	4	02/18/2014 9:33
14020560-002	MW104S	Groundwater	4	02/18/2014 9:45
14020560-003	MW150	Groundwater	4	02/19/2014 10:10
14020560-004	MW151	Groundwater	4	02/19/2014 9:40
14020560-005	MW152	Groundwater	4	02/19/2014 9:05
14020560-006	MW153	Groundwater	4	02/19/2014 11:35
14020560-007	MW154	Groundwater	4	02/19/2014 12:05
14020560-008	MW155	Groundwater	4	02/19/2014 12:35
14020560-009	MW252	Groundwater	4	02/19/2014 9:15
14020560-010	MW253	Groundwater	4	02/19/2014 11:20
14020560-011	MW350	Groundwater	4	02/19/2014 10:20
14020560-012	MW352	Groundwater	4	02/19/2014 9:25
14020560-013	MW355	Groundwater	4	02/19/2014 13:00
14020560-014	OW156	Groundwater	4	02/18/2014 13:45
14020560-015	OW157	Groundwater	4	02/18/2014 11:55
14020560-016	MW161	Groundwater	4	02/18/2014 14:45
14020560-017	MW162	Groundwater	4	02/19/2014 10:35
14020560-018	MW262	Groundwater	4	02/19/2014 10:50
14020560-019	OW256	Groundwater	4	02/18/2014 13:35
14020560-020	OW257	Groundwater	4	02/18/2014 11:40
14020560-021	TPZ158	Groundwater	4	02/18/2014 9:05
14020560-022	TPZ159	Groundwater	4	02/18/2014 13:15
14020560-023	TPZ160	Groundwater	4	02/18/2014 14:20
14020560-024	TPZ163	Groundwater	4	02/18/2014 10:10
14020560-025	TPZ164	Groundwater	4	02/18/2014 12:35
14020560-026	TPZ165	Groundwater	4	02/18/2014 15:05
14020560-027	TPZ166	Groundwater	4	02/18/2014 11:15
14020560-028	TPZ167	Groundwater	4	02/18/2014 10:35
14020560-029	TPZ168	Groundwater	4	02/18/2014 10:50
14020560-030	DUP 1	Groundwater	3	02/18/2014 9:33
14020560-031	DUP 2	Groundwater	3	02/19/2014 9:05
14020560-033	Field Blank 1	Aqueous	3	02/18/2014 8:45
14020560-034	Field Blank 2	Aqueous	3	02/19/2014 8:30

Teklab, Inc. Environmental Laboratory

Dates Report

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560
Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
14020560-001A	MW104D	02/18/2014 9:33	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 9:33
	Standard Methods 2550 B				02/18/2014 9:33
	SW-846 9040B				02/18/2014 9:33
	SW-846 9050A				02/18/2014 9:33
14020560-001B	MW104D	02/18/2014 9:33	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:23
14020560-001C	MW104D	02/18/2014 9:33	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 11:11
	SW-846 9251 (Dissolved)				02/21/2014 11:05
14020560-001D	MW104D	02/18/2014 9:33	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 14:38
14020560-002A	MW104S	02/18/2014 9:45	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 9:45
	Standard Methods 2550 B				02/18/2014 9:45
	SW-846 9040B				02/18/2014 9:45
	SW-846 9050A				02/18/2014 9:45
14020560-002B	MW104S	02/18/2014 9:45	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:24
14020560-002C	MW104S	02/18/2014 9:45	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 11:19
	SW-846 9251 (Dissolved)				02/21/2014 11:14
14020560-002D	MW104S	02/18/2014 9:45	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 14:56
14020560-003A	MW150	02/19/2014 10:10	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 10:10
	Standard Methods 2550 B				02/19/2014 10:10
	SW-846 9040B				02/19/2014 10:10
	SW-846 9050A				02/19/2014 10:10
14020560-003B	MW150	02/19/2014 10:10	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:24
14020560-003C	MW150	02/19/2014 10:10	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 11:41
	SW-846 9251 (Dissolved)				02/21/2014 11:22
14020560-003D	MW150	02/19/2014 10:10	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:02

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 14020560
Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
14020560-004A	MW151	02/19/2014 9:40	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 9:40
	Standard Methods 2550 B				02/19/2014 9:40
	SW-846 9040B				02/19/2014 9:40
	SW-846 9050A				02/19/2014 9:40
14020560-004B	MW151	02/19/2014 9:40	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:24
14020560-004C	MW151	02/19/2014 9:40	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 11:49
	SW-846 9251 (Dissolved)				02/21/2014 11:43
14020560-004D	MW151	02/19/2014 9:40	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:20
14020560-005A	MW152	02/19/2014 9:05	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 9:05
	Standard Methods 2550 B				02/19/2014 9:05
	SW-846 9040B				02/19/2014 9:05
	SW-846 9050A				02/19/2014 9:05
14020560-005B	MW152	02/19/2014 9:05	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:24
14020560-005C	MW152	02/19/2014 9:05	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 11:57
	SW-846 9251 (Dissolved)				02/21/2014 11:51
14020560-005D	MW152	02/19/2014 9:05	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:26
14020560-006A	MW153	02/19/2014 11:35	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 11:35
	Standard Methods 2550 B				02/19/2014 11:35
	SW-846 9040B				02/19/2014 11:35
	SW-846 9050A				02/19/2014 11:35
14020560-006B	MW153	02/19/2014 11:35	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:25
14020560-006C	MW153	02/19/2014 11:35	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:05
	SW-846 9251 (Dissolved)				02/21/2014 12:00
14020560-006D	MW153	02/19/2014 11:35	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:32

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/24/2014 17:57
14020560-007A	MW154	02/19/2014 12:05	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 12:05
	Standard Methods 2550 B				02/19/2014 12:05
	SW-846 9040B				02/19/2014 12:05
	SW-846 9050A				02/19/2014 12:05
14020560-007B	MW154	02/19/2014 12:05	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:25
14020560-007C	MW154	02/19/2014 12:05	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:08
	SW-846 9251 (Dissolved)				02/21/2014 12:08
14020560-007D	MW154	02/19/2014 12:05	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:38
14020560-008A	MW155	02/19/2014 12:35	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 12:35
	Standard Methods 2550 B				02/19/2014 12:35
	SW-846 9040B				02/19/2014 12:35
	SW-846 9050A				02/19/2014 12:35
14020560-008B	MW155	02/19/2014 12:35	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:26
14020560-008C	MW155	02/19/2014 12:35	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:35
	SW-846 9251 (Dissolved)				02/21/2014 12:16
14020560-008D	MW155	02/19/2014 12:35	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:44
14020560-009A	MW252	02/19/2014 9:15	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 9:15
	Standard Methods 2550 B				02/19/2014 9:15
	SW-846 9040B				02/19/2014 9:15
	SW-846 9050A				02/19/2014 9:15
14020560-009B	MW252	02/19/2014 9:15	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:26
14020560-009C	MW252	02/19/2014 9:15	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:43
	SW-846 9251 (Dissolved)				02/21/2014 12:37
14020560-009D	MW252	02/19/2014 9:15	02/20/2014 8:00		

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560
Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:51
14020560-010A	MW253	02/19/2014 11:20	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 11:20
	Standard Methods 2550 B				02/19/2014 11:20
	SW-846 9040B				02/19/2014 11:20
	SW-846 9050A				02/19/2014 11:20
14020560-010B	MW253	02/19/2014 11:20	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:26
14020560-010C	MW253	02/19/2014 11:20	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:51
	SW-846 9251 (Dissolved)				02/21/2014 12:45
14020560-010D	MW253	02/19/2014 11:20	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 15:57
14020560-011A	MW350	02/19/2014 10:20	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 10:20
	Standard Methods 2550 B				02/19/2014 10:20
	SW-846 9040B				02/19/2014 10:20
	SW-846 9050A				02/19/2014 10:20
14020560-011B	MW350	02/19/2014 10:20	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:27
14020560-011C	MW350	02/19/2014 10:20	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 12:54
	SW-846 9251 (Dissolved)				02/24/2014 15:50
14020560-011D	MW350	02/19/2014 10:20	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:15
14020560-012A	MW352	02/19/2014 9:25	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 9:25
	Standard Methods 2550 B				02/19/2014 9:25
	SW-846 9040B				02/19/2014 9:25
	SW-846 9050A				02/19/2014 9:25
14020560-012B	MW352	02/19/2014 9:25	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:28
14020560-012C	MW352	02/19/2014 9:25	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 13:29
	SW-846 9251 (Dissolved)				02/21/2014 13:34
14020560-012D	MW352	02/19/2014 9:25	02/20/2014 8:00		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:33
14020560-013A	MW355	02/19/2014 13:00	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 13:00
	Standard Methods 2550 B				02/19/2014 13:00
	SW-846 9040B				02/19/2014 13:00
	SW-846 9050A				02/19/2014 13:00
14020560-013B	MW355	02/19/2014 13:00	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:28
14020560-013C	MW355	02/19/2014 13:00	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 13:42
	SW-846 9251 (Dissolved)				02/21/2014 13:37
14020560-013D	MW355	02/19/2014 13:00	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:39
14020560-014A	OW156	02/18/2014 13:45	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 13:45
	Standard Methods 2550 B				02/18/2014 13:45
	SW-846 9040B				02/18/2014 13:45
	SW-846 9050A				02/18/2014 13:45
14020560-014B	OW156	02/18/2014 13:45	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:29
14020560-014C	OW156	02/18/2014 13:45	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 14:09
	SW-846 9251 (Dissolved)				02/21/2014 14:09
14020560-014D	OW156	02/18/2014 13:45	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:45
14020560-015A	OW157	02/18/2014 11:55	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 11:55
	Standard Methods 2550 B				02/18/2014 11:55
	SW-846 9040B				02/18/2014 11:55
	SW-846 9050A				02/18/2014 11:55
14020560-015B	OW157	02/18/2014 11:55	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:53
14020560-015C	OW157	02/18/2014 11:55	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 14:25
	SW-846 9251 (Dissolved)				02/21/2014 14:19
14020560-015D	OW157	02/18/2014 11:55	02/20/2014 8:00		

Dates Report

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 14020560
Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:51
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/24/2014 18:15
14020560-016A	MW161	02/18/2014 14:45	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 14:45
	Standard Methods 2550 B				02/18/2014 14:45
	SW-846 9040B				02/18/2014 14:45
	SW-846 9050A				02/18/2014 14:45
14020560-016B	MW161	02/18/2014 14:45	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:55
14020560-016C	MW161	02/18/2014 14:45	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 14:33
	SW-846 9251 (Dissolved)				02/21/2014 14:28
14020560-016D	MW161	02/18/2014 14:45	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 16:57
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/24/2014 18:03
14020560-018A	MW262	02/19/2014 10:50	02/20/2014 8:00		
	Field Elevation Measurements				02/19/2014 10:50
	Standard Methods 2550 B				02/19/2014 10:50
	SW-846 9040B				02/19/2014 10:50
	SW-846 9050A				02/19/2014 10:50
14020560-018B	MW262	02/19/2014 10:50	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:56
14020560-018C	MW262	02/19/2014 10:50	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 15:01
	SW-846 9251 (Dissolved)				02/21/2014 14:36
14020560-018D	MW262	02/19/2014 10:50	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 17:03
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/24/2014 18:09
14020560-019A	OW256	02/18/2014 13:35	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 13:35
	Standard Methods 2550 B				02/18/2014 13:35
	SW-846 9040B				02/18/2014 13:35
	SW-846 9050A				02/18/2014 13:35
14020560-019B	OW256	02/18/2014 13:35	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:56
14020560-019C	OW256	02/18/2014 13:35	02/20/2014 8:00		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Dissolved)				02/21/2014 15:11
	SW-846 9251 (Dissolved)				02/21/2014 15:11
14020560-019D	OW256	02/18/2014 13:35	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 17:09
14020560-020A	OW257	02/18/2014 11:40	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 11:40
	Standard Methods 2550 B				02/18/2014 11:40
	SW-846 9040B				02/18/2014 11:40
	SW-846 9050A				02/18/2014 11:40
14020560-020B	OW257	02/18/2014 11:40	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:56
14020560-020C	OW257	02/18/2014 11:40	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 15:25
	SW-846 9251 (Dissolved)				02/21/2014 15:19
14020560-020D	OW257	02/18/2014 11:40	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 17:15
14020560-021A	TPZ158	02/18/2014 9:05	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 9:05
	Standard Methods 2550 B				02/18/2014 9:05
	SW-846 9040B				02/18/2014 9:05
	SW-846 9050A				02/18/2014 9:05
14020560-021B	TPZ158	02/18/2014 9:05	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:57
14020560-021C	TPZ158	02/18/2014 9:05	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 15:27
	SW-846 9251 (Dissolved)				02/24/2014 16:01
14020560-021D	TPZ158	02/18/2014 9:05	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/21/2014 17:21
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 12:52	02/25/2014 11:22
14020560-022A	TPZ159	02/18/2014 13:15	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 13:15
	Standard Methods 2550 B				02/18/2014 13:15
	SW-846 9040B				02/18/2014 13:15
	SW-846 9050A				02/18/2014 13:15
14020560-022B	TPZ159	02/18/2014 13:15	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:57

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560

Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
14020560-022C	TPZ159	02/18/2014 13:15	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 15:54
	SW-846 9251 (Dissolved)				02/21/2014 15:35
14020560-022D	TPZ159	02/18/2014 13:15	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 17:52
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 18:27
14020560-023A	TPZ160	02/18/2014 14:20	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 14:20
	Standard Methods 2550 B				02/18/2014 14:20
	SW-846 9040B				02/18/2014 14:20
	SW-846 9050A				02/18/2014 14:20
14020560-023B	TPZ160	02/18/2014 14:20	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:58
14020560-023C	TPZ160	02/18/2014 14:20	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 16:02
	SW-846 9251 (Dissolved)				02/21/2014 15:57
14020560-023D	TPZ160	02/18/2014 14:20	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 17:58
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 18:45
14020560-024A	TPZ163	02/18/2014 10:10	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 10:10
	Standard Methods 2550 B				02/18/2014 10:10
	SW-846 9040B				02/18/2014 10:10
	SW-846 9050A				02/18/2014 10:10
14020560-024B	TPZ163	02/18/2014 10:10	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:58
14020560-024C	TPZ163	02/18/2014 10:10	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 16:11
	SW-846 9251 (Dissolved)				02/21/2014 16:05
14020560-024D	TPZ163	02/18/2014 10:10	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:04
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:58
14020560-025A	TPZ164	02/18/2014 12:35	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 12:35
	Standard Methods 2550 B				02/18/2014 12:35
	SW-846 9040B				02/18/2014 12:35

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9050A				02/18/2014 12:35
14020560-025B	TPZ164	02/18/2014 12:35	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:58
14020560-025C	TPZ164	02/18/2014 12:35	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 16:13
	SW-846 9251 (Dissolved)				02/21/2014 16:13
14020560-025D	TPZ164	02/18/2014 12:35	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:10
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 18:51
14020560-026A	TPZ165	02/18/2014 15:05	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 15:05
	Standard Methods 2550 B				02/18/2014 15:05
	SW-846 9040B				02/18/2014 15:05
	SW-846 9050A				02/18/2014 15:05
14020560-026B	TPZ165	02/18/2014 15:05	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 13:59
14020560-026C	TPZ165	02/18/2014 15:05	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/24/2014 16:47
	SW-846 9251 (Dissolved)				02/21/2014 16:21
14020560-026D	TPZ165	02/18/2014 15:05	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:28
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:09
14020560-027A	TPZ166	02/18/2014 11:15	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 11:15
	Standard Methods 2550 B				02/18/2014 11:15
	SW-846 9040B				02/18/2014 11:15
	SW-846 9050A				02/18/2014 11:15
14020560-027B	TPZ166	02/18/2014 11:15	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:00
14020560-027C	TPZ166	02/18/2014 11:15	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 16:29
	SW-846 9251 (Dissolved)				02/21/2014 16:29
14020560-027D	TPZ166	02/18/2014 11:15	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:34
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:15
14020560-028A	TPZ167	02/18/2014 10:35	02/20/2014 8:00		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Field Elevation Measurements				02/18/2014 10:35
	Standard Methods 2550 B				02/18/2014 10:35
	SW-846 9040B				02/18/2014 10:35
	SW-846 9050A				02/18/2014 10:35
14020560-028B	TPZ167	02/18/2014 10:35	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:00
14020560-028C	TPZ167	02/18/2014 10:35	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 16:57
	SW-846 9251 (Dissolved)				02/21/2014 16:51
14020560-028D	TPZ167	02/18/2014 10:35	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:40
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 20:04
14020560-029A	TPZ168	02/18/2014 10:50	02/20/2014 8:00		
	Field Elevation Measurements				02/18/2014 10:50
	Standard Methods 2550 B				02/18/2014 10:50
	SW-846 9040B				02/18/2014 10:50
	SW-846 9050A				02/18/2014 10:50
14020560-029B	TPZ168	02/18/2014 10:50	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/24/2014 11:44
14020560-029C	TPZ168	02/18/2014 10:50	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 17:05
	SW-846 9251 (Dissolved)				02/21/2014 16:59
14020560-029D	TPZ168	02/18/2014 10:50	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 18:58
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 20:10
14020560-030A	DUP 1	02/18/2014 9:33	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:01
14020560-030B	DUP 1	02/18/2014 9:33	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 17:13
	SW-846 9251 (Dissolved)				02/21/2014 17:07
14020560-030C	DUP 1	02/18/2014 9:33	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 19:04
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:22
14020560-031A	DUP 2	02/19/2014 9:05	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:03
14020560-031B	DUP 2	02/19/2014 9:05	02/20/2014 8:00		

Dates Report

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560

Report Date: 27-Feb-14

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Dissolved)				02/24/2014 17:14
	SW-846 9251 (Dissolved)				02/24/2014 16:50
14020560-031C	DUP 2	02/19/2014 9:05	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 19:10
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:28
14020560-033A	Field Blank 1	02/18/2014 8:45	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:03
14020560-033B	Field Blank 1	02/18/2014 8:45	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 17:25
	SW-846 9251 (Dissolved)				02/21/2014 17:25
14020560-033C	Field Blank 1	02/18/2014 8:45	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 19:17
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/25/2014 11:16
14020560-034A	Field Blank 2	02/19/2014 8:30	02/20/2014 8:00		
	Standard Methods 2540 C (Dissolved)				02/20/2014 14:03
14020560-034B	Field Blank 2	02/19/2014 8:30	02/20/2014 8:00		
	SW-846 9036 (Dissolved)				02/21/2014 17:44
	SW-846 9251 (Dissolved)				02/21/2014 17:44
14020560-034C	Field Blank 2	02/19/2014 8:30	02/20/2014 8:00		
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/21/2014 19:23
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			02/20/2014 13:44	02/24/2014 19:40

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

SW-846 9040B

Batch R187610 **SampType:** LCSD Units RPD Limit **1.8**

SampID: LCSD-R187610

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
pH, Field	1		**7.05**	7	0	100.7	7.05	0.00	02/18/2014
pH, Field	1		**7.05**	7	0	100.7	7.03	0.28	02/19/2014

Batch R187610 **SampType:** LCS Units

SampID: LCS-R187610

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH, Field	1		**7.05**	7	0	100.7	99.1	101	02/18/2014
pH, Field	1		**7.03**	7	0	100.4	99.1	101	02/19/2014

SW-846 9050A

Batch R187610 **SampType:** LCSD Units **µmhos/cm** RPD Limit **10**

SampID: LCSD-R187610

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Spec. Conductance, Field	1		**1420**	1412	0	100.6	1413	0.56	02/19/2014
Spec. Conductance, Field	1		**1430**	1412	0	101.3	1412	1.27	02/18/2014

Batch R187610 **SampType:** LCS Units **µmhos/cm**

SampID: LCS-R187610

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	1		**1410**	1412	0	100	90	110	02/18/2014
Spec. Conductance, Field	1		**1410**	1412	0	100.1	90	110	02/19/2014

STANDARD METHODS 2540 C (DISSOLVED)

Batch R187421 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20	J	**10**						02/20/2014
Total Dissolved Solids	20		**< 20**						02/20/2014
Total Dissolved Solids	20		**< 20**						02/20/2014
Total Dissolved Solids	20		**< 20**						02/20/2014

Batch R187421 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**930**	1000	0	93	90	110	02/20/2014

Batch R187421 **SampType:** LCSQC Units **mg/L**

SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**980**	1000	0	98	90	110	02/20/2014
Total Dissolved Solids	20		**998**	1000	0	99.8	90	110	02/20/2014
Total Dissolved Solids	20		**994**	1000	0	99.4	90	110	02/20/2014

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Work Order: 14020560

Client Project: Baldwin - Groundwater Monitoring

Report Date: 27-Feb-14

STANDARD METHODS 2540 C (DISSOLVED)

Batch R187421 **SampType:** MS Units **mg/L**

SampID: 14020560-001B MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**1130**	500	652	94.8	85	115	02/20/2014

Batch R187421 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 14020560-001B MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1170**	500	652	104.4	1126	4.17	02/20/2014

Batch R187421 **SampType:** MS Units **mg/L**

SampID: 14020560-015B MS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**3690**	500	3184	102	85	115	02/20/2014

Batch R187421 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 14020560-015B MSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**3720**	500	3184	106.4	3694	0.59	02/20/2014

Batch R187421 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 14020560-011B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1420**				1418	0.14	02/20/2014

Batch R187421 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 14020560-022B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**466**				480	2.96	02/20/2014

Batch R187421 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 14020560-031A DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	20		**1860**				1822	1.96	02/20/2014

Batch R187527 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**< 20**						02/24/2014
Total Dissolved Solids	20		**< 20**						02/24/2014

Batch R187527 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**996**	1000	0	99.6	90	110	02/24/2014

Client: Dynegy Midwest Generation, LLC
Client Project: Baldwin - Groundwater Monitoring
Work Order: 14020560
Report Date: 27-Feb-14

STANDARD METHODS 2540 C (DISSOLVED)

Batch R187527 **SampType:** LCSQC Units **mg/L**
SampID: LCSQC

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids	20		**978**	1000	0	97.8	90	110	02/24/2014

Batch R187527 **SampType:** DUP Units **mg/L** RPD Limit **15**
SampID: 14020560-029B DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids	100		**5070**				5120	0.98	02/24/2014

SW-846 9036 (DISSOLVED)

Batch R187442 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						02/21/2014

Batch R187442 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**21**	20	0	103.5	90	110	02/21/2014

Batch R187442 **SampType:** MS Units **mg/L**
SampID: 14020560-011CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**16**	10	7.3	88.5	85	115	02/21/2014

Batch R187442 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 14020560-011CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	10		**16**	10	7.3	91.9	16.15	2.08	02/21/2014

Batch R187442 **SampType:** MS Units **mg/L**
SampID: 14020560-014CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	50		**134**	50	88.38	90.8	85	115	02/21/2014

Batch R187442 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 14020560-014CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	50		**136**	50	88.38	95.2	133.8	1.65	02/21/2014

Client: Dynegy Midwest Generation, LLC **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring **Report Date:** 27-Feb-14

SW-846 9036 (DISSOLVED)

Batch R187442 **SampType:** MS Units mg/L

SampID: 14020560-018CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	20		**42**	20	24.09	91.2	85	115	02/21/2014

Batch R187442 **SampType:** MSD Units mg/L RPD Limit **10**

SampID: 14020560-018CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	20		**42**	20	24.09	89.5	42.33	0.81	02/21/2014

SW-846 9251 (DISSOLVED)

Batch R187451 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**2**						02/21/2014

Batch R187451 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**21**	20	0	105.6	90	110	02/21/2014

Batch R187451 **SampType:** MS Units mg/L

SampID: 14020560-014CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	25		**153**	100	55.09	97.6	85	115	02/21/2014

Batch R187451 **SampType:** MSD Units mg/L RPD Limit **15**

SampID: 14020560-014CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	25		**155**	100	55.09	99.5	152.7	1.27	02/21/2014

Batch R187451 **SampType:** MS Units mg/L

SampID: 14020560-018CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**21**	20	2.54	92	85	115	02/21/2014

Batch R187451 **SampType:** MSD Units mg/L RPD Limit **15**

SampID: 14020560-018CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	5		**20**	20	2.54	89.8	20.94	2.12	02/21/2014

Client: Dynegy Midwest Generation, LLC | **Work Order:** 14020560

Client Project: Baldwin - Groundwater Monitoring | **Report Date:** 27-Feb-14

SW-846 9251 (DISSOLVED)

Batch R187511 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5	J	**1**						02/24/2014

Batch R187511 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	5		**21**	20	0	107.4	90	110	02/24/2014

Batch R187511 **SampType:** MS Units **mg/L**

SampID: 14020560-011CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	10		**72**	40	33.48	97	85	115	02/24/2014

Batch R187511 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 14020560-011CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride	10		**71**	40	33.48	94.6	72.28	1.35	02/24/2014

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 96224 **SampType:** MBLK Units **mg/L**

SampID: MBLK-96224

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**< 0.02**	0.02	0	0	-100	100	02/21/2014
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	02/21/2014
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	02/21/2014

Batch 96224 **SampType:** LCS Units **mg/L**

SampID: LCS-96224

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.474**	0.5	0	94.9	85	115	02/21/2014
Iron	0.02		**0.92**	1	0	92	85	115	02/21/2014
Manganese	0.005		**0.479**	0.5	0	95.8	85	115	02/21/2014

Batch 96224 **SampType:** MS Units **mg/L**

SampID: 14020560-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.49**	0.5	0.015	95.2	75	125	02/21/2014
Iron	0.02		**0.932**	1	0	93.2	75	125	02/21/2014
Manganese	0.005		**0.526**	0.5	0.041	96.9	75	125	02/21/2014

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 96224 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 14020560-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.491**	0.5	0.015	95.3	0.49	0.14	02/21/2014
Iron	0.02		**0.932**	1	0	93.2	0.932	0.00	02/21/2014
Manganese	0.005		**0.528**	0.5	0.041	97.5	0.526	0.55	02/21/2014

Batch 96224 **SampType:** MS Units **mg/L**

SampID: 14020560-010DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.551**	0.5	0.068	96.6	75	125	02/21/2014
Iron	0.02		**0.949**	1	0	94.9	75	125	02/21/2014
Manganese	0.005		**0.495**	0.5	0	99.1	75	125	02/21/2014

Batch 96224 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 14020560-010DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**0.557**	0.5	0.068	97.8	0.551	1.07	02/21/2014
Iron	0.02		**0.954**	1	0	95.4	0.949	0.47	02/21/2014
Manganese	0.005		**0.497**	0.5	0	99.4	0.495	0.36	02/21/2014

Batch 96227 **SampType:** MBLK Units **mg/L**

SampID: MBLK-96227

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02	J	**0.007**	0.02	0	37	-100	100	02/21/2014
Iron	0.02		**< 0.02**	0.02	0	0	-100	100	02/21/2014
Manganese	0.005		**< 0.005**	0.005	0	0	-100	100	02/21/2014

Batch 96227 **SampType:** LCS Units **mg/L**

SampID: LCS-96227

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**0.499**	0.5	0	99.8	85	115	02/24/2014
Iron	0.02		**0.954**	1	0	95.4	85	115	02/21/2014
Manganese	0.005		**0.5**	0.5	0	99.9	85	115	02/21/2014

Batch 96227 **SampType:** MS Units **mg/L**

SampID: 14020560-025DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron	0.02		**2.23**	0.5	1.76	93	75	125	02/24/2014
Iron	0.02		**6.45**	1	5.52	93.4	75	125	02/21/2014
Manganese	0.005		**1.05**	0.5	0.582	94.3	75	125	02/21/2014

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560

Report Date: 27-Feb-14

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch **96227** **SampType:** **MSD** Units **mg/L** RPD Limit **20**

SampID: 14020560-025DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron	0.02		**2.22**	0.5	1.76	92.6	2.23	0.09	02/24/2014
Iron	0.02		**6.47**	1	5.52	94.7	6.45	0.20	02/21/2014
Manganese	0.005		**1.06**	0.5	0.582	96.3	1.05	0.94	02/21/2014

Teklab Inc. Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Dynegy Midwest Generation, LLC

Client Project: Baldwin - Groundwater Monitoring

Work Order: 14020560

Report Date: 27-Feb-14

Carrier: Rick Schmidt

Received By: EEP

Completed by: Emily Pohlman

On: 20-Feb-14

Emily E. Pohlman

Reviewed by: MLAustin

On: 20-Feb-14

Michael L. Austin

Pages to follow: Chain of custody 4 Extra pages included 35

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 3.6
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

CHAIN OF CUSTODY

pg. 1 of 4 Work order # 14020560

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 3.6 °C
Preserved in: ☐ LAB ☒ FIELD
FOR LAB USE ONLY
Lab Notes: EEP 2/20/14

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number
Baldwin - Groundwater Monitoring

Sample Collector's Name
Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	MATRIX: Groundwater	Dissolved (B Fe MN)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS
14020560-001	MW104D	2-18-14 9:33	3	1	X	X	X	X	X	X	X	X	X
002	MW104S	2-18-14 9:45	3	1	X	X	X	X	X	X	X	X	X
003	MW150	2-19-14 10:10	3	1	X	X	X	X	X	X	X	X	X
004	MW151	2-19-14 9:40	3	1	X	X	X	X	X	X	X	X	X
005	MW152	2-19-14 9:05	3	1	X	X	X	X	X	X	X	X	X
006	MW153	2-19-14 11:35	3	1	X	X	X	X	X	X	X	X	X
007	MW154	2-19-14 12:05	3	1	X	X	X	X	X	X	X	X	X
008	MW155	2-19-14 12:35	3	1	X	X	X	X	X	X	X	X	X
009	MW252	2-19-14 9:15	3	1	X	X	X	X	X	X	X	X	X
010	MW253	2-19-14 11:20	3	1	X	X	X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2-20-14 08:00	[signature]	2/20/14 800

BottleOrder: 18434

CHAIN OF CUSTODY

pg. 2 of 4 Work order # 14020560

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

* No Sample collected

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number: Baldwin - Groundwater Monitoring

Sample Collector's Name: Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3						Matrix: Groundwater	Dissolved (B Fe MN)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS					
011	MW350	2-19-14 10:20	3	1						X	X	X	X	X	X	X	X	X					
012	MW352	2-19-14 9:25	3	1						X	X	X	X	X	X	X	X	X					
013	MW355	2-19-14 13:00	3	1						X	X	X	X	X	X	X	X	X					
014	OW156	2-18-14 13:45	3	1						X	X	X	X	X	X	X	X	X					
015	OW157	2-18-14 11:55	3	1						X	X	X	X	X	X	X	X	X					
016	MW161	2-18-14 14:45	3	1						X	X	X	X	X	X	X	X	X					
*017	MW162	2-19-14 10:35	3	1						X	X	X	X	X	X	X	X	X					
018	MW262	2-19-14 10:50	3	1						X	X	X	X	X	X	X	X	X					
019	OW256	2-18-14 13:35	3	1						X	X	X	X	X	X	X	X	X					
020	OW257	2-18-14 11:40	3	1						X	X	X	X	X	X	X	X	X					

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2-20-14 8:00	[signature]	2/20/14 8:00

BottleOrder: 18434

CHAIN OF CUSTODY

pg. 3 of 4 Work order # 14020560

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number: Baldwin - Groundwater Monitoring

Sample Collector's Name: Rick Schmidt

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3	MATRIX: Groundwater	Dissolved (B Fe MN)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS
021	TPZ158	2-18-14 9:05	3	1	X	X	X	X	X	X	X	X	X
022	TPZ159	2-18-14 13:15	3	1	X	X	X	X	X	X	X	X	X
023	TPZ160	2-18-14 14:20	3	1	X	X	X	X	X	X	X	X	X
024	TPZ163	2-18-14 10:10	3	1	X	X	X	X	X	X	X	X	X
025	TPZ164	2-18-14 12:35	3	1	X	X	X	X	X	X	X	X	X
026	TPZ165	2-18-14 15:05	3	1	X	X	X	X	X	X	X	X	X
027	TPZ166	2-18-14 11:15	3	1	X	X	X	X	X	X	X	X	X
028	TPZ167	2-18-14 10:35	3	1	X	X	X	X	X	X	X	X	X
029	TPZ168	2-18-14 10:50	3	1	X	X	X	X	X	X	X	X	X
030	DUP 1	2-18-14 9:33	2	1	X	X	X	X					X

Relinquished By	Date/Time	Received By	Date/Time
	2-20-14 8:00		2/20/14 800

BottleOrder: 18434

CHAIN OF CUSTODY

pg. 4 of 4 Work order # 14020560

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Dynegy Midwest Generation, LLC
Address: 604 Pierce Blvd.
City / State / Zip O'Fallon, IL 62269
Contact: Brian Voelker **Phone:** (618) 206-5800
E-Mail: **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE °C
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes:

Client Comments

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number
Baldwin - Groundwater Monitoring

Sample Collector's Name
Rick Schmidt

Results Requested
☐ Standard ☐ 1-2 Day (100% Surcharge)
☐ Other ☐ 3 Day (50% Surcharge)

Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNP	HNO3							MATRIX: Groundwater				Dissolved (B Fe MN)	Dissolved Chloride	Dissolved Sulfate	Field Conductivity	Field Depth to Water	Field pH	Field Temperature (C)	TDS					
031	DUP 2	2-19-14 9:05	2	1							X				X	X	X					X					
032	DUP 3		2	1							X				X	X	X					X					
033	Field Blank 1	2-18-14 8:45	2	1							X				X	X	X					X					
034	Field Blank 2	2-19-14 8:30	2	1							X				X	X	X					X					
035	Field Blank 3		2	1							X				X	X	X					X					

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2-20-14 8:00	[signature]	2/20/14 800

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client.

BottleOrder: 18434

ATTACHMENT 9-6

NRT. 2016. *Supplemental Hydrogeologic Site Characterization and Groundwater Monitoring Plan. Baldwin Fly Ash Pond System. Baldwin Energy Complex, Baldwin, IL*. Natural Resource Technology, Inc.

SMARTER SOLUTIONS

EXCEPTIONAL SERVICE

VALUE

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT AND GROUNDWATER MONITORING PLAN

Baldwin Fly Ash Pond System
Baldwin Energy Complex
Baldwin, Illinois

Project No: 2340

March 31, 2016

NATURAL
RESOURCE
TECHNOLOGY

ENVIRONMENTAL CONSULTANTS

NATURAL RESOURCE TECHNOLOGY
ENVIRONMENTAL CONSULTANTS

2422 E. WASHINGTON STREET, SUITE 104
BLOOMINGTON, ILLINOIS 61704
(P) 414.837.3607
(F) 414.837.3608

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION AND GROUNDWATER MONITORING PLAN

BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX
BALDWIN, ILLINOIS

Project No. 2340

Prepared For:

DYNEGY MIDWEST GENERATION, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

Prepared By:

Natural Resource Technology, Inc.
234 W. Florida Street, Fifth Floor
Milwaukee, Wisconsin 53204

March 31, 2016

Stuart J. Cravens, PG
Principal Hydrogeologist

LICENSED PROFESSIONAL GEOLOGIST
Stuart J. Cravens
196-000108
ILLINOIS

Robert J. Karnauskas, PG
Senior Hydrogeologist

TABLE OF CONTENTS

Natural Resource Technology

FIGURES

TABLES

APPENDICES

1 INTRODUCTION

1.1 Overview

This Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan was prepared by Natural Resource Technology, Inc. (NRT) in support of a Closure Plan for fly ash ponds located at the Baldwin Energy Complex (BEC) which is owned by Dynegy Midwest Generation, LLC (DMG).

This report and the Closure Plan will apply specifically to the East Fly Ash Pond, Old East Fly Ash Pond and West Fly Ash Pond, hereinafter referred to as the Baldwin Fly Ash Pond System, which are part of a system of six Coal Combustion Residuals (CCR) surface impoundments, as defined further below.

Numerous subsurface investigations have been performed concerning the ash pond system at BEC. The information presented in this report supplements comprehensive data collection and evaluations from the prior hydrogeologic investigation reports (recent to oldest), including, but not limited to, the following:

- ***NRT, June 11, 2014. Groundwater Quality Assessment and Phase II Hydrogeologic Investigation, Baldwin Ash Pond System*** A Phase II assessment to further assess the hydrogeology and groundwater quality in the vicinity of the ash pond system at BEC, following the proposed scope of work (March 22, 2013) approved, with clarifications, by Illinois EPA, June 18, 2013).

- ***Dynegy, March 22, 2013. Proposed Scope of Work – Baldwin Ash Impoundment System*** A plan for conducting a more comprehensive hydrogeologic investigation along with development of a groundwater model to evaluate various pond closure scenarios on groundwater quality in the vicinity of the ash pond system; accepted, with clarifications, by Illinois EPA August 31, 2011.

- ***Kelron Environmental, June 30, 2012. Groundwater Quality Assessment and Initial Hydrogeologic Investigation – Baldwin Ash Pond System*** Assessed the hydrogeology and groundwater quality in the vicinity of the ash pond system, but not beneath the ash ponds. Thirteen monitoring wells were installed around the perimeter of the ash pond system and sampled quarterly to assess upgradient and downgradient groundwater quality (full inorganic parameter list in IAC 35 Part 620.410). Submitted to Illinois EPA.

- ***Kelron Environmental, April 16, 2012. Off-Site Groundwater Quality Results – Baldwin Energy Complex*** Off-site groundwater quality investigation, south and southwest of the ash pond system, to assess shallow off-site groundwater quality for the presence of inorganic parameters related to CCRs. Submitted to Illinois EPA.

- ***Kelron Environmental and NRT, June 7, 2010. Water Well Survey – Baldwin Ash Pond System*** A survey identifying water wells located within 2,500 feet (ft) of the BEC's ash pond system. The water well survey was prepared in accordance with the "Right to Know" Potable Water Well Survey procedures of 35 IAC 1600.210(b)(1) and 1600.210(b)(2). Submitted to Illinois EPA.

- ***Kelron Environmental and NRT, May 26, 2010. Hydrogeologic Assessment and Groundwater Monitoring Plan – Baldwin Ash Pond System*** A plan for initial evaluation of groundwater quality in the vicinity of the ash pond system along with an initial hydrogeologic characterization; accepted, with clarifications, by Illinois EPA August 31, 2011.

This Supplemental Hydrogeologic Site Characterization and Groundwater Monitoring Plan provides a summary of additional data collected and site investigations performed since submittal of the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014) in order to satisfy the following:

- Provide information to define hydrogeology and to assess the groundwater impacts related to the CCR surface impoundments.
- Provide information that could be used to perform a model to assess the groundwater impacts associated with closure of the Baldwin Fly Ash Pond System.
- Provide information to establish a groundwater monitoring program sufficient for long-term, post-closure monitoring.

In conjunction with the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014), groundwater flow and transport models were developed to evaluate the effect of various ash pond closure scenarios on groundwater quality (NRT, June 18, 2014) and to predict the fate and transport of CCR leachate components (NRT, September 30, 2014). Additional groundwater modeling is being conducted to enable estimation of the time required for hydrostatic equilibrium of groundwater beneath the unit. The existing groundwater flow and transport model for the ash pond system is also being updated to develop predictions for closure of the Baldwin Fly Ash Pond System. These groundwater modeling reports will be submitted under separate cover.

1.2 Site Location and Background

The BEC is located in southwest Illinois in Randolph and St. Clair Counties. The Randolph County portion of the BEC is located within Sections 2, 3, 4, 9, 10, 11, 14, 15 and 16 of Township 4 South and Range West. The St. Clair County portion of the property is located within Sections 33, 34, and 35 of Township 3 South and Range 7 West. The Baldwin Fly Ash Pond System is approximately one-half mile west-northwest of the Village of Baldwin. The site location is shown on Figure 1. In general, the BEC property is bordered: on the west by the Kaskaskia River; on the east by Baldwin Road, farmland, and strip mining areas; on the southeast by the village of Baldwin; on the south by the Illinois Central Gulf railroad tracks and State Route 154; and, on the north by the St. Clair/Randolph County Line.

The BEC utilizes four active ash ponds with two inactive fly ash ponds, located at the eastern end of the ash pond system (Figure 2):

- Bottom Ash Pond (177 acres, active)

- East Fly Ash Pond (76 acres, inactive)
- Old East Fly Ash Pond (102 acres, inactive)
- West Fly Ash Pond (54 acres, active)
- Secondary Pond (25 acres, active), used for water clarification rather than direct management of CCRs, but does contain a small volume of CCR
- Tertiary Pond (3.1 acres, active), used for final water clarification and contains a very small volume of CCR

There is one outfall from the ash pond system at the Tertiary Pond that discharges to a tributary of the Kaskaskia River, south of the Cooling Pond intake structure. All six impoundments of the ash pond system have been evaluated as part of the previously conducted hydrogeologic investigations, groundwater quality assessments and modeling.

2 GEOLOGY AND HYDROGEOLOGY

The additional site characterization activities performed at BEC since the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014) have included the following:

- Unlithified zone investigation
- Bedrock investigation
- Aquifer testing
- Geotechnical borings and soil laboratory testing

The results of these supplemental site investigations are discussed below.

2.1 Geology

Geologic units present at the ash pond system include fill, ash generated at BEC, unlithified geologic materials (i.e., Cahokia Alluvium, Equality Formation, and Vandalia Till Member) and Mississippian and Pennsylvanian bedrock.

2.1.1 Unlithified Material Investigations

Supplemental investigation within the unlithified materials was performed to further evaluate the potential presence of sand layers that could represent preferential migration pathways. Eleven borings (PZ-169 through PZ-178 and PZ-182) were performed during July-August 2015 as shown on Figure 3. Borings typically extended to bedrock where monitoring wells with 10 ft screens were installed. Boring depths ranged from 14 to 50 ft below ground surface (bgs). The boring logs and piezometer installation details are provided in Appendix C2.

The location of sand seams observed as well as their thickness and base elevation are shown on Figure 4, based on all borings performed within the unlithified materials. Sand seams appear randomly disseminated across the Site and range from one locally continuous unsaturated sand lens up to 7.9 ft in thickness to isolated, discontinuous thin seams 0.2 to 1 ft thick. No continuous sand seams were observed within or immediately adjacent to the Baldwin Fly Ash Pond System that represent significant preferential migration pathways.

Two overlapping sand seams that appear to be continuous between adjacent borings occur to the west of the Baldwin Fly Ash Pond System (Figure 4) and are vertically separated by at least 6 ft of clay. The shallower sand lens at elevations between 395 to 403 ft is not saturated. These sand lenses do not extend to the Baldwin Fly Ash Pond System as evidenced by several borings in which no sand was observed.

AECOM (2015) completed a geotechnical investigation that included additional borings that were reported in the 30% design data package for the ash ponds. The geotechnical exploratory program included the following:

- 26 auger borings at the Baldwin Fly Ash Pond System and Bottom Ash Pond. In addition, 3 hand auger borings were completed.
- 82 Cone Penetrometer Testing (CPT) soundings at the Baldwin Fly Ash Pond System and the Secondary, Tertiary, and Bottom Ash Ponds
- 13 vibrating wire piezometers installed at selected boring locations

The geotechnical exploration locations are shown on AECOM Figure D-01 in Appendix A.

Representative samples from the borings were submitted to AECOM of Conshohocken, Pennsylvania and Terrasense of Totowa, New Jersey for laboratory testing on the soil samples for geotechnical properties. A summary of the AECOM geotechnical laboratory test results on the soil samples is provided in Appendix A. The falling head permeability tests results are discussed below. The boring logs and other geotechnical testing data are being submitted under separate cover for the Bladwin Fly Ash Pond System closure plan.

2.1.2 Bedrock Investigations

Bedrock at the site consists of predominantly shale and limestone with lesser amounts of sandstone. As noted in the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014), the Mississippian and Pennsylvanian rocks in the vicinity of the BEC yield small amounts of water to wells from interconnected pores, cracks, fractures, crevices, joints, and bedding planes. Water-bearing openings are variable from place to place and are best developed near the bedrock surface in thin limestones. Shallow sandstone and creviced limestone may yield small supplies in some areas, but water quality becomes poorer (i.e., highly mineralized) with increasing depth.

Supplemental evaluation of bedrock hydraulic conductivity was performed that initially included three deeper holes (MW-304, MW-356, MW-373) extending 95 to 135 ft bgs (82 to 100 ft bgs below the bedrock surface). Packer testing was performed in these coreholes but is not reported herein because the test results were inconclusive. The bedrock was physically deformed by hydrofracking during the test and did not represent actual hydraulic conductivity. Consistent with the site geology and water wells in surrounding area, it was concluded that the most transmissive zone was near the bedrock surface.

Because there were an insufficient number of existing wells for monitoring groundwater in bedrock at the Baldwin Fly Ash Pond System, 16 additional monitoring wells were installed during September 2015 through March 2016. The base of the monitoring well screens were installed an average of approximately 21 ft below the top of bedrock. The additional bedrock monitoring wells installed at each surface impoundment (SI) unit are shown on Figure 3 and included the following.

- 1 monitoring well at an upgradient location (MW-304)
- 10 monitoring wells within and downgradient of the Baldwin Fly Ash Pond System, which is designated as an inactive SI multi unit
- 4 monitoring wells downgradient of the Secondary and Tertiary Ash Ponds, which are designated as an active SI multi unit
- 4 monitoring wells downgradient of the Bottom Ash Pond, which is designated as an active SI unit

Monitoring of upgradient groundwater quality in bedrock will be supplemented with the addition of an existing monitoring well, MW-306, located northeast of the Baldwin Fly Ash Pond System, Well numbers, locations and screened intervals for each SI unit are summarized on the following table and are shown on Figure 3.

Well Number	Depth to Bedrock (ft bgs)	Screened Interval (ft bgs)
Upgradient Monitoring Well		
MW-304*	41	45 - 55
MW-306	39	71 - 86
Inactive SI Multi-Unit: Baldwin Fly Ash Pond System		
MW-383	50	58 - 68
MW-384	56	61 - 71
MW-385**	64	80 - 90
MW-386**	64	76 - 86
MW-366	36	42 - 52
MW-375	50	57 - 67
MW-377	31	46 - 56
MW-387**	36	48 - 58
MW-390	40	50 - 65
MW-391	36	55 - 70
Active SI Multi-Unit: Secondary and Tertiary Ponds		
MW-373*	13	20 - 30
MW-374	24	30 - 40
MW-388	27	33 - 43
MW-389	36	42 - 52
Active SI Unit: Bottom Ash Pond		
MW-356*	37	56 - 66
MW-369	47	56 - 66
MW-370	28	53 - 63
MW-382	34	56 - 66

* Deep bedrock borings were partially backfilled to set the well screens at the specified depths
**Monitoring well scheduled to be abandoned (See section 4.3)

Bedrock boring logs and well construction details are in provided in Appendix C5.

Bedrock topography slopes generally to the west and southwest across the CCR surface impoundments. Topographic relief is approximately 45 ft and is shown on Figure 5.

2.2 Hydrogeology

In March 2015, NRT began an assessment of the existing monitoring well network(s) at BEC with respect to the existing CCR units. Included in the assessment was a review of the current placement and number of monitoring wells with respect to individual and contiguous CCR units as well as potential locations for new monitoring wells, as appropriate. Analytical data for the existing monitoring wells was reviewed to assure that the current well constructions were adequate to provide low turbidity samples during collection of unfiltered samples. None of the monitoring wells exhibited poor construction, evidence of damage or appeared to be otherwise compromised.

The discussion below summarizes the results of the supplemental well installations.

2.2.1 Uppermost Aquifer

The hydrogeology of the ash pond system was comprehensively addressed in the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014). An uppermost aquifer within the area of the six impoundments at the BEC has not been previously designated. Off-site, immediately upgradient and downgradient of the site property boundaries, both the shallow glacial deposits and the shallow bedrock have served as a source of water supply. The shallow unlithified deposits off-site have yielded water through intermittent, discontinuous sand lenses and, in the bedrock, through fractured sandstone and limestone. However, within the area of the ash impoundment only thin and intermittent sand lenses are present. Based on the above, the bedrock is the only viable aquifer in the vicinity of the ash impoundments and is being designated the uppermost aquifer, consistent with the US Environmental Protection Agency (USEPA) definition in 40 CFR Part 257.53 (USEPA, 2015). Seventeen new monitoring wells, as described above, were installed in 2015 and 2016 for purposes of groundwater monitoring within bedrock to comply with the monitoring requirements of 40 CFR Part 257.

Groundwater flow in bedrock is generally to the west and southwest, based on elevation measurements collected on March 2, 2016 (Figure 6). Piezometric heads in bedrock range from less than 1 ft to about 29 ft bgs.

2.2.2 Other Monitorable Units

Other monitorable units representing potential ash constituent migration pathways include glacial deposits and the uppermost bedrock surrounding and within the ash impoundments. The glacial deposits and uppermost bedrock are currently monitored in compliance with existing Illinois EPA permits. Groundwater in these existing wells will continue to be monitored to comply with 35 IAC Part 620 and BEC's existing NPDES permit.

Groundwater elevation measurements have been measured on a quarterly basis. Groundwater flow in the unlithified glacial materials is to the west, based on elevation measurements collected on November 10, 2015 (Figure 7). The westerly direction of flow is consistent with previous groundwater contour maps in the unlithified deposits (NRT, June 11, 2014). The depth to the potentiometric surface in the unlithified materials ranges from 3.2 to 17.7 ft bgs.

2.2.3 Hydraulic Conductivity

Field hydraulic conductivity tests performed on the unlithified geologic materials (i.e., Cahokia Alluvium, Equality Formation, and Vandalia Till Member) and Mississippian and Pennsylvanian bedrock at the Site were presented the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014). The unlithified and bedrock geologic materials had geometric mean hydraulic conductivities of approximately $3x10^{-5}$ cm/s and $5x10^{-6}$ cm/s, respectively.

Six falling head permeability tests (ASTM D5084 Method F) were performed in the laboratory on undisturbed soil samples collected from the AECOM (2015) geotechnical borings BAL-B001, BAL-B008, BAL-B010, BAL-B011, BAL-B017 and BAL-B027. Sample locations are shown on AECOM Figure D-01 in Appendix A. Test methods and details are provided in Appendix B and the results are summarized below.

Laboratory Hydraulic Conductivity Test Results

Boring Number	Sample Description	Sample Depth (feet)	Hydraulic Conductivity (cm/sec)
BAL-B001	Medium stiff, moist, pale gray with orange mottling, medium plasticity Lean CLAY (CL), trace fine gravel. [TILL]	35.6	1.3×10^{-8}
BAL-B008	Very stiff, moist, light brown with orange and gray mottling, low plasticity Silty CLAY (CL). [FILL/FLY ASH]	10.8	5.5×10^{-9}
BAL-B010	Stiff, moist to wet, gray, Silty CLAY (CL), iron staining, trace sand and clay. [LOESS]	21.3	2.4×10^{-6}
BAL-B011	Stiff, moist, gray with faint orange mottling, low plasticity Silty CLAY (CL). [FILL/FLY ASH]	15.2	1.8×10^{-9}
BAL-B017	Stiff, gray, medium plasticity CLAY (CL). [RESIDUAL]	26.7	1.7×10^{-8}
BAL-B027	Stiff, moist to wet, gray, Lean CLAY (CL), with silt and fine sand, trace gravel, iron staining. [TILL]	26.9	5.0×10^{-9}

3 GROUNDWATER QUALITY

3.1 Summary of Groundwater Monitoring Activities

An initial six quarters of sampling and analysis of groundwater from monitoring wells at the Baldwin Fly Ash Pond System was conducted from November 2010 through March 2012. The groundwater quality data collected from 2010 through 2012 included field parameters and the full list of inorganic parameters listed in 35 IAC Part 620 Section 420 (Groundwater Quality Standards for Class II: General Resource Groundwater) except for vanadium and perchlorate. Based on the results of the initial 2010–2012 (Phase I) investigation (Kelron, June 30, 2012), additional monitoring wells and piezometers were installed upgradient, downgradient, and within the ash pond system as part of the Phase II investigation (NRT, June 11, 2014). Further, the list of monitoring parameters was reduced to boron, iron, manganese, chloride, sulfate, TDS, and pH commencing in September 2013.

Samples are currently collected quarterly from 14 monitoring wells in accordance with NPDES Permit No. IL0000043 (effective January 1, 2015) for the following laboratory and/or field parameters:

Laboratory Parameters		
Boron	Manganese (total)	Sulfate
Chloride	Nitrate	Total Dissolved Solids (TDS)
Iron (total)		

Field Parameters	
pH	Depth of Well (ft bgs)
Specific Conductance	Elevation of measuring point (mp)
Temperature	Depth to Water (ft below mp)
	Groundwater Elevation (ft)

Groundwater monitoring results from sampling of the 14 wells are reported to the Illinois EPA annually in accordance with the NPDES permit.

3.2 Groundwater Monitoring Results

Analytical results from November 2010 through November 2015, including non-NPDES permit required wells, are summarized in Appendix D. Statistics showing the minimum and maximum concentrations detected in the unlithified materials, bedrock and leachate wells is included. Also, a comparison of groundwater data from wells screened in unlithified materials relative to the Groundwater Quality Standards for Class II: General Resource Groundwater is shown. The well locations are shown on Figure 3.

Parameters that have been detected in groundwater at concentrations exceeding the Class II groundwater quality standards include the following:

Boron	Iron	Sulfate
Chloride*	Manganese	TDS
pH		

*exceeded in bedrock well only; background chloride concentration in bedrock to be determined

Class II parameters that have not been detected in groundwater include the following:

Beryllium	Chromium	Mercury
Cadmium	Cyanide	Thallium

All other Class II parameters that have been detected are typically well below their respective groundwater quality standards.

Quarterly groundwater sampling of the new bedrock well network commenced in January 2016.

3.3 Statistical Evaluation of Background Groundwater Data

A statistical evaluation was performed to determine the maximum background concentrations likely to occur upgradient of the Baldwin Fly Ash Pond System within the unlithified glacial materials. The groundwater quality data collected from upgradient monitoring wells MW-104S/SR and MW-104D/DR was evaluated using the Electric Power Research Institute (EPRI, March 2014) computer database and analysis program, MANAGES™ (Version 3.4.49). The statistical analysis procedures used here are consistent with procedures described in the document: 2009 Unified Guidance. "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance," March 2009, EPA 530/R-09-2007 (USEPA, 2009).

The statistical methodology is provided in Appendix E. Establishing the tolerance interval(s) for the groundwater constituents was accomplished by using either a parametric or non-parametric procedure based on the percentage of non-detects in the data sets and the distribution of the sample population. If the statistical data for a constituent had less than 50 percent non-detects and was normally or log-normally distributed, a parametric procedure was used. If the data was not normally or log-normally distributed or had more than 50 percent non-detects, a non-parametric procedure was used. Appendix E, Figure E-1 is a flow chart which illustrates the processes followed to determine the appropriate statistical procedure used for each constituent based on its statistical characteristics.

3.4 Statistical Analysis Results

The results of the statistical analyses for the groundwater in the unlithified materials are located in Appendix E. A statistical summary of the background water quality data from MW-104S/SR and MW-104D/DR is provided in Table E-2, and includes the mean, median, minimum, maximum, standard deviation, Sen Slope trend, normality determination, and percent non-detects for the background dataset. The statistical analysis procedure inputs and results are provided in Table E-3.

Calculated background values (upper and lower limits) for the tested inorganic constituents and pH are listed in Appendix E, Table E-1 along with the percent non-detects, normal or lognormal distribution, test method, and confidence level. The calculated background values are also shown on Table 1 and are compared to the groundwater quality standards for Class II: General Resource Groundwater. The higher of the two values is shown as the Applicable Groundwater Standard on Table 1 (see additional discussion provided in Section 5.2).

4 GROUNDWATER MONITORING SYSTEM

A groundwater monitoring system is proposed for the Baldwin Fly Ash Pond System to monitor groundwater, evaluate post-closure groundwater quality and trends, and to demonstrate compliance with the applicable groundwater quality standards identified in Section 5. The proposed groundwater monitoring well networks consist of a sufficient number of wells, installed at appropriate locations and depths to monitor post-closure compliance with groundwater quality standards for Class II: General Resource Groundwater.

The groundwater monitoring program is consistent with the requirements of 35 IAC Part 620 and 40 CFR Part 257 and includes two monitoring well networks. As discussed in Section 2.2, groundwater within the glacial deposits and uppermost bedrock will continue to be monitored to comply with 35 IAC Part 620 and BEC's existing NPDES permit. The second monitoring well network will monitor groundwater within bedrock, which is the only viable aquifer in the vicinity of the ash impoundments and is being designated the uppermost aquifer.

The monitoring wells are designed and constructed in accordance with applicable standards, including the following:

- All monitoring wells are cased in a manner that maintains the integrity of the boreholes
- Wells are screened to allow sampling only at the specified interval
- All wells are covered with vented caps, unless located in flood-prone areas, and equipped with devices to protect against tampering and damage

Both monitoring well networks described below fulfill the following goals:

- Enable the collection of groundwater samples that represent the quality of background water that has not been affected by the Baldwin Fly Ash Pond System
- Enable the collection of groundwater samples that represent the quality of downgradient groundwater
- Include wells that are located within the stratigraphic unit(s) that may serve as potential chemical migration pathways

4.1 Proposed Modified NPDES Monitoring Well Network

The proposed modified NPDES monitoring well network includes 17 monitoring wells. Thirteen wells will be sampled and analyzed for laboratory and field parameters which are equivalent to the current NPDES Permit parameters. These wells include MW-104SR, MW-104DR, MW-150, MW-350, MW-151, MW-152, MW-252, MW-352, MW-153, MW-253, MW-154, MW-155, and MW-355. Eleven of these wells are screened in the unlithified materials and three wells are screened in the bedrock. Two background bedrock monitoring wells (MW-304, MW-306) will also be sampled and analyzed for an expanded laboratory parameter list and field parameters, as described in Section 6.1.1.

The above monitoring wells are supplemented by 2 locations (MW-156, and MW-157S) that will monitor specific conductance, temperature and groundwater elevations only.

The proposed modified NPDES monitoring well network goes beyond Special Condition 17 of the existing NPDES permit for the Baldwin groundwater sampling program with the addition of wells MW-151, MW-304 and MW-306 in the groundwater monitoring system,

Boring logs and monitoring well construction reports for the groundwater monitoring system are provided in Appendix C. The proposed modified NPDES monitoring well network locations are shown on Figure 8. The well depths, well screen intervals, depth to groundwater elevations and monitored units at the proposed monitoring well network locations are summarized below:

Well Number	Well Depth (ft bgs)	Well Screen Interval (ft bgs)	Depth To Groundwater (ft bgs)	Unit Monitored	Screened Interval Lithology
MW-104SR	15	5 - 15	10.5	Upgradient Shallow Unlithified	Clay
MW-104DR	35	23 - 28	10.6	Upgradient Deep Unlithified	Clay; Poorly Graded Sand
MW-304	135	45-55	10.6	Upgradient Bedrock	Limestone
MW-306	86	71-86	NM	Upgradient Bedrock	Limestone
MW-150	25	15 - 25	16.6	Downgradient Shallow Unlithified	Clay
MW-350	47	42 - 47	19.5	Downgradient Bedrock	Limestone
MW-151	16	6 - 16	NM	Downgradient Shallow Unlithified	Clay
MW-152	18	7 - 17	3.5	Downgradient Shallow Unlithified	Clay; Poorly Graded Sand
MW-252	50	44 - 49	2.7+	Downgradient Deep Unlithified	Clay
MW-352	74	68 - 73	3.7	Downgradient Bedrock	Shale and Limestone
MW-153	21	10 - 20	11.6	Downgradient Shallow Unlithified	Clay

Well Number	Well Depth (ft bgs)	Well Screen Interval (ft bgs)	Depth To Groundwater (ft bgs)	Unit Monitored	Screened Interval Lithology
MW-253	35	30 - 35	9.8	Downgradient Deep Unlithified	Clay
MW-154	13	7 - 12	10.7	Downgradient Shallow Unlithified	Clay
MW-155	21	10 - 20	17.7	Downgradient Shallow Unlithified	Clay; Clayey Sand
MW-355	33	27 - 32	20.9	Downgradient Bedrock	Limestone
MW-156*	18	8 - 18	4.6	Downgradient Shallow Unlithified	Clay
MW-157S*	18	8 - 18	3.2	Downgradient Shallow Unlithified	Clay

+ indicates groundwater elevation above ground surface
Groundwater depth elevations shown are from November 10, 2015; NM indicates groundwater elevation was not measured.
* MW-156 also known as OW-156, MW-157S also known as OW-157; monitored for specific conductance, temperature and groundwater elevations only

4.2 40 CFR Part 257 Monitoring Well Network

The 40 CFR Part 257 well network consists of 7 monitoring wells installed in bedrock adjacent to the Baldwin Fly Ash Pond System (MW-366, MW-375, MW-377, MW-383, MW-384, MW-390, MW-391) and 2 background monitoring wells (MW-304, MW-306). The bedrock wells monitor the uppermost aquifer. Boring logs and monitoring well construction reports for the groundwater monitoring system are provided in Appendix C5. Sampling of these wells commenced in January 2016, with the exception of MW-306, MW-390 and MW-391 (expected to commence in March 2016). The 40 CFR Part 257 groundwater monitoring network well locations are shown on Figure 8.

The well depths, well screen intervals, depth to groundwater and monitored units at the 40 CFR Part 257 monitoring well network locations are summarized below:

Well Number	Well Depth (ft bgs)	Well Screen Interval (ft bgs)	Depth To Groundwater (ft bgs)	Unit Monitored	Screened Interval Lithology
MW-304	135	45 - 55	8.0	Upgradient Bedrock	Shale and Limestone
MW-306	86	71-86	10.6	Upgradient Bedrock	Shale and Limestone
MW-366	52	42-52	10.5	Downgradient Bedrock	Shale and Limestone

Well Number	Well Depth (ft bgs)	Well Screen Interval (ft bgs)	Depth To Groundwater (ft bgs)	Unit Monitored	Screened Interval Lithology
MW-375	67	57-67	29.0	Downgradient Bedrock	Shale and Limestone
MW-377	56	46-56	0.3	Downgradient Bedrock	Shale and Limestone
MW-383	73	58 - 68	17.0	Downgradient Bedrock	Shale and Limestone
MW-384	94	61 - 71	6.9	Downgradient Bedrock	Shale and Limestone
MW-390	65	50 - 65	NM	Downgradient Bedrock	Shale and Limestone
MW-391	70	55 - 70	NM	Downgradient Bedrock	Shale and Limestone

Groundwater depth elevations shown are from March 2, 2016
NM indicates groundwater elevation was not measured.
Groundwater elevations may have not yet fully stabilized.

4.3 Abandoned Wells

Three piezometers (TPZ-163, TP-167 and TPZ-168) are located within the Baldwin Fly Ash Pond System. These former leachate monitoring wells will be properly abandoned prior to their being damaged or destroyed during the impoundment closure activities. Leachate data collected from these piezometers are provided in Appendix D for a limited set of parameters.

Two bedrock monitoring wells (MW-385 and MW-386) are located within the Baldwin Fly Ash Pond System along the berm separating the East and West Fly Ash Ponds. These monitoring wells will also be properly abandoned prior to their being damaged/destroyed during the impoundment closure activities.

Monitoring well MW-387 is located on the West Fly Ash Pond berm and does not provide sufficient water depth for sampling. This bedrock monitoring well will be properly abandoned and will be replaced with a new well, MW-391.

The locations of monitoring wells to be abandoned are shown on Figure 3.

5 APPLICABLE GROUNDWATER QUALITY STANDARDS

5.1 Groundwater Classification

The classification of groundwater at the Baldwin Fly Ash Pond System was addressed in the Groundwater Quality Assessment and Phase II Hydrogeologic Investigation (NRT, June 11, 2014). Field hydraulic conductivity tests performed on the unlithified geologic materials (i.e., Cahokia Alluvium, Equality Formation, and Vandalia Till Member) and Mississippian and Pennsylvanian bedrock at the Site had geometric mean hydraulic conductivities of approximately $3x10^{-5}$ cm/s and $5x10^{-6}$ cm/s, respectively.

Geologic material with a hydraulic conductivity of less than $1x10^{-4}$ cm/s which does not meet the provisions of Section 620.210 (Class I), Section 620.230 (Class III), or Section 620.240 (Class IV), meets the definition of a Class II – General Resource Groundwater. Based on the detailed geologic information provided for the unlithified materials and bedrock at BEC, along with the hydrogeologic data, the groundwater in both the unlithified deposits and underlying bedrock at the Site can be classified as Class II - General Resource Groundwater.

5.2 Applicable Groundwater Quality Standards

The groundwater quality standard for the proposed modified NPDES monitoring well network for wells screened in unlithified materials is the greater of either the background concentration or the groundwater quality standard for Class II General Resource Groundwater [35 IAC 620.420]. Based on the statistical evaluation of background groundwater data (Table 1), most background concentrations in the unlithified materials are below the groundwater quality standard for Class II General Resource Groundwater. Therefore, for these parameters, the groundwater quality standard for Class II General Resource Groundwater will apply to the proposed modified NPDES monitoring well network for wells screened within unlithified material. The exceptions include total iron, dissolved iron, dissolved manganese and pH (lower limit), where the background concentration is higher (or lower for pH lower limit) than the Class II standard. Therefore, for these parameters, the background concentration is the applicable groundwater standard.

Background groundwater quality in bedrock will be established through statistical evaluation following completion of 8 quarters of groundwater sampling of background wells MW-304 and MW-306 that commenced in January 2016. The groundwater quality standard for the proposed modified NPDES monitoring well network (bedrock wells) at the Baldwin Fly Ash Pond System will be the greater of either the background concentration or the groundwater quality standard for Class II General Resource

Groundwater. The list of applicable groundwater quality standards for the modified NPDES monitoring well network is shown on Table 1.

The groundwater quality standards (i.e., Groundwater Protection Standard) for the 40 CFR Part 257 well network will be established in accordance with the methods outlined in 40 CFR Part 257 following the collection of 8 independent samples from each of the upgradient and downgradient monitoring wells, with completion of the final sample event required by October 17, 2017.

5.3 Proposed Exceptions to the Groundwater Monitoring Parameters

Based on the results of groundwater monitoring performed at the site to date for the proposed modified NPDES monitoring well network, the following exceptions to the above applicable Class II: General Resource Groundwater standards are proposed:

- Analytical results (Appendix D) do not indicate exceedances of the groundwater quality standards for Class II General Resource Groundwater inorganic constituents listed in 35 IAC 620.420(a)(1). The analyzed constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, cyanide, fluoride, lead, mercury, nitrate, and thallium.[1] With the exception of nitrate, these constituents will not be monitored because they are well below the standards for Class II General Resource Groundwater and are not prevalent in groundwater associated with the Baldwin Fly Ash Pond System.
- Analytical results (Appendix D) do not indicate exceedances of the groundwater quality standards for Class II General Resource Groundwater for inorganic constituents copper, nickel, selenium, silver, and zinc listed in 35 IAC 620.420(a)(2). These constituents will not be monitored because they are well below the standards for Class II General Resource Groundwater and are not prevalent in groundwater associated with the Baldwin Fly Ash Pond System.
- Perchlorate is commonly used as an oxidizer in solid propellants, munitions, fireworks, airbag initiators for vehicles, matches and signal flares. It is also used in some electroplating operations and found in some disinfectants and herbicides (USEPA, 2014). Perchlorate is an inorganic constituent listed in 35 IAC 620.420(a)(1) but has not been previously analyzed. Perchlorate will not be monitored because it is not associated with the chemical characteristics of the Baldwin Fly Ash Pond System.

The proposed groundwater monitoring parameters for the proposed modified NPDES monitoring well network and 40 CFR Part 257 groundwater monitoring well network are discussed in Section 6.1.

[1] Perchlorate, vanadium and Ra-226/Ra-228 are parameters listed in 35 IAC 620.420(a)(1) but have not been analyzed.

6 GROUNDWATER MONITORING PLAN

The groundwater monitoring plan will monitor and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards for Class II: General Resource Groundwater as well as USEPA parameters, as appropriate. As discussed in Section 4, the proposed post-closure groundwater sampling network consists of four background monitoring wells and 20 compliance monitoring wells as shown on Figure 8.

6.1 Monitoring Parameters

6.1.1 Proposed Modified NPDES Monitoring Well Network

The proposed modified NPDES monitoring well network includes 17 monitoring wells. Thirteen wells will continue to be sampled and analyzed for the laboratory and field parameters listed below which are equivalent to the current NPDES Permit parameters. These wells include MW-104SR, MW-104DR, MW-150, MW-350, MW-151, MW-152, MW-252, MW-352, MW-153, MW-253, MW-154, MW-155, and MW-355.

Laboratory Parameters		
Boron (dissolved)	Manganese (total)	Sulfate (dissolved)
Chloride (dissolved)	Nitrate (total)	Total Dissolved Solids (TDS)
Iron (total)		

Field Parameters	
pH	Depth of Well (ft bgs)
Specific Conductance	Elevation of measuring point (mp)
Temperature	Depth to Water (ft below mp)
	Groundwater Elevation (ft)

As discussed in Section 5, other constituents listed under 35 IAC 620 will not be monitored at the proposed modified NPDES monitoring well network because the groundwater monitoring results to date indicate that the inorganic constituents antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, selenium, silver, thallium and zinc meet the Class II: General Resource Groundwater standards and are not associated with the chemical characteristics of the Baldwin Fly Ash Pond System.

Two monitoring wells, MW-156 and MW-157S, are monitored for specific conductance, temperature and groundwater elevation.

Two proposed background bedrock monitoring wells (MW-304, MW-306) will be sampled and analyzed for the following laboratory and field parameters:

Laboratory Parameters		
Boron (dissolved)	Manganese (total)	Sulfate (dissolved)
Chloride (dissolved)	Nitrate (total)	Total Dissolved Solids (TDS)
Iron (total)		
Field Parameters		
pH	Depth of Well (ft bgs)	
Specific Conductance	Elevation of measuring point (mp)	
Temperature	Depth to Water (ft below mp)	
	Groundwater Elevation (ft)	

As discussed in Section 5, perchlorate will not be monitored because this parameter is not associated with the chemical characteristics of the Baldwin Fly Ash Pond System.

6.1.2 40 CFR Part 257 Monitoring Well Network

The 40 CFR Part 257 well network consists of 7 monitoring wells installed in bedrock adjacent to the Baldwin Fly Ash Pond System (MW-366, MW-375, MW-377, MW-383, MW-384, MW-390, MW-391) and 2 background monitoring wells (MW-304, MW-306). Groundwater samples will be collected and analyzed for the following laboratory and field parameters:

Laboratory Parameters		
Metals (totals)		
Antimony	Cadmium	Lithium
Arsenic	Calcium	Mercury
Barium	Chromium	Molybdenum
Beryllium	Cobalt	Selenium
Boron	Lead	Thallium
Inorganics (totals)		
Fluoride	Sulfate	
Chloride	Total Dissolved Solids	
Other (total)		
Radium 226 and 228 combined		
Field Parameters		
pH	Temperature	
Oxidation/Reduction Potential	Specific Conductivity	
Dissolved Oxygen	Turbidity	

All parameters listed above will be sampled a minimum of eight times by October 17, 2017 to establish background groundwater quality. Following the initial eight rounds of sampling, the parameters to be monitored will be in accordance with the requirements of 40 CFR Part 257.94 and 257.95.

6.2 Sampling Schedule

Groundwater sampling for the proposed modified NPDES monitoring well network will initially be performed quarterly according to the following schedule:

Frequency	Duration
Quarterly	Begins: upon approval of this plan.
	Ends: 5 years after completion of cap and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Baldwin Fly Ash Pond System.
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied.
	Ends: 5 years after initiation of semiannual monitoring and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Baldwin Fly Ash Pond System.
Annual	Begins: after IEPA approves that semiannual monitoring requirements have been satisfied.
	Ends: upon IEPA approval of a certified post-closure care report.

Five years after approval of the Closure Plan, a request may be made to modify the post-closure care plan to reduce the frequency of groundwater monitoring to semi-annual sampling by demonstrating all of the following:

- Monitoring effectiveness will not be compromised by the reduced frequency of monitoring
- Sufficient data has been collected to characterize groundwater
- Concentrations of constituents monitored at the downgradient boundaries show no statistically significant increasing trends that can be attributed to the former ash ponds

If concentrations of parameters of concern at the downgradient boundaries of the site show no statistically significant increasing trends that can be attributed to the Baldwin Fly Ash Pond System for the five years after reducing the monitoring frequency to semi-annual, a request may be made to modify the post-closure care plan to reduce monitoring frequency to annual sampling by demonstrating the same items above as for the reduction to semi-annual monitoring.

Groundwater monitoring may be discontinued upon Illinois EPA's approval of a certified post-closure care report. Specifically, when no statistically significant increase is detected in the concentration of any constituent above that measured and recorded during the immediately preceding scheduled sampling for four consecutive years after changing to an annual monitoring frequency.

Groundwater monitoring for the 40 CFR Part 257 well network will follow a schedule in accordance with the requirements of 40 CFR Part 257.94 and 257.95.

6.3 Groundwater Sample Collection

Groundwater samples will be collected consistent with the requirements of 35 IAC Part 620 and 40 CFR 257.93 as described in Appendix F. In addition to groundwater well samples, quality assurance samples will be collected as described in Section 6.5.

6.4 Laboratory Analysis

Laboratory analysis will be performed consistent with the requirements of 35 IAC Part 620 and 40 CFR 257.93 by a state-certified laboratory using methods approved by Illinois EPA and USEPA. The practical quantitation limit (PQL) for all parameters analyzed will be lower than the applicable groundwater quality standard. Concentrations lower than the PQL will be reported as less than the PQL.

6.5 Quality Assurance Program

Consistent with the requirements of 35 IAC Part 620 and 40 CFR 257.93, the sampling and analysis program includes procedures and techniques for quality assurance and quality control. Additional quality assurance samples to be collected will include the following:

- Two blind duplicate groundwater samples from randomly selected monitoring wells
- One equipment blank sample will be collected and analyzed for each day of sampling. If dedicated sampling equipment is used, than equipment blank samples will not be collected.

The duplicate and equipment blank quality assurance samples will be supplemented by the laboratory QA/QC program, which typically includes:

- Regular generation of instrument calibration curves to assure instrument reliability
- Laboratory control samples and/or quality control check standards that have been spiked, and analyses to monitor the performance of the analytical method
- Matrix spike/matrix spike duplicate analyses to determine percent recoveries and relative percent differences for each of the parameters detected

- Analysis of replicate samples to check the precision of the instrumentation and/or methodology employed for all analytical methods
- Analysis of method blanks to assure that the system is free of contamination

6.6 Groundwater Monitoring System Maintenance Plan

Consistent with the requirements of 35 IAC Part 620 and 40 CFR 257.91, maintenance will be performed as needed to assure that the monitoring wells provide representative groundwater samples. Monitoring wells will be inspected during each groundwater sampling event. Monitoring well inspections will consist of the following:

- Visual inspection, clearing of vegetation, replacement of markers, and painting of protective casings as needed to assure that monitoring wells are clearly marked and accessible
- Visual inspection and repair or replacement of well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved
- Visual inspection and repair or replacement of protective casings as needed to assure that they are undamaged, and that locks are present and functional
- Checks to assure that well caps are intact and vented, unless in flood-prone areas in which case caps will not be vented
- Annual measurement of monitoring well depths to determine the degree of siltation within the wells. Wells will be redeveloped as needed to remove siltation from the screened interval if it impedes flow of water into the well
- Checks that wells are clear of internal obstructions, and flow freely

If maintenance of a monitoring well cannot address an identified deficiency, a replacement well will be installed.

6.7 Annual Statistical Analysis

6.7.1 Proposed Modified NPDES Monitoring Well Network

Trend analysis will be performed annually for each of the monitored parameters. Sen's Estimate of Slope will be applied to a minimum of four consecutive quarterly monitoring results. If there are increasing trends during closure and post-closure care periods, they will be further investigated as described below.

- If the results of sampling and analysis show an increasing trend at any compliance monitoring well, a Mann-Kendall analysis will be performed at 95 percent confidence to determine whether or not the increasing trend is statistically significant.
- If a statistically significant increasing trend occurs during post-closure care, further investigation of monitored concentrations will be performed as well as more frequent inspections of the surface of the cover system.

- If the investigation attributes a statistically significant increasing trend to a source other than the Baldwin Fly Ash Pond System, then the Illinois EPA will be notified in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.
- If there is not an alternative source causing the statistically significant increasing concentration and the sampling frequency had been reduced to semi-annual or annual sampling, a quarterly sampling schedule will be reestablished. The frequency of sampling will return to either semi-annual or annual, once four consecutive quarterly samples show no statistically significant increasing trend.

Notifications concerning statistically significant increasing trends and revisions of the sampling frequency will be reported to Illinois EPA in writing within 30 days after making the determinations.

6.7.2 40 CFR Part 257 Monitoring Well Network

As required in 40 CFR Part 257.93, statistical analysis will be performed to determine whether or not a statistically significant increase over a background value has occurred for each constituent and at each well. Appropriate statistical methods will be chosen from the list of methods provided and the test chosen will be conducted separately for each constituent in each monitoring well. In addition, each statistical method chosen will comply with the performance standards, as appropriate, based on the test method used. If a statistically significant increase over background values is determined, procedures from 40 CFR Part 257 will be followed including 1) establishing an assessment monitoring program or 2) demonstrating that a source other than the Baldwin Fly Ash Pond System caused the increase or demonstrating another plausible reason for the increase (error in sampling, etc.).

6.8 Data Reporting

Sampling and analysis data from quarterly, semi-annual and/or annual groundwater monitoring for the modified NPDES monitoring well network will be reported to Illinois EPA within 60 days after completion of sampling. Statistical analysis of the laboratory analytical data will be reported to Illinois EPA with the annual report for the facility, as described in the closure plan.

Data reporting for the 40 CFR Part 257 monitoring well network will be consistent with recordkeeping, notification, and internet posting requirements described in 40 CFR 257.105 through 257.107.

6.9 Compliance with Applicable On-Site Groundwater Quality Standards

Compliance with on-site groundwater quality standards, as measured at the modified NPDES monitoring well network, will be achieved when there are no statistically significant increasing trends that are attributed to the Baldwin Fly Ash Pond System for parameters detected at the compliance boundary for four (4) consecutive years following the change to an annual monitoring frequency.

Evaluation of groundwater quality data under USEPA (2015) will be consistent with 40 CFR Part 257.93 and 257.94.

6.10 Corrective Action

If a statistically significant increasing trend is observed to continue over a period of two or more years in groundwater sampled at the modified NPDES monitoring well network, and a subsequent hydrogeologic site investigation demonstrates that such exceedances are due to a release from the Baldwin Fly Ash Pond System and corrective actions are appropriate to mitigate such releases, a corrective action plan will be proposed as a modification to the post-closure care plan. A corrective action plan will be submitted to Illinois EPA within 180 days after completion of the investigation activities. The plan will propose corrective actions to be undertaken to mitigate the impacts associated with the constituents of concern which exceed applicable groundwater standards.

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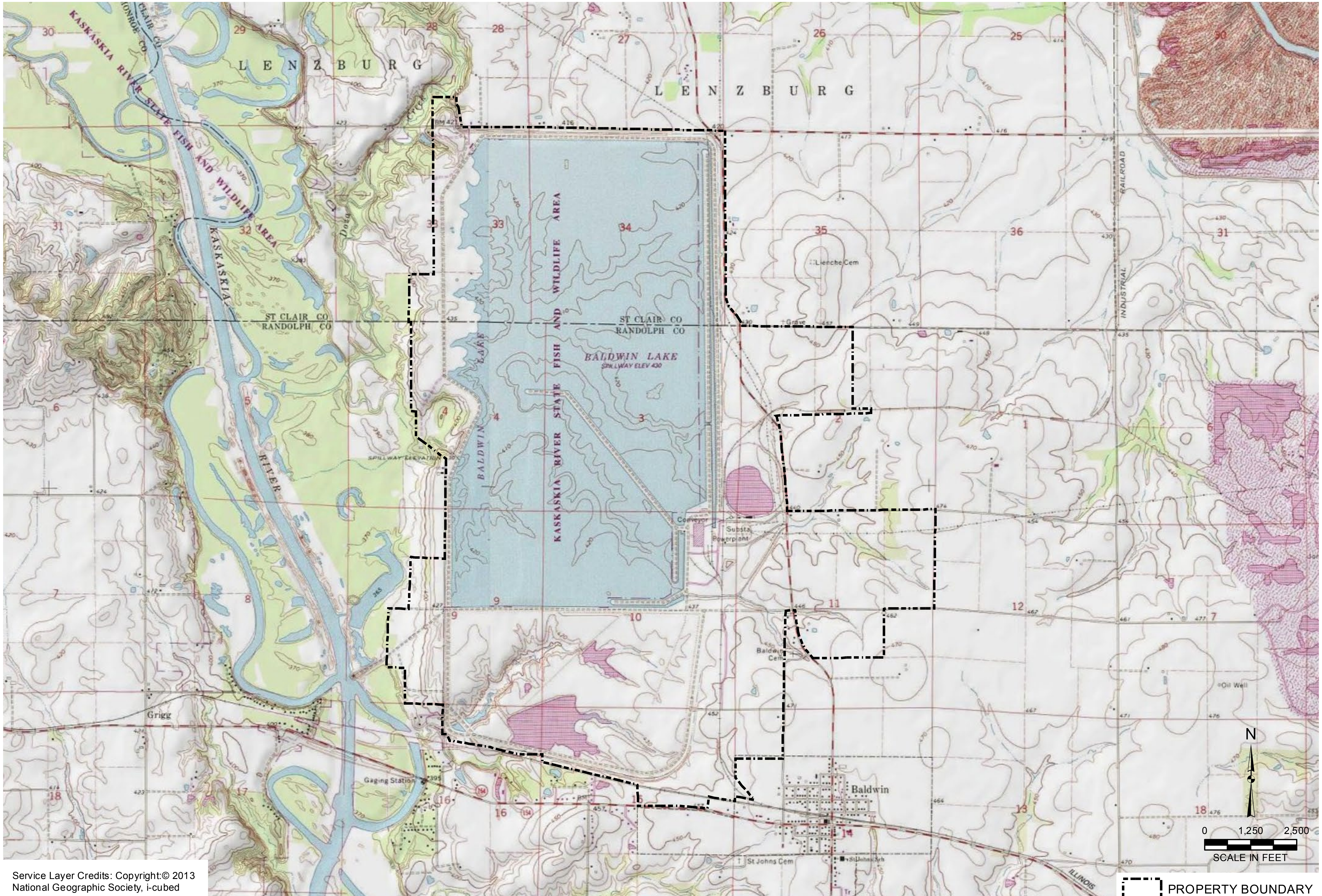
FIGURES



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REVIEWED BY/DATE: RJK 2/25/16
APPROVED BY/DATE: SJC 3/2/16

SITE LOCATION MAP

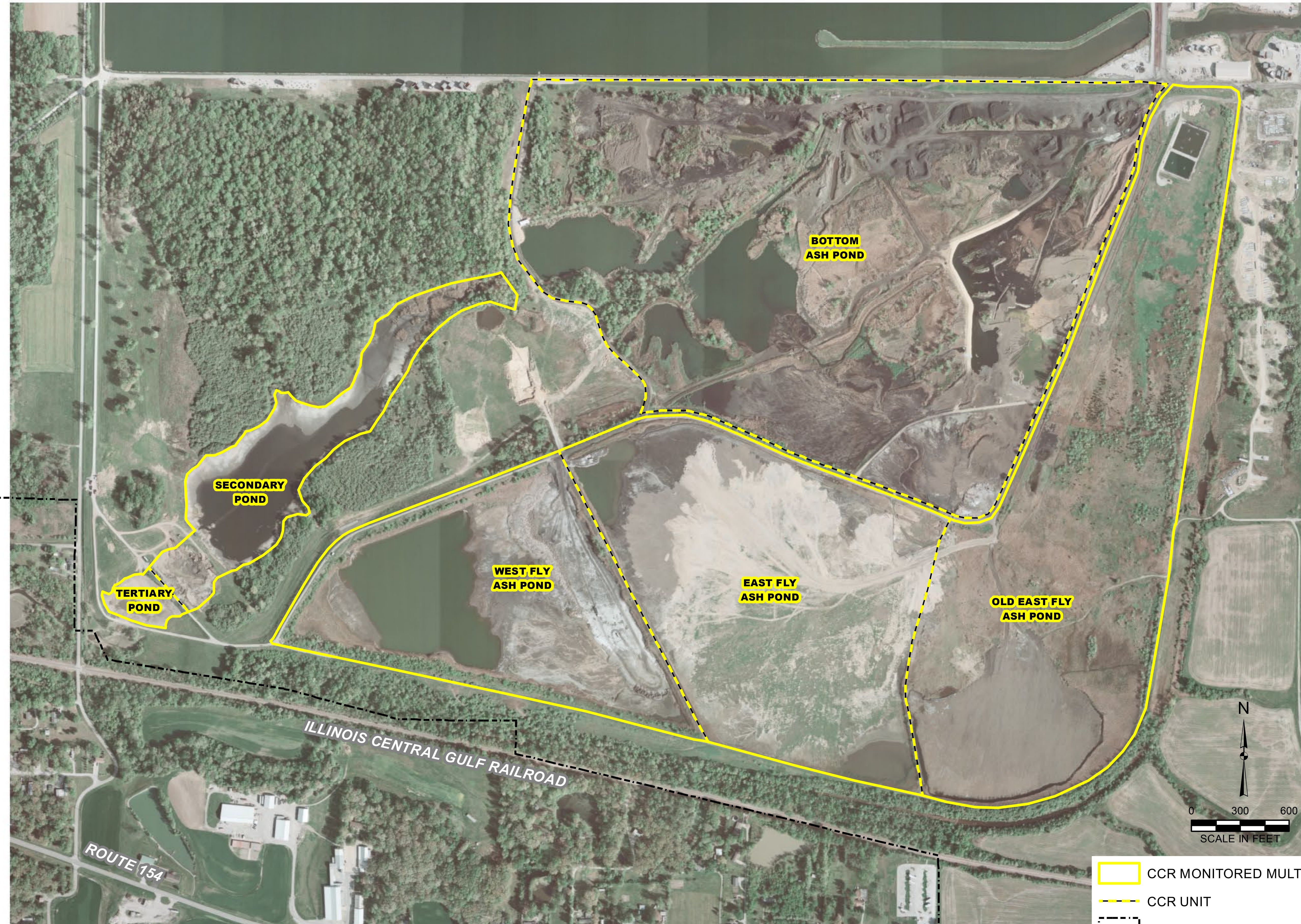
SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 1

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\23\2340\MXD\HydroGeo and GWMP_2015\Figure 1_Site Location Map.mxd Author: tcushman; Date/Time: 3/2/2016, 2:03:31 PM



AERIAL PHOTO SOURCE: HENDERSON AERIAL SURVEYS (4/2/2012).

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REVIEWED BY/DATE: RJK 2/25/16
APPROVED BY/DATE: SJC 3/2/16

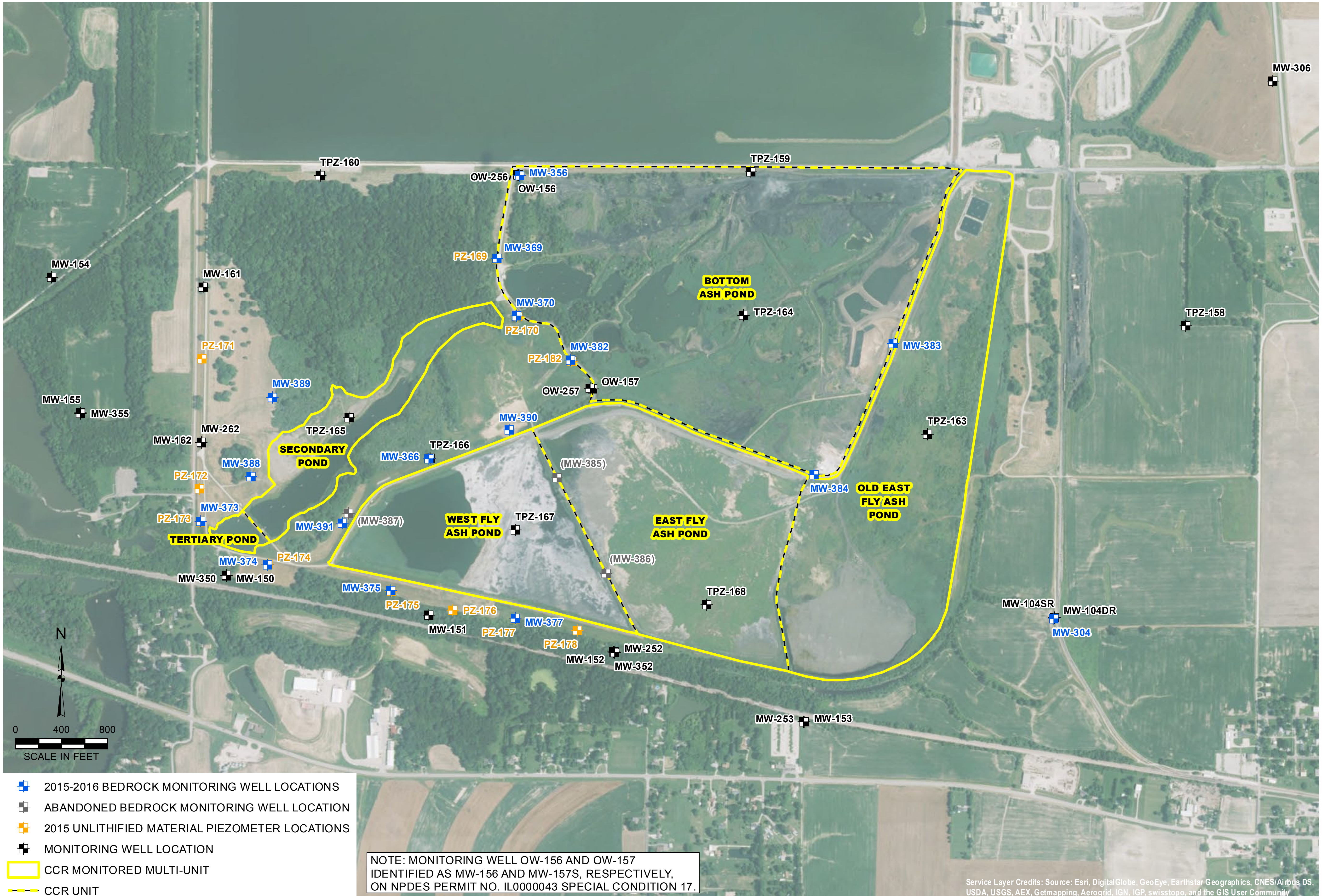
AERIAL PHOTOGRAPH OF SITE AND ASH POND SYSTEM

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 2

NATURAL RESOURCE TECHNOLOGY



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APPROVED BY/DATE: SJC 3/2/16

MONITORING WELL LOCATION MAP

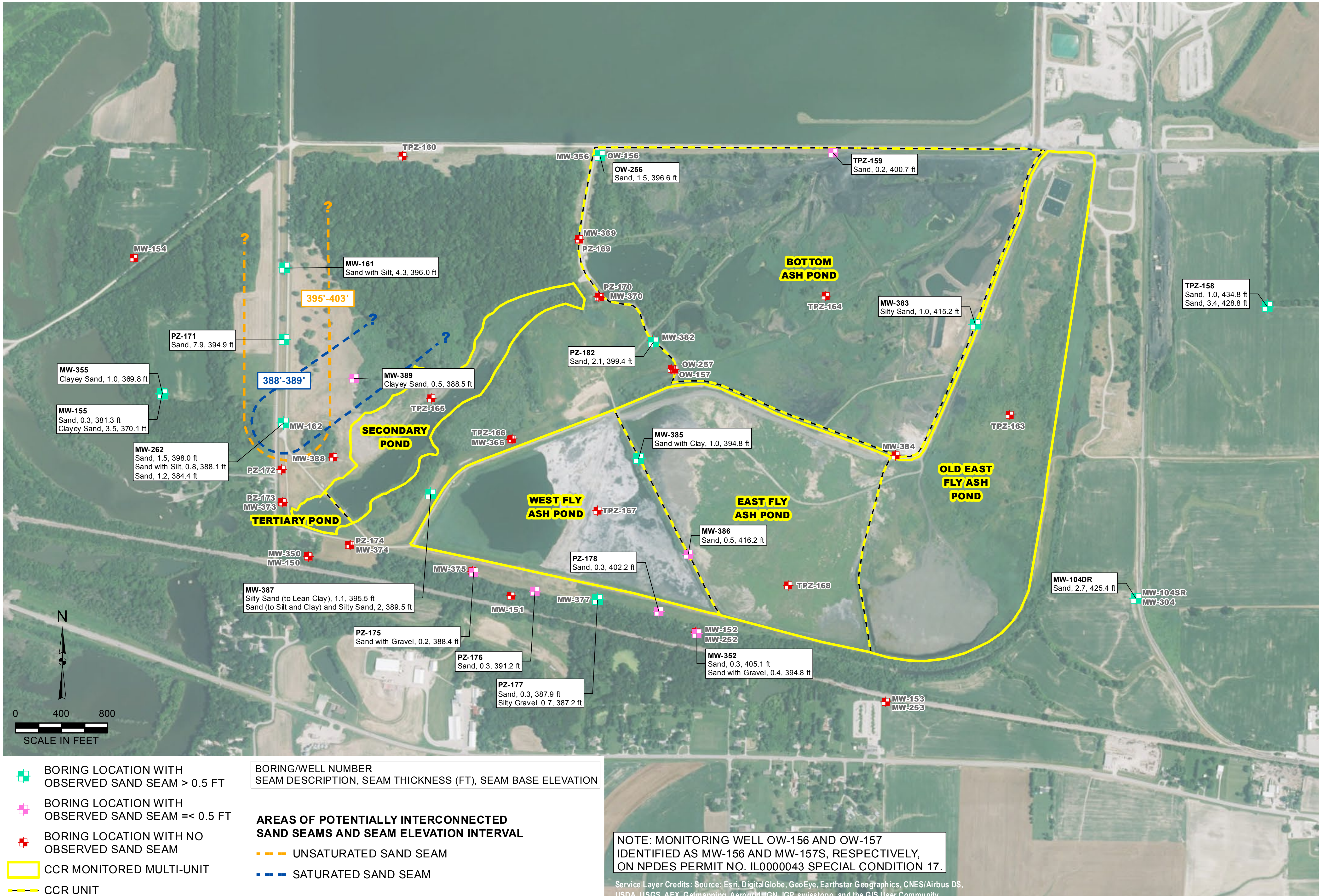
SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 3

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\23\2340\MXD\HydroGeo and GWMP_2015\Figure 3_Monitoring Well Location Map.mxd Author: tcushman; Date/Time: 3/7/2016, 9:31:47 AM



Y:\Mapping\Projects\23\2340\MXD\HydroGeo and GWMP_2015\Figure 4_Sand Seam Observations Thickness and Elevations.mxd Author: tcushman; Date/Time: 3/2/2016, 2:02:06 PM

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REVIEWED BY/DATE: RJK 2/25/16
APPROVED BY/DATE: SJC 3/2/16

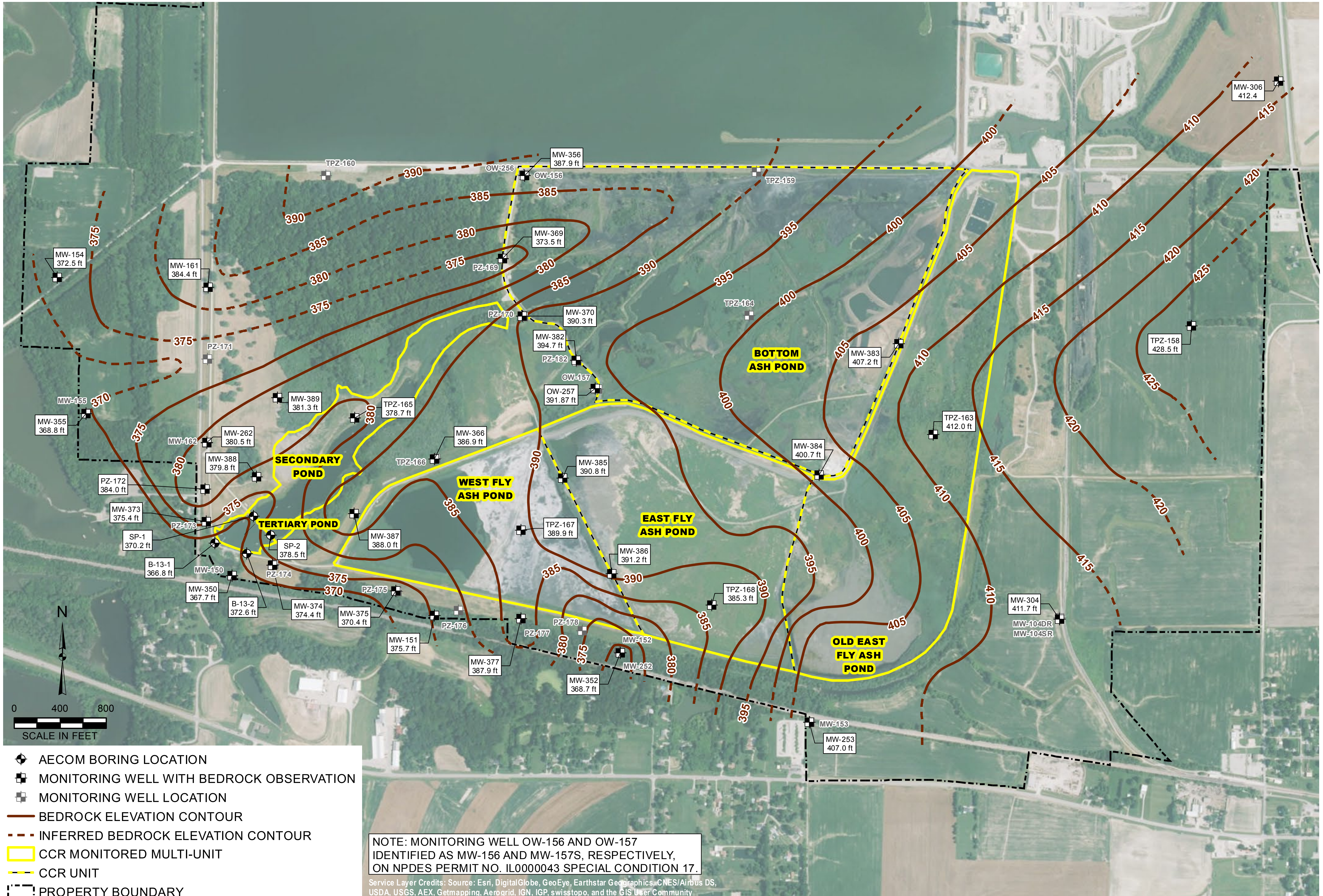
SAND SEAM OBSERVATIONS, THICKNESS AND ELEVATIONS

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 4

NATURAL RESOURCE TECHNOLOGY



Y:\Mapping\Projects\23\2340\MXD\HydroGeo and GWMP_2015\Figure 5_Bedrock Topography.mxd Author: tcushman; Date/Time: 3/2/2016, 2:01:23 PM

DRAWN BY/DATE: TDC 2/25/16
REVIEWED BY/DATE: JJW 2/26/16
APPROVED BY/DATE: SJC 3/2/16

BEDROCK TOPOGRAPHY

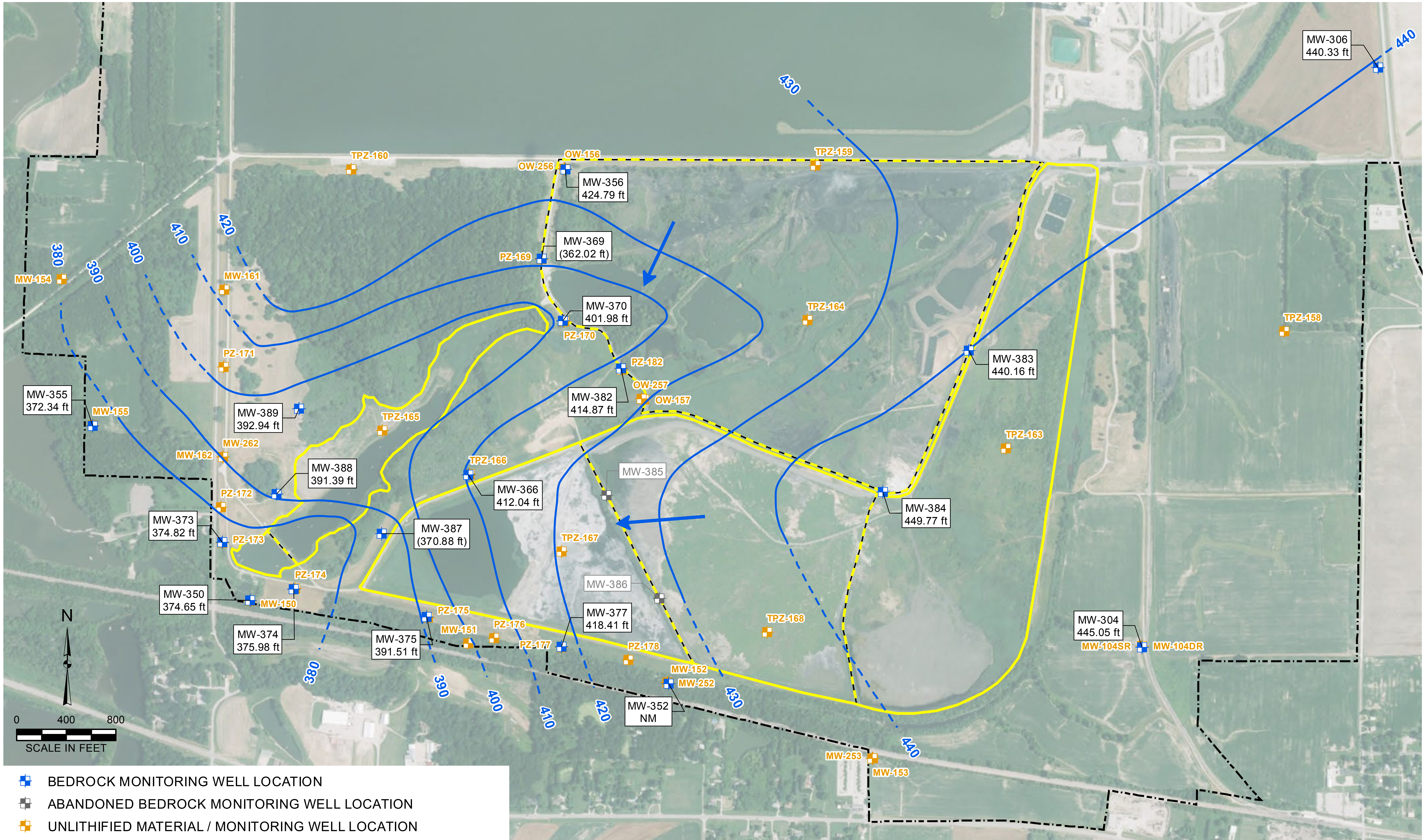
SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 5

NATURAL RESOURCE TECHNOLOGY

POTENTIOMETRIC SURFACE IN BEDROCK CONTOUR MAP
MARCH 2, 2016



- BEDROCK MONITORING WELL LOCATION
- ABANDONED BEDROCK MONITORING WELL LOCATION
- UNLITHIFIED MATERIAL / MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (10-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED MULTI-UNIT
- CCR UNIT
- PROPERTY BOUNDARY

NOTES:
- GROUNDWATER ELEVATION NOT MEASURED AT BEDROCK MONITORING WELL LOCATION MW-352 ON MARCH 2, 2016 DUE TO ACCESSIBILITY ISSUES CAUSED BY FLOODED WATER SURROUNDING WELL LOCATION.
- GROUNDWATER ELEVATIONS IN PARENTHESIS WERE NOT STABLE AT THE TIME OF MEASUREMENT AND NOT USED FOR CONTOURING.
- MONITORING WELL OW-156 AND OW-157 IDENTIFIED AS MW-156 AND MW-157S, RESPECTIVELY, ON NPDES PERMIT NO. IL0000043 SPECIAL CONDITION 17.

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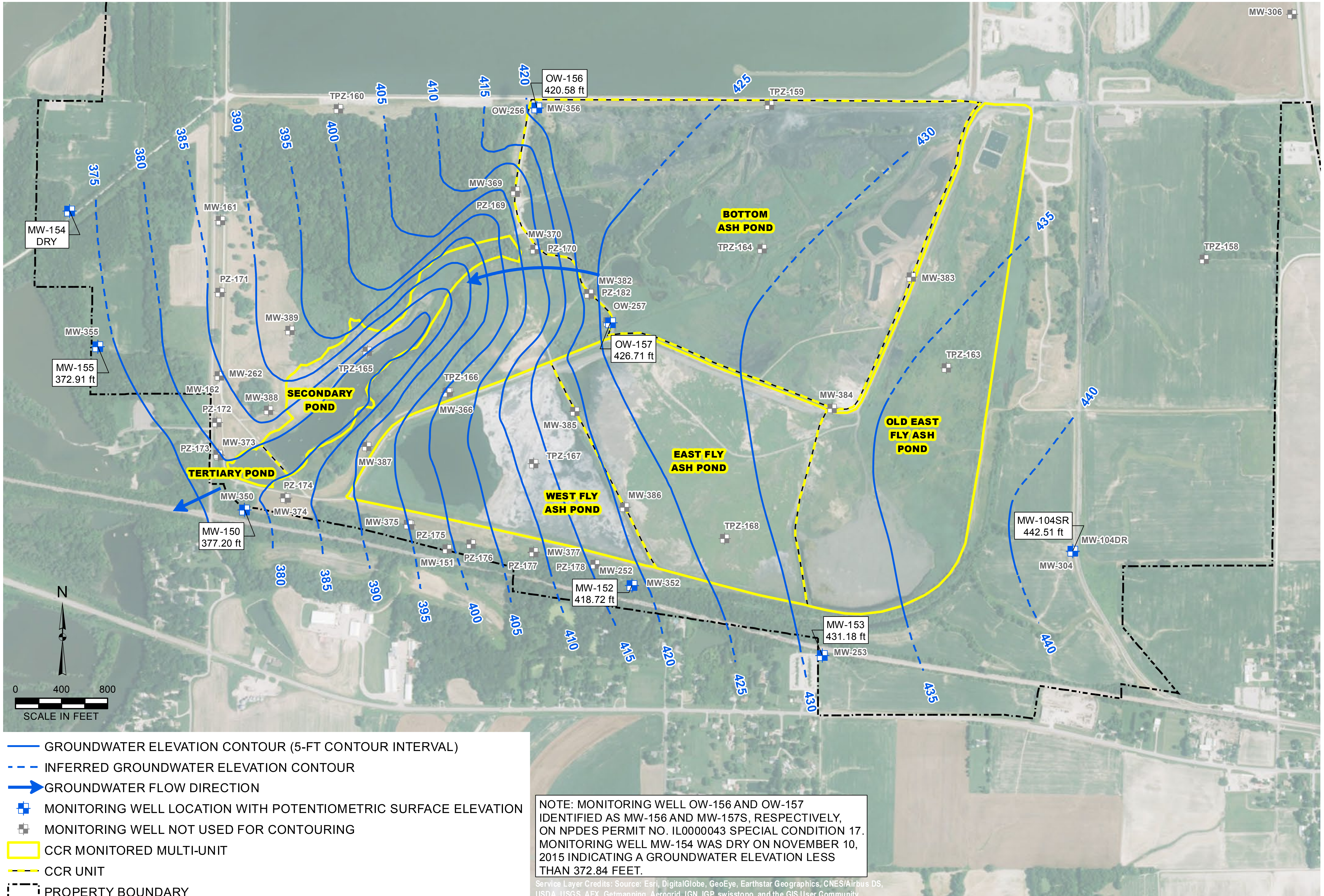
SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 6

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\23\2340\MXD\HydroGeo and GWMP_2015\Figure 6_Bedrock Groundwater Contour Map_Mar 2016.mxd Author: tcushman; Date/Time: 3/7/2016, 11:39:28 AM



- GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- MONITORING WELL LOCATION WITH POTENTIOMETRIC SURFACE ELEVATION
- MONITORING WELL NOT USED FOR CONTOURING
- CCR MONITORED MULTI-UNIT
- CCR UNIT
- PROPERTY BOUNDARY

NOTE: MONITORING WELL OW-156 AND OW-157 IDENTIFIED AS MW-156 AND MW-157S, RESPECTIVELY, ON NPDES PERMIT NO. IL0000043 SPECIAL CONDITION 17. MONITORING WELL MW-154 WAS DRY ON NOVEMBER 10, 2015 INDICATING A GROUNDWATER ELEVATION LESS THAN 372.84 FEET.

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APPROVED BY/DATE: SJC 3/2/16

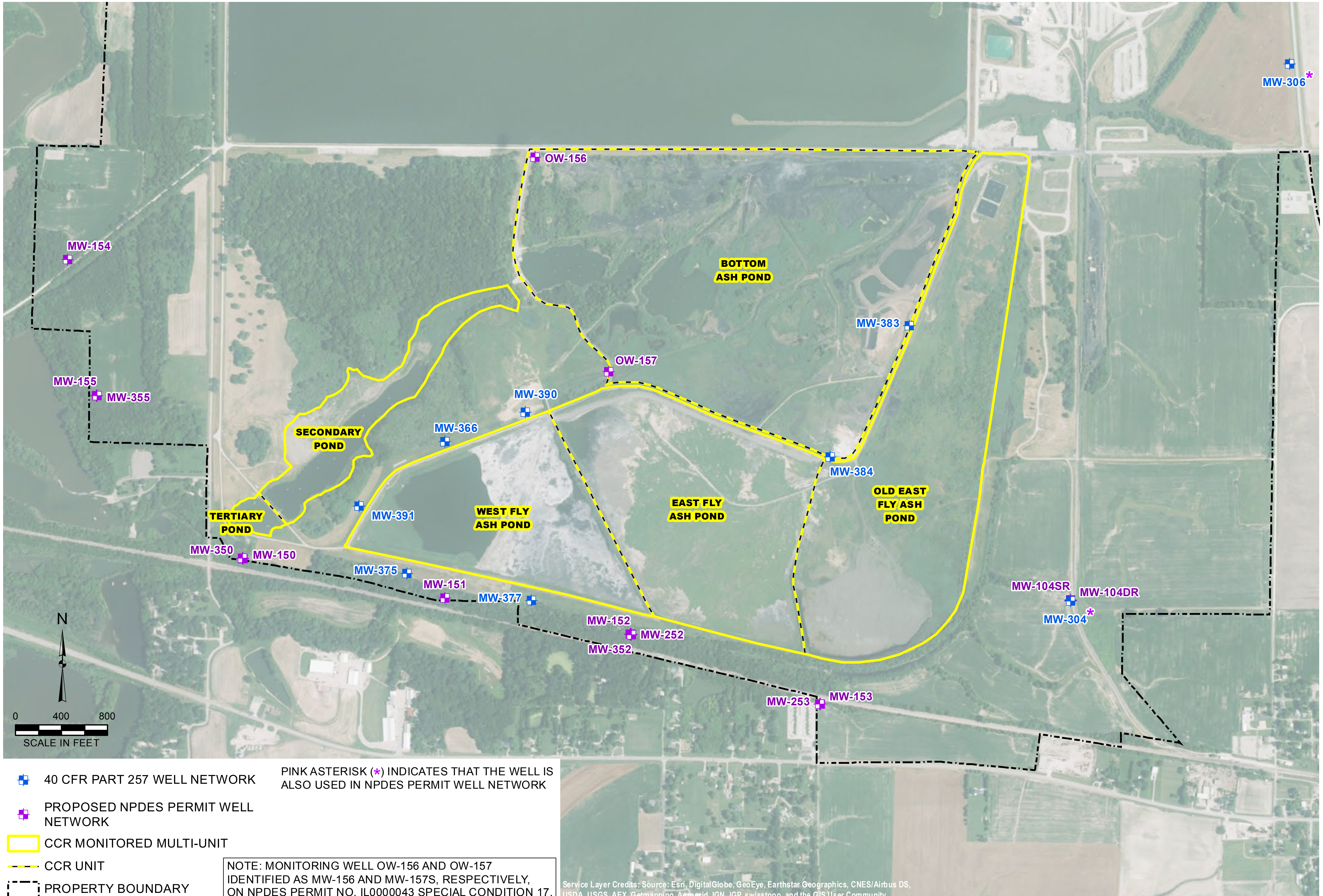
POTENTIOMETRIC SURFACE IN UNLITHIFIED DEPOSITS CONTOUR MAP
NOVEMBER 10, 2015

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 7

NATURAL RESOURCE TECHNOLOGY



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APPROVED BY/DATE: SJC 3/2/16

GROUNDWATER MONITORING NETWORK WELLS

SUPPLEMENTAL HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
AND GROUNDWATER MONITORING PLAN
BALDWIN FLY ASH POND SYSTEM
BALDWIN ENERGY COMPLEX, BALDWIN, ILLINOIS

PROJECT NO: 2340

FIGURE NO: 8

NATURAL RESOURCE TECHNOLOGY

TABLES

Table 1
Background Groundwater Quality and Applicable Groundwater Quality Standards
Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan
Baldwin Fly Ash Pond System
Baldwin Energy Center

		Unlithified[4]				Bedrock[5]			
Parameter	**IL Class II Std[1] (mg/L)**	**Background Concentration[2] (mg/L)**	**Applicable Groundwater Standard[3] (mg/L)**	**Maximum (mg/L)**	**Minimum (mg/L)**	**Background Concentration (mg/L)**	**Applicable Groundwater Standard (mg/L)**	**Maximum (mg/L)**	**Minimum (mg/L)**
Antimony	0.024	0.005	0.024	<0.005	<0.005	USEPA (t)	na	0.0075	<0.005
Arsenic	0.2	0.032	0.2	0.032	<0.005	USEPA (t)	na	0.011	<0.005
Barium	2.0	0.621	2.0	0.24	0.0094	USEPA (t)	na	1.6	0.098
Beryllium	0.5	0.004	0.5	<0.005	<0.004	USEPA (t)	na	<0.005	<0.004
Boron (t)	2.0	na	na	--	--	USEPA (t)	na	--	--
Boron (d)	2.0	0.237	2.0	45.3	<0.02	**tbd**	**tbd[3]**	1.88	<0.02
Calcium	NS	na	NS	289	54.17	USEPA (t)	na	533	45
Cadmium	0.05	0.002	0.05	<0.002	<0.002	USEPA (t)	na	<0.002	<0.002
Chloride (t)	200	na	na	--	--	USEPA (t)	na	--	--
Chloride (d)	200	58.7	200	140	4.1	**tbd**	**tbd[3]**	642	9
Chromium	1.0	0.005	1.0	<0.005	<0.005	USEPA (t)	na	<0.005	<0.005
Cobalt	1.0	0.005	1.0	0.01	<0.005	USEPA (t)	na	<0.005	<0.005
Copper	0.65	0.005	0.65	0.016	<0.005	na	na	<0.005	<0.005
Cyanide (t)	0.6	0.008	0.6	<0.008	<0.007	na	na	<0.008	<0.007
Fluoride	4.0	0.793	4.0	0.865	0.119	USEPA (t)	na	0.756	0.174
Iron (t)	5.0	**11**	11	69.4	<0.02	**tbd**	**tbd[3]**	3.82	0.02
Iron (d)	5.0	**18**	18	18	<0.01	na	na	1.6	0.011
Lead	0.1	0.005	0.1	0.005	<0.005	USEPA (t)	na	<0.005	<0.005
Lithium	NS	na	na	--	--	USEPA (t)	na	--	--
Manganese (t)	10	8.2	10	24.4	<0.003	**tbd**	**tbd[3]**	0.58	<0.003
Manganese (d)	10	**48.8**	48.8	6.8	<0.003	na	na	0.87	<0.003
Mercury	0.01	0.002	0.01	<0.002	<0.002	USEPA (t)	na	<0.002	<0.002
Molybdenum	NS	na	NS	--	--	USEPA (t)	na	--	--
Nickel	2.0	0.005	2.0	<0.005	<0.005	na	na	0.007	<0.005
Nitrate (as N) (t)	100	2.26	100	10.7	<0.05	**tbd**	**tbd[3]**	1.13	0.103
Nitrate (as N) (d)	100	2.25	100	18	<0.05	na	na	2.04	0.06
Selenium	0.05	0.01	0.05	0.016	<0.01	USEPA (t)	na	<0.01	<0.01
Silver	0.05	0.005	0.05	0.006	<0.005	na	na	0.01	<0.005
Sulfate (t)	400	na	na	--	--	USEPA (t)	na	--	--
Sulfate (d)	400	328	400	2050	23	**tbd**	**tbd[3]**	65	<10
Thallium	0.02	0.002	0.02	<0.002	<0.002	USEPA (t)	na	<0.002	<0.002
Vanadium	0.1	na	0.1	--	--	na	na	--	--
Zinc	10	0.009	10	0.014	<0.005	na	na	0.006	<0.005
TDS	1,200	999	1,200	3470	188	**tbd** / USEPA	**tbd[3]**	1709	375
Field pH	6.5 - 9.0	**6.06** - 7.55	6.06 - 9.0	12.4	5.6	**tbd** / USEPA	**tbd[3]**	12.9	6.5
Radium 226/228*	5.0 / 5.0	na	na	--	--	USEPA (t)	na	- -	- -

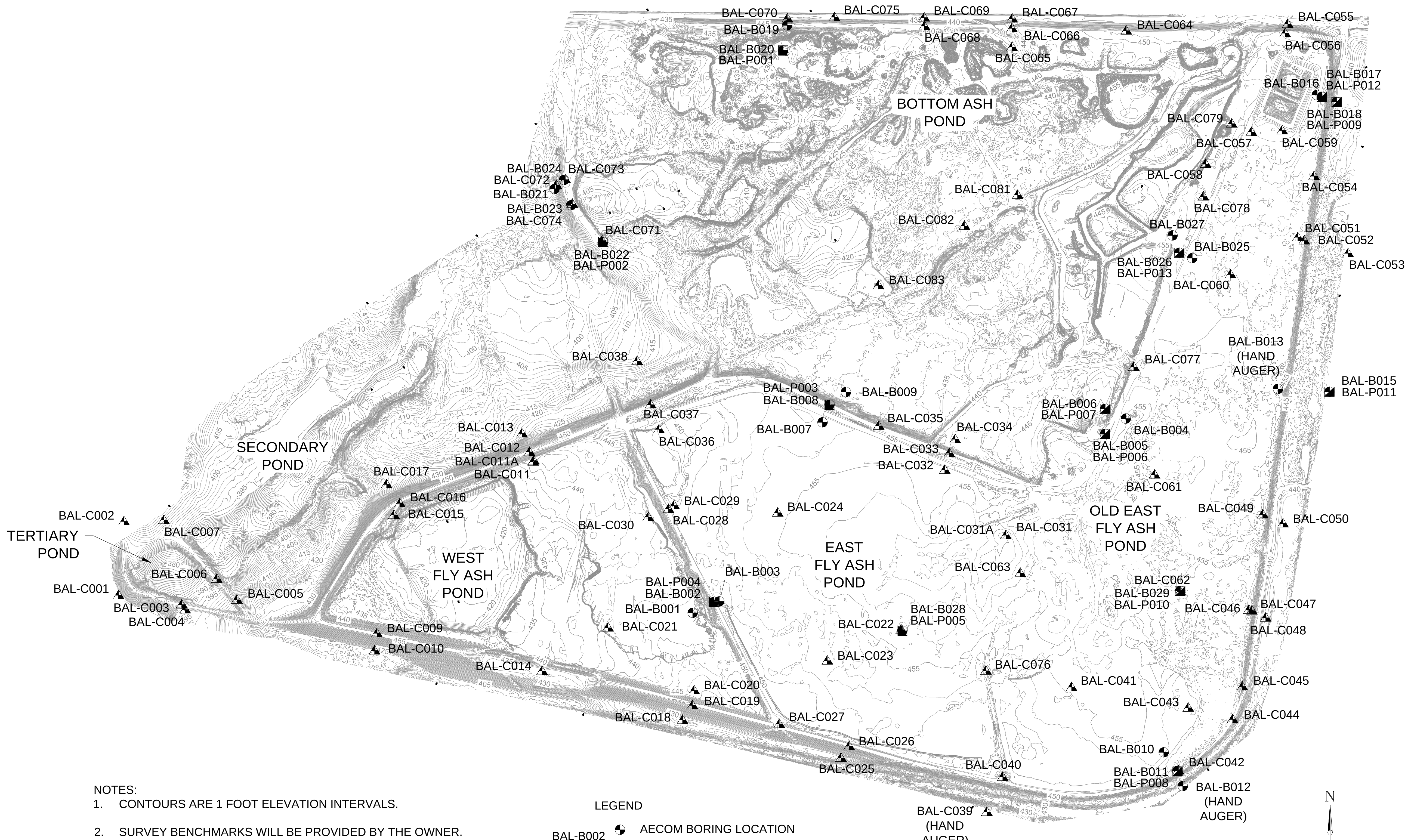
[O: JAZ 1/28/16, C:GFF 1/29/16, QA:SJC 3/2/16]

Notes:
All parameters are dissolved unless noted. Standards apply to dissolved or total concentration
(t) Total (d) Dissolved
tbd = To Be Determined for Illinois EPA monitoring program; based on future monitoring beginning January 2016
Bold = Background Concentration exceeds Class II Groundwater Standard
Red = Exceeds Applicable Groundwater Standard
-- = not analyzed prior to 2016
na = not applicable; parameter [dissolved and total] not proposed for Illinois EPA monitoring program under proposed modified NPDES Permi
NS = No Class II Groundwater Standard
USEPA (t) = background concentration for parameter [total] required under USEPA program (40 CFR Part 257

[1] IPCB 620 Class II: General Resource Groundwater Standard
[2] Background Concentration obtained from Appendix E - Statistical Procedure for Calculation of Background (Table E-1 Tolerance Limits for Background Monitoring Wells MW-104S/SR and MW-104D/DR using the Upper and Low
[3] Applicable Groundwater Standard is the higher of the Background Concentration and the Class II Groundwater Standard (or the lower if compared to the pH lower limit).
[4] Unlithified Wells used for maximum and minimum include those designated as upgradient or downgradient in Appendix D.
[5] Bedrock wells used for maximum and minimum include MW-350, MW352, and MW-355 (all downgradient) as listed in Appendix D.
* Radium 226 and 228 reported separately for IPCB Class II Groundwater Standard, reported combined for USEPA 40 CFR Part 257.

APPENDIX A

AECOM (2015) GEOTECHNICAL LABORATORY RESULTS



NOTES:

1. CONTOURS ARE 1 FOOT ELEVATION INTERVALS.
2. SURVEY BENCHMARKS WILL BE PROVIDED BY THE OWNER.
3. EXISTING CONTOURS SHOWN ARE FROM AERIAL SURVEY COMPLETED BY SURDEX ON AUGUST 17, 2015 AND BATHYMETRIC SURVEY COMPLETED BY WEAVER CONSULTANTS GROUP ON SEPTEMBER 22, 2015.

LEGEND

BAL-B002	AECOM BORING LOCATION
BAL-P004	AECOM PIEZOMETER LOCATION
BAL-C021	AECOM CONE PENETRATION TEST (CPT) LOCATION

AECOM
1001 Highlands Plaza Drive, Suite 300
St. Louis, Mo. 63110
314 429-0100 (phone)
314-429-0462 (fax)

DYNEGY
Dynegy Inc.
1500 EastPort Plaza Drive
Collinsville, IL 62234

CCR RULE ASSESSMENT OF PLANTS

BALDWIN POWER PLANT
BALDWIN, IL

30% DESIGN DRAWINGS FOR CLOSURE OF EAST ASH POND, OLD EAST ASH POND, AND WEST ASH POND

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60440742
DRAWN BY:	DJD
DESIGNED BY:	DJD
CHECKED BY:	SAV
DATE CREATED:	2015-10-13
PLOT DATE:	2015-10-13
SCALE:	1" = 300'
ACAD VER:	2014

SHEET TITLE

EXPLORATION LOCATIONS

D-01

SHEET 1 OF 3

DEGUIRE, DAVID, 12/16/2015 10:15 AM

AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DynegyCCR\04Tasks\00 Program Tasks\01_Templates\CADD\DYNEGY CAD STANDARDS\7.04_Plan_Sheets\D-01 EXPLORATION LOCATIONS.dwg

Project: Dynergy CCR-Baldwin | **Project No.: 60440739**

Summary of Laboratory Test Results

BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	IDENTIFICATION TESTS: WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2µm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	STRENGTH: Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	CONSOLIDATION INITIAL CONDITIONS: VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B001	S-4	7.5-9		66.9				SM	31.5	5										
BAL-B001	S-6	15-18		37.9				CL	93.9	6										
BAL-B001	ST-2	35-37									125.6									
BAL-B001	ST-2	35.35		23.1																
BAL-B001	ST-2A	35.6		23.8	63	15	48	CH			126.6	102.3		1.30E-08						P10576
BAL-B001	ST-2	35.9		23.2																
BAL-B001	ST-2	36.15		22.4				CH			128.4	104.9			UU@6.2	1.6	10.9			UU245g
BAL-B001	S-10	45.0-46.5	Brown silty CLAY, trace gravel	16.6																
BAL-B001	S-11	50.0-51.5	Brown silty, CLAY with gravel	12.4																
BAL-B001	S-14	65.0-66.5	Gray brown silty CLAY with fine gravel	19.0																
BAL-B001	S-16	75.0-75.5	Gray brown silty CLAY with fine gravel	12.5																
BAL-B002	S-1	0.0-1.5	Brown silty CLAY, trace sand and gravel	19.5																
BAL-B002	S-2	2.5-4.0	Brown silty CLAY, trace sand and gravel	16.5																
BAL-B002	S-3	5.0-6.5	Brown silty CLAY, trace sand and gravel	19.1	36	19														
BAL-B002	ST-1	8-10									120.5									
BAL-B002	ST-1A	8.25		19.1				CH	91.8	29										dispersion
BAL-B002	ST-1B	8.8		25.9	54	16	38	CH			120.1	95.4			UU@1.1	1	15			UU257i
BAL-B002	S-4	10.0-11.5	Brown silty CLAY, trace sand and gravel	21.0																
BAL-B002	ST-2	15-17									130.3									
BAL-B002	ST-2A	15.45		21.8	46	14	32	CL			123.3	101.2			UU@1.9	0.7	15			UU257j
BAL-B002	S-5	20.0-21.5	Brown silty CLAY, trace sand and gravel	21.7																
BAL-B002	S-6	25.0-26.5	Brown sandy silty CLAY	40.3																
BAL-B002	ST-3	27.5-30									113.5									
BAL-B002	ST-3A	27.75		34.8				ML			111.5	82.7			CIU@3.4	1.3	16.5			T3850
BAL-B002	ST-3B	28.1		26.4				ML			118.5	93.8						0.69	97	C15141
BAL-B002	ST-3C	28.45		32.1	21	21	NP	ML			114.9	87	2.491		CIU@3.5	2.9	19.6			T3851
BAL-B002	ST-3D	28.9		25.5				ML			122	97.2			CIU@3.6	10.1	24.8			T3852
BAL-B002	S-7	30.0-31.5	Brown sandy silty CLAY with gravel	47.9																
BAL-B002	S-8	35.0-36.5	Brown sandy silty CLAY with gravel	36.8																
BAL-B002	S-9	40-41.5		38.6				CL	94.3	5										
BAL-B002	S-10	45.0-46.5	Dark brown silty CLAY, trace sand	32.6																
BAL-B002	S-11	50.0-51.5	Dark brown silty CLAY, trace sand	25.0																
BAL-B002	S-12	55.0-56.5	Brown silty CLAY, trace sand	24.0	42	23														
BAL-B002	S-13	60.0-61.5	Dark brown silty CLAY with gravel, trace organics	33.3																
BAL-B002	S-14	70.0-71.5	Gray silty CLAY, trace sand	16.5																
BAL-B002	S-15	75.0-76.0	Gray silty CLAY, trace sand	17.4	45	24														
BAL-B003	S-4	10.0-11.5	Brown CLAY with fine gravel	22.3	39	17														
BAL-B003	ST-2	15-17									125.3									
BAL-B003	ST-2	15.35		25.4																
BAL-B003	ST-2A	15.6																		
BAL-B003	ST-2	15.95		23.4																
BAL-B003	ST-2B	16.2		24.7	58	15	43	CH			124.8	100.1			UU@1.9	0.8	15			UU230d
BAL-B003	S-6	30.0-31.5	Brown CLAY	40.7				CL	97	7										
BAL-B003	S-8	40.0-41.5	Brown sandy silty CLAY	43.6									2.43							
BAL-B003	S-10	50.0-51.5	Brown fat CLAY, trace sand and gravel	19.3	39	17														
BAL-B003	S-12	60.0-61.5	Light brown silty CLAY	26.9																
BAL-B003	S-13	65.0-66.5	Light gray silty CLAY	21.6	57	30														
BAL-B003	S-14	70.0-75.4	Light gray silty CLAY	18.7																
BAL-B004	S-2	2.5-4		10.3				SW-SM	5.4	0										
BAL-B004	ST-2	25-27									118.1									
BAL-B004	ST-2A	25.35		37.1				PT			115.8	84.5			CIU@3.0	1.4	12.1			T3892
BAL-B004	ST-2B	25.85		23.6	47	14	33	CL			127	102.7			CIU@3.1	1.4	12.3			T3893
BAL-B004	ST-2C	26.35		29.9				CL			119.2	91.8			CIU@3.2	1.8	19			T3894
BAL-B004	S-8	30-31.5		31.4	37	18	19	CL												
BAL-B004	S-9	35.0-36.5	Light gray silty CLAY, trace sand	19.4	38	15														
BAL-B004	S-11	45.0-46.5	Light brown silty CLAY with gravel	20.3																
BAL-B005	S-1	0.0-1.5	Dark brown silty coarse SAND with gravel	9.8																
BAL-B005	S-2	2.5-4.0	Brown silty CLAY	25.7																
BAL-B005	ST-1	5.0-7.0									108.7									
BAL-B005	ST-1	5.75		24.3																UU275A

Summary of Laboratory Test Results

				IDENTIFICATION TESTS											STRENGTH			CONSOLIDATION INITIAL CONDITIONS		
BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2µm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B005	ST-1B	6		22	60	17	43	CH			126.5	103.7			UU@0.7	1.9	15			
BAL-B005	S-3	7.5-9.0	Brown silty CLAY	26.2																
BAL-B005	ST-2	10.0-12.0									115.1									
BAL-B005	ST-2A	10.3		25.8				CH			121.4	96.5			CIU@0.8	0.7	19.8			T3910
BAL-B005	ST-2B	10.85		24.8	60	16	44	CH			123.7	99.1			CIU@1.2	1.4	19.6			T3911
BAL-B005	S-4	15.0-16.5	Brown silty CLAY, trace sand	25.1																
BAL-B005	S-5	20.0-21.5	Brown gray silty CLAY	27.5																
BAL-B005	S-6	25.0-26.5	Brown silty CLAY	24.1																
BAL-B005	S-7	30.0-31.5	Brown silty CLAY	21.2	36	18														
BAL-B005	S-8	35.0-36.5	Brown silty CLAY	21.9																
BAL-B005	S-9	40.0-41.5	Brown silty CLAY	16.7																
BAL-B005	S-10	45.0-46.5	Gray silty CLAY	16.6																
BAL-B005	S-11	50.0-51.5	Gray silty CLAY	22.0																
BAL-B005	S-12	55.0-56.5	Gray silty CLAY, trace sand	16.6	44	25														
BAL-B005	S-13	60.0-60.4	Gray brown silty CLAY	18.8																
BAL-B006	S-1	0.0-1.5		11.6				SC	20.9	2										
BAL-B006	S-2	2.5-4.0		67.9				SC	44.4	4										
BAL-B006	S-3	5.0-6.5		31.6				SM	18.5	1										
BAL-B006	S-4	7.5-9.0		24.9				SC	12.8	0										
BAL-B006	S-5	10.0-11.5		19.9				CL	53.4	6										
BAL-B006	S-6	12.5-15	Gray brown silty CLAY, trace sand and fine gravel	21.2																
BAL-B006	ST-1	15.0-17.0									129									
BAL-B006	ST-1	15.15		25.2																
BAL-B006	ST-1	15.7		23.5																
BAL-B006	ST-1B	15.95		17.9				CL			135	114.5			UU@1.4	1.7	15			UU275G
BAL-B006	ST-1	16.25		15.9																
BAL-B006	S-7	20.0-21.5	Gray brown silty CLAY, trace sand and fine gravel	20.8																
BAL-B006	S-8	25.0-26.5	Light brown silty CLAY, trace sand and fine gravel	20	32	14														
BAL-B006	ST-2	30.0-32									139.5									
BAL-B006	ST-2A	30.25		13.4	29	15	14	CL			138.3	122			CIU@2.0	6.1	17.4			T3886
BAL-B006	ST-2B	30.6		13				CL			135.3	119.7	2.682					0.398	87	C15157
BAL-B006	ST-2C	31		13.3				CL			134.8	119			CIU@2.2	7.2	21.8			T3887
BAL-B006	ST-2D	31.5		14				CL			137	120.1			CIU@2.4	5	18.5			T3888
BAL-B006	S-9	35.0-36.5	Light brown silty CLAY, trace sand and fine gravel	29.6																
BAL-B006	S-10	40.0-41.5	Gray silty CLAY, trace sand	22.4																
BAL-B006	S-11	45.0-46.5	Gray CLAY, trace sand	19.1	56	23														
BAL-B006	S-12	50-51.5	Gray silty GRAVEL	9.1																
BAL-B007	S-3	5.5-7.0		65.4	NP	NP														
BAL-B007	ST-1	30-32									123									
BAL-B007	ST-1A	30.4		25				CL			125.8	100.6			CIU@3.6	2.2	15.2			T3857
BAL-B007	ST-1B	30.95		25.8	48	17	31	CL			126.6	100.6	2.609		CIU@3.7	2.9	14.7			T3859
BAL-B007	ST-1C	31.35		22.8				CL			123	100.1						0.661	92	C15142
BAL-B007	ST-1D	31.8		26				CL			125.8	99.8			CIU@3.8	2.5	16.7			T3858
BAL-B008	S-1	0.0-1.5	Brown silty CLAY, trace sand	15.4																
BAL-B008	S-2	2.5-4.0	Brown silty, CLAY, trace sand	21.8																
BAL-B008	S-3	5.0-6.5	Brown silty CLAY, trace sand and fine gravel	21.6	48	21														
BAL-B008	S-4	10.0-11.5	Brown silty CLAY, trace sand and fine gravel	19.6																
BAL-B008	ST-1	10-12																		
BAL-B008	ST-1A	10.35		25.7				CH	84.2	25										dispersion
BAL-B008	ST-1B	10.8		23.1	65	17	48	CH			127.5	103.6		5.50E-09						P10595
BAL-B008	S-5	20.0-21.5	Brown silty CLAY, trace sand and fine gravel	22.5																
BAL-B008	ST-2	20-22									119.5									
BAL-B008	ST-2	20.05		43.5																
BAL-B008	ST-2A	20.3		23.4	58	18	40	CH			125.7	101.9			UU@2.5	0.4	15			UU278e
BAL-B008	S-6	25.0-26.5	Brown silty CLAY, trace sand and fine gravel	20.8																
BAL-B008	S-7	30.0-31.5	Brown silty CLAY, trace sand and fine gravel	26.2	38	17														
BAL-B008	S-8	35.0-36.5	Brown silty CLAY, trace sand and fine gravel	22.9																
BAL-B008	S-9	40.0-41.5	Brown silty CLAY, trace sand and fine gravel	20.8																
BAL-B008	S-10	45.0-46.5	Brown silty CLAY, trace sand and fine gravel	22.1																
BAL-B008	S-11	50.0-51.5	Brown silty CLAY, trace sand and fine gravel	18.0																
BAL-B008	S-12	55.0-56.5	Light brown SILTY SAND	19.2				SM	16											

Summary of Laboratory Test Results

				IDENTIFICATION TESTS											STRENGTH			CONSOLIDATION INITIAL CONDITIONS		
BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2µm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B008	S-13	60.0-61.5	Gray silty CLAY, trace sand	17.8	42	25														
BAL-B008	S-14	65.0-66.5	Gray silty CLAY, trace sand	14.0																
BAL-B009	S-1	0-1.5		85.3				MH	78.3	10										
BAL-B009	ST-2	10.5-12.5									122.5									
BAL-B009	ST-2A	10.65		4.3				CL												
BAL-B009	ST-2	10.9		24.9																
BAL-B009	ST-2B	11.15		25.2				CL			124.9	99.8			CIU@1.3	1.8	16.9			T3863
BAL-B009	ST-2	11.45		28																
BAL-B009	ST-2C	11.7		26.3				CL			124.1	98.3			CIU@1.4	1.6	14.6			T3889
BAL-B009	ST-2	12		24.1																
BAL-B009	ST-2D	12.25		26.3	40	19	21	CL	95.2	20	123.6	97.8			CIU@1.5	2.1	14.2			dispersion T3864
BAL-B009	ST-3	25-27									113.6									
BAL-B009	ST-3	25.25		22.1	49	14	35	CL			125.9	103.1			UU@3.1	0.7	15			UU278g
BAL-B009	ST-3	25.85		19.5																
BAL-B009	S-7	30.0-31.5	Brown POORLY GRADED GRAVEL	14.5				GP	3											
BAL-B009	S-8	35.0-36.5	Gray silty CLAY, trace sand	23.2	49	25														
BAL-B009	S-9	40.0-41.5	Gray silty CLAY, trace sand	21.2																
BAL-B010	S-2	2.5-4		50.2				SC	28.4	4										
BAL-B010	S-5	15-16.5		42.5				CL	98.3	7										
BAL-B010	ST-2	20-22									123.9									
BAL-B010	ST-2	20.5		24.7																
BAL-B010	ST-2	21.05		22.1																
BAL-B010	ST-2B	21.3		22.2	42	18	24	CL			124.2	101.7		2.40E-06						P10578
BAL-B010	ST-2	21.6		21.9																
BAL-B010	ST-2C	21.85		20.9				CL			124.9	103.3			UU@2.5	2	3.8			UU246d
BAL-B010	S-8	30.0-31.5	Light brown silty CLAY with sand and gravel	18.6	30	14														
BAL-B010	S-9	35.0-36.5	Brown silty CLAY with sand and gravel	15.0	22	14														
BAL-B010	S-11	45.0-46.5	Light brown silty CLAY with sand and gravel	21.7																
BAL-B010	S-12	50.0-51.5	Brown silty CLAY, trace sand	18.2																
BAL-B011	S-1	0.0-1.5	Brown silty CLAY, trace sand	13.0																
BAL-B011	S-2	2.5-4		23.0				CL	95.2	27										
BAL-B011	S-4	7.5-9.0	Brown silty CLAY, trace sand	18.8																
BAL-B011	S-5	10.0-11.5	Gray brown silty CLAY, trace sand	19.9																
BAL-B011	ST-1	15-17									122.8									
BAL-B011	ST-1A	15.2		25.8							123.3	98		1.80E-09						P10594
BAL-B011	ST-1B	15.7		24.8				CL			125.1	100.2			CIU@1.8	2.5	12.1			T3903
BAL-B011	ST-1C	16.2		24.9				CL			122.3	98			CIU@1.9	2.8	20.1			T3904
BAL-B011	ST-1	16.55		25.4																
BAL-B011	ST-1D	16.8		25.6	46	18	28	CL			121.3	96.6			CIU@2.0	1.7	19.2			T3905
BAL-B011	S-6	20.0-21.5	Gray brown silty CLAY, trace sand	21.7																
BAL-B011	S-7	30.0-31.5	Brown silty CLAY, trace sand	17.8																
BAL-B011	S-8	35.0-36.5	Brown silty sandy CLAY with gravel	8.8	19	11														
BAL-B011	S-9	42.5-44.0	Light brown silty CLAY, trace sand	18.2	49	24														
BAL-B011	S-10	47.5-49.0	Gray silty CLAY, trace sand	19.8																
BAL-B012	S-3	2.0-3.0	Brown silty CLAY, trace sand	22.0	54	24														
BAL-B012	S-7	6.0-7.0	Light brown silty CLAY	20.7	34	18														
BAL-B012	S-10	9.0-10.0	Light brown silty CLAY	21.3																
BAL-B015	S-1	0.0-1.5	Light brown sandy silty CLAY with find gravel and organics	12.5																
BAL-B015	S-2	2.5-4.0	Light brown sandy silty CLAY	21.5																
BAL-B015	ST-1	5.0-7.0									124.7									
BAL-B015	ST-1	5.6		24.8																
BAL-B015	ST-1	6.15		43																
BAL-B015	ST-1C	6.4		21.3	44	17	27	CL			129.1	106.4			UU@0.7	2.3	15			UU275D
BAL-B015	S-3	7.5-9.0	Light brown sandy silty CLAY	22.8																
BAL-B015	S-4	10.0-11.5	Light brown sandy silty CLAY, trace gravel	21.0																
BAL-B015	ST-2	11.5-13.5									128.6									
BAL-B015	ST-2	11.8		19.5																
BAL-B015	ST-2A	12.05		20.8				CH			129.5	107.2			CIU@1.0	1.8	18.7			T3912
BAL-B015	ST-2	12.35		20.8																
BAL-B015	ST-2B	12.6		20.1				CH			129.9	108.2			CIU@1.2	1.8	20.4			T3913
BAL-B015	ST-2	12.9		20.7																

Summary of Laboratory Test Results

BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	IDENTIFICATION TESTS: WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2µm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	STRENGTH: Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	CONSOLIDATION INITIAL CONDITIONS: VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B015	ST-2C	13.15		21.1	53	14	39	CH			128.8	106.4			CIU@1.4	1.9	20.1			T3914
BAL-B015	S-5	15.0-16.5	Light brown sandy silty CLAY, trace gravel	23.0																
BAL-B015	S-6	20.0-21.5	Light brown sandy silty CLAY with gravel	18.8																
BAL-B015	S-7	25.0-26.5	Light brown gray silty CLAY, trace sand and gravel	17.1	37	15														
BAL-B015	S-8	30.0-31.5	Light brown silty CLAY, with sand and gravel	23.7																
BAL-B015	S-9	35.0-36.5	Brown silty CLAY, trace sand	23.5																
BAL-B015	S-10	40.0-41.5	Gray brown silty CLAY	20.1																
BAL-B015	S-11	45.0-46.5	Light brown sandy silty CLAY with medium gravel	25.9																
BAL-B015	S-12	50.0-51.5	Gray fat CLAY	21.7	87	33														
BAL-B016	ST-1	4.0-6.0									114.6									
BAL-B016	ST-1	4.15		15.7																
BAL-B016	ST-1A	4.4		15				ML			128	111.3			CIU@0.5	0.8	21.2			T3825
BAL-B016	ST-1	4.7		19.8																
BAL-B016	ST-1B	4.95		27.6				ML			115.4	90.5			CIU@0.6	2.1	18			T3826
BAL-B016	ST-1	5.25		33.3																
BAL-B016	ST-1C	5.5		31.8	24	22	2	ML			107.7	81.7			CIU@0.7	1.9	11.1			T3827
BAL-B016	S-3B	7.5-9.0	Brown SILT	41.3				ML	96	6										
BAL-B016	ST-2	10.0-12.0									103.4									
BAL-B016	ST-2	10.15		44.3																
BAL-B016	ST-2	10.65		49.8																
BAL-B016	ST-2	11.15		54.9																
BAL-B016	ST-2B	10.9		62.1	-	29	NP	ML			96.8	59.7						1.562	97	C15119
BAL-B016	S-4	15.0-16.5		31.3																
BAL-B016	S-5	20.0-21.5	Dark brown SILT	29				ML	90	4										
BAL-B016	S-8	35.0-36.5		22.6																
BAL-B016	S-10	45.0-46.5		17.9																
BAL-B016	S-11	50.0-51.5		14.5	30	15														
BAL-B016	S-12	55.0-56.5		10.3	34	14														
BAL-B016	S-14	65.0-66.5		18.2																
BAL-B017	S-1	0.0-1.5		11.5				ML												
BAL-B017	S-2	2.5-4.0		14.7				ML	73.5	9										
BAL-B017	S-3	5.0-6.5		21.4				ML	67	4										
BAL-B017	S-4	7.5-9.0		28.9				ML	94.2	6										
BAL-B017	ST-1	10.0-12.0									108.5									
BAL-B017	ST-1	11.3		28.4																
BAL-B017	ST-1C	11.55		35	23	25	NP	ML	95.4	7	112.2	83.1			UU@0.8	0.4	15			UU278H
BAL-B017	S-5	15.0-16.5	Brown silty CLAY	30.5																
BAL-B017	S-6	20.0-21.5	Brown silty CLAY with fine gravel	21.4	33	15														
BAL-B017	ST-2	25.5-27.5									122.1									
BAL-B017	ST-2	25.9		30.3																
BAL-B017	ST-2A	26.15		22.6				CL			125.4	102.3			CIU@2.2	6.7	20.1			T3921
BAL-B017	ST-2	26.45		21.9																
BAL-B017	ST-2B	26.7		23.5	44	15	29	CL			124.5	100.8		1.70E-08	CIU@2.4	2	19.7			T3922
BAL-B017	ST-2	27		25																
BAL-B017	ST-2C	27.25		25.4				CL			124.4	99.2			CIU@2.6	1.8	12.9			T3923
BAL-B017	S-7	30.0-31.5	Brown silty CLAY with fine gravel	30.5																
BAL-B017	S-8	35.0-36.5	Brown silty CLAY with fine gravel	21.2	43	11														
BAL-B017	S-9	40.0-41.5	Gray brown sandy silty CLAY with fine gravel	18.1																
BAL-B017	S-10	45.0-45.1	Gray brown sandy silty CLAY with fine gravel	15.6																
BAL-B017	S-11	50.0-51.5	Gray brown sandy silty CLAY with fine gravel	22.6																
BAL-B017	S-12	55.0-56.5	Brown sandy silty CLAY with fine gravel	10.3	28	9														
BAL-B018	S-2	5.0-6.5	Light brown silty CLAY	30.0	37	20														
BAL-B018	ST-2	25-27									126.1									
BAL-B018	ST-2B	25.95		27.4				CH			123.3	96.8			CIU@3.0	0.9	22.7			T3890
BAL-B018	ST-2C	26.55		18.1	54	13	41	CH			129.7	109.9			CIU@3.2	2.2	18.2			T3865
BAL-B018	S-7	35.0-36.5	Light brown silty CLAY	23.6																
BAL-B018	S-8	40.0-41.5	Gray silty CLAY, trace sand	17.7	47	25														
BAL-B018	S-9	45.0-46.5	Gray silty CLAY, trace sand	18.4																
BAL-B019	S-1	0.0-1.5		15.3																
BAL-B019	S-3	5.0-6.5		22.4	40	19														
BAL-B019	S-7	15.0-16.5		17.5																

Summary of Laboratory Test Results

BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	IDENTIFICATION TESTS										PERMEA-BILITY (cm/sec)	STRENGTH			CONSOLIDATION INITIAL CONDITIONS		REMARKS/ TEST ID
				WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2μm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)		Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	VOID RATIO (-)	SATUR-ATION (%)	
BAL-B019	ST-1	25-27.5									128.1									
BAL-B019	ST-1	25.45		24.3																
BAL-B019	ST-1	26		25.1																
BAL-B019	ST-1	26.55		23.9																
BAL-B019	ST-1C	26.8		24.5	38	17	21	CL			124.8	100.3			UU@3.1	1.5	14.6			UU231a
BAL-B019	ST-2	35-37.5									118.4									
BAL-B019	ST-2	35.35		34.7																
BAL-B019	ST-2	35.9		25.6																
BAL-B019	ST-2	36.5		22.3																
BAL-B019	ST-2C	36.8		22.1	55	15	40	CH			126.8	103.8			UU@4.1	2	8.8			UU231b
BAL-B019	S-11	45.0-46.5		16.7	33	16														
BAL-B019	S-13	55.0-56.5		18.6	40	18														
BAL-B019	S-14	60.0-61.5		21.9	43	26														
BAL-B019	S-16	70.0-71.0		15.4																
BAL-B019	S-18	80.0-80.8		17.5																
BAL-B020	S-2A	2.5-4		19.5				SP-SM	10.8	1										
BAL-B020	ST-2	9-11									121.1									
BAL-B020	ST-2A	9.4		30.8				CH			120.4	92.1			CIU@1.1	0.9	19			T3901
BAL-B020	ST-2B	9.9		25.6	51	17	34	CH			123.5	98.3			CIU@1.2	1.2	18.8			T3895
BAL-B020	ST-2C	10.4		24.7				CH			125.8	100.9			CIU@1.3	1.3	17.9			T3896
BAL-B020	S-5	20.0-21.5	Brown SANDY LEAN CLAY	22.6	38	16		CL	67											
BAL-B020	S-7B	30.0-31.5	Brown CLAY with SAND	18.7				CL	78											
BAL-B020	S-10	45.0-46.5	Gray silty sandy CLAY with fine gravel	11.2																
BAL-B020	S-13	60.0-61.5	Gray silty CLAY	21.6	73	36														
BAL-B020	S-17	80.0-81.5	Gray silty CLAY	21.3																
BAL-B021	ST-1	2.5-4.5									117.5									
BAL-B021	ST-1A	2.75		20.6				CL			125.8	104.3			CIU@0.3	0.6	18			T3834
BAL-B021	ST-1B	3.25		22.4	49	15	34	CL			124.9	102			CIU@0.54	0.9	20.5			T3835
BAL-B021	S-3	7.5-9.0		20.8	43	17														
BAL-B021	S-5	15.0-16.5		20.7																
BAL-B021	S-6	20.0-21.5		20.5																
BAL-B021	S-9	35.0-36.5		18.6	42	23														
BAL-B022	S-3	5.0-6.5	Brown silty CLAY, trace fine gravel	22.0	28	18														
BAL-B022	ST-1	10-12									130.3									
BAL-B022	ST-1	10.35		21.1																
BAL-B022	ST-1A	10.6		20.7				CL			129.4	107.2			CIU@1.2	2.2	20.1			T3906
BAL-B022	ST-1	10.9		19.9																
BAL-B022	ST-1B	11.15		19.1	40	15	25	CL	80.3	22	130.3	109.4			CIU@1.3	2	15.3			dispersion T3907
BAL-B022	ST-1	11.45		18.7																
BAL-B022	ST-1C	11.7		18.4				CL			130.7	110.4			CIU@1.4	2.5	20.2			T3908
BAL-B022	S-8	35.0-36.5	Gray silty CLAY, trace gravel	23.6	58	25														
BAL-B022	S-10	45.0-45.8	Gray silty CLAY, trace gravel	16.6																
BAL-B023	S-3	5.0-6.5		18.6	37	14														
BAL-B023	ST-1	10.0-12.5									129									
BAL-B023	ST-1	10.3		23.7																
BAL-B023	ST-1A	10.55		22.6	51	15	36	CH			127.7	104.1			UU@1.3	2.1	15			UU230b
BAL-B023	ST-1	10.85		22.3																
BAL-B023	ST-1B	11.1																		
BAL-B023	S-6	20.0-21.5		22.3	34	18														
BAL-B023	ST-2	25-27.5									132.8									
BAL-B023	ST-2B	25.65		17.9				CL			132.2	112.1			CIU@3.0	2.6	21.4			T3828
BAL-B023	ST-2C	26.05		16.2	36	14	22	CL			133.4	114.8			CIU@3.2	2.5	21			T3829
BAL-B023	S-7	30.0-31.5		26.7	59	30														
BAL-B023	S-8	35.0-36.5		17.8																
BAL-B023	S-11	50.0-50.8		16.1																
BAL-B024	S-4	7.5-9.0		18.7																
BAL-B024	S-6	15.0-16.5		24.1	41	19														
BAL-B024	ST-1	20.0-22.5									128									
BAL-B024	ST-1	20.45		28.1																
BAL-B024	ST-1A	20.7		19.4				CL			130	108.9			CIU@2.4	2.8	17.7			T3831
BAL-B024	ST-1	21.05		20.0																

Summary of Laboratory Test Results

BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	IDENTIFICATION TESTS: WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2μm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	STRENGTH: Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	CONSOLIDATION INITIAL CONDITIONS: VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B024	ST-1B	21.3		20.5	49	13	36	CL			129.6	107.6			CIU@2.5	2.8	11			T3832
BAL-B024	ST-1	21.6		20.6																
BAL-B024	ST-1C	21.9		19.4				CL			128.6	107.7			CIU@2.6	2.3	6.2			T3833
BAL-B024	S-7	25.0-26.5		18.1																
BAL-B024	S-10	40.0-41.5		14.5	45	23														
BAL-B024	S-12	50.0-51.5		22.6																
BAL-B025	ST-1	7.5-9.5									112.5									
BAL-B025	ST-1	7.75		22.4																
BAL-B025	ST-1A	8		22.0				CL	74.3	4										
BAL-B025	ST-1	8.3		25.6																
BAL-B025	ST-1	8.85		55.1																
BAL-B025	S-4	10.0-11.5		40.4									2.46							
BAL-B025	S-7	25.0-26.5		26.5	40	20														
BAL-B025	S-9B	40.0-41.5		19.3	32	16														
BAL-B025	S-11	50.0-51.5		24.2																
BAL-B025	S-12	55.0-56.5		16.7	43	21														
BAL-B026	S-4	7.5-9		9.4				SM	14.6											
BAL-B026	S-6	15-16.5		19.4				SW-SM	5.8											
BAL-B026	ST-1	20-22																		
BAL-B026	ST-1	20.45		37.3																
BAL-B026	ST-1	21		27.3																
BAL-B026	ST-1	21.55		23.5																
BAL-B026	ST-1C	21.8		20.1				CL	97.5	28	128	106.5			UU@2.6	2	8.7			UU257k
BAL-B026	S-7A	25-26.5		32.9				CL	78.9											
BAL-B026	ST-2	35-37									126.3									
BAL-B026	ST-2A	35.35		23.6				CH			125.4	101.4			CIU@4.2	2	19			T3860
BAL-B026	ST-2B	35.9		24.0				CH			125.9	101.6			CIU@4.3	2.1	19.2			T3861
BAL-B026	ST-2C	36.25		23.5	61	14	47	CH			124.3	100.6	2.675					0.649	96	C15144
BAL-B026	ST-2D	36.8		22.9				CH			126.4	102.9			CIU@4.4	1.9	15.9			T3862
BAL-B026	S-9	40.0-41.5	Brown silty CLAY, trace gravel	17.8	48	13														
BAL-B026	S-11	50.0-51.5	Brown silty CLAY, trace gravel	23.5	49	19														
BAL-B026	S-12	55.0-56.5	Brown silty CLAY, trace gravel	16.6	43	17														
BAL-B026	S-15	70.0-71.5	Gray silty CLAY, trace sand	16.5																
BAL-B027	S-1	0-1.5		17.7				SW-SM	5.3											
BAL-B027	S-7	20-21.5		16.7				SP	0.2											
BAL-B027	ST-1	25-27									124.6									
BAL-B027	ST-1	25.55		21.1																
BAL-B027	ST-1	26.1		21.8																
BAL-B027	ST-1C	26.35		21.4				CL			128.5	105.9			UU@3.1	3.3	11.9			UU275e
BAL-B027	ST-1	26.65		21.1																
BAL-B027	ST-1D	26.9		21.2	43	16	27	CL			127.7	105.4		5.00E-09						P10596
BAL-B027	ST-2	35-37									127.3									
BAL-B027	ST-2	35.3		19.1																
BAL-B027	ST-2	35.85		19.9																
BAL-B027	ST-2	36.4		19.8																
BAL-B027	ST-2C	36.65		20.3	47	15	32	CL			130	108			UU@4.3	1.6	15			UU275f
BAL-B027	S-10	45.0-46.5	Light brown silty CLAY	24.1																
BAL-B027	S-12	55.0-56.5	Gray silty CLAY, trace sand	17.4	47	21														
BAL-B027	S-13	60.0-61.5	Gray silty CLAY, trace sand	19.4																
BAL-B028	S-1	0-1.5		72.5																
BAL-B028	S-2	2.5-4.0		70.8				ML	67.5	11										
BAL-B028	ST-1	5.0-7.0									89.5									
BAL-B028	ST-1	5.4		104.4																
BAL-B028	ST-1	5.95		76.6																
BAL-B028	ST-1	6.55		114.3																
BAL-B028	ST-1C	6.8		90.7	47	53	NP	ML	81.4		90.7	47.6			CYCTRX@0.7					CTXS488
BAL-B028	S-3	7.5-9.0		103.7				ML	75.6	13										
BAL-B028	ST-2	9.0-11.0									89.5									
BAL-B028	ST-2A	9.3		48.5				ML	67.9		104.4	70.3			CYCTRX@1.0					CTXS487
BAL-B028	ST-2B	9.95		65	47	52	NP	ML			101.8	61.7	2.684					1.716	102	C15154
BAL-B028	S-4	15-17		39.6				ML	64.3	6										

Summary of Laboratory Test Results

BORING NO.	SAMPLE NO.	DEPTH (ft)	CLASSIFICATION	IDENTIFICATION TESTS: WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2µm (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY (-)	PERMEA-BILITY (cm/sec)	STRENGTH: Type Test @ STRESS (ksf)	PEAK SHEAR STRESS (ksf)	AXIAL STRAIN @ PEAK STRESS (%)	CONSOLIDATION INITIAL CONDITIONS: VOID RATIO (-)	SATUR-ATION (%)	REMARKS/ TEST ID
BAL-B028	S-5	20-22		34.9				ML	97.7	8										
BAL-B028	S-6A&B	25-26.5		50.6				CL	89.4	9										
BAL-B028	S-7	30.0-31.5	Brown silty Clay	26.7																
BAL-B028	S-8	35.0-36.5	Brown silty CLAY with sand and gravel	20.3	40	18														
BAL-B028	S-9	40.0-41.5	Brown silty CLAY with sand and gravel	20.7																
BAL-B028	S-10	45.0-46.5	Brown silty CLAY with sand and gravel	16.5																
BAL-B028	S-11	50.0-51.5	Brown silty CLAY with sand and gravel	20.2																
BAL-B028	S-12	55.0-56.5	Gray silty CLAY, trace sand	21.0																
BAL-B028	S-13	60.0-61.5	Gray silty CLAY with sand and gravel	16.7																
BAL-B028	S-14	65.0-66.5	Gray silty CLAY, trace gravel	18.9	39	25														
BAL-B028	S-15	70.0-71.5	Gray silty CLAY, trace gravel	18.5																
BAL-B028	S-16	75.0-76.5	Gray silty CLAY, trace gravel	20.9																
BAL-B028	S-17	80.0-81.5	Gray silty CLAY, trace gravel	17.8																
BAL-B028	S-18	85.5-86.0	Gray silty CLAY, trace gravel	17.7																
BAL-B029	S-1	0.0-1.5		20.6	42	19	23	CL												
BAL-B029	S-2	2.0-4.0		31				CL	95.7	6										
BAL-B029	S-3	7.5-9.0		31.9				ML	86	7										
BAL-B029	S-4	10.0-11.5		34.1				ML	94.5	8										
BAL-B029	S-5	20.0-21.5	Gray sandy silty CLAY	22.1	32	16														
BAL-B029	S-6	25.0-26.5	Gray brown sandy silty CLAY	19.8																
BAL-B029	S-7	30.0-31.5	Gray brown sandy silty CLAY	21.9	47	22														
BAL-B029	S-8	35.0-56.5	Brown sandy CLAY with gravel	10.9																
BAL-B029	S-9	40.0-41.5	Brown sandy CLAY with gravel	26.3	56	20														
BAL-B029	S-11	50.0-51.5	Brown gray sandy silty CLAY	21.8																
BAL-C039	S-1	0.0-1.0	Brown silty CLAY, trace sand	34.0	52	26														
BAL-C039	S-2	2.0-3.0	Brown silty CLAY with organics	24.5	37	16														
BAL-C039	S-6	5.0-6.0	Brown silty CLAY with organics, trace sand and gravel	21.7																

NOTE: Laboratory tests were performed by AECOM, Conshoshocken, Pennsylvania and Terrasense, Totowa, New Jersey.

APPENDIX B

LABORATORY HYDRAULIC CONDUCTIVITY TEST RESULTS

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60428794 BORING: BAL-B001 Test No.: P10576
Project Name: Dynegy CCR - Baldwin SAMPLE: ST-2A DEPTH (ft): 35.6

Specimen - Apparatus set-up - Test Information Cell No. E Apparatus No. 1 Stage No.: 5

Preliminary Length/Area Calculations

Lo =	3.991	in	Lo=	10.137	cm
dLc=	0.091	in	Ao =	41.93	cm^2
Lc=	3.900	in	Vo =	424.99	cm^3
			Lc=	9.905	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	29.07	cm^3
			Vc =	395.92	cm^3
Sc =	0.248	cm^{-1}	Ac=	39.970	cm^2

1) Specimen Tested in : [x] Triaxial Cell or [ ] Compaction Mold or
[x] with stones or [ ] Stones with filter paper or top + bottom
2) Specimen orientation for: [x] Vertical or [ ] Horizontal permeability determination
3) During saturation: Water flushed up sides of specimen to remove air [x] No [ ] Yes
4) During consolidation: [x] Top and bottom drainage or [ ] Top [ ] Bottom only
5) Direction of permeant : [x] Up during or [ ] Down during permeation
6) Permeant: water used [x] Tap [ ] Distilled
or [ ] [ ] Demineralized [ ] 0.005 N calcium sulfate (CaSO4)

Equations Used

Kt = - 0.0000757 * Sc/dT(min) * ln (ho/hf)
RT = (-0.02452*(ave. temp in C) + 1.495)
K @ 20 ºC = RT * Kt TubeC= 1.3127

Consol Stage- Trial No.	Temp. º C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	U-tube Reading Head (cm) (cc)	Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.5	9/4/15	09	47	00	129.9	100.0	57.00	37.70	0.88	1.40E-08
final	23.1	9/4/15	11	34	00			55.87	38.10		1.30E-08
1	RT = 0.936	dT =	107.00 min			σ'_c =	4.3 ksf	0.085	0.096	io= 24.5	-1%
initial	23.1	9/4/15	11	35	00	129.9	100.0	59.27	37.04	1.00	1.49E-08
final	23.5	9/4/15	13	29	00			57.80	37.50		1.36E-08
2	RT = 0.924	dT =	114.00 min			σ'_c =	4.3 ksf	0.110	0.110	io= 28.2	4%
initial	23.5	9/4/15	13	30	00	129.9	100.0	59.65	36.90	0.97	1.48E-08
final	23.5	9/4/15	15	19	00			58.22	37.36		1.35E-08
3	RT = 0.919	dT =	109.00 min			σ'_c =	4.3 ksf	0.107	0.110	io= 28.9	2%
initial	23.5	9/4/15	15	20	00	129.9	100.0	60.00	36.78	1.02	1.37E-08
final	23.5	9/4/15	17	38	00			58.30	37.30		1.25E-08
4	RT = 0.919	dT =	138.00 min			σ'_c =	4.3 ksf	0.127	0.125	io= 29.5	-5%
initial											
final											
5		dT =				σ'_c =					
initial											
final											
6		dT =				σ'_c =					

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 9.905 cm ε_{axial} = 2.3%
Ac = 40.425 cm^2
Vc= 400.43 cm^3 ε_{vol} = 5.8%
Sc = 0.245 cm^{-1} Sc = Lc / Ac , final

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	23.79	126.6	102.3	94.0
PreTest	21.79	132.2	108.6	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4
ave K @ 20 ºC: **1.31E-08** cm/sec
(i_o)ave = 27.8

Tested By: BB Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60428794 | BORING: BAL-B008 | Test No.: P10595

Project Name: Dynegy CCR - Baldwin | SAMPLE: ST-1B | DEPTH (ft): 10.8

Specimen - Apparatus set-up - Test Information | Cell No. C | Apparatus No. 2 | Stage No.: 2

Preliminary Length/Area Calculations

Lo =	3.985	in	Lo=	10.121	cm
dLc=	0.010	in	Ao =	41.87	cm^2
Lc=	3.975	in	Vo =	423.74	cm^3
			Lc=	10.095	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	3.19	cm^3
			Vc =	420.55	cm^3
Sc =	0.242	cm^{-1}	Ac=	41.657	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
	x	with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air	x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
or		Demineralized		0.005 N calcium sulfate (CaSO4)	

Equations Used

Kt = - 0.0000746 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt   TubeC= 1.3214

Consol Stage- Trial No.	Temp. º C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	U-tube Reading Head (cm) (cc)	Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.3	10/3/15	15	11	00	105.0	100.0	58.00	43.50	1.16	6.53E-09
final	22.0	10/4/15	09	33	00			54.40	44.50		6.21E-09
6	RT = 0.952	dT =	1102.00 min			σ'_c =	0.7 ksf	0.268	0.231	io= 18.1	13%
initial	22.0	10/4/15	09	38	00	105.0	100.0	58.20	43.40	1.07	5.75E-09
final	23.6	10/4/15	14	32	00			57.20	43.70		5.38E-09
7	RT = 0.936	dT =	294.00 min			σ'_c =	0.7 ksf	0.074	0.069	io= 18.4	-2%
initial	23.6	10/4/15	14	36	00	105.0	100.0	58.15	43.50	1.61	5.39E-09
final	24.2	10/4/15	17	11	00			57.65	43.60		4.89E-09
8	RT = 0.909	dT =	155.00 min			σ'_c =	0.7 ksf	0.037	0.023	io= 18.2	-11%
initial	24.2	10/4/15	17	11	00	105.0	100.0	57.65	43.60	0.95	5.89E-09
final	22.6	10/5/15	08	49	00			54.85	44.55		5.43E-09
9	RT = 0.921	dT =	938.00 min			σ'_c =	0.7 ksf	0.208	0.220	io= 17.5	-1%
initial											
final											
10		dT =				σ'_c =					
initial											
final											
11		dT =				σ'_c =					

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	10.095	cm	ε_{axial} =	0.3%	
Ac =	41.674	cm^2			
Vc=	420.72	cm^3	ε_{vol} =	0.7%	
Sc =	0.242	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	23.07	127.5	103.6	94.9
PreTest	23.87	129.2	104.3	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 6-9

ave K @ 20 ºC: **5.48E-09** cm/sec

(i_o)ave = 18.1

Tested By: BB   Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60428794	BORING: BAL-B010	Test No.: P10578
Project Name: Dynegy CCR - Baldwin	SAMPLE: ST-2B	DEPTH (ft): 21.3

Specimen - Apparatus set-up - Test Information Cell No. B Apparatus No. 2 Stage No.: 4

Preliminary Length/Area Calculations

Lo =	4.006	in	Lo=	10.174	cm
dLc=	0.057	in	Ao =	42.20	cm^2
Lc=	3.949	in	Vo =	429.34	cm^3
			Lc=	10.029	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	18.33	cm^3
			Vc =	411.01	cm^3
Sc =	0.245	cm^{-1}	Ac=	40.980	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
	x	with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove air	x	No		Yes		
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
or		Demineralized		0.005 N calcium sulfate (CaSO4)		

Equations Used

Kt = - 0.0000746 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3214

Consol Stage-Trial No.	Temp. º C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	23.1	9/8/15	11	02	00	117.6	100.0	56.00	44.13	1.01	2.66E-06
final	23.1	9/8/15	11	15	00			48.37	46.55		2.44E-06
1	RT = 0.929	dT =	13.00 min			σ'_c =	2.5 ksf	0.568	0.560	io= 14.9	0%
initial	23.1	9/8/15	11	16	00	117.6	100.0	56.00	44.13	0.99	2.85E-06
final	23.2	9/8/15	11	31	00			47.88	46.77		2.62E-06
2	RT = 0.927	dT =	15.00 min			σ'_c =	2.5 ksf	0.604	0.611	io= 14.9	7%
initial	23.2	9/8/15	11	32	00	117.6	100.0	56.00	44.13	1.01	2.76E-06
final	23.2	9/8/15	11	40	00			49.70	46.13		2.53E-06
3	RT = 0.926	dT =	8.00 min			σ'_c =	2.5 ksf	0.469	0.463	io= 14.9	4%
initial	23.2	9/8/15	11	41	00	117.6	100.0	56.00	44.13	1.01	2.38E-06
final	23.2	9/8/15	12	02	00			47.60	46.80		2.18E-06
4	RT = 0.926	dT =	21.00 min			σ'_c =	2.5 ksf	0.625	0.618	io= 14.9	-11%
initial											
final											
5		dT =				σ'_c =					
initial											
final											
6		dT =				σ'_c =					

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	10.029	cm	ε_{axial} =	1.4%
Ac =	41.453	cm^2		
Vc=	415.75	cm^3	ε_{vol} =	3.2%
Sc =	0.242	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	22.15	124.2	101.7	88.4
PreTest	23.11	129.2	105.0	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **2.44E-06** cm/sec

(i_o)ave = 14.9

Tested By: BB Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60428794 | BORING: BAL-B011 | Test No.: P10594

Project Name: Dynegy CCR - Baldwin | SAMPLE: ST-1A | DEPTH (ft): 15.2

Specimen - Apparatus set-up - Test Information | Cell No. D | Apparatus No. 1 | Stage No.: 3

Preliminary Length/Area Calculations

Lo =	3.998	in	Lo=	10.155	cm
dLc=	0.017	in	Ao =	42.08	cm^2
Lc=	3.981	in	Vo =	427.34	cm^3
			Lc=	10.112	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	5.45	cm^3
			Vc =	421.89	cm^3
Sc =	0.242	cm^{-1}	Ac=	41.722	cm^2

1) Specimen Tested in : [x] Triaxial Cell or [ ] Compaction Mold or
[x] with stones or [ ] Stones with filter paper or top + bottom
2) Specimen orientation for: [x] Vertical or [ ] Horizontal permeability determination
3) During saturation: Water flushed up sides of specimen to remove air [x] No [ ] Yes
4) During consolidation: [x] Top and bottom drainage or [ ] Top [ ] Bottom only
5) Direction of permeant : [x] Up during or [ ] Down during permeation
6) Permeant: water used [x] Tap [ ] Distilled
or [ ] [ ] Demineralized [ ] 0.005 N calcium sulfate (CaSO4)

Equations Used

Kt = - 0.0000757 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3127

Consol Stage-Trial No.	Temp. º C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	U-tube Reading Head (cm) (cc)	Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	23.7	10/1/15	17	22	00	105.0	100.0	56.45	37.90	0.95	2.70E-09
final	21.9	10/2/15	09	04	49			54.62	38.50		2.54E-09
5	RT = 0.936	dT =	942.82 min			σ'_c =	0.7 ksf	0.137	0.144	io= 23.1	39%
initial	22.5	10/2/15	15	34	00	105.0	100.0	57.61	37.55	1.10	2.25E-09
final	22.0	10/3/15	11	47	00			55.50	38.15		2.15E-09
6	RT = 0.949	dT =	1213.00 min			σ'_c =	0.7 ksf	0.158	0.144	io= 24.9	18%
initial	22.0	10/3/15	12	05	00	105.0	100.0	57.00	37.75	1.09	1.43E-09
final	22.0	10/4/15	09	35	00			55.60	38.15		1.37E-09
7	RT = 0.956	dT =	1290.00 min			σ'_c =	0.7 ksf	0.105	0.096	io= 23.9	-25%
initial	22.0	10/4/15	09	40	00	105.0	100.0	56.30	37.95	1.02	1.28E-09
final	22.2	10/5/15	08	54	00			55.00	38.35		1.23E-09
8	RT = 0.953	dT =	1394.00 min			σ'_c =	0.7 ksf	0.097	0.096	io= 22.8	-32%
initial											
final											
9		dT =				σ'_c =					
initial											
final											
10		dT =				σ'_c =					

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	10.112	cm	ε_{axial} =	0.4%	
Ac =	41.467	cm^2			
Vc=	419.30	cm^3	ε_{vol} =	1.9%	
Sc =	0.244	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_t (pcf)	γ_d (pcf)	S (%)
Initial	25.83	123.3	98.0	94.5
PreTest	26.15	126.0	99.9	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 5-8

ave K @ 20 ºC: **1.82E-09** cm/sec

(i_o)ave = 23.7

Tested By: BB Reviewed By: G. Thomas

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60440739 — Boring: BAL-B017 — Test No.: T3922

Project Name: Dynegy CCR - Baldwin — Sample: ST-2B — Depth: 26.7

Specimen - Apparatus set-up - Test Information — Cell No. H-6 — Apparatus No. 1 — Stage No.: 3

Preliminary Length/Area Calculations

Lo =	5.975 in	Lo=	15.178	cm
dLc=	0.064 in	Ao =	41.79	cm^2
Lc=	5.911 in	Vo =	634.27	cm^3
		Lc=	15.015	cm
dVc = 3 Vo * (dLc/Lo)		dVc=	20.38	cm^3
		Vc =	613.89	cm^3
Sc =	0.367 cm^{-1}	Ac=	40.885	cm^2

1) Specimen Tested in : [x] Triaxial Cell or [ ] Compaction Mold or
[x] with stones or [ ] Stones with filter paper or ______ top + bottom

2) Specimen orientation for: [x] Vertical or [ ] Horizontal permeability determination

3) During saturation: Water flushed up sides of specimen to remove air [x] No [ ] Yes

4) During consolidation: [x] Top and bottom drainage or [ ] Top [ ] Bottom only

5) Direction of permeant : [x] Up during or [ ] Down during permeation

6) Permeant: water used [x] Tap [ ] Distilled

or [ ] [ ] Demineralized [ ] 0.005 N calcium sulfate (CaSO4)

Equations Used

$Kt = -\ 0.0000757 * Sc/dT(min) * \ln(ho/hf)$

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt — TubeC= 1.3127

Consol Stage- Trial No.	Temp. º C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	U-tube Reading Head (cm) (cc)	Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.5	10/13/15	09	21	00	116.7	100.0	61.98	36.20	0.99	2.38E-08
final	22.5	10/13/15	13	38	00			58.10	37.42		2.21E-08
1	RT = 0.943	dT =	257.00 min			σ'_c =	2.4 ksf	0.291	0.292	io= 21.6	30%
initial	22.5	10/13/15	13	40	00	116.7	100.0	61.78	36.30	1.05	2.05E-08
final	22.9	10/13/15	18	03	00			58.35	37.32		1.90E-08
2	RT = 0.939	dT =	263.00 min			σ'_c =	2.4 ksf	0.257	0.244	io= 21.3	11%
initial	22.9	10/13/15	18	12	00	116.7	100.0	61.48	36.35	1.00	1.74E-08
final	22.4	10/14/15	09	00	00			53.30	38.91		1.61E-08
3	RT = 0.940	dT =	888.00 min			σ'_c =	2.4 ksf	0.613	0.613	io= 21.0	-5%
initial	22.4	10/14/15	09	02	00	116.7	100.0	61.55	36.35	0.97	1.74E-08
final	24.0	10/14/15	12	31	00			59.20	37.11		1.58E-08
4	RT = 0.926	dT =	209.00 min			σ'_c =	2.4 ksf	0.176	0.182	io= 21.1	-7%
initial	24.0	10/14/15	12	37	00	116.7	100.0	62.20	36.18	1.07	1.90E-08
final	22.9	10/14/15	15	37	00			59.90	36.85		1.72E-08
5	RT = 0.920	dT =	180.00 min			σ'_c =	2.4 ksf	0.172	0.161	io= 21.8	1%
initial											
final											
6		dT =				σ'_c =					

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 15.015 cm — ε_{axial} = 1.1%

Ac = 41.570 cm^2

Vc= 624.17 cm^3 — ε_{vol} = 1.6%

Sc = 0.361 cm^{-1} — Sc = Lc / Ac , final

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	23.51	124.5	100.8	95.4
PreTest	23.66	126.6	102.4	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 2-5

ave K @ 20 ºC: **1.70E-08** cm/sec

(i_o)ave = 21.3

Tested By: BB — Reviewed By: GET

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE
ASTM D 5084 - Method F

Project No.: T60428794 | BORING: BAL-B027 | Test No.: P10596

Project Name: Dynegy CCR - Baldwin | SAMPLE: ST-1D | DEPTH (ft): 26.9

Specimen - Apparatus set-up - Test Information | Cell No. B | Apparatus No. 3 | Stage No.: 4

Preliminary Length/Area Calculations

Lo = 3.986	in	Lo=	10.125	cm	
dLc= 0.018	in	Ao =	41.55	cm^2	
Lc= 3.968	in	Vo =	420.72	cm^3	
		Lc=	10.079	cm	
dVc = 3 Vo * (dLc/Lo)		dVc=	5.70	cm^3	
		Vc =	415.02	cm^3	
Sc = 0.245	cm^{-1}	Ac=	41.176	cm^2	

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
	x	with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air	x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
or		Demineralized		0.005 N calcium sulfate (CaSO4)	

Equations Used

Kt = - 0.0000755 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt   TubeC= 1.3132

Consol Stage- Trial No.	Temp. º C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	U-tube Reading Head (cm) (cc)	Tail (cm) (cc)	Flow in/out gradient	Permeability Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.9	10/5/15	11	34	00	121.5	100.0	65.60	46.90	1.05	9.40E-09
final	22.7	10/5/15	16	07	27			63.75	47.45		8.86E-09
1	RT = 0.936	dT =	273.45 min			σ'_c =	3.1 ksf	0.138	0.131	io= 23.3	79%
initial	22.7	10/5/15	16	43	00	121.5	100.0	65.65	46.85	0.27	7.28E-09
final	23.5	10/5/15	18	22	26			65.10	47.50		6.81E-09
2	RT = 0.929	dT =	99.43 min			σ'_c =	3.1 ksf	0.041	0.155	io= 23.4	37%
initial	23.5	10/5/15	18	24	00	121.5	100.0	66.40	46.65	1.01	5.93E-09
final	22.2	10/6/15	09	03	00			62.70	47.80		5.59E-09
3	RT = 0.935	dT =	879.00 min			σ'_c =	3.1 ksf	0.277	0.274	io= 24.6	13%
initial	22.2	10/6/15	09	07	00	121.5	100.0	65.85	46.80	1.01	5.07E-09
final	22.5	10/7/15	08	41	12			61.18	48.25		4.84E-09
4	RT = 0.947	dT =	1414.20 min			σ'_c =	3.1 ksf	0.349	0.346	io= 23.8	-2%
initial	22.6	10/7/15	08	57	00	121.5	100.0	65.58	46.85	1.04	5.18E-09
final	22.8	10/7/15	17	04	00			63.76	47.40		4.90E-09
5	RT = 0.938	dT =	487.00 min			σ'_c =	3.1 ksf	0.136	0.131	io= 23.4	-1%
initial	22.8	10/7/15	17	04	00	121.5	100.0	63.76	47.40	0.94	4.76E-09
final	22.8	10/8/15	09	16	00			61.00	48.32		4.49E-09
6	RT = 0.936	dT =	972.00 min			σ'_c =	3.1 ksf	0.206	0.220	io= 20.4	-9%

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 10.079 cm ε_{axial} = 0.5%

Ac = 40.862 cm^2

Vc= 411.86 cm^3 ε_{vol} = 2.1%

Sc = 0.247 cm^{-1} Sc = Lc / Ac , final

	w (%)	γ_t (pcf)	γ_d (pcf)	S (%)
Initial	21.16	127.7	105.4	90.0
PreTest	22.27	131.6	107.7	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 3-6

ave K @ 20 ºC: **4.95E-09** cm/sec

(i_o)ave = 23.0

Tested By: BB   Reviewed By: G. Thomas

APPENDIX C

BORING LOGS AND WELL DETAILS

APPENDIX C1

MW 100 SERIES BORING LOGS AND WELL DETAILS

KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-104SR

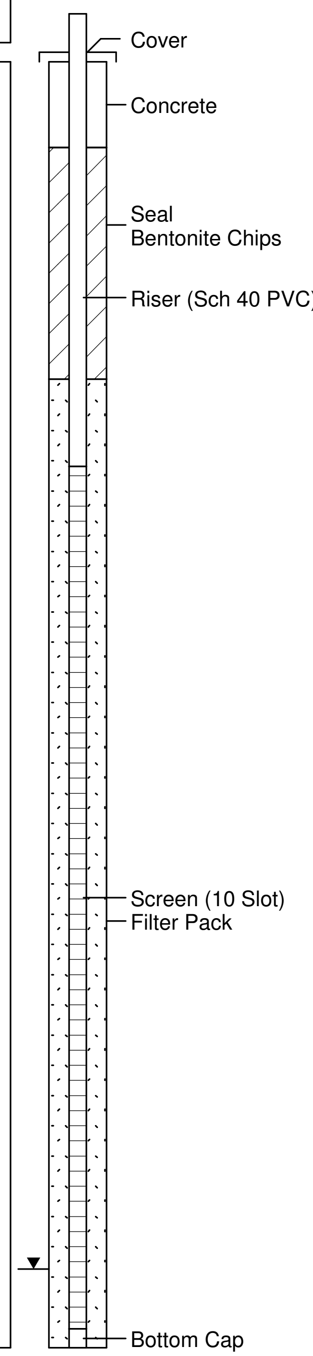
(Page 1 of 1)

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SE, SE

Date Completed	: 07/26/11	Driller	: Matt Cooper
Hole Diameter	: 7 3/4"OD; 3 3/4" ID	Geologist	: Stu Cravens (Kelron)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 452.52
Sampling Method	: MacroCore (60")	Top of Casing Elevation	455.54
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2386609, 554205

Depth in Feet	DESCRIPTION	Surf. Elev. 452.52	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted Refer to boring log for adjacent nested well MW-104DR for a descriptionof subsurface materials						
		450					
5							
		445					
10	(Slotted screen interval = 9.40 ft)						
		440					
	- groundwater level at completion = 14.06' bls						
15	END BOREHOLE AT 15 FEET BLS						

Well: MW-104SR
Elev.: 455.54



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KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-104DR

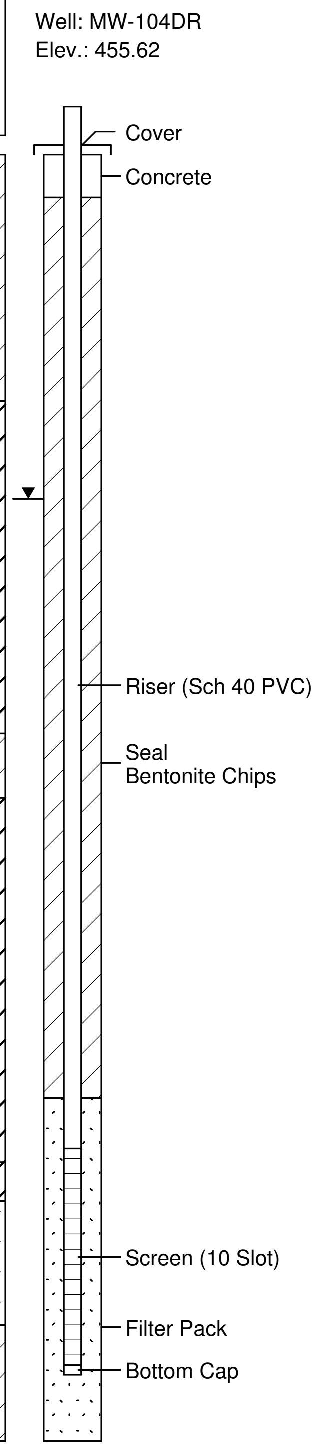
Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SE, SE

Date Completed	: 07/25/11	Driller	: Matt Cooper
Hole Diameter	: 7 3/4"OD; 3 3/4" ID	Geologist	: Stu Cravens (Kelron)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 452.62
Sampling Method	: MacroCore (60")	Top of Casing Elevation	455.62
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2386609, 554201

Depth in Feet	DESCRIPTION	USCS
0	SILTY CLAY, trace sand, med plasticity, organics and roots, dry hard, light gray (Gley1-7/1) with brown mottling (Fe-oxidation) (10YR 3/1), dry - moist	CL
5.75	CLAY (Fat) with Silt, high plasticity, soft to very soft, high organics and roots, dark gray grading to gray with brown mottling, moist - groundwater level at completion = 8.03' bls - medium hardness - light gray (GLEY1-7/1) with yellow-brown Fe-oxid mottling (10%)	CH
13.5	CLAY (lean) with Silt, medium plasticity, light gray with yellow-brown mottling (10%)	CL
15	CLAY with Silt, trace sand and fine gravel, high plasticity, medium to stiff, light gray with brown mottling (20%) - trace sand and gravel, medium to high plasticity, medium to stiff hardness, mottling 25 to 50%	CH
23.5	SANDY FAT CLAY, fine sand, trace fine gravel, high plasticity, greenish gray (GLEY-6/1), moist	CH
24.75	SAND (fine to medium), trace gravel, poorly graded, light gray, wet - brown (Slotted screen interval = 4.52 ft)	SP
27.5	SILTY CLAY, trace sand and gravel (angular), medium plasticity, very stiff, olive brown (2.5Y 4/4) with light gray mottling <20%, moist (TILL)	CL

Samples	Recovery inches	Qp TSF
1		>4.5
2		>4.5
3	60/60	3.5
4		2.5
5		2.5
6		2.5
7		2.5
8	60/60	1
9		1
10		1
11		1.75
12		2.25
13	60/60	2.25
14		3.0
15		2.5
16		3.75
17		2.75
18	60/60	3.5
19		3.5
20		3
21		3
22		2.5
23	60/60	2.5
24		2.5
25		2.5
26		
27		2.5
28	60/60	
29		4.0
30		4.5

Surf. Elev. 452.62: 450, 445, 440, 435, 430, 425



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KELRON ENVIRONMENTAL INCORPORATED	# LOG OF BORING MW-104DR

Ash Pond System Monitoring Well Network Baldwin Energy Complex Dynegy Midwest Generation, Inc. Location: Twp 04S, Rng 07W, 10 SE, SE, SE		
Date Completed : 07/25/11	Driller : Matt Cooper	
Hole Diameter : 7 3/4"OD; 3 3/4" ID	Geologist : Stu Cravens (Kelron)	
Drilling Method : Hollow-Stem (CME-550)	Land Surface Elevation: 452.62	
Sampling Method : MacroCore (60")	Top of Casing Elevation 455.62	
Drilling Company : Terra Drill, Inc.	X,Y Coordinates : 2386609, 554201	

Well: MW-104DR
Elev.: 455.62

Depth in Feet	DESCRIPTION	Surf. Elev. 452.62	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
30	SHALE, highly weathered; Clay with Silt, platy /laminated, medium to high plasticity, very stiff, moist		31		3.0	~~CL~~	
			32				
		420	33	60/60		SH	
			34		3.5		
	- unweathered, light gray, fissile, dry		35				
35	END BOREHOLE AT 35 FEET BLS						
		415					
40							
		410					
45							
		405					
50							
		400					
55							
		395					
60							

KELRON ENVIRONMENTAL INCORPORATED

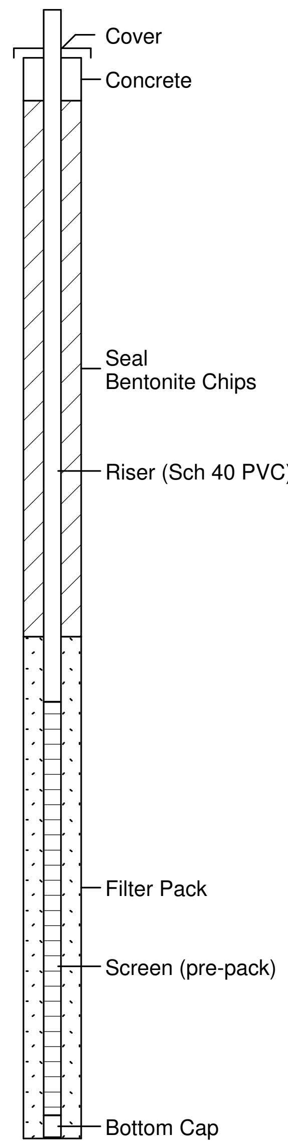
LOG OF BORING MW-150

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/08/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 393.84
Sampling Method	: MacroCore (60")	Top of Casing Elevation	396.54
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2379413, 554563

Depth in Feet	DESCRIPTION	Surf. Elev. 393.84	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continous boring - no soil sampling conducted. Refer to boring log for adjacent nested well MW-350 for a description of subsurface materials	393					
5		388					
10		383					
15		378					
20		373					
25	END BOREHOLE AT 25.2 FEET BLS	368					
30							

Well: MW-150
Elev.: 396.54



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KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-151

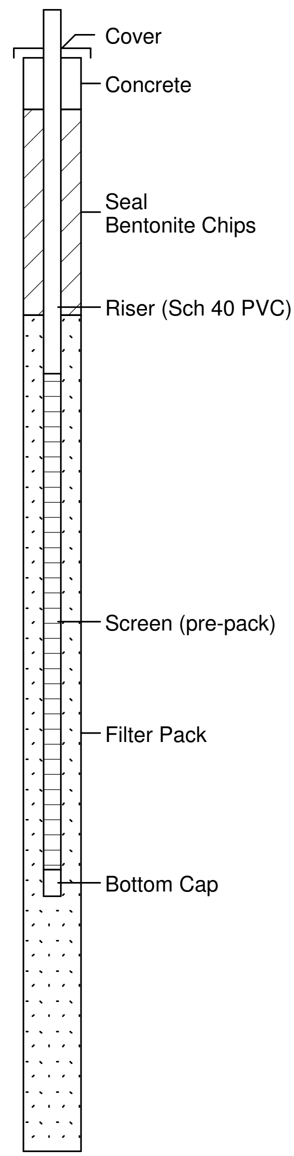
(Page 1 of 1)

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/21/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 397.22
Sampling Method	: MacroCore (60")	Top of Casing Elevation	399.96
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2381171, 554221

Depth in Feet	DESCRIPTION	Surf. Elev. 397.22	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, light brown, dry	397	1	31/48		CL
			2		1.5	
			3		1.0	
			4		1.5	
	SANDY CLAY, dark gray (10YR 4/1)		5	32/60		CL
5		392	6		1.0	
	- moist		7		0.5	
	- moist to wet - very dark gray-brown; grain size analysis @7.5-8 ft: 39% sand, 41.8% silt, 19.2% clay		8		1.0	
			9		2.5	
	SILTY CLAY, yellowish-brown (10YR 5/1)		10	46/60	2.5	CL
10		387	11		3.0	
			12		2.75	
	- two small light gray sandy seams		13		2.5	
	- 2-inch layer of dusky red CLAY (10R 3/2)		14		2.75	
	CLAY, low plasticity, medium soft		15	58/60	2.5	CH
15		382	16		2.5	
	- shaley, light olive brown (2.5Y 5/4) grading to olive gray; grain size analysis @16-17 ft:: 1%sand, 28.5% silt, 70.5% clay - platy/laminated		17		3.5	
			18		2.75	
			19		2.75	
			20	24/27	2.5	
20	Refusal in bedrock at 21.5 feet BLS END BOREHOLE AT 21.5 FEET BLS	377	21		4.5+	
			22			
	LIMESTONE, no recovery Drove split-spoon to 21.75 feet BLS - no recovery					LS
25						

Well: MW-151
Elev.: 399.96



KELRON
ENVIRONMENTAL
INCORPORATED

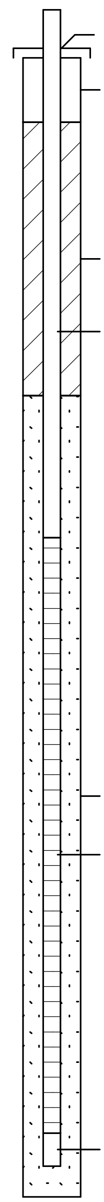
LOG OF BORING MW-152

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/22/10	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.18
Sampling Method	: MacroCore (60")	Top of Casing Elevation	424.99
Drilling Company	: PSC	X,Y Coordinates	: 2382779, 553906

Depth in Feet	DESCRIPTION	Surf. Elev. 422.18	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted. Refer to boring log for adjacent nested well MW-352 for a description of subsurface materials.	422					
5		417					
10		412					
15		407					
	END BOREHOLE AT 17.7 FEET BLS						
20							

Well: MW-152
Elev.: 424.99



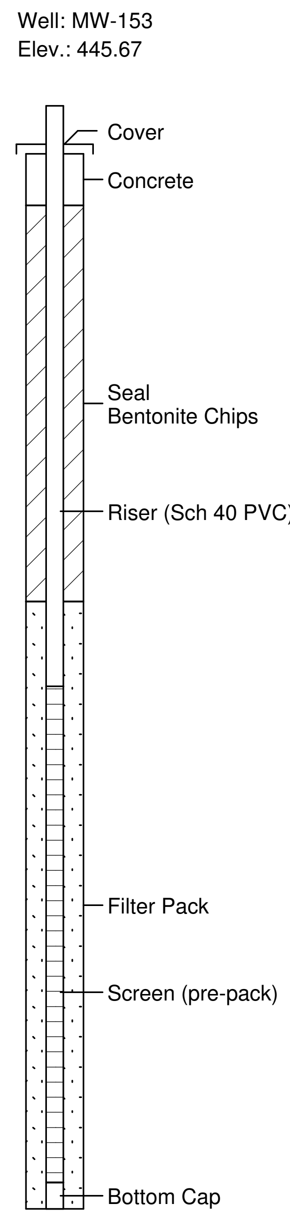
KELRON
ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-153

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 15 SW, SW, NE

Date Completed	: 09/22/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 442.77
Sampling Method	: MacroCore (60")	Top of Casing Elevation	445.67
Drilling Company	: PSC	X,Y Coordinates	: 2384435, 553298

Depth in Feet	DESCRIPTION	Surf. Elev. 442.77	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted Refer to boring log for adjacent nested well MW-253 for a description of subsurface materials	442					
5		437					
10		432					
15		427					
20	END BOREHOLE AT 20.5 FEET BLS	422					
25							



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KELRON ENVIRONMENTAL
INCORPORATED

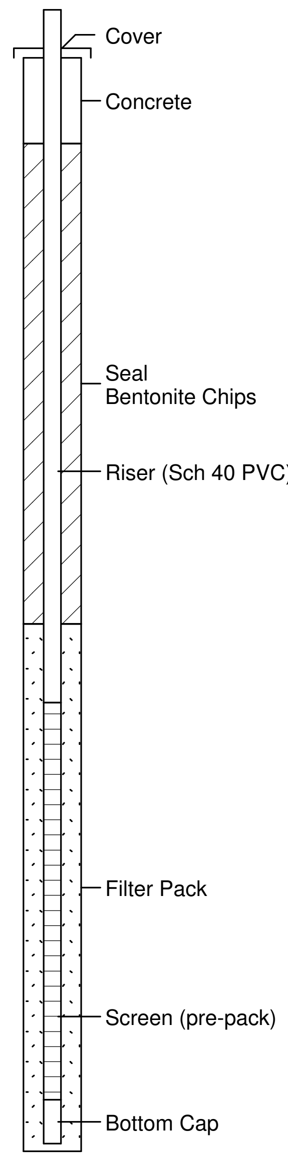
LOG OF BORING MW-154

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, NE, SW

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 384.99
Sampling Method	: MacroCore (60")	Top of Casing Elevation	387.76
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2377892, 557163

Depth in Feet	DESCRIPTION	Surf. Elev. 384.99	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	SILTY CLAY, hard, very dark gray (10YR 3/1), dry	384	1	35/48		CL	
	CLAY, black, moist					CH	
5		379	2	44/60			
	SANDY CLAY with gravel, very stiff to hard, low plasticity, dark gray with yellow-brown mottling, dry - grain size analysis @ 8-9.2 ft: 17.4% gravel, 30.5 %sand, 18.8% silt, 33.4% clay					CL	
10		374	3	24/42			
	CLAY, shaley, gray with light olive-brown mottling - grain size analysis @ 11-12 ft: 12.5% sand, 23% silt, 64.5% clay Refusal in bedrock at 12.5 feet BLS					CH	
	LIMESTONE		4	1/6		LS	
	Drove split-spoon to 12.75 feet BLS - 1-inch recovery END BOREHOLE AT 12.75 FEET BLS						
15							

Well: MW-154
Elev.: 387.76



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KELRON ENVIRONMENTAL INCORPORATED

LOG OF BORING MW-155

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, SE, SW

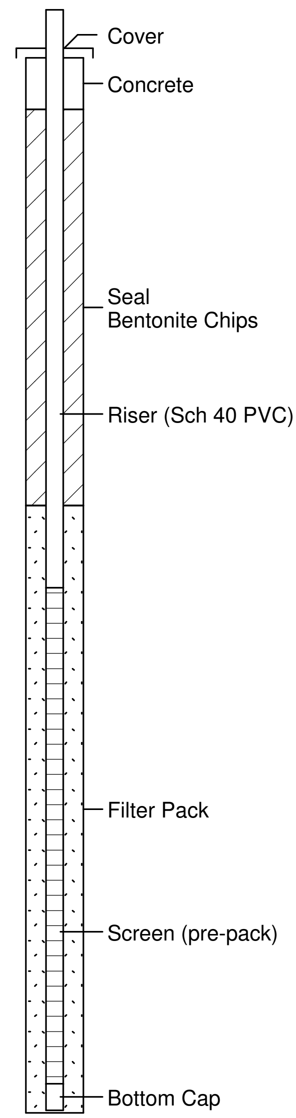
Date Completed	: 09/10/2010
Hole Diameter	: 8 1/2"OD; 4 1/4" ID
Drilling Method	: Hollow-Stem (CME-550)
Sampling Method	: MacroCore (60")
Drilling Company	: Terra Drill, Inc.
Driller	: Matt Cooper
Geologist	: Brendon Wilder (PSC)
Land Surface Elevation	: 390.62
Top of Casing Elevation	393.55
X,Y Coordinates	: 2378141, 555983

Depth in Feet	DESCRIPTION	Surf. Elev. 390.62	USCS
0	SILTY CLAY, hard, reddish brown, dry	390	CL
	CLAY (lean), hard, low plasticity, pale brown (10YR 6/3), grading to Fat CLAY - grain size analysis @ 7 - 8 ft: 2.5% sand, 47.2% silt, 50.3% clay	385	CL/CH
5			
	SANDY CLAY, dry		CL
	SAND, 4-inch seam, poorly graded, loose		SP
10	CLAY with sand grading to SANDY CLAY, very soft, moist	380	CL
15		375	
	CLAYEY SAND, poorly graded, dark yellow brown - grain size analysis @ 18.5 - 19.5 ft: 53.9 %sand, 28.1% silt, 18.0% clay		SC
20	END BOREHOLE AT 20.5 FEET BLS	370	
25			

Samples	Recovery inches	Qp TSF
1	40/48	
2		
3		
4		4.5
5	53/60	
6		
7		4.5+
8		
9		0.75
10	44/60	
11		
12		1.5
13		
14		1.5
15	50/60	
16		0.5
17		
18		1.5
19		
20		

GRAPHIC

Well: MW-155
Elev.: 393.55



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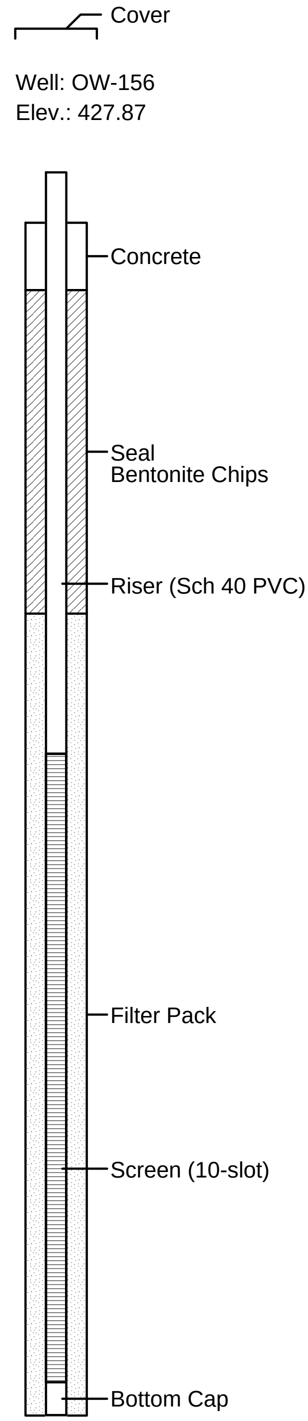
KELRON ENVIRONMENTAL
Incorporated

LOG OF BORING OW-156

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 NW, NW, SW

Date Completed	: 09/10/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation:	425.14
Sampling Method	: MacroCore (60")	Top of Casing Elevation:	427.87
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378141, 555983

Depth in Feet	DESCRIPTION	Surf. Elev.425.15	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	SILTY CLAY, stiff, medium brown, dry	425					
			1	32/48	2.5		
			2		1.5		
			3		3.5		
			4		1.75		
5	- stiff to very stiff, low plasticity	420	5	56/60	2.0		
			6		1.75		
	- dark gray-brown (10YR 3/3) with light brown mottling (10YR 6/3)		7		1.75		
			8		1.75		
			9		2.25		
10	CLAY (lean) with Sand, soft to medium, light brown (10YR 6/3) with brown-yellow mottling (10YR 6/6), moist	415	10	60/60	1.0	CL	
			11		1.5		
			12		1.75		
			13		1.75		
			14		1.5		
15		410	15	50/60	2.25		
			16		2.0		
			17		2.5		
	END BOREHOLE AT 17.7 FEET BLS		18		1.25		
	Terminated probing with MacroCore at 19.5 feet bls		19				
20							



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KELRON ENVIRONMENTAL
INCORPORATED

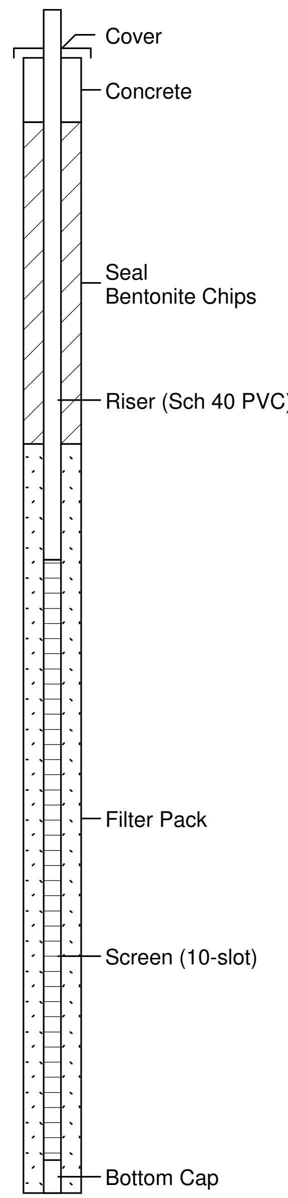
LOG OF BORING OW-157

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 10 SE, SW, SW

Date Completed	: 09/9/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD; 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem (CME-550)	Land Surface Elevation	: 432.64
Sampling Method	: MacroCore (60")	Top of Casing Elevation	429.90
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2382593, 556189

Depth in Feet	DESCRIPTION	Surf. Elev. 429.90	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY with Fly Ash, dark gray-brown, dry	429	1	48/48		CL/FL
5	CLAY with Silt, hard, medium plasticity, light olive brown, moist	424	2	60/60		CH
10	CLAY with Sand, stiff, wet	419	3	60/60		CL
	CLAY, trace to some Sand, very stiff to hard, medium to high plasticity					CL/CH
15		414	4	60/60		
	END BOREHOLE AT 17.5 FEET BLS					
	Terminated probing with MacroCore at 19.5 feet bls					
20						

Well: OW-157
Elev.: 432.64



KELRON ENVIRONMENTAL
Incorporated

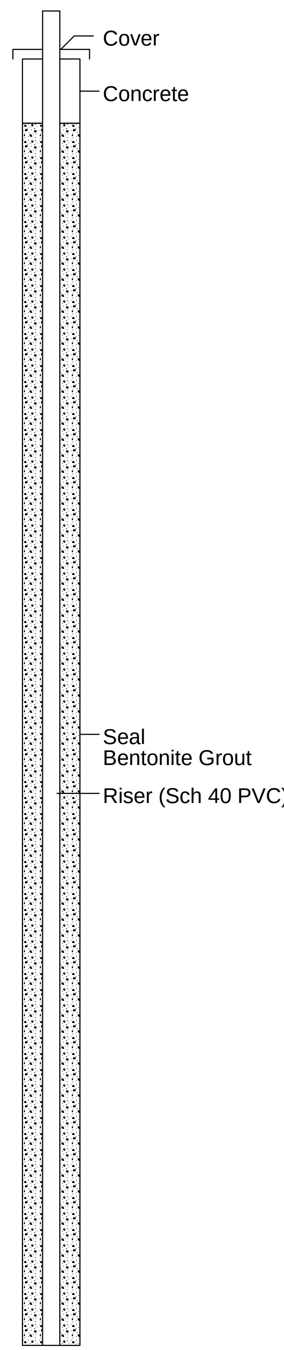
LOG OF PROBEHOLE MW-161

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS
0	FILL - Silt with clay, organics (roots), stiff, non-plastic, light yellowish brown (10YR 6/4), dry		1	38/42	2.75	FL/CL
			2		>4.5	
	SILT with clay, roots, hard, brownish yellow (10YR 6/6)		3		3.0	ML
	Silty CLAY with roots, very stiff, medium plasticity, with reddish-brown mottling and manganese staining, moist	425	4	60/60	2.0	CL
5			5		2.0	
	- medium hardness, medium to high plasticity, light brownish gray (10YR 6/2) with mottling and manganese staining		6		2.25	
			7		2.5	
			8		1.75	
	SILT, stiff, non-plastic, brownish yellow (10YR 6/6)	420	9	60/60	1.0	ML
	- with clay, very soft, medium plasticity, wet					
10	Silty CLAY, stiff to very stiff, high plasticity, light brownish gray (10YR 6/2) with reddish brown and black mottling grading to light gray, moist		10		2.5	CL
			11		1.0	
	SILT, very soft, non-plastic, light brownish gray (10YR 6/2)					
	- wet		12		0.75	ML
	Silty CLAY, stiff, medium plasticity, gray (10YR 6/1), moist		13		2.0	CL
		415	14	60/60	1.5	
15	- soft to medium hardness, high plasticity, yellowish brown (10YR 5/6)		15		1.25	
	- <25% mottling		16		1.5	
			17		1.25	
			18		2.25	
		410	19	60/60	2.0	
20			20		1.0	

Well: MW-161
Elev.: 431.27



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KELRON ENVIRONMENTAL

Incorporated

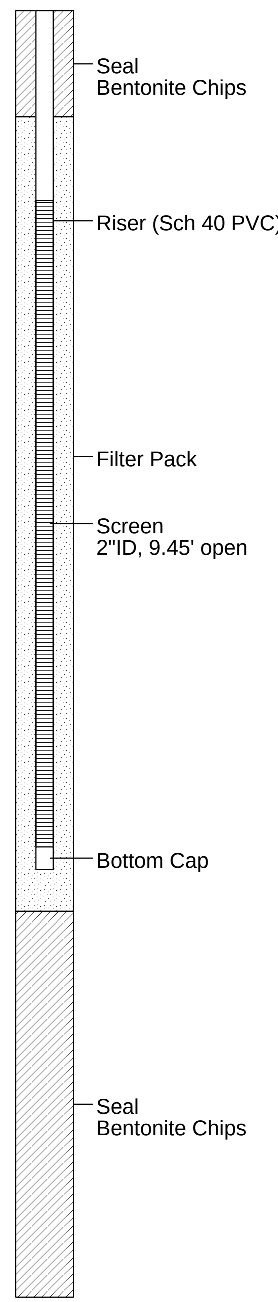
LOG OF PROBEHOLE MW-161

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS
20			20		1.0	CL
	SILT with clay, stiff, low plasticity, brownish yellow (10YR 6/8)		21		2.0	ML
	- soft, yellowish brown (10YR 5/4), wet		22		2.0	
	Silty CLAY, stiff, low to medium plasticity, pale brown (10YR 6/3) with reddish-brown mottling, moist		23		1.0	CL
	- soft to very soft, high plasticity, light yellowish brown - brown (10YR 5/3) with <10% reddish brown mottling	405	24	60/60	0.75	
25			25			
			26			
	- with fine sand		27		1.0	
			28			
	SAND with Silt, fine grained, gray-brown, wet	400	29	53/60		SP/SM
30			30			
	<Sample MC161-32 @ 31.5-32.5'> grain size analysis: 89.8% Sand, 10.2% Silt		31			
	- pale green (Gley1 5G 6/2)		32			
	CLAY (lean), trace fine-medium sand, hard, low plasticity, greenish-gray (10GY 5/1), moist [TILL]		33		3.0	CL
	- medium to stiff, medium to high plasticity	395	34	60/60	2.5	
35			35		1.25	
			36		1.5	
			37		1.75	
			38		3.0	
	- trace sand, stiff to hard	390	39	44/60	2.0	
40			40		1.5	

Well: MW-161
Elev.: 431.27



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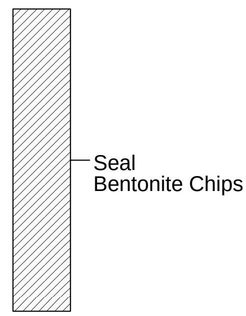
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-161

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.74
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.27
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379206, 557078

Depth in Feet	DESCRIPTION	Surf. Elev. 428.74	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
40			40		1.5	CL	
			41		2.0		
			42		1.5		
	Sandy SILT, medium hardness, non-plastic					ML	
	Silty CLAY with shale and fine-coarse limestone gravel (rounded to sub-rounded up to 1.5"), stiff to very stiff, greenish gray (Gley1 10Y 5/1)	385	43		2.0	CL	
			44	14/14	>4.5		
45	SHALE, laminated, hard, weathered (top of bedrock = 44.3' bls)					SH	
	END BOREHOLE AT 44.7 FEET BLS Refusal of Macrocore and Auger on top of competent bedrock						
		380					
50							
		375					
55							
		370					
60							

Well: MW-161
Elev.: 431.27



KELRON ENVIRONMENTAL
Incorporated

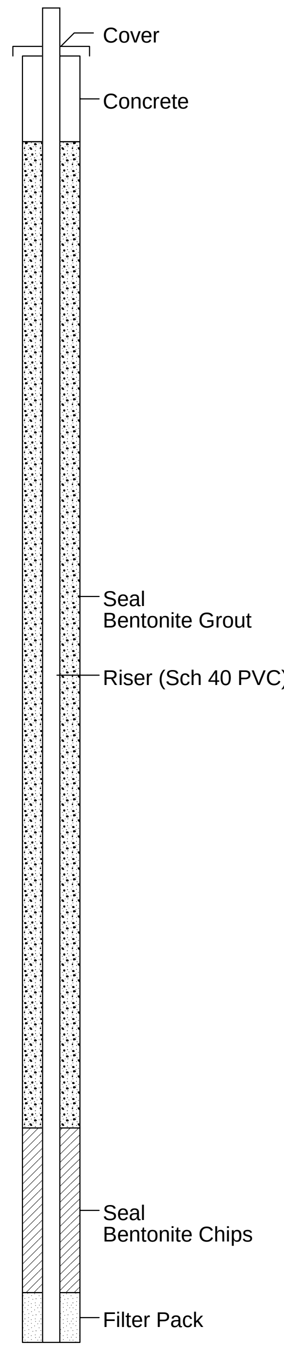
LOG OF PROBEHOLE MW-162

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/20/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.83
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.20
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555725

Depth in Feet	DESCRIPTION	Surf. Elev. 430.83	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continous Boring - no soil sampling conducted. Descriptions of subsurface materials on this log are from adjacent boring log for well MW-262.	430					
	Silty Clay with gravel, roots, stiff, non-plastic, pale brown (10YR 6/3), dry						
	- brownish yellow (10YR 6/6), moist					CL	
5	- medium stiff, high plasticity	425					
	SILT, very soft, non-plastic, light yellowish brown (10YR 6/4), moist [LOESS]						
10	- clayey, soft to medium hardness, low to medium plasticity	420				ML	
	- soft, yellowish brown (10YR 5/4)						
	- non-plastic						
15							

Well: MW-162
Elev.: 433.20



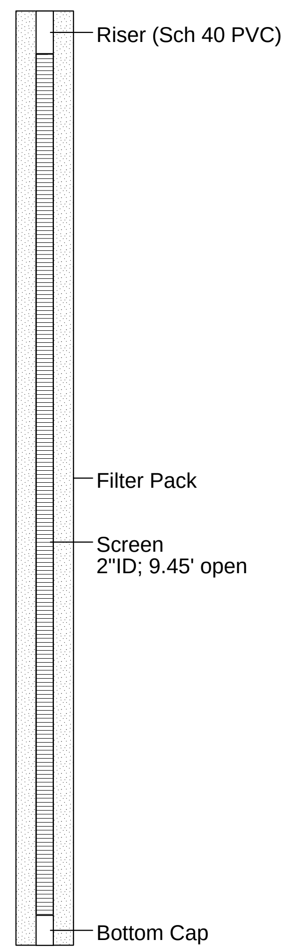
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-162 (Page 2 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/20/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.83
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.20
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555725

Depth in Feet	DESCRIPTION	Surf. Elev. 430.83	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
15		415				ML	
	Sandy CLAY (lean), medium hardness, low to medium plasticity, yellowish brown, moist					CL	
20	SILT, very soft, non-plastic, brownish yellow (10YR 6/6), moist	410				ML	
25	Silty CLAY, very soft, low plasticity - medium plasticity, wet	405				CL	
30	END BOREHOLE AT 25.9 feet BLS						

Well: MW-162
Elev.: 433.20



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APPENDIX C2

PZ 100 SERIES BORING LOGS AND WELL DETAILS

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Baldwin Energy Complex		PZ-169	
Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/27/2015	7/28/2015	hollow stem auger
Common Well Name: PZ-169	Final Static Water Level: Feet (NAVD88)	Surface Elevation: 420.01 Feet (NAVD88)	Borehole Diameter: 8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 557,323.57 N, 2,381,764.94 E E/Ⓦ
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 49.0632"
Long -89° 52' 12.9108"
Local Grid Location ☐N ☐S Feet ☐E ☐W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 15.5	4 9 10 11	0–1	0 - 0.2' **SILT:** ML, dark grayish brown (10YR 4/2), trace roots and clay, very soft (<0.25 tsf), dry.	ML									
			1–2	0.2 - 2' **SILTY CLAY** CL/ML, brown (10YR 5/3), cohesive, nonplastic to low plasticity, dry.	CL/ML									
2 ST	24 22		2–4	2 - 4' Shelby Tube Sample.										ST2: 24" push at 500lbs of pressure.
3 SS	24 21	2 3 6 6	4–6	4 - 10' **SILTY CLAY** CL/ML, dark yellowish brown (10YR 3/6), trace brown (10YR 5/3) and gray (10YR 6/1) mottling, cohesive, nonplastic to low plasticity, stiff to very stiff (1.0-2.5 tsf), dry to moist.	CL/ML									
4 SS	24 20	2 3 5 7	6–8											
5 SS	24 24	2 3 4 5	8–10	8' - 10' dark grayish brown (10YR 4/2), very dark brown (10YR 2/2) mottling, trace dark yellowish brown (10YR 6/3), cohesive, moist. 8.9' dark brown (10YR 3/3) mottling.										
6 SS	24 23	1 3 4 5	10–12	10 - 12' **SILTY CLAY** to **LEAN CLAY:** CL/ML, dark yellowish brown (10YR 3/6), trace yellowish brown (10YR 5/6) mottling, decreasing silt content with depth, moist. 10.3' trace wood pieces. 11.4' - 11.7' trace very dark brown (10YR 2/2) mottling.	CL/ML									
7 ST	24 24		12–14	12 - 14' Shelby Tube Sample.										ST7: 24" push at 400lbs of pressure.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
8 SS	24 22	2 4 5 6	15	14 - 20' **LEAN CLAY:** CL, dark yellowish brown (10YR 3/6), grades to gray (10YR 6/1), yellowish brown (10YR 5/6) mottling, trace very dark brown (10YR 2/2) mottling, silt (5-30%), cohesive, low to medium plasticity, stiff to very stiff (1.5-3.5 tsf), moist.	CL								
9 SS	24 22.5	2 3 5 5	16, 17	16' - 19.9' dark yellowish brown (10YR 3/6) and yellowish brown (10YR 5/6) mottling.									
10 SS	24 23	1 4 4 4	18, 19	18' trace dark yellowish brown (10YR 6/3) mottling, trace silt, softer with depth. 18.8' trace very fine and coarse sand.									
11 SS	24 21	1 3 4 4	20, 21	20 - 22' **SILTY CLAY** CL/ML, gray (10YR 6/1), dark yellowish brown (10YR 3/6) and trace very dark brown (10YR 2/2) mottling, trace to few very fine sand seams, cohesive, nonplastic to low plasticity, stiff to very stiff (1.75-2.5 tsf), moist. 21' trace very fine sand seams.	CL/ML								
12 ST	24 25		22, 23	22 - 24' Shelby Tube Sample.									ST12: 24" push at 150lbs of pressure, wet tube (free water)
13 SS	24 24	1 2 3 5	24, 25	24 - 28' **LEAN CLAY WITH SAND:** s(CL), pale brown (10YR 6/3), trace brownish yellow (10YR 6/6) mottling, very fine sand, trace coarse sand, trace silt, cohesive, soft, moist to wet.	s(CL)								
14 SS	24 24	1 1 2 4	26, 27										
15 SS	24 21.5	4 6 8 10	28, 29	28 - 30' **SILTY CLAY** CL/ML, gray (10YR 5/1), trace strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) mottling, very fine sand (10-20%), trace coarse sand and fine gravel, stiff to hard (1.25->4.5 tsf), moist to wet (on bottom).	CL/ML								
16 SS	24 21	3 7 9 14	30, 31	30 - 32' **LEAN CLAY:** to **SILTY CLAY** CL, yellowish brown (10YR 5/4), trace gray (10YR 5/1) and yellowish brown (10YR 5/6) mottling, silt (15-25%), trace very fine to fine gravel, cohesive, medium to high plasticity, very stiff (2.5-4.0 tsf), moist. 30.2' small dark brown (10YR 3/3) fragments (possible shale).	CL								
17 SS	24 20	4 6 10 13	32, 33	32 - 38' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace gray (10YR 5/1) mottling, silt (5-15%), trace fine to coarse sand, low to medium plasticity, medium to hard (0.75->4.5 tsf), dry to moist (increasing moisture content with depth). 33.1' - 33.3' dark gray (10YR 4/1).	CL								
18 SS	24 17	4 6 13 16	34, 35	34' - 35.4' no coarse sand, moist.									
19 SS	11 11	5 50 for 5"	36, 37	36' - 37' low plasticity, moist (decreasing moisture content with depth).									subangular gravel in shoe of sample SS19

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-169

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
					CL									
20 SS	24 0	13 20 23 25	38	38 - 40' No Recovery.										
21 SS	18 6	16 35 50 for 6"	40	40 - 42' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace gray (10YR 5/1) mottling, silt (0-10%), subrounded to subangular gravel (5-10%), trace fine to coarse sand, low to medium plasticity, medium to hard (0.75->4.5 tsf), moist to wet.	CL									
			42	42' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-170

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/29/2015	7/29/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-170	Feet (NAVD88)	418.58 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,822.69 N, 2,381,944.92 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 44.106"
Long -89° 52' 10.6752"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 8	4 5 6 9	0–2	0 - 2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (15-25%), trace roots, grass, gravel, and coarse sand, cohesive, nonplastic to low plasticity, hard (>4.5 tsf), dry.	CL/ML								
2 ST	24 21		2–4	2 - 4' Shelby Tube Sample.									ST2: 24" push at 500lbs of pressure.
3 SS	24 15	2 3 5 7	4–6	4 - 8' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (5-15%), trace very fine sand and gravel, low plasticity, very stiff to hard (2.5->4.5 tsf), dry.	CL/ML								
4 SS	24 17	3 5 8 8	6–8	6' - 7.4' trace gray (10YR 5/1) mottling.									
5 SS	24 17	3 4 6 6	8–10	8 - 10' **SILTY CLAY** to **LEAN CLAY:** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (5-15%), trace very fine sand and gravel, silt content decreases with depth, clay content increases with depth, medium plasticity, very stiff (3.25 tsf), dry.	CL/ML								
6 SS	24 20	3 4 5 5	10–12	10 - 12' **LEAN CLAY:** CL, brown (5YR 4/3), trace very dark brown (10YR 2/2) mottling, trace silt, silt content increasing with depth, medium to high plasticity, stiff (1.75-2.0 tsf).	CL								
7 ST	24 24		12–13	12 - 14' Shelby Tube Sample.									ST7: 24" push at 250lbs of pressure.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Template: ILLINOIS BORING LOG - Project: BALDWIN GINT.GPJ

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-170

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				12 - 14' Shelby Tube Sample. *(continued)*									
8 SS	24 21	3 5 7 8	14	14 - 24' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (10-20%), trace gravel, cohesive, low plasticity, stiff to very stiff (1.0-3.0 tsf), dry to moist. 14.9' - 15.3' very dark brown (10YR 2/2) mottling.	CL/ML								
9 SS	24 24	2 4 4 6	16	16' - 18.5' increaed very dark brown (10YR 2/2) mottling (5-15%), very fine sand (0-10%), trace fine gravel, subangular, cohesive, low to medium plasticity, dry to moist. 16.8' - 17.1' very dark brown (10YR 2/2) mottling.									
10 SS	24 24	1 3 3 3	18	18' - 20' silt (15-25%), very fine sand (0-10%), trace fine gravel, medium plasticity, moist. 19' layer of gravel (2" thick, subangular to subrounded). 19.8' very soft (0.25 tsf).									
11 SS	24 20	1 2 5 7	20	20' - 24' subangular to subrounded gravel, low plasticity, dry to moist. 20.8' increased gravel content (10-15%). 21.2' decrease in gravel content (5-15%).									
12 SS	24 20.5	3 6 8 10	22										
13 ST	24 24		24	24 - 26' Shelby Tube Sample.									ST13: 24" push at 650lbs of pressure.
14 SS	24 22	3 6 12 14	26	26 - 28.2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/6), trace brown (10YR 5/3) and very dark brown (10YR 2/2) mottling, silt (10-30%), very fine sand (0-15%), trace fine subangular to subrounded gravel, gravel decreases with depth to no gravel, trace <1mm thick very fine sand seams, cohesive, low to medium plasticity, plasticity increasing with depth, very stiff to hard (2.0->4.5 tsf), moist, decreasing silt and sand content with depth.	CL/ML								
15 SS	24 22	9 17 24 35	28	28.2 - 30' **LEAN CLAY:** CL, very dark gray (2.5Y 3/1), trace silt, cohesive, medium to high plasticity, hard (>4.5 tsf), dry. 28.5' black (2.5Y 2.5/1). 28.9' greenish gray (GLEY 1 6/1).	CL								
16 SS	17 13	11 30 50 for 5"	30	30 - 31.1' **SHALE:** to **LEAN CLAY:** BDX (SH), greenish gray (GLEY 1 6/1), trace silt, cohesive, medium to high plasticity, dry, shale (residual soil to highly decomposed, very weak, fissile). 31.1' End of Boring.	BDX (SH)								Hollow Stem Auger Refusal at 31.1 ft bgs on Shale Bedrock.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-171

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/30/2015	7/31/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-171	Feet (NAVD88)	431.54 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,453.57 N, 2,379,199.67 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 40.542"
Long -89° 52' 45.0804"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 16	2 5 4 4	0–2	0 - 2' **SILT:** ML, brown (7.5YR 4/3), 5-15% clay, trace roots, cohesive, nonplastic, dry. 0.7' increase in clay content (15-25%).	ML								
2 ST	24 24		2–4	2 - 4' Shelby Tube Sample.									ST2: 24" push at 250lbs of pressure.
3 SS	24 18	1 3 3 3	4–6	4 - 10.8' **SILTY CLAY** CL/ML, brown (10YR 5/3), very dark brown (10YR 2/2) and dark yellowish brown (10YR 4/4) mottling, silt (10-20%), cohesive, low to medium plasticity, medium to stiff (0.5-1.75 tsf), moist.	CL/ML								
4 SS	24 24	1 3 3 5	6–8	6' low plasticity.									
5 SS	24 17	1 2 3 3	8–10	7.7' silt (25-35%), trace very fine sand, nonplastic to low plasticity. 8' silt (5-15%), medium plasticity.									
6 SS	24 24	2 2 3 4	10–12	10' silt (20-50%), silt content increasing with depth, moist.									
				10.8 - 12' **CLAYEY SILT** ML/CL, clay (30-50%), medium (0.5-0.75 tsf), moist.	ML/CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 ST	24 26		12-14	12 - 14' Shelby Tube Sample.									ST7: 24" push at 200lbs of pressure.
8 SS	24 24	2 3 3 5	14-16	14 - 20' **SILTY CLAY** CL/ML, brown (10YR 5/3), very dark brown (10YR 2/2) and dark yellowish brown (10YR 4/4) mottling, silt (30-40%), cohesive, low to medium plasticity, medium to stiff (0.75-2.0 tsf), moist.	CL/ML								
9 SS	24 24	2 3 5 5	16-18										
10 SS	24 20	1 3 5 8	18-20	17.4' - 19.7' dark yellowish brown (10YR 4/4), brown (10YR 5/3) mottling, clay (20-30%), cohesive, nonplastic, moist.									
11 ST	24 16		20-22	20 - 22' Shelby Tube Sample.									ST11: 24" push at 350lbs of pressure.
12 SS	24 21	1 1 2 2	22-24	22 - 26' **SILTY CLAY** CL/ML, brown (10YR 5/3), very dark brown (10YR 2/2) and dark yellowish brown (10YR 4/4) mottling, silt (10-20%), cohesive, low to medium plasticity, very soft to medium (0.25-1.0 tsf), moist. 22.8' - 23' sandy clay layer, very fine sand, wet.	CL/ML								
13 SS	24 17	WOR 1 2 3	24-26	24' - 26' silt (5-15%), medium to high plasticity, moist.									WOR = Weight of Rods
14 SS	24 24	1 1 2 2	26-28	26 - 28' **SILTY CLAY** to **SANDY LEAN CLAY:** CL/ML, yellowish brown (10YR 5/4), very fine sand (30-50%), increasing sand content with depth, silt (20-40%), decreasing silt content with depth, clay content decreasing with depth, cohesive, nonplastic to low plasticity, decreasing plasticity with depth, wet.	CL/ML								
15 SS	24 21.5	1 3 7 10	28-30	28 - 28.7' **CLAYEY SILT** to **POORLY-GRADED SAND:** ML/CL, yellowish brown (10YR 5/4), clay (10-20%), fine sand (10-20%), cohesive, nonplastic, wet. 28.7 - 36.6' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/4), fine sand, silt (5-15%), clay (5-15%), medium and coarse grained sand (5-10%), wet.	ML/CL SP								
16 SS	24 24	4 4 3 4	30-32	30' trace clay, trace medium and coarse sand.									

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-171

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 21.5	5 9 15 20	33	28.7 - 36.6' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/4), fine sand, silt (5-15%), clay (5-15%), medium and coarse grained sand (5-10%), wet. *(continued)* 32' - 33.8' sand grading from fine to very fine with depth.	SP									
18 SS	24 22	5 15 19 22	34, 35											
19 SS	24 22	4 4 5 6	36	36' - 36.6' increase in silt content with depth (5-15%). 36.4' clay layer (2mm thick). 36.5' clay layer (2mm thick).										
			37, 38	36.6 - 38' **LEAN CLAY:** CL, dark gray (2.5Y 4/1) to very dark gray (2.5Y 3/1), trace silt, trace fine sand seams, high plasticity, stiff (1.5-1.75 tsf), moist.	CL									
				38' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-172

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/31/2015	7/31/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-172	Feet (NAVD88)	410.22 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,323.28 N, 2,379,176.11 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 29.3676"
Long -89° 52' 45.4188"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 17	3 6 5 4	0–1	0 - 0.5' **FILL, TOPSOIL:** ML, dark grayish brown (10YR 4/2), trace clay, gravel, roots, and grass, noncohesive, dry. 0.4' angular gravel.	(FILL) ML								
			1–2	0.5 - 2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), very dark brown (10YR 2/2) and strong brown (7.5YR 4/6) mottling, silt (5-15%), trace fine sand, cohesive, low plasticity, dry.	CL/ML								
2 ST	24 17		2–4	2 - 4' Shelby Tube Sample.									ST2: 24" push at 500lbs of pressure.
3 SS	24 19	2 3 4 6	4–6	4 - 9.2' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), increased very dark brown (10YR 2/2) and strong brown (7.5YR 4/6) mottling, silt (5-15%), trace fine sand, cohesive, medium plasticity, very soft to very stiff (0.25-2.5 tsf), moist.	CL/ML								
4 SS	24 22	2 2 4 8	6–8	6' silt (10-20%), low to medium plasticity.									
5 SS	24 20	1 3 5 9	8–9.2	8' decreased mottling, trace brown silt seams, silt content increasing with depth (20-50%).									
			9.2–10	9.2 - 10' **SILT:** ML, brown (7.5YR 4/4), clay (5-15%), cohesive, nonplastic, moist.	ML								
6 ST	24 16		10–12	10 - 12' Shelby Tube Sample.									ST6: 24" push at 450lbs of pressure.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-172

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 24	1 1 3 4	13	12 - 18' **SILTY CLAY** CL/ML, brown (7.5YR 4/4), cohesive, nonplastic to low plasticity, stiff to very stiff (1.25-2.75 tsf), moist. 13.3' soft (0.5 tsf).	CL/ML									
8 SS	24 24	2 3 4 7	14, 15											
9 SS	24 22.5	2 4 4 6	16, 17	15.8' hard (4.0 tsf). 16.6' - 16.8' increased very dark brown (10YR 2/2) mottling.										
10 ST	24 22		18, 19	18 - 20' Shelby Tube Sample.										ST10: 24" push at 350lbs of pressure.
11 SS	24 23	1 3 3 3	20, 21	20 - 21' **SANDY LEAN CLAY:** s(CL), dark gray (10YR 4/1), with clay seams, trace yellowish brown (10YR 5/8 mottling), cohesive, nonplastic, wet, clay seams (medium to high plasticity).	s(CL)									
				21 - 22' **SANDY LEAN CLAY WITH GRAVEL:** s(CL)g, mostly yellowish brown (10YR 5/8) with some dark gray (10YR 4/1), silt (>15%), cohesive, nonplastic.	s(CL)g									
12 SS	14 12	1 2 50 for 2"	22, 23	22 - 24' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/8) with dark gray (10YR 4/1) mottling, sand (5-15%), cohesive, low plasticity.	CL/ML									
13 SS	22 18	15 14 18 50 for 4"	24, 25	24 - 26' **LEAN CLAY:** CL, trace gravel, hard (4.5 tsf), cohesive, dry.	CL									
14 SS	2 2	50 for 2"	26	26 - 26.2' **SHALE:** BDX (SH), clay (5-15%). 26.2' End of Boring.	BDX (SH)									

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-173

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/3/2015	8/3/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-173	Feet (NAVD88)	388.43 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,035.38 N, 2,379,187.28 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 26.52"
Long -89° 52' 45.2892"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 0		0–2	0 - 2' No Recovery. Gravel Pad.	(FILL)								
2 SS	24 13	2 2 2 3	2	2 - 10.9' **SILTY CLAY** CL/ML, dark grayish brown (10YR 4/2), trace sand and wood, cohesive, medium plasticity, very stiff (2.5-3.5 tsf), moist.	CL/ML								
3 SS	24 7	2 5 4 5	4	4' yellowish red (5YR 4/6) mottling.									
4 SS	24 20	2 4 8 9	6	6' - 7.7' yellowish brown (10YR 5/6) with dark gray (10YR 4/1) mottling, hard, laminated, dry.									
5 SS	24 19	2 4 6 8	8	8.2' very dark gray (10YR 3/1), trace dark yellowish brown (10YR 4/6) mottling, small hard nodules of clay in the matrix, dry to moist.									
6 SS	24 18	2 3 6 7	10	10.6' olive (5Y 5/6) with bluish gray (GLEY2 5/2) mottling.									
			10.9–12	10.9 - 13.8' **SILT:** ML, dark reddish gray (5YR 4/2), cohesive, nonplastic, stiff (2.0 tsf), moist.	ML								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Patrick M Hafft

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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-173

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	22 16	2 5 15 50 for 4"	13	10.9 - 13.8' **SILT:** ML, dark reddish gray (5YR 4/2), cohesive, nonplastic, stiff (2.0 tsf), moist. *(continued)* 12' - 13.3' trace brown (7.5YR 4/4) mottling, trace gravel, trace sand, increasing sand and gravel with depth. 12.6' wet. 12.8' clay (0-15%).	ML									Hollow Stem Auger Refusal at 13.5 ft bgs on Bedrock. SS8: Rock chips in spoon. Split Spoon Refusal at 14.1 ft bgs on Bedrock.
8 SS	2 0	50 for 2"	14	13.8 - 14.1' **BEDROCK** BDX (SH), wet.	BDX (SH)									
9 SS	1 1	50 for 1"		14.1' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-174

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/4/2015	8/4/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-174	Feet (NAVD88)	398.97 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,666.23 N, 2,379,774.23 E E/W (W circled)
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 22.8552"
Long -89° 52' 37.9524"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 5	2 3 5 3	0–2	0 - 2' **TOPSOIL:** ML, brown (10YR 4/3), trace grass and roots, cohesive, nonplastic, dry.	ML								
2 SS	24 0	2 2 2 4	2–4	2 - 4' No Recovery.									
3 SS	24 6	2 2 4 5	4–6	4 - 24.7' **LEAN CLAY:** CL, dark grayish brown (10YR 4/2), dark yellowish brown (10YR 4/4) mottling, silt (10-20%), cohesive, medium plasticity, moist.	CL								
4 SS	24 6	4 4 5 7	6–8										
5 SS	24 23	3 4 5 5	8–10	8' - 9.9' increased yellowish brown (10YR 4/4) mottling, increase in silt content with depth (50%).									
6 SS	24 20	2 4 8 6	10–12	10' - 11.7' decrease in silt content with depth (10-20%). 10.6' - 11.2' dark yellowish brown (10YR 4/4) and very dark brown (10YR 2/2) mottling (50%), dry to moist.									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Patrick M Heffe (signed)

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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-174

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 21	2 3 5 7	13	4 - 24.7' **LEAN CLAY:** CL, dark grayish brown (10YR 4/2), dark yellowish brown (10YR 4/4) mottling, silt (10-20%), cohesive, medium plasticity, moist. *(continued)* 12' - 13.8' trace coarse sand, dry.									
8 SS	24 21	2 4 5 8	14, 15	14' - 15.8' increased sand content, trace gravel, dry.									
9 SS	24 24	2 4 5 7	16, 17	16' - 18' yellowish brown (10YR 5/4), moist.									
10 SS	24 24	3 7 9 12	18, 19	18' - 20' coarse sand and gravel (5-15%), moist.	CL								
11 SS	24 24	3 7 9 15	20, 21										
12 SS	24 24	4 7 8 10	22, 23										
13 SS	8 8	11 50 for 2"	24	24' - 24.7' decreased moisture content with depth.									Hollow Stem Auger Refusal at 24.7 ft bgs on Shale Bedrock.
				24.7' End of Boring.									

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-175

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/7/2015	8/7/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-175	Feet (NAVD88)	419.87 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,433.02 N, 2,380,846.31 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 20.5152"
Long -89° 52' 24.5316"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 17	4 7 5 4		0 - 0.9' **SILT:** ML, brown (10YR 5/3), trace roots and grass, noncohesive, nonplastic, hard (3.0->4.5 tsf), dry.	ML								
			1	0.9 - 5.4' **LEAN CLAY:** CL, brownish yellow (10YR 6/6), black (10YR 2/1) mottling, silt (5-15%), dry, cohesive, low plasticity, very stiff (2.5-3.0 tsf).	CL								
2 SS	24 15	2 4 4 6	2	2' dry, increase in moisture content with depth, trace brown (10YR 5/3) silt seams.									
			3										
3 SS	24 17	2 3 4 6	4	4' increased brown (10YR 5/3) and black mottling (10YR 2/1), moist.									
			5										
4 SS	24 23	2 2 4 4	6	5.4 - 13.5' **SILT:** ML, light yellowish brown (10YR 6/4), trace dark gray (10YR 4/1) mottling, clay (5-15%), moist, cohesive, nonplastic, medium to stiff (0.5- 1.5 tsf).	ML								
			7										
5 SS	24 22	1 2 3 3	8	8' decreased mottling.									
			9										
6 SS	24 24	1 2 2 2	10	10' brown (7.5YR 4/4), no mottling.									
			11										
7 SS	24 23	1 2 3 4	12	12' increasing clay content with depth, low plasticity.									
			13										
			14										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Patrick M Hoffe

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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-175

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S
8 SS	24 / 21	1 3 4 5	14–16	13.5 - 22.3' **LEAN CLAY:** CL, brown (7.5YR 4/4), silt (5-15%), moist, cohesive, low to medium plasticity, stiff to very stiff (1.5-4.0 tsf) increasing with depth. *(continued)* 14' trace black (10YR 2/1) and dark gray (10YR 4/1) mottling, trace silt.	CL
9 SS	24 / 24	2 3 4 4	16–18	16' brown (7.5YR 5/4), silt (5-15%).	
10 SS	24 / 23	1 4 6 6	18–20	18' trace black (10YR 2/1) and dark gray (5-50% 10YR 4/1) mottling, trace silt, silt content decreasing with depth, wet.	CL
11 SS	24 / 23	2 5 7 7	20–22	20' no black (10YR 2/1) mottling, yellowish brown (5-15% 10YR 5/8) mottling.	
12 SS	24 / 24	3 3 4 4	22–24	22.3 - 26' **SILT:** ML, clay (5-15%), trace coarse sand, decrease in clay content with depth, moist, cohesive, nonplastic, very soft to very stiff (<0.25-3.0 tsf) decreasing with depth.	
13 SS	24 / 24	2 2 2 3	24–26	23.9' sandy silt seam (2" thick), wet. 24' some sandy and clayey silt seams, trace coarse sand to fine gravel, moist to wet in sandy silt seams.	ML
14 SS	24 / 24	11 8 9 10	26–28	26 - 28' **LEAN CLAY:** to **SILT:** CL, silt (40-60%), coarse sand to fine gravel (5-15%), trace fine sand seams, moist, cohesive, low plasticity, stiff (1.5-2.0 tsf).	CL
15 SS	24 / 24	8 11 15 20	28–30	28 - 28.4' **SANDY SILT:** s(ML), yellowish brown (10YR 5/4), wet, cohesive, nonplastic, stiff (1.5 tsf). 28.4 - 31.3' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), coarse sand to fine gravel (5-15%), trace fine sand seams, hard (>4.5 tsf), dry to moist.	s(ML) CL
16 SS	24 / 24	9 19 20 23	30–32		
17 SS	24 / 24	6 6 8 10	32–34	31.3 - 31.5' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, dark yellowish brown (10YR 4/6), dry. 31.5 - 43.8' **LEAN CLAY:** CL, gray (10YR 5/1), dry, very stiff to hard (2.5->4.5 tsf), cohesive, nonplastic. 32' trace yellowish brown (10YR 5/6) seams and mottling, medium to high plasticity, increasing moisture content with depth.	(SW)g
18 SS	24 / 24	7 5 6 8	34–36	34' trace mottling, moist, decreasing moisture content with depth.	CL
19 SS	24 / 24	3 5 6 7	36–38	36' dry to moist, silty clay seam (4" thick, moist).	

Columns also present but empty: Graphic Log, Well Diagram, Soil Properties (Compressive Strength (tsf), Moisture Content, Liquid Limit, Plasticity Index, P 200), RQD/Comments.

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-175

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
20 SS	24 24	3 4 7 7	38, 39	31.5 - 43.8' **LEAN CLAY:** CL, gray (10YR 5/1), dry, very stiff to hard (2.5->4.5 tsf), cohesive, nonplastic. *(continued)* 38' trace black (10YR 2/1) mottling. 38.3' yellowish brown (10YR 5/6) with gray (10YR 5/1) mottling.	CL									
21 SS	24 24	3 5 6 7	40, 41											
22 SS	24 24	3 5 8 20	42, 43	42' trace fine gravel.										
23 SS	24 20	3 11 12 14	44, 45	43.8 - 45.7' **SANDY LEAN CLAY WITH GRAVEL:** s(CL)g, brown (10YR 5/3), mostly broken rock, moist. 44' black (10YR 2/1) mottling, seams of wet gravel, coarse sand to coarse gravel.	s(CL)g									
24 SS	24 24	3 5 7 11	46, 47	45.7 - 50' **LEAN CLAY:** CL, light yellowish brown (10YR 6/4), brownish yellow (10YR 6/6) and dark gray (10YR 4/1) and black (10YR 2/1) mottling, trace fine gravel, some laminations, very stiff (2.5-3.5 tsf).	CL									
25 SS	24 24	4 7 12 20	48, 49	48' moist to dry. 48.7' laminated, dry.										
26 SS	1 0	50 for 1"	50	50 - 50.2' **SHALE:** BDX (SH). 50.2' End of Boring.	BDX (SH)									Hollow Stem Auger Refusal at 50.2 ft bgs on Shale Bedrock.

SOIL BORING LOG INFORMATION

Natural Resource Technology

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-176

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/6/2015	8/6/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-176	Feet (NAVD88)	403.46 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,264.76 N, 2,381,381.02 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 18.834"
Long -89° 52' 17.8428"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 15	3 3 4 4		0 - 0.5' **TOPSOIL:** ML, dark grayish brown (10YR 4/2), clay (5-15%), trace grass and roots, cohesive, nonplastic, stiff (1.5 tsf), dry.	ML								
			1	0.5 - 2.4' **SILT:** ML, dark grayish brown (10YR 4/2), brownish yellow (10YR 6/6) and dark brown (10YR 3/3) mottling, clay (30-50%), trace roots, cohesive, low plasticity, very stiff (3.0 tsf), dry.	ML								
2 SS	24 16	3 3 5 5	2										
			3	2.4 - 6.3' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), dark gray (10YR 4/1) mottling, silt (5-15%), trace roots, cohesive, medium plasticity, moist.									
3 SS	24 9	2 3 4 4	4	4' increase in silt content (40-60%), dry to moist.	CL								
			5										
4 SS	24 21	3 3 3 4	6	6.3 - 12' **SILT:** ML, dark gray (10YR 4/1), cohesive, nonplastic, moist.									
			7										
5 SS	24 12	1 1 1 2	8	8' sand (0-40%), sand content increasing with depth, moist to wet.									
			9		ML								
6 SS	24 13	1 1 1 2	10	10' increase in sand content (40-60%).									
			11										
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Patrick M Hagle

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NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number PZ-176

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 20	1 2 3 5	13	12 - 12.3' **WELL-GRADED SAND:** SW, very dark grayish brown (10YR 3/2), fine gravel (>15%), moist. /	SW									
				12.3 - 16' **LEAN CLAY:** CL, gray (10YR 5/1), brownish yellow (5-15% 10YR 6/6) and trace very dark brown (10YR 2/2) mottling, silt (5-15%), trace sand seams, cohesive, medium plasticity, stiff to very stiff (1.5-3.0 tsf).										
8 SS	24	2 3 3 5	14 15	14' increase in thickness of sand seams (1"-2" thick, moist, wet).	CL									
9 SS	24 17	2 4 7 10	16 17	16 - 28.6' **LEAN CLAY:** CL, dark gray (10YR 4/1), light yellowish brown (10YR 6/4) mottling, cohesive, low plasticity, very stiff to hard (3.5->4.5 tsf) dry.										
10 SS	24 18	4 6 8 12	18 19	18' increased mottling, mostly brown (10YR 5/3), brownish yellow (10YR 6/6), dark gray (10YR 4/1), and olive gray (5Y 5/2) mottling.										
11 SS	24 17	5 16 22 25	20 21	20' olive gray (5Y 5/2), brownish yellow (10YR 6/6) mottling. 20.3' dark gray (2.5Y 4/1), brownish yellow (10YR 6/6) mottling, clay becoming blocky and laminated.										
12 SS	11 7	7 50 for 5"	22 23	22' pale olive (5Y 6/3), dark gray (10YR 4/1) mottling, laminated.	CL									
13 SS	24 24	13 21 31 43	24 25	24' brownish yellow (10YR 6/6) mottling.										At 23.6' rock fragment on bottom of split spoon. Refusal of split spoon.
14 SS	24 24	14 12 17 19	26 27											
15 SS	8 8	9 50 for 2"	28	28' hard (4.5 tsf).										
16 SS	1 0	50 for 1"		28.6' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-177

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/5/2015	8/6/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-177	Feet (NAVD88)	417.93 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,192.18 N, 2,381,923.59 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 18.0996"
Long -89° 52' 11.0496"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 12	1 6 8 5	1	0 - 4' **TOPSOIL:** ML, dark yellowish brown (10YR 4/4), clay (5-15%), clay content increasing with depth, trace sand and roots, cohesive, nonplastic, dry.	ML								
2 SS	24 4	4 4 6 7	2, 3										
3 SS	24 17	2 3 4 5	4, 5	4 - 19.3' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace black (10YR 2/1) and dark gray (10YR 4/1) mottling, silt (5-15%), moist, cohesive, medium plasticity, stiff to very stiff (1.0-3.5 tsf).	CL								
4 SS	24 23	1 2 4 4	6, 7	6' dark yellowish brown (10YR 4/4), decreased mottling.									
5 SS	24 20	2 2 4 4	8, 9	8' trace black (10YR 2/1) and dark gray (10YR 4/1) mottling.									
6 SS	24 20	2 4 6 7	10, 11										
7 SS	24 20	3 4 5 8	12, 13	12' yellowish brown (10YR 5/4), yellowish brown (10YR 5/8) mottling, trace coarse sand to fine gravel, no black mottling.									
8 SS	24 23	3 3 6 7	14, 15	14' trace black (10YR 2/1) mottling.									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Patrick M Hoffa (signature)

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-177

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
9 SS	24 23	2 4 4 5	16	4 - 19.3' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace black (10YR 2/1) and dark gray (10YR 4/1) mottling, silt (5-15%), moist, cohesive, medium plasticity, stiff to very stiff (1.0-3.5 tsf). *(continued)* 16' increased gravel content.	CL						
10 SS	24 24	1 2 3 2	18								
11 SS	24	2 2 3 4	20	19.3 - 22' **SILT:** ML, yellowish brown (10YR 5/4), brownish yellow (10YR 6/8) mottling, clay (5-15%), trace sand, cohesive, nonplastic, soft (0.5 tsf), wet. 20' increase in clay content with depth (30-50%), trace gravel.	ML						
12 SS	24 16	2 4 13 11	22	22 - 29.7' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), strong brown (7.5YR 5/6) mottling, silt (5-15%), trace sand and gravel, stiff to hard (1.5->4.5 tsf) increasing with depth, moist to wet.	CL						
13 SS	24 24	3 4 7 9	24	24' sand (5-15%), moist. 24.5' - 25.3' black sand (0-15%).							
14 SS	24 24	4 6 11 13	26	26' no mottling, decreasing sand and gravel content with depth to trace, dry to moist, moisture content increases with depth, cohesive, low to medium plasticity, plasticity decreasing with depth.							
15 SS	24 22	5 7 15 50 for 5"	28	28' clay becoming laminated with depth. 28.7' brownish yellow (10YR 6/6), yellowish brown (10YR 5/4) mottling.							
16 SS	9 6	11 50 for 3"	30	29.7 - 30' **WELL-GRADED SAND:** SW, trace gravel and silt (noncohesive, nonplastic, rock flour), wet.	SW						
17 SS	1 1	50 for 1"		30 - 30.7' **SILTY GRAVEL:** GM, gravel is broken pieces of bedrock, silt is laminated, cohesive, and nonplastic. 30.7' End of Boring.	GM						Hollow Stem Auger Refusal at 30.7 ft bgs.

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-178

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	8/4/2015	8/5/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-178	Feet (NAVD88)	428.45 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,089.94 N, 2,382,460.67 E E/Ⓦ
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 17.0736"
Long -89° 52' 4.3248"
Local Grid Location ☐N ☐S Feet ☐E ☐W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 16	2 7 5 5		0 - 6.3' **SILT:** ML, brown (10YR 5/3), clay (10-20%), noncohesive, nonplastic, stiff to hard (1.5->4.5 tsf) decreasing with depth, dry.									
			1	1' - 1.3' cohesive, moist.									
2 SS	24 19	2 7 8 6	2	2' yellowish brown (10YR 5/4), clay (0-15%), brown and gray mottling (30-50%), dry to moist.									
			3		ML								
3 SS	24 18	2 4 6 8	4	4' dark grayish brown (10YR 4/2), dark yellowish brown (10YR 4/6) mottling, increasing clay content, moist.									
			5										
4 SS	24 23	2 3 4 5	6	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), dark brown (10YR 3/3) mottling, silt (5-15%), moist, cohesive, medium plasticity.									
			7										
5 SS	24 23	1 3 3 4	8										
			9		CL								
6 SS	24 24	2 2 3 5	10	10' increased silt content.									
			11										
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
Patrick M Hagle	Natural Resource Technology 234 W. Florida St., Fifth Floor, Milwaukee, WI 53204 Tel: (414) 837-3607 Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-178

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 22	1 2 4 5	13	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), dark brown (10YR 3/3) mottling, silt (5-15%), moist, cohesive, medium plasticity. *(continued)*										
8 SS	24 22	2 4 6 8	14, 15											
9 SS	24 22	3 4 6 7	16, 17	16' trace coarse sand.	CL									
10 SS	24 20	2 4 6 9	18, 19											
11 SS	24 24	2 4 7 6	20, 21	20 - 24.3' **LEAN CLAY:** to **SILT:** CL, dark gray (10YR 4/1), dark brown (10YR 3/3) mottling, clay (40-60%), silt (40-60%), trace coarse sand, cohesive, medium plasticity, moist.										
12 SS	24 24	1 2 5 4	22, 23	21.7' - 22' sand seam (mostly sand with silt). 23' interbedded sand (mostly fine to medium sand), silt and clay layers, wet.	CL									
13 SS	24 18	1 12 17 20	24, 25	24.3 - 26' **SANDY SILT:** s(ML), medium to coarse sand, moist, cohesive, nonplastic.	s(ML)									
14 SS	24 22	8 16 18 25	26, 27	26 - 26.3' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/4), mostly fine sand, trace medium sand and silt, wet. 26.3 - 43.5' **LEAN CLAY:** CL, fine to coarse sand (5-15%), trace gravel, yellowish brown (10YR 5/4), very stiff to hard (2.5->4.5 tsf), moist.	SP									
15 SS	24 22	7 8 9 11	28, 29	26.6' dark gray (10YR 4/1) mottling, silt (5-15%), increase in silt content with depth, trace very thin sand seams, trace black fine gravel, cohesive, nonplastic, dry. 28' - 28.6' wet in sand seams. 28.6' trace sand and silt, cohesive, medium to high plasticity, moist.	CL									
16 SS	24 19	4 7 9 13	30, 31, 32	30' trace fine gravel, no sand.										

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-178

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 17	4 5 16 22	33	26.3 - 43.5' **LEAN CLAY:** CL, fine to coarse sand (5-15%), trace gravel, yellowish brown (10YR 5/4), very stiff to hard (2.5->4.5 tsf), moist. *(continued)* 32' increased mottling, trace fine gravel, no sand. 33' brown (10YR 4/3), no mottling, no gravel, trace silt, cohesive, very stiff, dry.										
18 SS	24 20	10 21 25 37	34 35	34' brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (5-15%).										
19 SS	24 22	12 20 24 24	36 37	36' increase to yellowish brown (10YR 5/6) mottling (30-50%), trace coarse sand, becoming laminated with depth.										
20 SS	24	5 11 14 16	38 39	38.3' silt seam (very soft, wet), trace sand.	CL									
21 SS	24 24	5 10 13 17	40 41	39.6' dark gray grading to black with depth, trace olive yellow (2.5Y 6/6) mottling, silt (5-15%), dry to moist. 40' trace dark gray (10YR 4/1) and brownish yellow (10YR 6/8) mottling, no laminations, silt (5-15%), moist. 40.1' black seam (<0.25" thick).										
22 SS	17 17	7 16 50 for 5"	42 43	42' silt (30-50%), moist to dry, cohesive, nonplastic to low plasticity. 42.2' - 42.5' mostly silt seams [brownish yellow (10YR 6/6), dry]. 43.4' becoming laminated with depth.										
23 SS	1 0	50 for 1"		43.5' End of Boring.										Hollow Stem Auger Refusal at 43.5 ft bgs.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		PZ-182

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/29/2015	7/30/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
PZ-182	Feet (NAVD88)	428.47 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,433.70 N, 2,382,412.47 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 40.2432"
Long -89° 52' 4.836"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 15	5 9 10 8	0–2	0 - 2' **SILTY CLAY** CL/ML, grayish brown (10YR 5/2), gravel (5-15%), cohesive, low to medium plasticity, dry. 0.9' - 2' yellowish brown (10YR 5/4), trace gray (10YR 6/1) mottling, silt (10-20%), medium to high plasticity.	CL/ML								
2 ST	24 23		2–4	2 - 4' Shelby Tube Sample.									ST2: 24" push at 550lbs.
3 SS	24 15.5	2 3 6 7	4–6	4 - 12' **SILTY CLAY** CL/ML, grayish brown (10YR 5/2), trace very dark brown (10YR 2/2) mottling, silt (5-15%) and gravel, trace sand, medium plasticity, medium to very stiff (0.75-2.75 tsf), moist.	CL/ML								
4 SS	24 20	3 4 5 6	6–8	6' - 7.7' low to medium plasticity. 7.2' increase in silt content (20-30%), increase in very fine sand content (5-15%).									
5 SS	24 23	1 3 3 4	8–10	9.3' sandy silt seams (sand is very fine).									
6 SS	24 20.5	1 3 4 4	10–12	9.9' sandy silt seams (sand is very fine). 10' - 12' medium plasticity.									
7 ST	24 21		12–14	12 - 14' Shelby Tube Sample.									ST7: 24" push.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
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Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number PZ-182

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			14	12 - 14' Shelby Tube Sample. *(continued)*									
8 SS	24 21	3 4 5 7	14–16	14 - 22' **SILTY CLAY** CL/ML, grayish brown (10YR 5/2), trace very dark brown (10YR 2/2) mottling, silt (10-20%), gravel (5-15%), trace sand, low to medium plasticity, medium to very stiff (0.75-3.0 tsf), moist.	CL/ML								
9 SS	24 22	3 4 6 7	16–18	16' color grades to grayish brown (10YR 5/2), dark yellowish brown (10YR 4/4) mottling, medium plasticity. 16.3' - 17.4' very dark brown (10YR 2/2) mottling.									
10 SS	24 24	3 4 6 7	18–20	18.4' trace coarse sand and subangular fine gravel.									
11 SS	24 17	1 4 5 7	20–22	20' 0-10% sand. 21.1' pocket of weak red (10R 5/4), medium sand (1" diameter).									
12 ST	24 20		22–24	22 - 24' Shelby Tube Sample.									ST12: 24" push at 200lbs.
13 SS	24 20	1 1 4 5	24–26	24 - 27' **SILTY CLAY** CL/ML, brown (10YR 5/3), trace very dark brown (10YR 2/2) mottling, silt (20-30%), gravel (5-15%), very fine to fine sand (10-20%), cohesive, medium to high plasticity, medium (0.5-0.75 tsf), moist to wet. 24.5' - 25.6' yellowish brown (10YR 5/6), grayish brown (10YR 5/2) mottling, trace subrounded gravel. 25.4' black (10YR 2/1) gravel (shale, 1" diameter), sand content increasing with depth.	CL/ML								
14 SS	24 24	6 10 11 12	26–28	26' decrease in very fine sand content 5-15%, medium plasticity, wet. 26.6' seam of coarse sand and fine gravel. 26.7' very stiff (3.0 tsf). 27 - 29.1' **WELL-GRADED SAND:** SW, yellowish brown (10YR 5/6), trace silt, clay, and fine gravel, wet.	SW								WOR = Weight of Rods.
15 SS	24 18	WOR 2 6 9	28–30	28' - 28.1' increase in very fine sand content. 29.1 - 30' **SANDY LEAN CLAY WITH GRAVEL:** s(CL)g, yellowish brown (10YR 5/6), well-graded sand (10-20%), subangular fine gravel (5-15%), trace silt, wet.	s(CL)g								
16 SS	24 16	6 12 15 19	30–32	30 - 34' **SILTY CLAY** CL/ML, brown (10YR 5/3), very dark brown (10YR 2/2) mottling, silt (20-30%), gravel (5-15%), very fine to fine sand (10-20%), cohesive, low to medium plasticity, stiff to very stiff (1.25-4.0 tsf), moist to wet. 30.8' - 31.1' layer of coarse sand and subangular fine gravel, clay (50%).	CL/ML								
17 SS	24 10	16 15 19 26	32–34	32' - 34' silt (10-20%), subangular gravel (5-10%), very fine sand (5-10%), sand and gravel content decreasing with depth, medium to low plasticity. 32.7' - 32.9' very dark gray (2.5Y 3/1), trace silt, high plasticity, dry.									
			34	34' End of Boring.									

APPENDIX C3

TPZ 100 SERIES BORING LOGS AND WELL DETAILS

KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-158

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 453.26
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 456.26
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2387752, 556741

DESCRIPTION

Depth in Feet 0–2.1: Silty Loam with roots, stiff, non-plastic, pale brown (10YR 6/3), dry
- dark brown (10YR 3/3)

USCS: CL

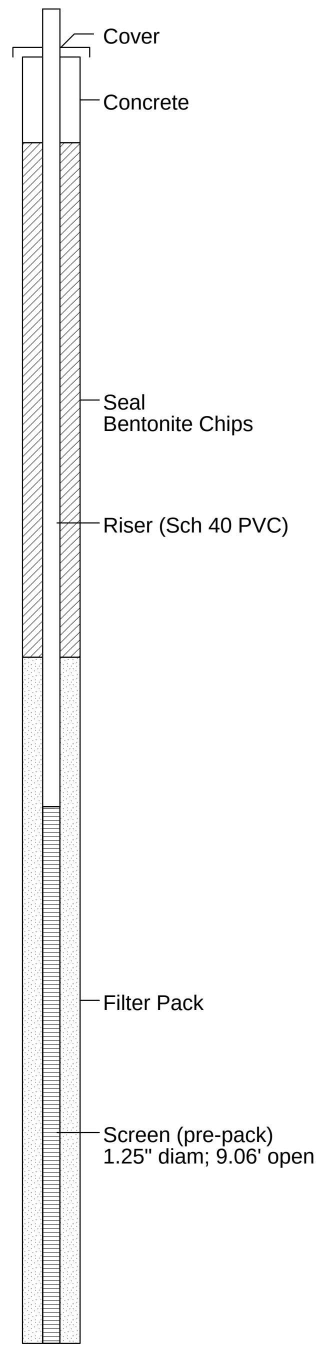
Depth in Feet 2.1–15: Silty CLAY, very stiff, low plasticity, gray (10YR 5/1) with yellowish-brown mottling, moist
- 25-50% mottling w/ black oxidation staining
- high plasticity, <25% mottling
- trace fine-medium sand, brownish yellow mottling (10YR 6/8)
- trace fine-coarse sand and fine gravel (angular to sub-angular)
- few to little sand and gravel, very stiff, 50-75% mottling
- high plasticity

USCS: CL

Surf. Elev. 453.26 (elevation ticks: 450, 445, 440)

Samples	Recovery inches	Qp TSF
1	60/60	2
2		2.75
3		3.75
4		3.5
5		4.5
6	60/60	2.5
7		2.5
8		1.25
9		1.25
10		1.75
11	60/60	1.75
12		3.5
13		2.25
14		2.75
15		2.5

Well: TPZ-158
Elev.: 456.26



KELRON ENVIRONMENTAL
Incorporated

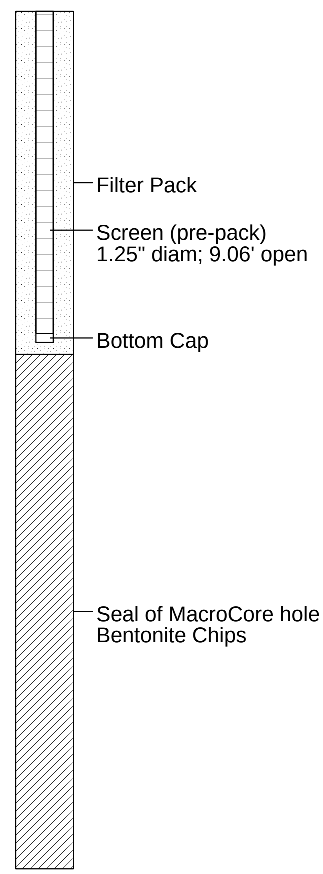
LOG OF PROBEHOLE TPZ-158

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 453.26
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 456.26
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2387752, 556741

Depth in Feet	DESCRIPTION	Surf. Elev. 453.26	Samples	Recovery inches	Qp TSF	USCS
15	- high plasticity					
			16	60/60	1.0	CL
	- trace fine to medium sand, soft, light gray (10YR 6/1) with 50-75% brownish-yellow mottling		17		0.75	CL
	Sandy CLAY (fine to medium sand) with trace fine-coarse gravel (<1"), very soft		18		- -	CL
	SAND, fine to coarse, well graded, brownish-yellow (10YR 6/8), wet	435				SW
	Sandy CLAY (fine-coarse sand) with gravel, hard, non-plastic, moist		19		>4.5	CL
20	Silty CLAY with trace sand and gravel, hard, medium to high plasticity, very pale brown (10YR 7/3)		20		>4.5	CL
	- very soft, high plasticity		21	60/60	<0.5	CL
	SAND, fine to coarse, well graded, yellowish-brown (10YR 5/8), wet		22		- -	SW
			23		- -	SW
		430	24		- -	SW
			25		4.0	SW
25	Silty CLAY with trace fine to coarse sand, hard, brownish-yellow (10YR 6/6), moist					CL
	SHALE, weathered, gray (10YR 6/1), dry at 24.75' - platy/laminated, dark gray (10YR 4/1), at 24.9' - top of bedrock = 24.75' bls					SH
	END BOREHOLE AT 25 FEET BLS					
		425				
30						

Well: TPZ-158
Elev.: 456.26



KELRON ENVIRONMENTAL
Incorporated

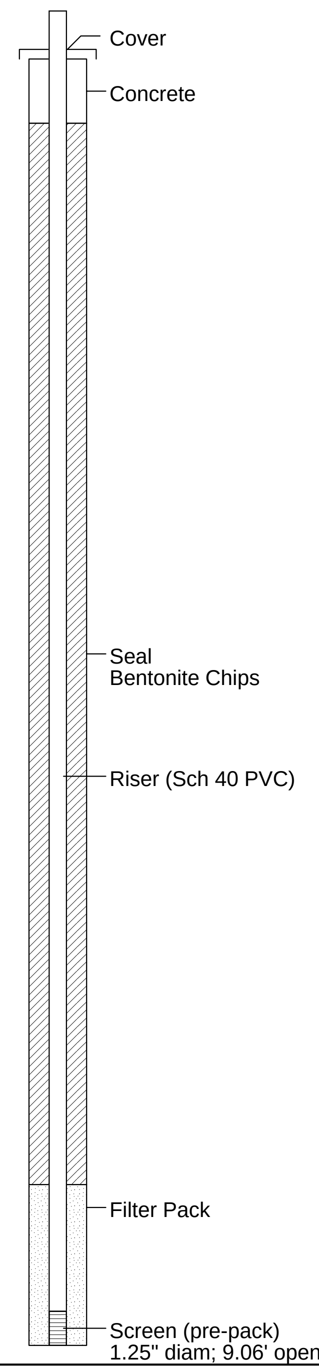
LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Bottom Ash with some clay and silt, soft, loose, dry					AR	
	FILL - Silty CLAY with some bottom ash, sand, and gravel, hard, low-medium plasticity, yellowish brown (10YR 5/4) with variable brown to gray mottling		1	49/60	- -	FL/CL	
5		440	2	7/42	- -		
			3	8/18	3.0		
10	- few bottom ash, very stiff, high plasticity, moist	435					
			4	0/60	- -		
15		430					
	Silty CLAY, trace fine-coarse sand, stiff, med plasticity, light yellowish brown (10YR 6/4), moist		5	60/60	2.5	CL	
			6		3.25		
			7		1.75		
	- high plasticity, gray (10YR 5/1) with <10% yellowish-brown mottling		8		2.0		
20		425	9		3.0		

Well: TPZ-159
Elev.: 447.64



KELRON ENVIRONMENTAL
Incorporated

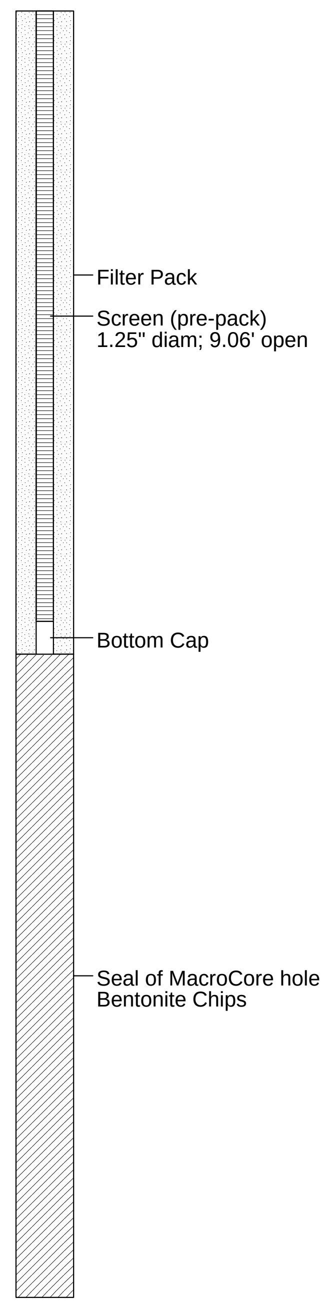
LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS
20	Silty CLAY, trace fine-coarse sand, stiff, med plasticity, light yellowish brown (10YR 6/4), moist					CL
			10	16/60	- -	
	- soft to medium hardness, yellowish-brown mottling with black manganese staining	420				
25			11	32/60	1.5	
			12		- -	
	- high plasticity, brown (10YR 5/3)		13		1.25	
			14		1.25	
	- trace fine-medium sand, very stiff, gray (10YR 6/1) with 10-25% yellowish-brown mottling (10YR 5/6)	415	15		2.75	
30			16	49/60	- -	
	- no sand, brown		17		1.5	
			18		1.0	
	- trace sand, gray (10YR 6/1) with 10-25% yellowish-brown mottling		19		2.0	
	- trace fine-coarse sand and gravel (sub-angular to sub-rounded)	410	20		2.0	
35	- stiff, medium plasticity, pale brown (10YR 6/3) with <10% gray mottling		21	60/60	2.5	
			22		2.0	
			23		1.0	
			24		0.5	
	- few fine-coarse sand and fine gravel, very stiff, yellowish brown (10YR 5/8)	405	25		3.0	
40	- hard, non-plastic, dry					

Well: TPZ-159
Elev.: 447.64



LOG OF PROBEHOLE TPZ-159

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/23/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 444.69
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 447.64
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383974, 558081

Well: TPZ-159
Elev.: 447.64

Depth in Feet	DESCRIPTION	Surf. Elev. 444.69	Samples	Recovery inches	Qp TSF	USCS
40	- trace sand and gravel, very stiff, high plasticity, brown (10YR 5/3) to pale brown (10YR 6/3)		26	50/60	2.75	CL
			27		- -	
			28		<0.5	
	SAND, fine to coarse, well graded, greenish gray (Gley1 10Y 5/1), wet (2.4 inch seam)	400				SW
45	Silty CLAY, trace sand, hard grading to very stiff, low plasticity grading to high plasticity, dark gray (Gley1 4/N), moist [TILL]		29		>4.5	
			30	5/60	- -	CL
		395	31		3.25	
50	END BOREHOLE AT 50 FEET BLS					
		390				
55						
		385				
60						

Seal of MacroCore hole
Bentonite Chips

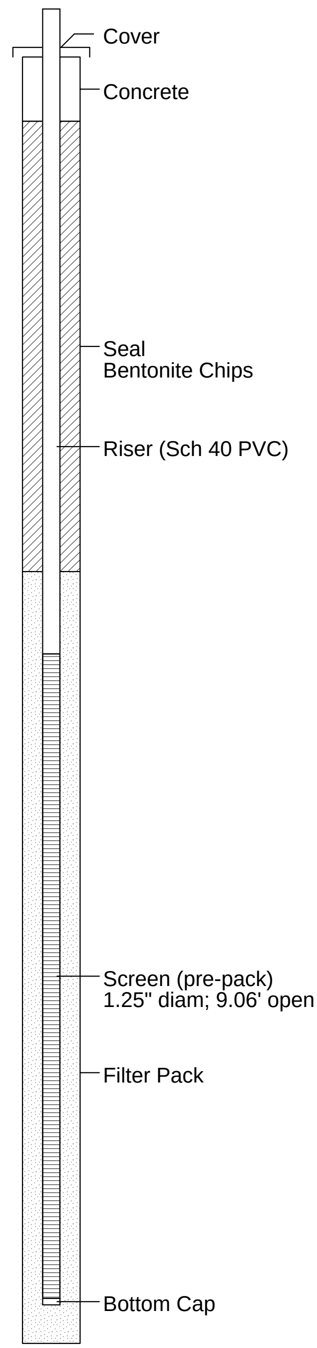
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-160 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 428.59
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.49
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380230, 558046

Depth in Feet	DESCRIPTION	Surf. Elev. 428.59	Samples	Recovery inches	Qp TSF	USCS
0	Silty CLAY with grass / roots, hard, non-plastic, pale brown (10YR 6/3), dry		1	58/60	4.5	
	- gray (10YR 6/1) with reddish-brown mottling and black oxidation staining		2		3.25	
	- very stiff, low plasticity, brown (10YR 4/3), moist - high plasticity, grayish brown (10YR 5/2) with 10-25% reddish-brown mottling'		3		3.0	
		425	4		3.0	
5			5		2.25	CL
	- gray (10YR 6/1), <10% mottling		6	58/60	1.5	
			7		1.0	
	- 10-25% mottling, black organics		8		1.0	
		420	9		1.0	
10	Sandy SILT, fine sand, very soft, non-plastic, light brownish gray (10YR 6/2), wet		10		1.0	
			11	41/60	- -	
	Clayey SILT, trace fine sand, very soft, medium plasticity, gray (10YR 6/1)		12		<0.5	ML
			13		<0.5	
		415	14		<0.5	
15	Silty CLAY, medium to high plasticity, gray with trace reddish-brown mottling, moist - 1-inch weathered zone with 75% yellowish-brown (10YR 5/8) mottling @ 14.5'		15		1.25	CL
	SILT, gray (10YR 7/1), wet @ 14.9'		16	16/60	- -	ML
	CLAY, medium hardness,brown (10YR 5/3), moist	410	17		1.25	
20	- greenish gray (Gley1 10GY 5/1)		18		1.5	CL

Well: TPZ-160
Elev.: 431.49



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KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-160 (Page 2 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/21/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 428.59
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.49
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380230, 558046

Well: TPZ-160
Elev.: 431.49

Depth in Feet	DESCRIPTION	Surf. Elev. 428.59	Samples	Recovery inches	Qp TSF	USCS
20			19	24/60	- -	CL
	- gray (10YR 6/1)					
	- very soft, brown (10YR 5/3)	405	20		<0.5	
	- soft, greenish gray		21		1.25	
25			22	27/60	- -	
			23		0.75	
		400	24		1.0	
			25		1.5	
			26		2.5	
30	Silty CLAY with fine-coarse sand and fine gravel (sub-angular to sub-rounded), very stiff, greenish gray with reddish-brown mottling [TILL]		27	27/60	- -	CL
	- very soft, high plasticity, yellowish-brown (10YR 5/4)		28		0.5	
	- medium plasticity, greenish gray with 50-75% yellowish-brown mottling, moist	395	29		0.5	
			30		1.5	
35	Sandy CLAY, stiff, dark yellowish-brown (10YR 4/4) with <25% greenish-gray mottling, dry					CL
	END BOREHOLE AT 35 FEET BLS					
		390				
40						

Seal of MacroCore Hole
Bentonite Chips

KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-163 (Page 1 of 2)

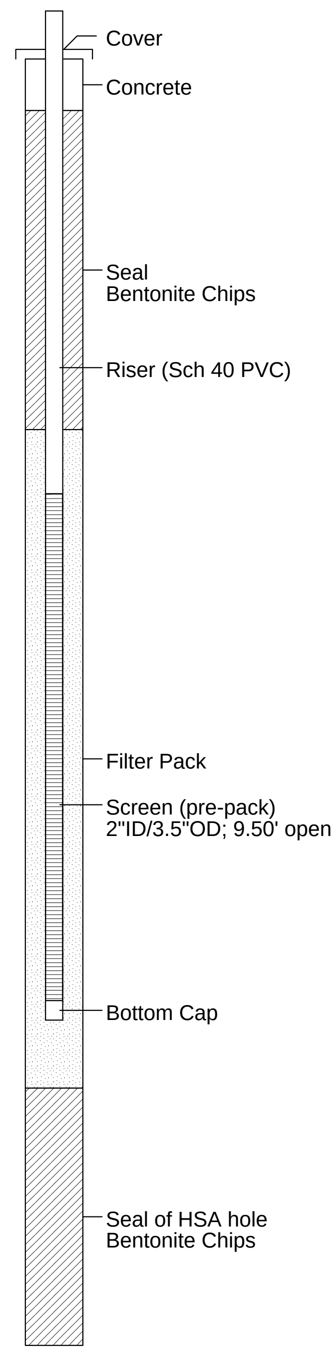
Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 455.51
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 458.41
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2385507, 555798

Depth in Feet	DESCRIPTION	Surf. Elev. 455.51	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Silty clay loam with roots, loose, pale brown (10YR 6/3), dry (13" thick soil cover)						FL/CL
	FILL - Fly Ash, silty, loose very dark gray (10YR 3/1)						AR
	<Shelby Tube Sample ST163-3 @1.5-3.5'> grain size analysis (Ash - very dark brown): 51% Sand, 45.8% Silt, 3.2% Clay		1		9/24	- -	
5		450					
	- very soft, wet		2	1 0 1	18/18	<0.5	
10		445					
			3	1 0 1	18/18	<0.5	
15		440					
	Silty CLAY (lean to fat), trace fine sand, stiff, medium to high plasticity, gray (10YR 6/1) with 10-25% yellowish-brown mottling (10YR 6/8), moist		4	1 3 5	17/18	2.75	CL/CH
20		435					
	- very stiff		5	2 2 4	18/18	2.25	
25		430					

GRAPHIC

Well: TPZ-163
Elev.: 458.41



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KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-163
	(Page 2 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/27/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 455.51
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 458.41
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2385507, 555798

Depth in Feet	DESCRIPTION	Surf. Elev. 455.51	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC	Well: TPZ-163 Elev.: 458.41
25									
	- dark yellowish brown <Shelby Tube Sample ST163-30 @ 28-30'> grain size analysis: 10.6% Sand, 51.2% Silt, 38.2% Clay		6		24/24	- -	CL/CH		
30		425							
	Silty CLAY with trace fine-coarse sand and fine gravel, stiff to very stiff, high plasticity, brownish-yellow (10YR 6/6), moist [TILL]		7	2 2 5	18/18	2.5			
35		420							Seal of HSA hole Bentonite Chips
	- medium plasticity, pale brown (10YR 6/3)						CL		
			8	5 5 7	18/18	3.5			
40	- brownish-yellow (10YR 6/6) with 10-25% light gray mottling (10YR 6/1)	415							
	SHALE, platy/laminated with weathered clay layers; hard, gray (10YR 5/1) with 25-50% olive yellow clayey layers (2.5Y 6/6) (top of bedrock = 43.5' bls)		9	5 7 8	18/18	>4.5	SH		
45	END BOREHOLE AT 45 FEET BLS	410							
50		405							

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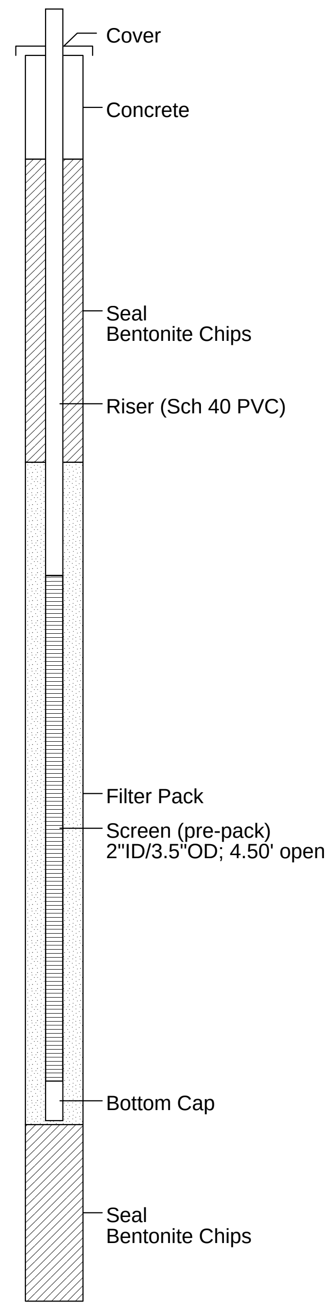
LOG OF PROBEHOLE TPZ-164

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 432.50
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Surf. Elev. 432.50	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry							
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay	430						
4		429	1		17/24		AR	
5	- wet	428						
6		427						
7		426						
8		425						
9	CLAY (lean), stiff, medium to high plasticity, dark gray (10YR 4/1), moist - @8.9' - light yellowish brown (10YR 6/4) with <10% light gray mottling - @9.3' - gray (10YR 6/1) with 25-50% brownish-yellow mottling (10YR 6/6)	424 423	2	3 3 5	18/18		CL	
10								
11	- light olive brown <Shelby Tube Sample ST164-12 @ 10-12'> grain size analysis: 7.2% Sand, 62.2% Silt, 30.6% Clay	422 421	3		23/24		CL	
12	END BOREHOLE AT 10.3 FEET BLS END Split-Spoon Sampling at 12 feet BLS	420 419						

Well: TPZ-164
Elev.: 435.10



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LOG OF PROBEHOLE TPZ-165

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 4" OD	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: Solid Flight Auger (CME-55LC)	Ground Elevation	: 396.10
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 398.85
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2380478, 555940

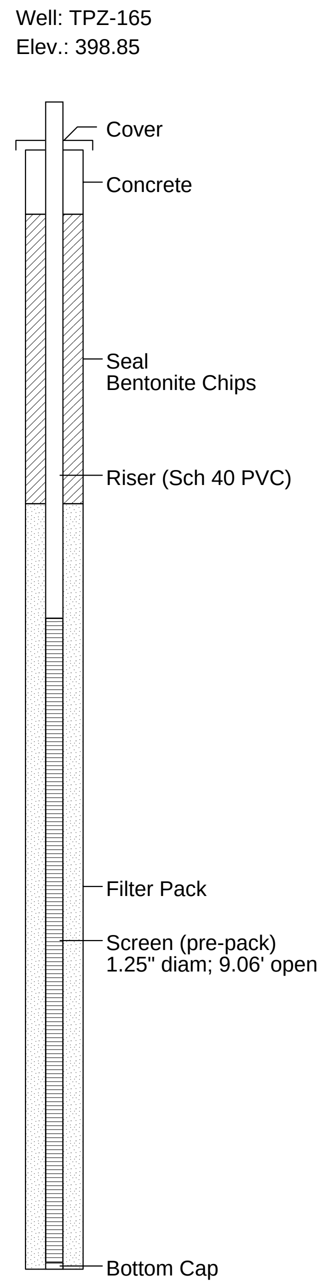
Depth in Feet	DESCRIPTION	USCS
0 – 2.2	FILL - Fly Ash, silty, stiff, non-plastic to low plasticity, very dark grayish-brown (10YR 3/2), moist	AR
2.2 – 5.2	FILL - Silty Clay with Fly Ash, very soft, dark gray (10YR 4/1)	FL/CL
5.2 – 12.8	Silty CLAY (lean) with organics and roots, soft, high plasticity, dark gray - gray (10YR 5/1) - trace sand, very dark gray brown <Shelby Tube Sample ST165-10 @ 8-10'> grain size analysis: 11.2% Sand, 59.2% Silt, 29.6% Clay	CL
12.8 – 16.5	Silty CLAY (lean) with trace fine-coarse sand and fine gravel, very soft, medium to high plasticity, dark gray (10YR 4/1), moist [TILL]	CL
16.5 – 17.4	LIMESTONE, hard, light gray, hammer refusal at 16.5', auger refusal at 17.4' bls (top of bedrock)	LS

END BOREHOLE AT 17.4 FEET BLS

Surf. Elev. 396.10 (elevation marks: 395, 390, 385, 380)

Samples	Recovery inches	Qp TSF
1	41/60	1.75
2		0.75
3		- -
4		- -
5		- -
6	60/60	1.5
7		2.0
8		2.75
9		2.5
10		1.25
11	49/60	2.0
12		0.5
13		0.5
14		1.0
15		0.5
16	18/18	0.5
17		- -

GRAPHIC



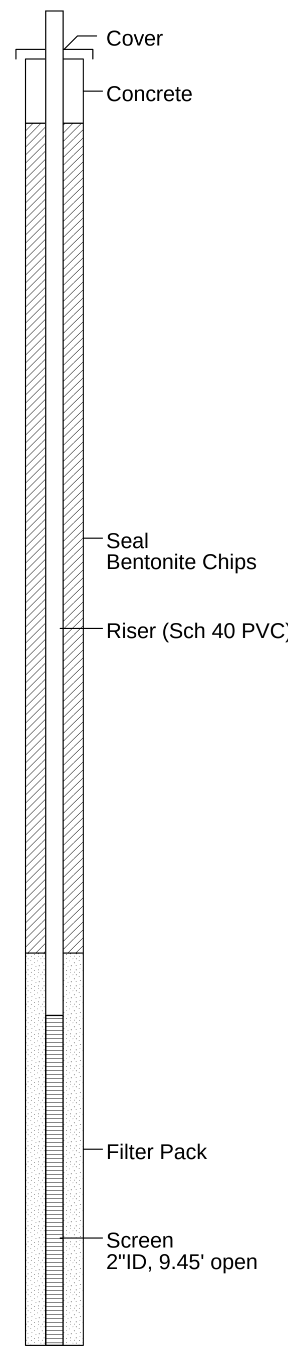
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-166 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 422.33
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 425.18
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381183, 555587

Depth in Feet	DESCRIPTION	Surf. Elev. 422.33	Samples	Recovery inches	Qp TSF	USCS
0	FILL - Silty CLAY, trace roots, very stiff, non-plastic, light brown gray (10YR 6/2), dry		1	60/60	2.75	FL/CL
	- medium plasticity, pale brown (10YR 6/3) w/ trace manganese and iron oxide staining		2		2.75	
	- very stiff, yellowish brown (10YR 5/4) with 25% reddish-brown mottling	420	3		3.75	
	- very stiff, low plasticity		4		1.5	
5	- gray mottling		5		2.75	
	- 1-inch silt lense with high organics, trace roots		6	60/60	1.5	
	Silty CLAY, very stiff, medium plasticity, gray (10YR 6/1) with reddish-brown mottling and manganese staining					CL
	- medium to stiff, high plasticity, 25-50% manganese staining		7		2.75	
		415	8		1.75	
	- no manganese staining		9		2.5	
10			10		2.5	
			11	60/60	1.5	
			12		1.5	
	- stiff, medium plasticity, yellowish brown (10YR 5/4) with 10-25% reddish-brown mottling, moist	410	13		2.25	
			14		2.0	
15			15		2.5	
	- very soft, high plasticity		16	60/60	1.0	
	- very stiff, medium plasticity		17		3.0	
		405	18		3.0	
	Silty CLAY with trace fine-coarse sand and fine gravel, very stiff, medium plasticity, yellowish brown (10YR 5/4) with <10% reddish-brown mottling, moist [TILL]		19		3.5	CL
	- hard, gray (10YR 6/1) with 10-25% reddish-brown mottling		20		3.25	
20						

Well: TPZ-166
Elev.: 425.18



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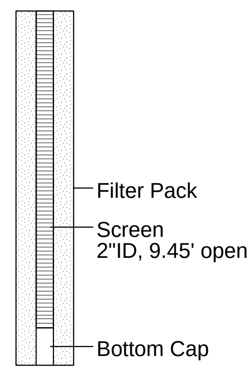
LOG OF PROBEHOLE TPZ-166

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 422.33
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 425.18
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381183, 555587

Depth in Feet	DESCRIPTION	Surf. Elev. 422.33	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
20			21	24/24	>4.5	CL	
	END BOREHOLE TPZ-166 AT 22' BLS.		22		>4.5		
	CONTINUE LOG USING URS BORINGS B-13-4 and B-13-5 FROM 08/01/2013	400					
25							
		395				CL	
30							
		390					
	SHALE, calcareous, fine grained, highly weathered, very weak, brown-gray to gray (top of bedrock = 32.53' bls; elevation = 389.8 ft NAVD88)						
35						SH	
		385					
	END URS LOGS AT 38 FEET BLS						
40							

Well: TPZ-166
Elev.: 425.18



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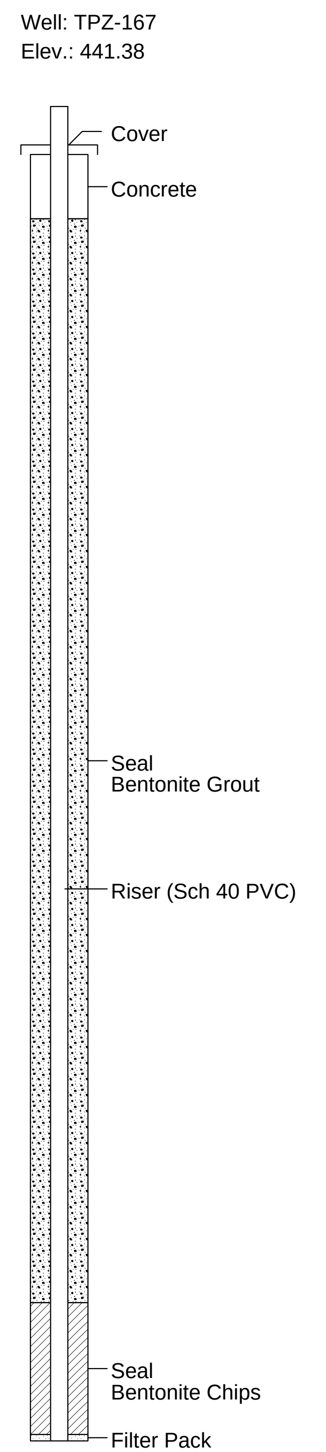
LOG OF PROBEHOLE TPZ-167

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS
0	FILL - Fly Ash, silty to clayey with coarse sand grain size, soft, medium to high plasticity, dark gray (Gley 1 4/N), moist						
		435					
	- very soft, non-plastic, wet		1		18/18		
5							
	- dark greenish gray (10Y 4/1)	430	2	2 2 1	18/18		
10							AR
	- silty with sand grain size, very dark greenish gray (10Y 3/1)	425	3	0 0 1	18/18		
15							
		420					
20							



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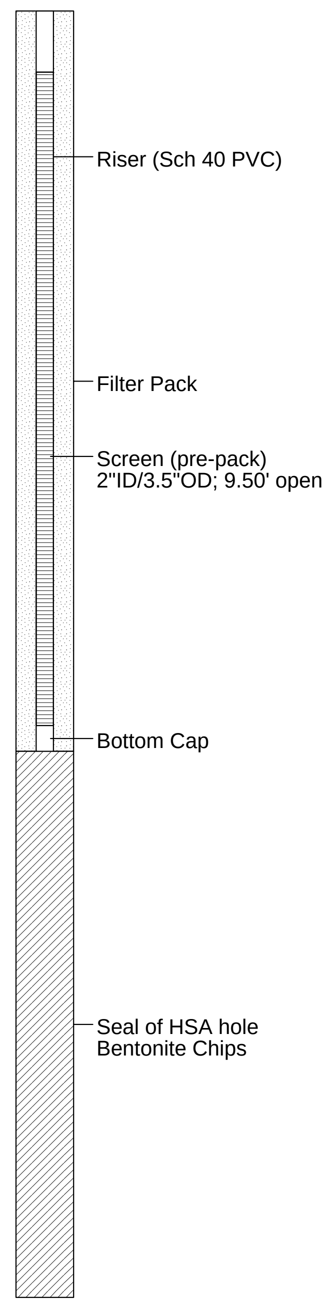
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE TPZ-167 (Page 2 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
20							AR	
	- dark greenish gray	415	4	0 0 1	18/18			
25								
	- very dark gray brown <Sample SS167-30 @ 29-30'> grain size analysis (Ash): 1.5% Sand, 77.6% Silt, 20.8% Clay	410	5	0 0 0	18/18			
30								
	Silty CLAY (lean) with sand and trace fine gravel (chert, angular to sub-angular), very stiff, medium to high plasticity, light gray (10Y 7/N) with 15-50% reddish brown mottling, dry [TILL] <Shelby Tube Sample ST167-34 @ 32-34'> grain size analysis: 15.7% Sand, 52.6% Silt, 31.7% Clay	405	6		20/24		CL	
35								
		400	7	3 4 6	16/18	3.5		
40								

Well: TPZ-167
Elev.: 441.38



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LOG OF PROBEHOLE TPZ-167

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/14/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 438.63
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 441.38
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381925, 554963

Depth in Feet	DESCRIPTION	Surf. Elev. 438.63	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
40							CL	
	- soft, brownish-yellow (10YR 6/6), moist	395	8	2 2 2	18/18	>4.5		
45	- laminated, hard, non-plastic, black (3/4" thick organic-rich layer)						CL	
	CLAY (lean to fat) with sand, stiff to very stiff, medium to high plasticity, greenish gray (10YR 6/1), dry						CL/CH	
	- with sand and fine gravel (angular)		9	5 5 50	18/18	4.0		
		390	10	50	3/3			
	SHALE, weathered; clay (laminated) with platy and micaceous layer and limestone parting, dark gray (Gley1 4/N), dry (top of bedrock = 48.75' bls)		11	53	5/5		SH	
50	END BOREHOLE (Auger Refusal) at 48.75 feet BLS END Split-Spoon Sampling at 49.15 feet BLS							
		385						
55								
		380						
60								

Well: TPZ-167
Elev.: 441.38

Seal of HSA hole
Bentonite Chips

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KELRON ENVIRONMENTAL
Incorporated

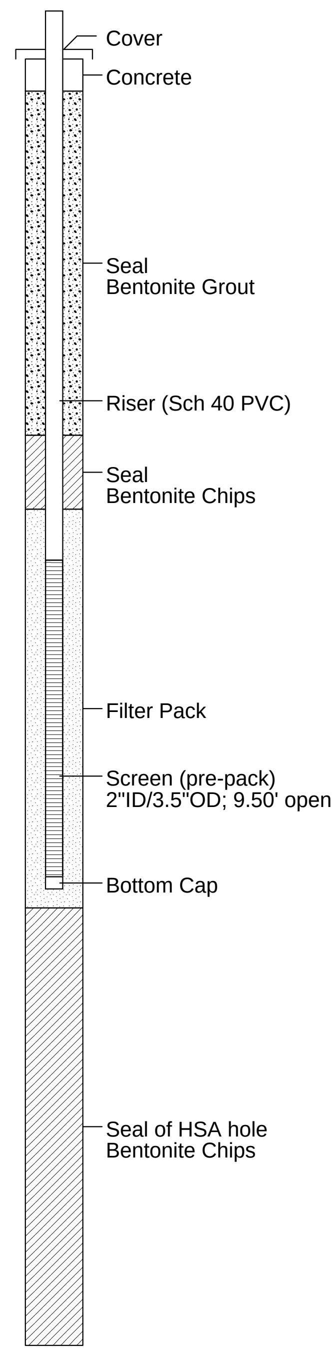
LOG OF PROBEHOLE TPZ-168

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/15/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 454.93
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 457.53
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383585, 554314

Depth in Feet	DESCRIPTION	Surf. Elev. 454.93	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Fly Ash, silt size, greenish gray (10Y 5/1), moist							
5	<Shelby Tube Sample ST168-5 @ 3-5'> grain size analysis: 29.4% Sand, 50.2% Silt, 20.4% Clay	450	1		21/24			
10	- wet	445	2	3 2 3	18/18			
15	- silty with coarse sand grain size, greenish black (10Y 2.5/1)	440	3	1 1 1	16/18		AR	
20		435	4		0/24			
25		430	5		3/18			
30	Silty CLAY, medium to stiff, high plasticity, light gray (10YR 7/1) with 10-50% reddish-brown mottling	425	6	3 3 5	18/18	2.0	CL	
35		420						
40		415	7	2 4 5	18/18	3.5	CL	

Well: TPZ-168
Elev.: 457.53



KELRON
ENVIRONMENTAL
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LOG OF PROBEHOLE TPZ-168

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/15/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 454.93
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 457.53
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383585, 554314

Well: TPZ-168
Elev.: 457.53

Depth in Feet	DESCRIPTION	Surf. Elev. 454.93	Samples	Blow Count	Recovery inches	Qp TSF	USCS	Well
40	Silty CLAY, trace sand and fine gravel (angular to sub-angular), stiff to very stiff, 10-25% reddish-brown mottling, moist [TILL]						CL	
45		410						
	- light yellowish-brown (10YR 6/4) with <10% light gray mottling		8	3 7 10	18/18	3.5		
50	Clay, black (1/2" thick organic-rich layer) surrounded by highly weathered zone with >75% reddish-brown mottling	405						
55		400						Seal of HSA hole Bentonite Chips
	- medium to stiff, high plasticity, yellowish brown (10YR 5/4)		9	3 4 8	18/18	2.0		
60	- with 25-50% light gray mottling	395						
65		390						
	- with sand seams, very stiff, medium plasticity, dark gray (10YR 4/1)		10	10 16 18	18/18	>4.5		
70	SHALE, laminated, hard, dark gray (top of bedrock = 69.6' bls)	385					SH	
	END BOREHOLE AT 70 FEET BLS							
75		380						
80		375						

APPENDIX C4

MW 200 SERIES BORING LOGS AND WELL DETAILS

KELRON
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LOG OF BORING MW-252

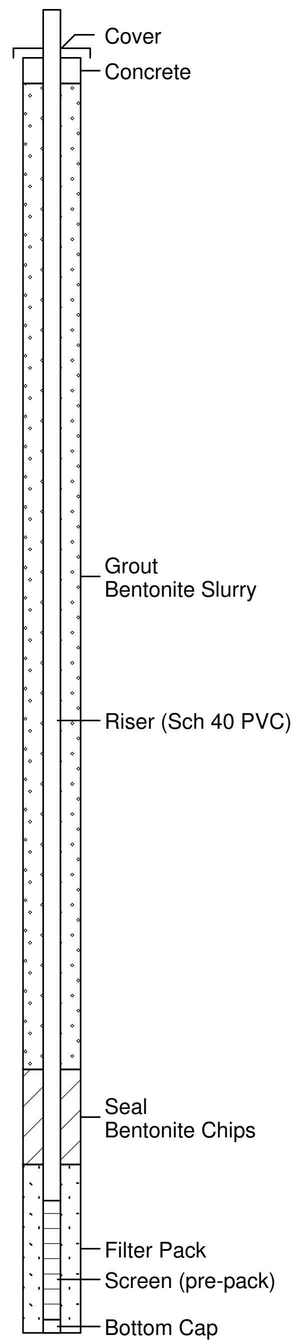
(Page 1 of 1)

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/22/10	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.27
Sampling Method	: MacroCore (60")	Top of Casing Elevation	425.07
Drilling Company	: PSC	X,Y Coordinates	: 2382784, 553904

Depth in Feet	DESCRIPTION	Surf. Elev. 422.27	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring - no soil sampling conducted.	422					
	Refer to boring log for adjacent nested well MW-352 for a description of subsurface materials.						
5		417					
10		412					
15		407					
20		402					
25		397					
30		392					
35		387					
40		382					
45		377					
50	END BOREHOLE AT 49.54 FEET BLS						

Well: MW-252
Elev.: 425.07



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KELRON ENVIRONMENTAL INCORPORATED

LOG OF BORING MW-253

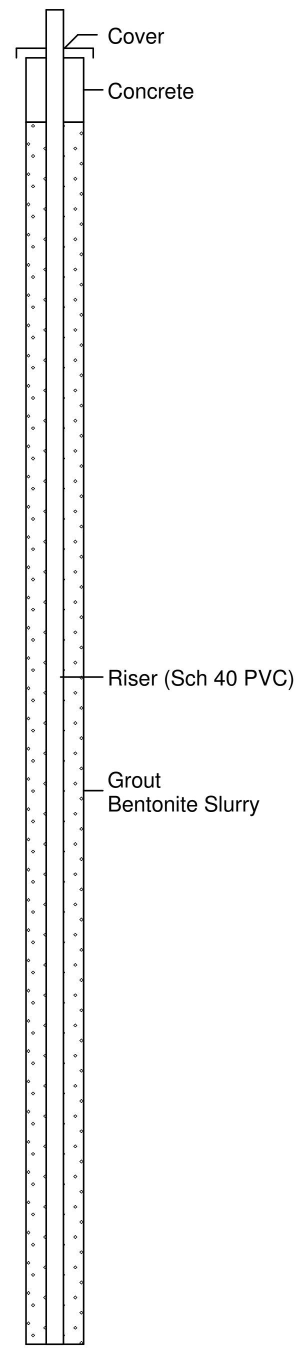
Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 15 SW, SW, NE

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 442.70
Sampling Method	: MacroCore (60")	Top of Casing Elevation	445.84
Drilling Company	: PSC	X,Y Coordinates	: 2384430, 553298

Depth in Feet	DESCRIPTION	Surf. Elev. 442.70	USCS
0	SILTY CLAY, trace gravel, hard, light brown, dry	442	CL
5	- hard, medium plasticity, gray (2.5Y 6/1) with yellow-brown mottling (10YR 5/6), moist	437	CL
10		432	CL
11	CLAY (fat) with SAND, trace gravel, dark yellow brown with light gray mottling, mottling decreases with depth - grain size analysis @ 11 - 12 ft: 0.7% gravel, 16.4% sand, 41.4% silt, 41.4% clay		CH
15		427	CH
18	- soft		CH
19	CLAY (lean) with SAND, trace gravel, stiff to hard, medium plasticity, dark yellow brown		CL
20			

Samples	Recovery inches	Qp TSF
1	25/48	4.5+
2		4.5+
3	47/60	4.5
4		4.5
5		4.5
6	53/60	4.5
7		4.0
8		4.0
9		3.0
10	52/60	4.5
11		3.5
12		3.5
13		2.0
14	60/60	

Well: MW-253
Elev.: 445.84



KELRON ENVIRONMENTAL
INCORPORATED

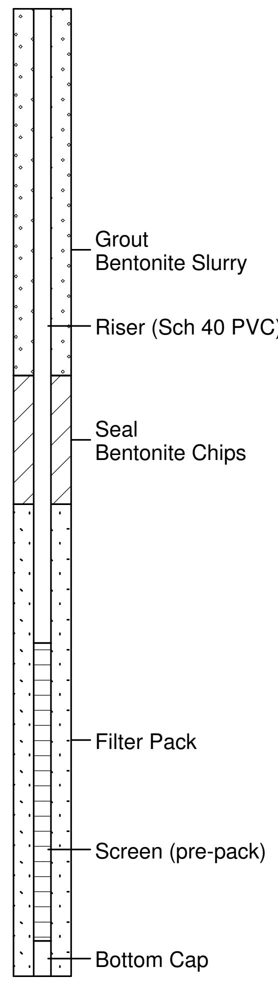
LOG OF BORING MW-253

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 15 SW, SW, NE

Date Completed	: 09/20/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 442.70
Sampling Method	: MacroCore (60")	Top of Casing Elevation	445.84
Drilling Company	: PSC	X,Y Coordinates	: 2384430, 553298

Depth in Feet	DESCRIPTION	Surf. Elev. 442.70	Samples	Recovery inches	Qp TSF	USCS
20	- grain size analysis @ 19 - 19.5 ft: 0.7% gravel, 26.9% sand, 38.1% silt, 34.3% clay	422	14	60/60		CL
25	- small fine sand seams from 25 to 27 feet	417	15	60/60		CL
	CLAY (fat), shaley, platy/laminated, soft, low plasticity, light yellow brown (10YR 6/4)		16		3.5	CH
	- stiff to very stiff, light olive brown (2.5Y 5/4)		17		3.0	CH
30	- grain size analysis @ 29 - 30 ft: 6.7% sand, 21.6% silt, 71.7% clay	412	18	60/60	4.5	CH
			19		3.5	CH
	- Drove split-spoon 2-inches into bedrock: 34.5 to 34.7 feet bls		20		3.0	CH
	LIMESTONE with SHALE		21	2/2		LS/SH
35	Auger refusal at 35.0 feet END BOREHOLE AT 35.0 FEET BLS	407				
40						

Well: MW-253
Elev.: 445.84



KELRON ENVIRONMENTAL
Incorporated

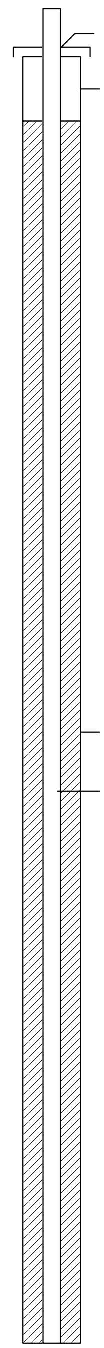
LOG OF PROBEHOLE OW-256

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/22/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 425.20
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 427.70
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381947, 558054

Depth in Feet	DESCRIPTION	Surf. Elev. 425.20	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring to 13.5 feet below ground surface. Refer to boring log for adjacent well OW-156.	425				CL	
5		420					
10		415					
13.5	CLAY (lean), very stiff, high plasticity, pale brown (10YR 6/3),moist - 25% reddish-brown mottling with black manganese staining - light gray (10YR 7/1) with 10-25% mottling		1	60/60	3.0	CL	
15		410	2		2.25		
			3		2.0		
			4		2.0		
			5		1.75		
18.5	Silty CLAY, trace fine to coarse sand [TILL]		6	60/60	2.5	CL	
			7		1.0		
20							

Well: OW-256
Elev.: 427.70



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KELRON ENVIRONMENTAL
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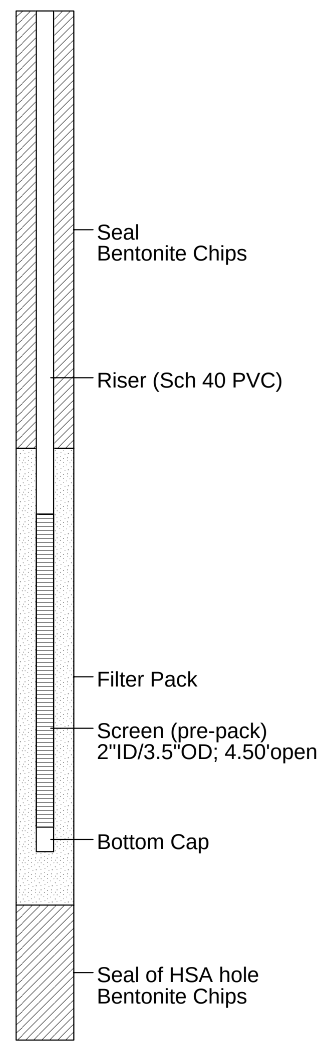
LOG OF PROBEHOLE OW-256

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/22/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 425.20
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 427.70
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2381947, 558054

Depth in Feet	DESCRIPTION	Surf. Elev. 425.20	Samples	Recovery inches	Qp TSF	USCS
20		405	7		1.0	CL
			8		1.75	
			9		1.75	
			10		1.0	
	- trace fine-coarse gravel (angular to sub-angular; granite piece of 1 1/4"), 50-75% yellowish-brown (10YR 6/8) mottling - few sand and gravel, stiff, high plasticity, gray (10YR 6/1) with 25-75% mottling		11	60/60	1.0	
25	- <25% mottling - with sand (fine-medium)	400	12		2.0	
			13		1.0	
			14		1.0	
	SAND (fine-medium), well graded, brownish yellow (10YR 6/6), wet		15			SW
	Silty CLAY (lean) with sand (fine-medium), medium plasticity, brownish yellow, wet		16	35/60		CL
30		395	17			
	- hard, non plastic, light brownish gray (10YR 6/2), moist [Vandalia Till @ 31.5'] - little sand (fine-coarse) and gravel (fine-coarse, sub-angular to sub-rounded), low to non-plastic, gray (10YR 5/1)		18		>4.5	
			19			
			20			
	SHALE and CLAY, semi-competent, laminated clay with up to 1/2-inch thick layers of hard shale, dry [note: top of weathered bedrock at 33.9 feet below ground surface]		21	54/60	3.0	SH/CL
35		390	22		4.0	
	SHALE with intermittent clay layers, hard, gray		23		>4.5	SH
			24		>4.5	
			25		>4.5	
	END Sampling at 38.5 feet BLS END WELL BOREHOLE at 36.0 feet BLS					
40						

Well: OW-256
Elev.: 427.70



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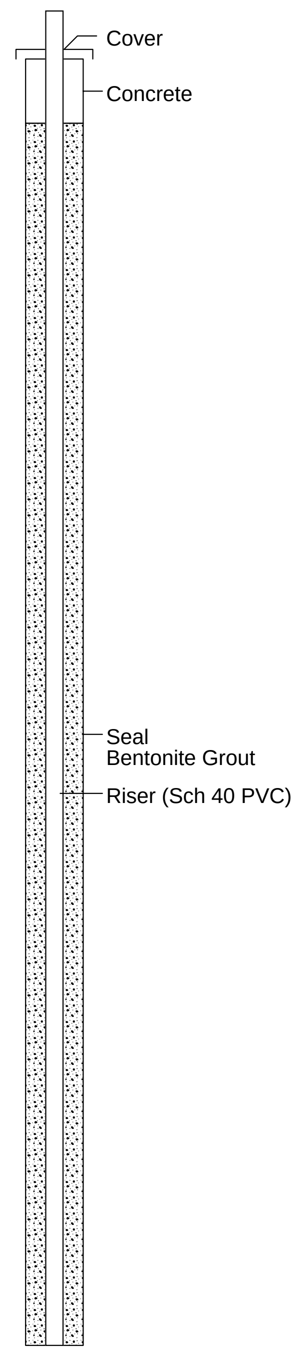
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE OW-257 (Page 1 of 2)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.17
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.02
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2382572, 556198

Depth in Feet	DESCRIPTION	Surf. Elev. 428.17	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0	Continuous boring to 18.5 feet below ground surface. Refer to boring log for adjacent well OW-157.	425					
5		420				CL	
10		415					
15		410					
18.5	Silty CLAY, trace sand and gravel, stiff, high plasticity, gray (10YR 6/1) with 25-50% reddish-brown mottling, moist [TILL]		1	56/60	3.0	CL	
20			2		2.75		

Well: OW-257
Elev.: 431.02



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KELRON ENVIRONMENTAL
Incorporated

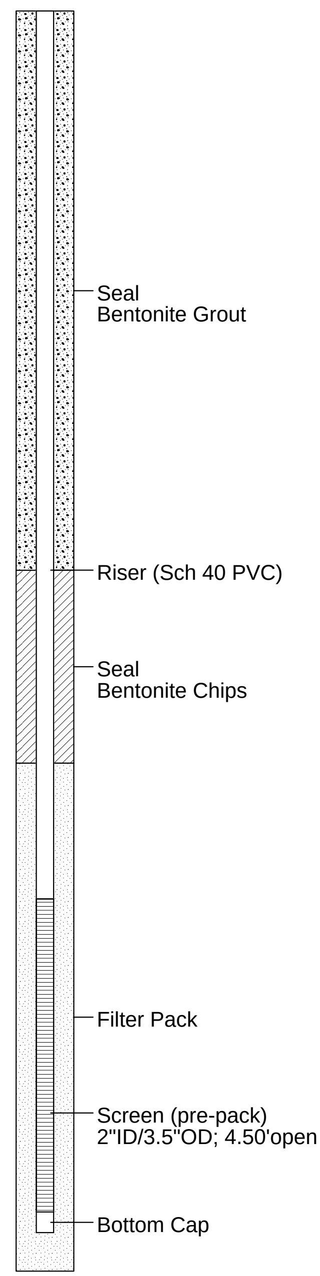
LOG OF PROBEHOLE OW-257

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/16/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 428.17
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 431.02
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2382572, 556198

Depth in Feet	DESCRIPTION	Surf. Elev. 428.17	Samples	Recovery inches	Qp TSF	USCS
20			2		2.75	CL
	- >50% mottling		3		2.5	
	Sandy CLAY with gravel (fine-coarse, sub-angular; granite piece of 1.5"), brownish yellow (10YR 6/6), wet					CL
	Silty CLAY, trace sand and gravel, soft, high plasticity, yellowish brown (10YR5/6) with 10-25% light gray mottling		4		1.0	CL
		405	5		1.5	
	- very soft, brownish yellow with <10% mottling		6	60/60	0.5	
25	- with trace pyrite crystals		7		1.0	
	- medium hardness grading to stiff		8		2.0	
			9		2.0	
		400	10		3.25	
			11	60/60	1.5	
30			12		3.5	
	- stiff, high plasticity, gray with <10% reddish-brown mottling, moist		13		2.75	
	- very stiff, dark gray (10YR 4/1)		14		2.0	
		395	15		3.5	
			16	60/60	2.0	
35			17		2.0	
	- low plasticity, very dark gray (10YR 3/1)		18		4.0	
	SHALE and CLAY (fat), intermittent lamination, hard, very dark gray, moist [note: top of weathered bedrock at 36.3 feet below ground surface]		19		3.0	SH/CL
		390	20		>4.5	
			21	13/13		
40	END BOREHOLE at 39.6 feet BLS					

Well: OW-257
Elev.: 431.02



KELRON ENVIRONMENTAL
Incorporated

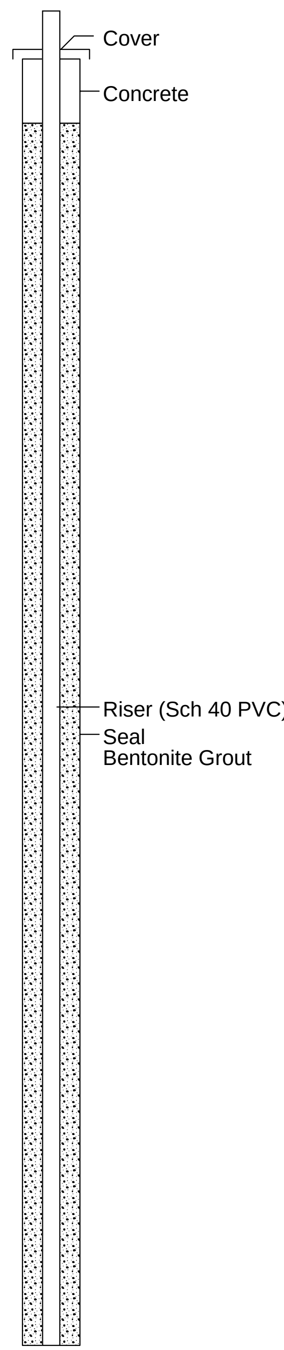
LOG OF PROBEHOLE MW-262

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
0	Silty Clay with gravel, roots, stiff, non-plastic, pale brown (10YR 6/3), dry	430	1	60/60	2.5	CL
			2		>4.5	
	- brownish yellow (10YR 6/6), moist		3		3.25	
			4		2.5	
			5		2.25	
5	- medium stiff, high plasticity	425	6	42/42	1.5	
			7		1.75	
			8		2.0	
	SILT, very soft, non-plastic, light yellowish brown (10YR 6/4), moist [LOESS]		9	60/60	1.0	ML
10	- clayey, soft to medium hardness, low to medium plasticity		10		1.5	
		420	11		1.25	
			12		1.5	
			13		1.5	
	- soft, yellowish brown (10YR 5/4)		14	60/60	1.0	
15	- non-plastic		15		1.25	
		415	16		1.25	
			17		1.5	
	Sandy CLAY (lean), medium hardness, low to medium plasticity, yellowish brown, moist		18		2.0	CL
	SILT, very soft, non-plastic, brownish yellow (10YR 6/6), moist		19	60/60	2.0	ML
20			20			

Well: MW-262
Elev.: 433.21



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KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-262 (Page 2 of 3)

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Well: MW-262
Elev.: 433.21

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
20			20			ML
		410	21			
			22			
	Silty CLAY, very soft, low plasticity		23		0.75	CL
	- medium plasticity, wet		24	60/60	0.75	
25			25		0.75	
	- high plasticity, yellowish brown (10YR 5/4)	405	26		0.75	
			27		0.5	
	- moist		28		1.25	
			29	53/60	1.0	
30	- with fine sand		30		0.75	
		400	31			
	SAND, fine to medium grained, with clay, yellowish brown (10YR 5/6), wet		32			SW/SC
	- light brownish gray					
	CLAY (fat), trace fine to medium sand, high plasticity, light brownish gray		33			CH
	<Sample ST262-35 @ 33.5 - 35.5'> grain size analysis: 13.1% Sand, 33.2% Silt, 53.7% Clay		34	24/24		
35			35			
	- very stiff, greenish gray (Gley1 10Y 6/1)	395	36	16/36	2.75	
			37			
			38		2.75	
	- medium plasticity		39	56/60	1.0	
40			40		0.75	

Seal
Bentonite Grout

Riser (Sch 40 PVC)

Seal
Bentonite Chips

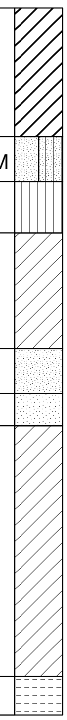
KELRON ENVIRONMENTAL Incorporated	LOG OF PROBEHOLE MW-262

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

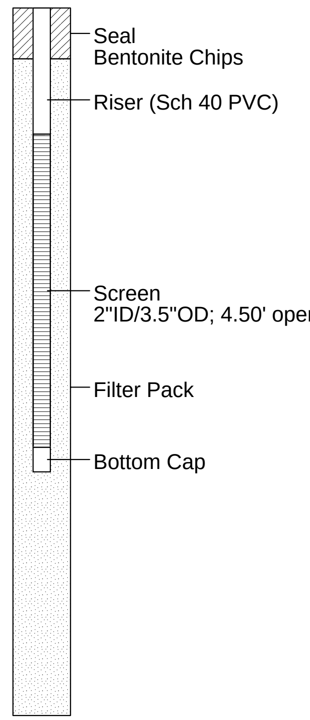
Date Completed	: 08/19/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 430.86
Sampling Method	: MacroCore (60")	Casing (MP) Elevation	: 433.21
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2379193, 555729

Depth in Feet	DESCRIPTION	Surf. Elev. 430.86	Samples	Recovery inches	Qp TSF	USCS
40	- with <10% reddish-brown mottling	390	40		0.75	CH
			41		1.25	
			42		1.5	
	SAND with Silt, fine grained, poorly graded, light brown (10YR 6/4), wet					SP/SM
	Sandy SILT		43			ML
	Silty CLAY with fine sand, very soft, brownish yellow (10YR 6/6)		44	60/60	0.75	CL
45			45		0.75	
	SAND, fine grained, poorly graded	385				SP
	SAND, fine to coarse grained, well graded, trace gravel		46		1.25	SW
	Silty CLAY with trace and and gravel, stiff, high plasticity, light yellowish brown (10YR 6/4), moist [TILL]		47		3.0	CL
	- trace reddish-brown mottling		48		2.25	
			49	30/30	2.25	
50			50		2.25	
	SHALE, clay partings, laminated, gray, weathered, dry (top of bedrock = 50.4' bls)	380	51		3.5	SH
	END BOREHOLE AT 51 feet BLS					
55		375				
60						

GRAPHIC



Well: MW-262
Elev.: 433.21



APPENDIX C5

MW 300 SERIES BORING LOGS AND WELL DETAILS

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-304

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
John Gates Bulldog Drilling	10/9/2015	10/20/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-304	Feet (NAVD88)	453.03 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,194.03 N, 2,386,608.77 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 17.9952"
Long -89° 51' 12.39"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–5.8	0 - 5.8' **SILTY CLAY** CL/ML.	CL/ML									0-35.4' Blind Drilled. See log MW-104DR for soil description details.
			5.8–12	5.8 - 13.5' **FAT CLAY:** CH.	CH									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
Brad Rocks	Natural Resource Technology 234 W. Florida St., Fifth Floor, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	5.8 - 13.5' **FAT CLAY:** CH. *(continued)*	CH									
			14	13.5 - 15' **LEAN CLAY:** CL.	CL									
			15–23	15 - 23.5' **SILTY CLAY** CL/ML.	CL/ML									
			24	23.5 - 24.5' **SANDY FAT CLAY:** s(CH).	s(CH)									
			25–27	24.5 - 27.3' **POORLY-GRADED SAND:** SP.	SP									
			28–29	27.3 - 30' **SILTY CLAY** CL/ML.	CL/ML									
			30–32	30 - 35.4' **SHALE:** BDX (SH).	BDX (SH)									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33–35	30 - 35.4' **SHALE:** BDX (SH). *(continued)*	BDX (SH)									
1 CORE	60 31		36	35.4 - 41.3' **LEAN CLAY:** CL, gray, 2" of wood on top of unit, stiff, dry. 36.3' stiff to very hard, dry. 36.7' trace chert gravel.	CL									
2 CORE	60 59.5		40	40.2' dry.										
			41–45	41.3 - 46.8' **SHALEY LIMESTONE:** BDX (LS/SH), thinly to medium bedded with shale, intensely to moderately fractured (extremely narrow apertures). 41.6' - 42' vertical fracture.	BDX (LS/SH)									
3 CORE	60 63		45	45.4' intensely fractured.										Core 3, RQD=75%
			47–49	46.8 - 55.6' **SHALE:** BDX (SH), gray, trace chert gravel, thickly bedded, highly to moderately decomposed, intensely fractured.	BDX (SH)									
4 CORE	60 65		50–52	50.4' moderately fractured.										Core 4, RQD=95%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53, 54, 55	46.8 - 55.6' **SHALE:** BDX (SH), gray, trace chert gravel, thickly bedded, highly to moderately decomposed, intensely fractured. *(continued)* 54.4' intensely fractured.	BDX (SH)									
5 CORE	60 57		56, 57, 58, 59, 60	55.6 - 60.2' **LIMESTONE:** BDX (LS), shaley, thickly bedded, fossiliferous, unfractured to slightly fractured.	BDX (LS)									Core 5, RQD=95%
6 CORE	60 64		61, 62, 63, 64	60.2 - 81.6' **SHALEY LIMESTONE:** BDX (LS/SH), medium bedded, mostly fossiliferous limestone, highly decomposed dark gray shale beds, intensely to moderately fractured.										Bedrock corehole reamed 6" in diameter to 59' for well installation. Core 6, RQD=73%
7 CORE	60 66		65, 66, 67, 68, 69, 70		BDX (LS/SH)									Core 7, RQD=64%
8 CORE	60 63		71, 72	70.3' thickly bedded with dark gray shale.										Core 8, RQD=88%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	60.2 - 81.6' **SHALEY LIMESTONE:** BDX (LS/SH), medium bedded, mostly fossiliferous limestone, highly decomposed dark gray shale beds, intensely to moderately fractured. *(continued)*										
			74											
9 CORE	60 60		75	75' diagonal fracture (narrow aperture). 75.3' intensely fractured.										Core 9, RQD=50%
			76											
			77		BDX (LS/SH)									
			78											
			79											
10 CORE	60 72		80	80.3' moderately fractured.										Core 10, RQD=43%
			81											
			82	81.6 - 91.9' **SHALE:** BDX (SH), gray, highly decomposed, intensely fractured.										
			83											
			84											
11 CORE	60 65		85	85.4' moderately to highly decomposed, intensely to moderately fractured.										Core 11, RQD=57%
			86											
			87		BDX (SH)									
			88											
			89											
12 CORE	60 61.5		90	90.5' extremely narrow to very narrow apertures.										Core 12, RQD=50%
			91											
			92											

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93	91.9 - 115.3' **SHALEY LIMESTONE:** BDX (LS/SH), thinly to medium bedded with shale, slightly to moderately decomposed shale, intensely to moderately fractured (extremely narrow to narrow apertures). *(continued)*										
			94											
			95											
13 CORE	60 62			95.3' tight to very narrow apertures.										Core 13, RQD=48%
			96											
			97											
			98											
			99											
			100											
14 CORE	60 65			100.4' thickly bedded, moderately fractured.										Core 14, RQD=65%
			101											
			102		BDX (LS/SH)									
			103											
			104											
			105											
15 CORE	60 60			105.3' medium bedded, slightly fractured (very narrow apertures).										Core 15, RQD=98%
			106											
			107											
			108											
			109											
			110											
16 CORE	60 72			110.3' moderately fractured.										Core 16, RQD=91%
			111											
			112											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			113–115	91.9 - 115.3' **SHALEY LIMESTONE:** BDX (LS/SH), thinly to medium bedded with shale, slightly to moderately decomposed shale, intensely to moderately fractured (extremely narrow to narrow apertures). *(continued)*	BDX (LS/SH)									
17 CORE	60 60.5		116–120	115.3 - 135.4' **LIMESTONE:** BDX (LS), fossiliferous, thinly to medium bedded, slightly fractured (narrow apertures).										Core 17, RQD=100%
18 CORE	60 59		121–125	120.4' trace cherty limestone, slightly to moderately fractured (extremely narrow to very narrow apertures).	BDX (LS)									Core 18, RQD=97%
19 CORE	60 60.5		126–130	125.3' slightly fractured (very narrow to narrow apertures).										Core 19, RQD=98%
20 CORE	60 60		131–132	130.4' very narrow apertures.										Core 20, RQD=98%

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-304

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			133 134 135	115.3 - 135.4' **LIMESTONE:** BDX (LS), fossiliferous, thinly to medium bedded, slightly fractured (narrow apertures). *(continued)*	BDX (LS)									
				135.4' End of Boring.										

LOG OF BORING MW-306

Project Name: SDR Landfill Project
Project Location: Baldwin Energy Complex, Baldwin, IL
Project Number: 6225
Elevation: 450.9 Feet
Date Drilled: 09/25/91
Drilling Contractor: Burlington Environmental
Drilling Method: H.S.A. & NX Rock Core
Logged By: Burlington Environmental

Elevation/ Depth (feet)	Graphic Log Sampler Symbols and SPT Blows	Rec. (in./in.)	USCS	Description	DD (pcf)	UCS (tsf)	MC (%)	Remarks
0 (450.9) – 30				*Augered to 53.2 feet. No samples taken. See MW-124; BTB-39 for sample descriptions from 0-53.5 feet*				

Elevation scale: 450, 445, 440, 435, 430, 425; Depth scale: 0, 5, 10, 15, 20, 25, 30

(continued)

Notes: Data presented on this log has been transcribed from Boring Logs prepared by Burlington Environmental, presented in a report dated April 22, 1992.

GROUNDWATER

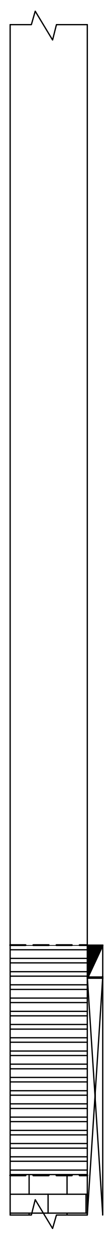
Piezometer Installed: No

Shively Geotechnical
A Division of Environmental Operations, Inc.
Missouri (314) 241-0900
Illinois (618) 398-1414

LOG OF BORING MW-306 (Cont.)

Project Name: SDR Landfill Project
Project Location: Baldwin Energy Complex, Baldwin, IL
Project Number: 6225
Elevation: 450.9 Feet

Date Drilled: 09/25/91
Drilling Contractor: Burlington Environmental
Drilling Method: H.S.A. & NX Rock Core
Logged By: Burlington Environmental

Elevation/ Depth (feet)	Graphic Log Sampler Symbols and SPT Blows	Rec. (in./in.)	USCS	Description	DD (pcf)	UCS (tsf)	MC (%)	Remarks
420 / 30				*Augered to 53.2 feet. No samples taken. See MW-124; BTB-39 for sample descriptions from 0-53.5 feet (continued)*				
415 / 35								
410 / 40								
405 / 45								
400 / 50								
395 / 55		*4/10*		*Gray Clayey SHALE*				
60		*62/108*		*Light Gray LIMESTONE*				

(continued)

Notes: Data presented on this log has been transcribed from Boring Logs prepared by Burlington Environmental, presented in a report dated April 22, 1992.

GROUNDWATER

Piezometer Installed: No

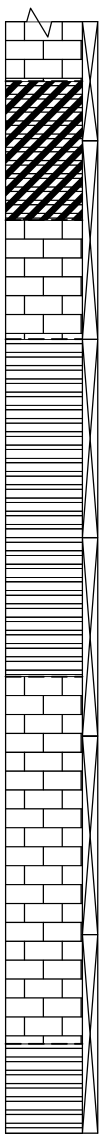
Shively Geotechnical
A Division of Environmental Operations, Inc.

Missouri (314) 241-0900
Illinois (618) 398-1414

LOG OF BORING MW-306 (Cont.)

Project Name: SDR Landfill Project
Project Location: Baldwin Energy Complex, Baldwin, IL
Project Number: 6225
Elevation: 450.9 Feet

Date Drilled: 09/25/91
Drilling Contractor: Burlington Environmental
Drilling Method: H.S.A. & NX Rock Core
Logged By: Burlington Environmental



Elevation/ Depth (feet)	Graphic Log Sampler Symbols and SPT Blows	Rec. (in./in.)	USCS	Description	DD (pcf)	UCS (tsf)	MC (%)	Remarks
60 / 390				*Light Gray LIMESTONE (continued)*				
			CL	*Gray Shaley CLAY*				
65 / 385		*60/60*		*Light Gray LIMESTONE*				
				Olive Clayey SHALE				
70 / 380		*37/60*		*-Dark Gray, Calcareous below 70.3 Feet*				
75 / 375		*60/60*						
				Light Gray LIMESTONE				
80 / 370		*60/60*						
85 / 365		*59/60*		*Dark Gray Clayey SHALE*				
				TD - 88.0 Feet				
90								

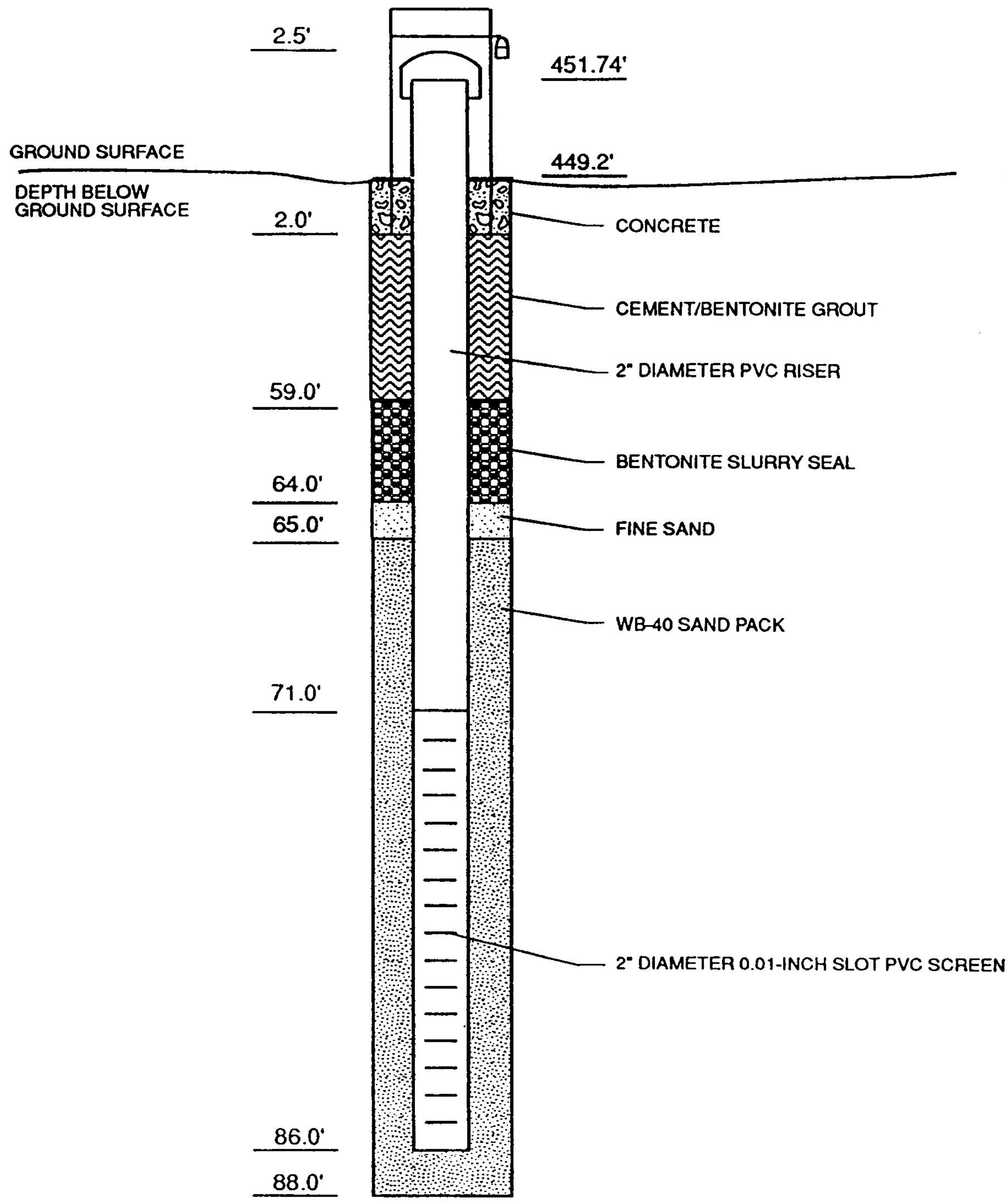
Notes: Data presented on this log has been transcribed from Boring Logs prepared by Burlington Environmental, presented in a report dated April 22, 1992.

GROUNDWATER

Piezometer Installed: No

Shively Geotechnical
A Division of Environmental Operations, Inc.

Missouri (314) 241-0900
Illinois (618) 398-1414



NOT TO SCALE

Burlington Environmental Inc.	
BAMW - 306 MONITORING WELL CONSTRUCTION DIAGRAM	
BALDWIN FGD SOLID WASTE BALDWIN, ILLINOIS 124081	BAMW-306

PROJECT MANAGER

PROJECT MANAGER

CHECKED BY

DRAWN BY

MH
REV. DATE
11/20/91

LOG OF BORING MW-124

Project Name: SDR Landfill Project
Project Location: Baldwin Energy Complex, Baldwin, IL
Project Number: 6225
Elevation: 451.0 Feet

Date Drilled: 09/19/91
Drilling Contractor: Burlington Environmental
Drilling Method: Hollow Stem Auger
Logged By: Burlington Environmental

Elevation/ Depth (feet)	Graphic Log Sampler Symbols and SPT Blows	Rec. (in./in.)	USCS	Description	DD (pcf)	UCS (tsf)	MC (%)	Remarks
0–5 (450)		47/60	CL	*Dark Brown Silty CLAY* *-2" Silt Seam at 0.2 Feet* *-Gray-Brown below 0.5 Feet*				
5–10 (445)		60/60	CH	*Gray-Brown CLAY, with Silt, Sand*				
10–15 (440)		60/60						
15–20 (435)		50/60	CL	*Brown Silty CLAY*				*Hit water at 17.0 feet.*
20–25 (430)		60/60		*-Gray-Brown from 19.5 to 20.0 Feet* *-Dark Gray-Brown with Sand, Trace Gravel below 20.0 Feet* *-1" Sand Seam at 21.3 Feet*				
25–30 (425)		60/60		*-2" Gravel Seam at 26.7 Feet*				

(continued)

Notes: Data presented on this log has been transcribed from Boring Logs prepared by Burlington Environmental, presented in a report dated April 22, 1992.

GROUNDWATER

∇ First Observed During Drilling - 17.0 Feet

▼

Piezometer Installed: No

Shively Geotechnical
A Division of Environmental Operations, Inc.
Missouri (314) 241-0900
Illinois (618) 398-1414

LOG OF BORING MW-124 (Cont.)

Project Name: SDR Landfill Project
Project Location: Baldwin Energy Complex, Baldwin, IL
Project Number: 6225
Elevation: 451.0 Feet

Date Drilled: 09/19/91
Drilling Contractor: Burlington Environmental
Drilling Method: Hollow Stem Auger
Logged By: Burlington Environmental

Elevation/ Depth (feet)	Graphic Log Sampler Symbols and SPT Blows	Rec. (in./in.)	USCS	Description	DD (pcf)	UCS (tsf)	MC (%)	Remarks
30 / 420		60/60	CL	*Dark Gray-Brown Silty CLAY, with Sand, Trace Gravel*				
35 / 415		60/60	CH	*Dark Gray-Brown CLAY, with Silt, Sand*				
40 / 410		60/60		*Dark Gray-Brown Weathered SHALE -Gray-Brown below 39.0 Feet*				
45 / 405				*TD - 45.0 Feet*				
50 / 400								
55 / 395								
60								

Notes: Data presented on this log has been transcribed from Boring Logs prepared by Burlington Environmental, presented in a report dated April 22, 1992.

GROUNDWATER
▽ First Observed During Drilling - 17.0 Feet
▼

Piezometer Installed: No

Shively Geotechnical
A Division of Environmental Operations, Inc.

Missouri (314) 241-0900
Illinois (618) 398-1414

KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-350

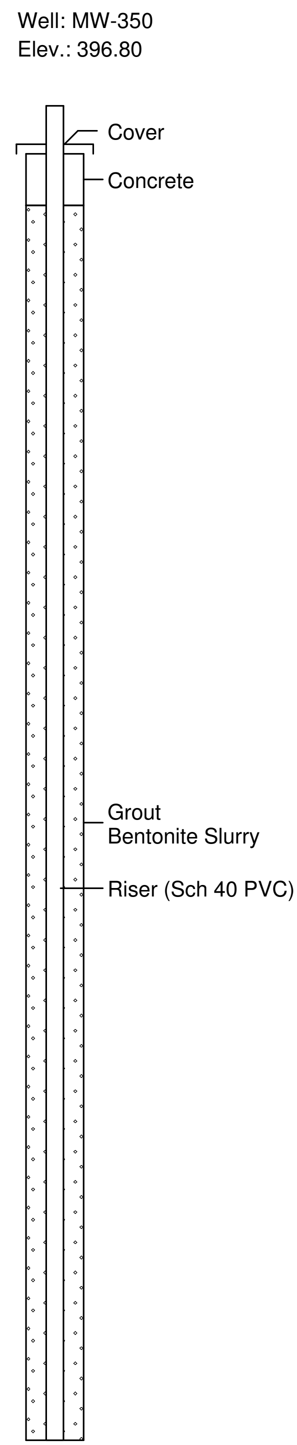
Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/07/2010
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock
Drilling Method	: Hollow-Stem/Rotary (CME-550)
Sampling Method	: MacroCore (60")/NX Core
Drilling Company	: PSC
Driller	: Matt Cooper
Geologist	: Brendon Wilder (PSC)
Land Surface Elevation	: 394.11
Top of Casing Elevation	396.80
X,Y Coordinates	: 2379410, 554568

Depth in Feet	DESCRIPTION	Surf. Elev. 394.11	USCS
0 – 11	CLAY, very stiff to hard, brown, grayish-brown (10YR 5/2) mottled yellowish brown (10YR 5/8), dry - grain size analysis @ 5 - 6 ft: 2.3% sand, 42.4% silt, 55.3% clay	394 (0), 389 (5), 384 (10)	CH
11 – 16	CLAY, brown to olive brown, moist - grain size analysis @ 11 - 12 ft: 8.4% sand, 39.3% silt, 52.3% clay	379 (15)	CL/CH
16 – 25	CLAY, soft, high plasticity, dark yellow brown, moist; 1-2" sand seams at 17' and 19' - grain size analysis @ 18 - 20 ft: 1.8% sand, 21.9% silt, 76.3% clay - very stiff to hard, high plasticity	374 (20)	CH

Samples	Recovery inches	Qp TSF
1	19/54	4.5
2		2.25
3		
4	47/60	4.5
5		3.5
6		3.25
7		4.0
8	60/60	2.75
9		2.75
10		2.75
11		1.75
12		2.0
13	45/60	
14	60/60	
15	23/23	

GRAPHIC



KELRON ENVIRONMENTAL
INCORPORATED

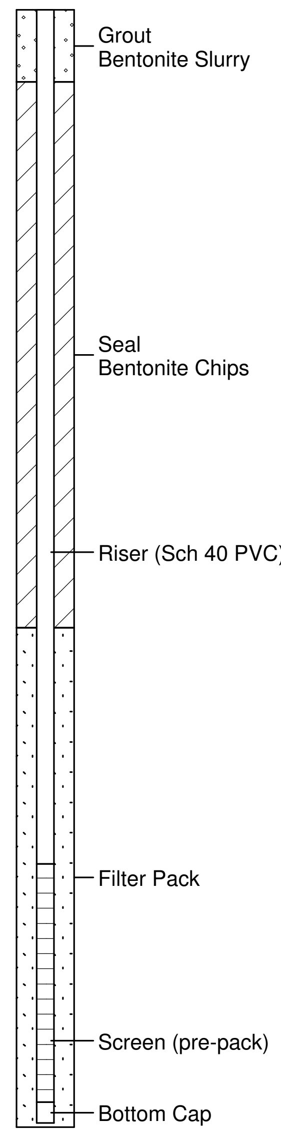
LOG OF BORING MW-350

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NW, NE

Date Completed	: 09/07/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 394.11
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	396.80
Drilling Company	: PSC	X,Y Coordinates	: 2379410, 554568

Depth in Feet	DESCRIPTION	Surf. Elev. 394.11	Samples	Recovery inches	Qp TSF	USCS
25	- Auger refusal at 26.4 feet bgs	369	15	23/23		CL
	LIMESTONE and SHALE, interbedded, banded, solid, very soft, light to dark gray; slightly weathered					LS/SH
	LIMESTONE, banded, medium bedded, solid, hard, medium gray; unweathered					LS
30	LIMESTONE and SHALE, interbedded; limestone is banded, medium bedded, hard, medium gray; shale is very soft to medium soft, dark gray Borehole diameter from 26.4 to 46.7 feet bgs = 3 7/8" RQD for 26.4 - 36.4' = 72% (Fair) Recovery = 116/120"	364	16	116/120		LS/SH
35	SHALE, banded, medium bedded, solid, soft to medium soft, dark gray	359				SH
40	LIMESTONE, banded, massive, solid, hard to very hard, light to medium gray	354	17	118/120		LS
45	RQD for 36.4 - 46.4' = 96% (Excellent) Recovery = 118/120"	349				
	END BOREHOLE AT 46.7 FEET BLS					
50						

Well: MW-350
Elev.: 396.80



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KELRON ENVIRONMENTAL
INCORPORATED

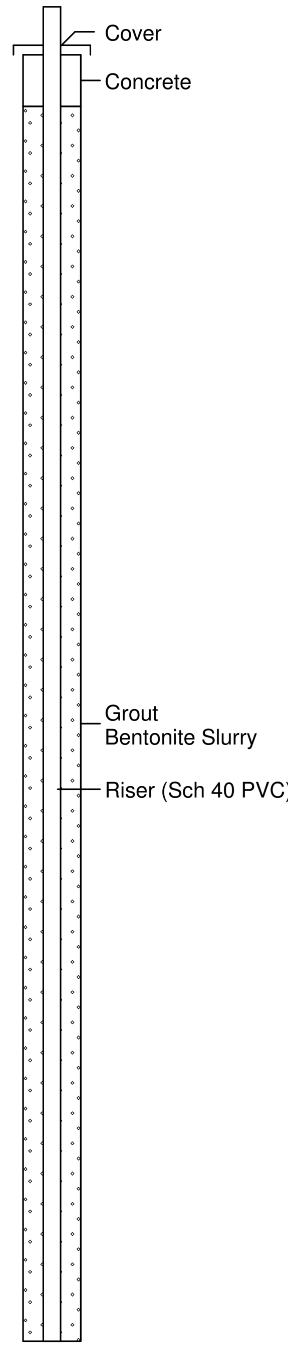
LOG OF BORING MW-352

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/16/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.36
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	425.04
Drilling Company	: PSC	X,Y Coordinates	: 2382789, 553901

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36	Samples	Recovery inches	Qp TSF	USCS
0	SILTY CLAY, very stiff to hard, yellow brown (10YR 5/6), dry	422				
			1	46/48	4.5+	CL
			2	60/60	3.5	
5	CLAY, trace sand and fine gravel, very stiff, high plasticity, few black organic material	417	3		4.0	
			4		2.75	
			5		3.0	
10	- medium hard	412	6	60/60	2.75	
			7		2.0	CL
	- soft		8		1.0	
			9		1.25	
15		407	10	60/60	1.5	
	- medium hard		11		2.5	
	SAND, poorly graded, loose, wet (4-inch thick)					SP
	SANDY CLAY, trace fine gravel, yellow brown to olive brown (2.5Y 5/3)		12		2.75	
			13		3.5	
20		402	14	60/60	4.5+	
			15		2.5	CL
			16		2.5	
			17		2.75	
25			18	48/60	2.5	

Well: MW-352
Elev.: 425.04



KELRON ENVIRONMENTAL INCORPORATED

LOG OF BORING MW-352

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/16/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.36
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	425.04
Drilling Company	: PSC	X,Y Coordinates	: 2382789, 553901

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36
25	- grain size analysis @ 26.5 - 27.5 ft: 33.7% sand, 27.1% silt, 39.2% clay	397
	SAND with few gravel, yellow brown	
	CLAY, some sand and fine gravel, hard to very hard, high plasticity, dark yellow brown (10YR 4/6)	
30	CLAY, lean to fat	392
	- grain size analysis @ 32 - 33 ft: 13.2% sand, 43.9% silt, 42.8% clay	
35	- medium hard, high plasticity, gray brown to light olive brown (2.5Y 5/2-5/3)	387
	- trace silt, dark yellow brown (10YR 4/4)	
40		382
45		377
	CLAY, medium hard, low plasticity, olive brown (2.5Y 5/4)	
50		

Samples	Recovery inches	Qp TSF	USCS
18	48/60	2.5	CL / SP / CL
19	60/60	3.0	CL
20		3.0	CL/CH
21		3.5	CL/CH
22		3.0	CL/CH
23	48/60	1.5	CL/CH
24		1.5	CL/CH
25		1.75	CL/CH
26		1.5	CL/CH
27	54/60	1.75	CL/CH
28		2.0	CL/CH
29		2.5	CL/CH
30		2.5	CL/CH
31	57/60	2.0	CL/CH
32		1.75	CL/CH
33		1.75	CL/CH
34		2.5	CL
35		1.75	CL
36	3/3		CL

GRAPHIC

Well: MW-352
Elev.: 425.04

Grout
Bentonite Slurry

Riser (Sch 40 PVC)

KELRON ENVIRONMENTAL
INCORPORATED

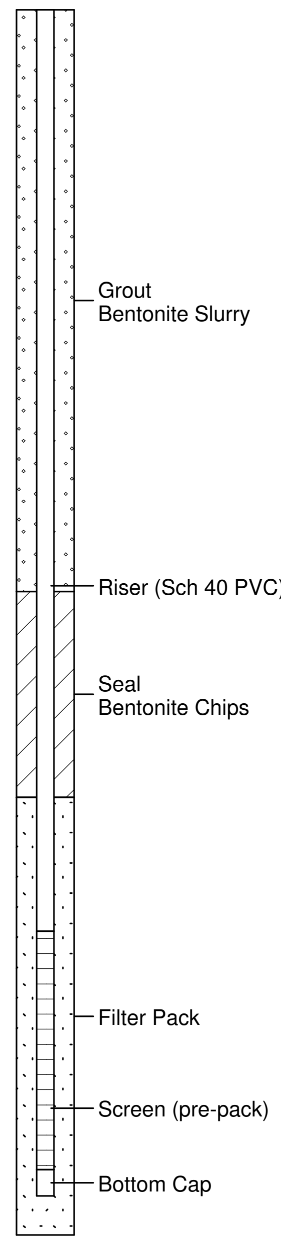
LOG OF BORING MW-352

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 16 SE, NE, NE

Date Completed	: 09/16/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID: 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 422.36
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	425.04
Drilling Company	: PSC	X,Y Coordinates	: 2382789, 553901

Well: MW-352
Elev.: 425.04

Depth in Feet	DESCRIPTION	Surf. Elev. 422.36	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
50	- Auger refusal at 53.7 feet bgs	372				CL	
	LIMESTONE, weathered, thinly laminated, medium hard to hard, gray		37	5/5		LS	
55		367	38	8/27			
	SHALE, clayey, gray					SH	
	LIMESTONE, occasional shale partings		39	19/60		LS	
60	- laminated, fossiliferous, medium gray	362	40	54/60			
	SHALE, soft, dark gray					SH	
65		357					
	LIMESTONE, medium hard to hard, light gray		41	59/60		LS	
70	Borehole diameter from 53.7 to 73.8 feet bgs = 3 7/8" RQD for 53.8 - 73.8' = 57% (Fair) Recovery = 173/240"	352	42	33/34			
	END BOREHOLE AT 73.8 FEET BLS						
75							



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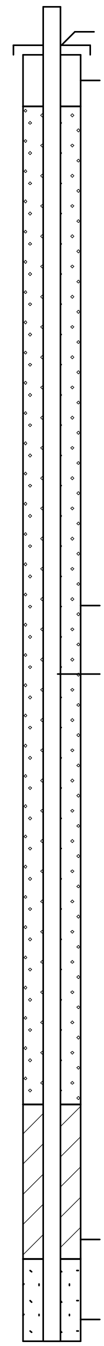
KELRON ENVIRONMENTAL
INCORPORATED

LOG OF BORING MW-355

Ash Pond System Monitoring Well Network
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.
Location: Twp 04S, Rng 07W, 09 SW, SE, SW

Date Completed	: 09/14/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID; 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 390.82
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	393.69
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378145, 555980

Depth in Feet	DESCRIPTION	Surf. Elev. 390.82	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
0–20	Continuous boring to 20 feet below ground surface. Refer to boring log for adjacent well MW-155 for description of subsurface materials to 20 feet.	390, 385, 380, 375					
20	CLAYEY SAND, poorly graded, dark yellow brown, wet	370	1	23/23	3.5	SC	
	CLAY, lean, very stiff, gray with yellow-brown mottling - Auger refusal at 22.1 feet bgs					CL	
	LIMESTONE, lightly weathered, fine grained, slightly fossiliferous, medium soft, light gray banded with light red staining along horizontal fractures; three small shale lenses within 31 inch interval - coarse grained, medium soft to hard		2	108/124		LS	
25							

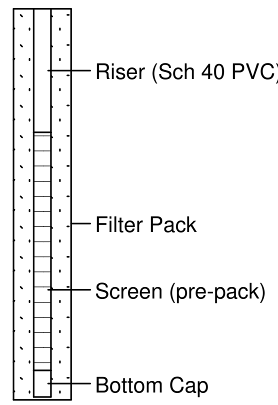


KELRON ENVIRONMENTAL INCORPORATED	LOG OF BORING MW-355 (Page 2 of 2)

Ash Pond System Monitoring Well Network, Baldwin Energy Complex, Dynegy Midwest Generation, Inc., Location: Twp 04S, Rng 07W, 09 SW, SE, SW			
Date Completed	: 09/14/2010	Driller	: Matt Cooper
Hole Diameter	: 8 1/2"OD / 4 1/4" ID; 3 7/8" rock	Geologist	: Brendon Wilder (PSC)
Drilling Method	: Hollow-Stem/Rotary (CME-550)	Land Surface Elevation	: 390.82
Sampling Method	: MacroCore (60")/NX Core	Top of Casing Elevation	393.69
Drilling Company	: Terra Drill, Inc.	X,Y Coordinates	: 2378145, 555980

Depth in Feet	DESCRIPTION	Surf. Elev. 390.82	Samples	Recovery inches	Qp TSF	USCS	GRAPHIC
25	- fine grained, slightly fossiliferous, light gray Borehole diameter from 22.1 to 32.6 feet bls = 3 7/8" RQD for 22.1 - 32.6' = 57% (Fair)	365	2	108/124		LS	
30		360					
	END BOREHOLE AT 32.6 FEET BLS						
35		355					
40		350					
45		345					
50							

Well: MW-355
Elev.: 393.69



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NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-356

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
John Gates Bulldog Drilling	9/28/2015	10/1/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-356	Feet (NAVD88)	425.18 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 558,050.37 N, 2,381,958.49 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 56.2662"
Long -89° 52' 10.4808"

Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0 - 10	0 - 10' **SILTY CLAY** CL/ML.	CL/ML									0-37.3' Blind Drilled. See logs OW-156 and OW-256 for soil description.
			10 - 12	10 - 17.7' **LEAN CLAY WITH SAND:** (CL)s.	(CL)s									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Brad Rodes

Firm: Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12–17.7	10 - 17.7' **LEAN CLAY WITH SAND:** (CL)s. *(continued)*	(CL)s									
			17.7–27.3	17.7 - 27.3' **SILTY CLAY** CL/ML.	CL/ML									
			27.3–28.6	27.3 - 28.6' **POORLY-GRADED SAND:** SP.	SP									
			28.6–32	28.6 - 33.9' **SILTY CLAY** CL/ML.	CL/ML									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	28.6 - 33.9' **SILTY CLAY** CL/ML. *(continued)*	CL/ML								
			34–35	33.9 - 35.7' **LEAN CLAY:** to **SHALE:** CL.	CL								
			36–37	35.7 - 37.3' **SHALE:** BDX (SH).	BDX (SH)								
1 CORE	28 24.5		38	37.3 - 53.8' **SHALE:** BDX (SH), weathered shale and clay, brown to dark gray, soft, slightly fractured.	BDX (SH)								Core 1, RQD=92%
2 CORE	60 57		40	39.6' light to dark gray to tan.									Core 2, RQD = 58%
			42	42.3' - 43.2' limestone.									
			43	43.2' light to dark gray/tan, very weak.									
3 CORE	60 41		45	45' - 50' dark gray, intensely fractured.									Low recovery, possible washout. Core 3, RQD = 18%
4 CORE	36 36		50	50' - 53.1' thin beds of limestone, limestone is more competent, slightly fractured, wet.									Core 4, RQD=92%
			52										

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
5 CORE	24 21.5		53	37.3 - 53.8' **SHALE:** BDX (SH), weathered shale and clay, brown to dark gray, soft, slightly fractured. *(continued)* 53.1' - 53.8' intensely fractured.	BDX (SH)								Core 5, RQD=58%
6 CORE	60 60.5		54, 55	53.8 - 55.4' **LIMESTONE:** BDX (LS), white, thickly bedded, moderately fractured (moderately wide to very narrow apertures).	BDX (LS)								Core 6, RQD=84%
			56, 57	55.4 - 57.2' **SHALE:** BDX (SH), dark gray, trace limestone beds, moderately fractured. 56.8' soft, highly weathered bed, decomposed. 57.1' soft, highly weathered bed.	BDX (SH)								
			58, 59	57.2 - 60' **LIMESTONE:** BDX (LS), trace shale beds, moderately fractured (moderately wide to very wide apertures). 59.4' - 59.7' vertical fractures with pyrite mineralization.	BDX (LS)								
7 CORE	60 61		60, 61, 62, 63, 64	60 - 65.8' **SHALE:** BDX (SH), gray, moderately fractured. 61' -62' dark gray. 62' - 62.4' soft, clayey.	BDX (SH)								Core 7 RQD=75%
8 CORE	60 61.5		65	65' dark gray, narrow to moderately wide apertures. 65.3' - 65.8' fossiliferous.									Core 8, RQD=67%
			66, 67, 68	65.8 - 68.8' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, slightly to moderately fractured.	BDX (LS/SH)								
			69	68.8 - 70' **SHALE:** BDX (SH), gray, fossiliferous, moderately fractured (moderately wide to narrow apertures).	BDX (SH)								Bedrock corehole reamed 6" in diameter to 69' for well installation.
9 CORE	60 61		70, 71, 72	70 - 75' **SHALEY LIMESTONE:** BDX (LS/SH), gray to dark gray, fossiliferous, medium bedded, moderately fractured (narrow apertures).	BDX (LS/SH)								Core 9, RQD=87%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			72–75	70 - 75' **SHALEY LIMESTONE:** BDX (LS/SH), gray to dark gray, fossiliferous, medium bedded, moderately fractured (narrow apertures). *(continued)*	BDX (LS/SH)									
10 CORE	60 60		75	75 - 75.9' **SHALE:** BDX (SH), dark gray, soft, moderately fractured (narrow to moderately narrow apertures).	BDX (SH)									Core 10, RQD=95%
			76	75.9 - 76.2' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, narrow to moderately narrow apertures.	BDX (LS/SH)									
			77	76.2 - 101.8' **LIMESTONE:** BDX (LS), light gray, fossiliferous, thickly bedded, narrow to moderately narrow apertures.	BDX (LS)									
11 CORE	60 60.5		80	80' light gray to gray, unfractured.										Core 11, RQD=100%
12 CORE	60 61.5		85											Core 12, RQD=100%
13 CORE	60 59.5		90											Core 13, RQD=100%
			92											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93–94	76.2 - 101.8' **LIMESTONE:** BDX (LS), light gray, fossiliferous, thickly bedded, narrow to moderately narrow apertures. *(continued)*	BDX (LS)									
14 CORE	61 61		95											Core 14, RQD=100%
			96–99											
15 CORE	60 59.5		100	99.7' slightly weathered, decomposed. 100' gray, no fossils.										Core 15, RQD=100%
			101											
			102–104	101.8 - 106.5' **SHALE:** BDX (SH), dark gray, thickly bedded, slightly fractured.	BDX (SH)									
16 CORE	60 58.5		105											Core 16, RQD=56%
			106	106.2' weathered, decomposed.										
			107–108	106.5 - 108.4' **LIMESTONE:** BDX (LS), light gray to green, highly decomposed, intensely fractured.	BDX (LS)									
			109	108.4 - 109.8' **SHALE:** BDX (SH), dark reddish-brown, highly decomposed.	BDX (SH)									
17 CORE	60 55		110–111	109.8 - 111.1' **LIMESTONE:** BDX (LS), gray, highly disintegrated (healed dissolution cracks with green highly decomposed infilling). 109.9' - 110.7' angular gravel-sized fragments. 110.7' moderately decomposed, very intensely fractured.	BDX (LS)									Core 17, RQD=49%
			112		BDX (SH)									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			112-114	111.1 - 114' **SHALE:** BDX (SH), dark gray, moderately to highly decomposed, moderately fractured. *(continued)*	BDX (SH)						
18 CORE	60 61		114-116.3	114 - 116.3' **LIMESTONE:** BDX (LS), gray, moderately fractured.	BDX (LS)						Core 18, RQD=61%
			116.3-116.7	116.3 - 116.7' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured.	BDX (LS/SH)						
			116.7-119.7	116.7 - 119.7' **SHALE:** BDX (SH), gray, slightly decomposed, intensely fractured.	BDX (SH)						
			119.7-120.9	119.7 - 120.9' **SHALEY LIMESTONE:** BDX (LS/SH), gray, slightly decomposed, intensely fractured.	BDX (LS/SH)						
19 CORE	60 64		120.9-122.2	120.9 - 122.2' **SHALE:** BDX (SH), dark gray, moderately fractured.	BDX (SH)						Core 19, RQD=86%
			122.2-126.1	122.2 - 126.1' **LIMESTONE:** BDX (LS), gray, moderately fractured. 123.3' - 123.4' fossiliferous. 124.1' - 124.1' fossiliferous. 124.7' - 124.8' fossiliferous.	BDX (LS)						
20 CORE	48 48										Core 20, RQD =88%
			126.1-127.6	126.1 - 127.6' **SHALE:** BDX (SH), dark gray, slightly decomposed. 126.7' - 127' limestone, gray. 127' moderately decomposed.	BDX (SH)						
			127.6-129.2	127.6 - 129.2' **LIMESTONE:** BDX (LS), slightly decomposed.	BDX (LS)						
21 CORE	12 12		129.2-130	129.2 - 130' **SHALE:** BDX (SH), gray, intensely fractured.	BDX (SH)						Core 21, RQD=0%
22 CORE	60 60		130-130.4	130 - 130.4' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured.	BDX (LS/SH)						Core 22, RQD=94%
			130.4-131	130.4 - 131' **LIMESTONE:** BDX (LS), gray, fossiliferous, moderately fractured.	BDX (LS)						
			131-134	131 - 134' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured.							

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-356

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			133	131 - 134' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured. *(continued)*	BDX (LS/SH)									The casing dropped 3" during drilling.
			134	134 - 135' **LIMESTONE:** BDX (LS), gray, thickly bedded, moderately fractured.	BDX (LS)									
			135	135' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-366

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	12/3/2015	12/4/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-366	Feet (NAVD88)	422.54 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,581.80 N, 2,381,171.15 E E/W
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 31.8876"
Long -89° 52' 20.4414"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0 - 5.6	0 - 5.6' **FILL, SILTY CLAY** CL/ML.	(FILL) CL/ML								0-33' Blind Drilled. See logs TPZ-166 and B-13-4 for soil description.
			5.6 - 12	5.6 - 33' **SILTY CLAY** CL/ML.	CL/ML								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-366

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
				5.6 - 33' **SILTY CLAY** CL/ML. *(continued)*										
			13											
			14											
			15											
			16											
			17											
			18											
			19											
			20											
			21											
			22		CL/ML									
			23											
			24											
			25											
			26											
			27											
			28											
			29											
			30											
			31											
			32											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-366

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				5.6 - 33' **SILTY CLAY** CL/ML. *(continued)*	CL/ML									
1 SS	23 18	17 21 20 50	33 34 35	33 - 35.6' **LEAN CLAY:** to **SHALE:** CL, gray, residual soil, hard (>4.5 tsf).	CL									
1 CORE	60 54		36 37 38 39	35.6 - 39.3' **SHALE:** BDX (SH), gray, highly decomposed, moderately fractured. 38.4' limestone layer (approximately 2.5").	BDX (SH)									Core 1, RQD=54%
2 CORE	60 47		40 41 42	39.3 - 42.3' **LIMESTONE:** BDX (LS), cherty, intensely fractured.	BDX (LS)									Core 2, RQD=32%
			43	42.3 - 42.9' **SHALE:** BDX (SH), dark gray, intensely fractured.	BDX (SH)									
				42.9 - 43.7' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured.	BDX (LS/SH)									
3 CORE	60 63		44 45 46 47 48 49	43.7 - 49.8' **SHALE:** BDX (SH), dark gray, moderately fractured.	BDX (SH)									Core 3, RQD=73%
4 CORE	60 49		50 51 52	49.8 - 54.3' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, slightly fractured.	BDX (LS/SH)									Core 4, RQD=96%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-366

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			53 54	49.8 - 54.3' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, slightly fractured. *(continued)* 52.8' - 53.1 shale bed. 53.1' fossiliferous.	BDX (LS/SH)									
				54.3' End of Boring.										Bedrock corehole reamed 6" in diameter to 54' for well installation.

NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-369

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	11/17/2015	11/18/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-369	Feet (NAVD88)	420.49 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒

State Plane 557,329.71 N, 2,381,765.41 E E/W

1/4 of 1/4 of Section , T N, R

Lat 38° 11' 49.1496"

Long -89° 52' 12.9288"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0 - 0.2' **SILT:** ML.	ML								0-43' Blind Drilled. See log PZ-169 for soil description.
			0.2	0.2 - 2' **SILTY CLAY** CL/ML.	CL/ML								
			2	2 - 4' Shelby Tube Sample.									
			4	4 - 10' **SILTY CLAY** CL/ML.	CL/ML								
			10	10 - 12' **SILTY CLAY** to **LEAN CLAY:** CL/ML.	CL/ML								
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
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NATURAL RESOURCE TECHNOLOGY

Boring Number MW-369

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12–14	12 - 14' Shelby Tube Sample.										
			14–20	14 - 20' **LEAN CLAY:** CL.	CL									
			20–22	20 - 22' **SILTY CLAY** CL/ML.	CL/ML									
			22–24	22 - 24' Shelby Tube Sample.										
			24–28	24 - 28' **LEAN CLAY WITH SAND:** (CL)s.	(CL)s									
			28–30	28 - 30' **SILTY CLAY** CL/ML.	CL/ML									
			30–32	30 - 32' **LEAN CLAY:** to **SILTY CLAY** CL.	CL									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-369

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			32–38	32 - 38' **LEAN CLAY:** CL.	CL									
			38–40	38 - 40' No Recovery.										
			40–42	40 - 42' **LEAN CLAY:** CL.	CL									
1 SS	24 0	10 18 30 40	42–45	42 - 45' No Recovery.										
2 SS	5 9	50/5"	45–45.3	45 - 45.3' **LEAN CLAY:** CL, dark brown (10YR 3/3), 30-50% pale brown (10YR 6/4) and brown (10YR 4/3) mottling, trace subrounded fine gravel, cohesive, low plasticity, moist.	CL									
3 SS	5 8	50/5"	45.3–48.7	45.3 - 48.7' **SHALE:** BDX (SH), dark grayish brown, highly decomposed. 47' trace clay layers (< 1" thick), highly decomposed, very weak.	BDX (SH)									
1 CORE	66 30		48.7–50.8	48.7 - 50.8' **LIMESTONE:** BDX (LS), white, fossiliferous, intensely fractured (extremely narrow to narrow apertures), microcrystalline, slightly to moderately decomposed.	BDX (LS)									Core 1, RQD=17%
			50.8–52	50.8 - 53.4' **SHALE:** BDX (SH), dark gray, intensely fractured (extremely narrow to narrow apertures), highly decomposed, very weak.	BDX (SH)									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-369

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	50.8 - 53.4' **SHALE:** BDX (SH), dark gray, intensely fractured (extremely narrow to narrow apertures), highly decomposed, very weak. *(continued)*	BDX (SH)								
2 CORE	60 46		54 55 56 57 58 59	53.4 - 59.3' **LIMESTONE:** BDX (LS), white, moderately fractured (very narrow to narrow apertures), fossiliferous, microcrystalline, slightly decomposed, very strong, pitted, trace mineralization. 58.4' mud in fracture.	BDX (LS)								Core 2, RQD=83%
3 CORE	60 64		60 61 62 63 64	59.3 - 64.9' **SHALEY LIMESTONE:** BDX (LS/SH), dark gray, medium bedded shale, intensely fractured (extremely narrow to narrow apertures), fossiliferous, microcrystalline, decomposed, very weak to weak, weathered, highly weathered shale cementing segments together.	BDX (LS/SH)								Core 3, RQD=63%
4 CORE	60 62		65 66 67 68	64.9 - 68.8' **LIMESTONE:** BDX (LS), white, slightly fractured (tight to narrow apertures), fossiliferous, microcrystalline, slightly decomposed, slightly disintegrated, pitted.	BDX (LS)								Core 4, RQD=79%
			69 70	68.8 - 70.7' Overdrilled for Well Installation.									
				70.7' End of Boring.									Bedrock corehole reamed 6" in diameter to 70.7' for well installation.

NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-370

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	11/20/2015	11/24/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-370	Feet (NAVD88)	418.67 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,826.50 N, 2,381,936.14 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 44.1702"
Long -89° 52' 10.8084"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–2	0 - 2' **SILTY CLAY** CL/ML.	CL/ML								0-28' Blind Drilled. See log PZ-170 for soil description.
			2–4	2 - 4' Shelby Tube Sample.									
			4–8	4 - 8' **SILTY CLAY** CL/ML.	CL/ML								
			8–10	8 - 10' **SILTY CLAY** to **LEAN CLAY:** CL/ML.	CL/ML								
			10–12	10 - 12' **LEAN CLAY:** CL.	CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12	12 - 14' Shelby Tube Sample.										
			14	14 - 24' **SILTY CLAY** CL/ML.	CL/ML									
			24	24 - 26' Shelby Tube Sample.										
			26	26 - 28' **SILTY CLAY** CL/ML.	CL/ML									
1 SS	10 10	23 50/4"	28	28 - 28.4' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace angular limestone gravel, soft, medium plasticity, moist.	CL									
1 CORE	60 18.5		28.4	28.4 - 28.9' **SHALE:** BDX (SH), gray, highly decomposed, very weak.	BDX (SH)									Core 1, RQD=51%
			28.9	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong.	BDX (LS/SH)									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

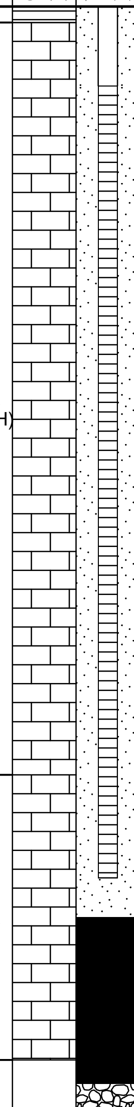
Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			33	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong. *(continued)*									
2 CORE	51.5 12		34	33.9' - 38.1' gray, greenish gray in fractures, trace fossils, moderately to highly decomposed, slightly to moderately disintegrated, clay in shoe with a hard, reddish brown inclusion.									Core 2, RQD=0%
			35		BDX (LS/SH)								
			36	36' - 37.9' vertical fracture.									
			37										
3 CORE	24 25		38	38.1 - 44' **SHALE:** BDX (SH), bluish gray, intensely fractured (extremely narrow to narrow apertures), highly decomposed, weak.									Core 3, RQD=40%
			39										
4 CORE	24 11		40										Core 4, RQD=0%
5 CORE	36 32		41	40.6' - 40.8 shaley limestone layer, light gray to gray, microcrystalline, moderately decomposed, very strong. 41.1' - 43.2 gray, moderately to highly decomposed.	BDX (SH)								Core 5, RQD=78%
			42										
			43										
6 CORE	12 28		44	44 - 45.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to narrow apertures), thin to medium bedded, microcrystalline, slightly decomposed, clay cement in apertures, very strong.									Core 6, RQD=29%
7 CORE	45 27		45	45' shale layer, bluish gray, moderately fractured (extremely narrow to narrow apertures), highly decomposed, weak.	BDX (LS/SH)								Core 7, RQD=65%
			46	45.7 - 52.2' **SHALE:** BDX (SH), bluish gray, moderately fractured (tight to narrow), highly decomposed, weak.									
			47										
			48										
8 CORE	24 30		49		BDX (SH)								Core 8, RQD=78%
			50										
			51										
9 CORE	24 24		52										Core 9, RQD=0%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
				52' clay cement.										
10 CORE	24 36		53 54 55	52.2 - 61.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (very narrow to narrow), thin to medium bedded, microcrystalline, slightly decomposed, cemented clay in apertures, very strong. 52.7' - 53' clayey sand in aperture. 53' - 53.1 shale bed, bluish gray, fossiliferous, moderately fractured (very narrow to narrow), highly decomposed, weak. 53.1' white to bluish gray, gray in the fractures (extremely narrow to moderately narrow apertures), thinly to medium bedded, slightly to moderately disintegrated.	BDX (LS/SH)									Core 10, RQD=0%
11 CORE	24 30		56 57	55.7' moderately disintegrated.										Core 11, RQD=18%
12 CORE	30 27		58 59 60	58.1' highly decomposed.										Core 12, RQD=39%
13 CORE	36 53		61											Core 13, RQD=89%
			62 63 64 65	61.7 - 65.3' **LIMESTONE:** BDX (LS).	BDX (LS)									
			66	65.3 - 66' Overdrilled for Well Installation.										
				66' End of Boring.										Bedrock corehole reamed 6" in diameter to 66' for well installation.



SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-373

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
John Gates Bulldog Drilling	10/21/2015	10/28/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-373	Feet (NAVD88)	388.80 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,041.91 N, 2,379,186.06 E E/W
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 26.613"
Long -89° 52' 45.3282"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0 - 2' No Recovery. Gravel Pad.										0-13.4' Blind Drilled. See log PZ-173 for soil description detail.
			2	2 - 10.9' **SILTY CLAY** CL/ML.	CL/ML									
			10.9	10.9 - 13.4' **SILT:** ML.	ML									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

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NATURAL RESOURCE TECHNOLOGY

Boring Number MW-373

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	10.9 - 13.4' **SILT:** ML. *(continued)*	ML								
1 CORE	23 23		14	13.4 - 14.7' **LIMESTONE:** BDX (LS), fossiliferous, extremely fractured, thickly bedded.	BDX (LS)								Core 1, RQD=65%
			15	14.7 - 15.5' **SHALE:** BDX (SH), gray, trace limestone, highly decomposed.	BDX (SH)								
2 CORE	58.2 42		16	15.5 - 16.6' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, intensely fractured.	BDX (LS/SH)								Core 2, RQD=52%
			17	16.6 - 17.3' **SHALE:** BDX (SH), gray, highly decomposed.	BDX (SH)								
			18	17.3 - 18.8' **LIMESTONE:** BDX (LS), thickly bedded.	BDX (LS)								
			19, 20	18.8 - 20.2' **SHALE:** BDX (SH), highly decomposed.	BDX (SH)								
3 CORE	60 56			20.2 - 20.8' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured, tight diagonal fracture.	BDX (LS/SH)								Core 3, RQD=57%
			21	20.8 - 21.5' **SHALE:** BDX (SH), gray, highly decomposed.	BDX (SH)								
			22, 23, 24	21.5 - 24.9' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured, extremely narrow to narrow apertures.	BDX (LS/SH)								
4 CORE	60 55		25, 26, 27, 28, 29	24.9 - 29.1' **SHALE:** BDX (SH), highly decomposed. 25.1' - 25.4' limestone, fossiliferous. 25.4' gray, fossiliferous, thickly bedded, hard.	BDX (SH)								Core 4, RQD=65%
5 CORE	60 60		30, 31, 32	29.1 - 48.3' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded. 30' - 35.1' moderately fractured, extremely narrow apertures.	BDX (LS)								Core 5, RQD=95%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-373

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				29.1 - 48.3' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded. *(continued)*										
			33											Bedrock corehole reamed 6" in diameter to 33.3' for well installation.
			34											
6 CORE	60 58		35	35.1' - 40' slightly fractured, narrow apertures.										Core 6, RQD=96%
			36											
			37											
			38											
			39											
7 CORE	60 60		40	40' - 45.1' moderately fractured, extremely narrow to narrow apertures.	BDX (LS)									Core 7, RQD=100%
			41	41.3' - 41.6' vuggy.										
			42											
			43											
			44											
8 CORE	60 61.5		45	45.1' - 48.3' moderately fractured.										Core 8, RQD=63%
			46											
			47											
			48	48.3 - 57' **SHALE:** BDX (SH), gray, thin limestone beds.										
			49											
9 CORE	60 63		50	49.9' moderately decomposed.	BDX (SH)									Core 9, RQD=57%
			51											
			52											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-373

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				48.3 - 57' **SHALE:** BDX (SH), gray, thin limestone beds. *(continued)*										
			53											
			54		BDX (SH)									
10 CORE	60 46		55	54.7' - 55' fossiliferous.										Core 10, RQD=35%
			56											
			57	57 - 58.3' **LIMESTONE:** BDX (LS), intensely fractured, decomposed green infilling.	BDX (LS)									
			58	58.3 - 60' **LEAN CLAY:** CL, greenish gray to reddish brown. 58.7' reddish brown.	CL									
			59											
11 CORE	60 55		60	60 - 65.2' **SHALE:** BDX (SH), intensely fractured, thickly bedded, decomposed.	BDX (SH)									Core 11, RQD=51%
			61											
			62											
			63	62.8' gray.										
			64											
12 CORE	60 58		65	65.2 - 66.5' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured, thinly bedded.	BDX (LS/SH)									Core 12, RQD=67%
			66	66.5 - 68.8' **SHALE:** BDX (SH), gray.	BDX (SH)									
			67											
			68											
			69	68.8 - 70.7' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured, decomposed (greenish gray).	BDX (LS/SH)									
13 CORE	46 48		70											Core 13, RQD=60%
			71	70.7 - 80.1' **SHALE:** BDX (SH), dark gray, thickly bedded.	BDX (SH)									
			72											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-373

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				70.7 - 80.1' **SHALE:** BDX (SH), dark gray, thickly bedded. *(continued)*										
			73											
			74											
14 CORE	12 11													Core 14, RQD=91%
			75											
15 CORE	60 62													Core 15, RQD=61%
			76	76.1' dark to light gray, intensely fractured, highly decomposed.	BDX (SH)									
			77	77.5' dark gray, moderately fractured.										
			78	78.7' highly fractured, decomposed.										
			79											
16 CORE	60 64		80	80.1 - 83.3' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured.										Core 16, RQD=61%
			81											
			82		BDX (LS/SH)									
			83	83.3 - 85.4' **SHALE:** BDX (SH), dark gray, intensely fractured.										
			84		BDX (SH)									
17 CORE	60 60		85	85.4 - 88.4' **SHALEY LIMESTONE:** BDX (LS/SH), thickly bedded, fossiliferous.										Core 17, RQD=87%
			86											
			87		BDX (LS/SH)									
			88	88.4 - 88.8' **SHALE:** BDX (SH), dark gray, intensely fractured.	BDX (SH)									
			89	88.8 - 94' **LIMESTONE:** BDX (LS), thickly bedded.										
			90											
18 CORE	60 59				BDX (LS)									Core 18, RQD=88%
			91											
			92											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-373

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93	88.8 - 94' **LIMESTONE:** BDX (LS), thickly bedded. *(continued)*	BDX (LS)									
			94 95	94 - 95.1' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)									
				95.1' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-374

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	11/6/2015	11/9/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-374	Feet (NAVD88)	398.41 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,663.65 N, 2,379,766.63 E E/W (W circled)
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 22.8546"
Long -89° 52' 38.0706"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0 - 2	0 - 2' **TOPSOIL:** ML.	ML								0-23.6' Blind Drilled. See log PZ-174 for soil description.
			2 - 4	2 - 4' No Recovery.									
			4 - 12	4 - 23.6' **LEAN CLAY:** CL.	CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

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NATURAL RESOURCE TECHNOLOGY

Boring Number MW-374

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13–23	4 - 23.6' **LEAN CLAY:** CL. *(continued)*	CL									
1 SS	24 0.4	50/5"	24	23.6 - 24.1' **SILTY CLAY** CL/ML, brown, 3" of shale at bottom of sample.	CL/ML									
1 CORE	18 16			24.1 - 27.5' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded, moderately fractured (very narrow to moderately narrow apertures).										Core 1, RQD=89%
2 CORE	60 44		26		BDX (LS)									Core 2, RQD=61%
			28	27.5 - 37.2' **SHALEY LIMESTONE:** BDX (LS/SH), decomposed, thickly bedded.										
3 CORE	38 30		30	29.7' moderately fractured.	BDX (LS/SH)									Core 3, RQD=67%

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-374

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				27.5 - 37.2' **SHALEY LIMESTONE:** BDX (LS/SH), decomposed, thickly bedded. *(continued)*	BDX (LS/SH)									
4 CORE	30 27		33											Core 4, RQD=56%
			34											
			35											
5 CORE	59 59			35.4' - 36.2' fossiliferous.										Core 5, RQD=100%
			36	36.2' increase in shale content.										
			37											
				37.2 - 40.3' **SHALE:** to **LIMESTONE:** BDX (SH), gray, limestone content decreasing with depth, thickly bedded, moderately fractured.	BDX (SH)									
			38											
			39											
				39.6' dark gray, no limestone.										
			40											
6 CORE	25 25			40.3 - 42.3' **LIMESTONE:** BDX (LS), fossiliferous, slightly fractured.	BDX (LS)									Core 6, RQD=100%
			41											
			42	41.9' very narrow diagonal fracture.										Bedrock corehole reamed 6" in diameter to 42' for well installation.
				42.3' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-375

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	11/3/2015	11/6/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-375	Feet (NAVD88)	420.50 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,434.97 N, 2,380,838.70 E E/Ⓦ
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 20.562"
Long -89° 52' 24.6504"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0 - 0.9	0 - 0.9' **SILT:** ML.	ML									0- 44.8' Blind Drilled. See log PZ-175 for soil description details.
			0.9 - 5.4	0.9 - 5.4' **LEAN CLAY:** CL.	CL									
			5.4 - 13.5	5.4 - 13.5' **SILT:** ML.	ML									
			13.5 - 15	13.5 - 22.3' **LEAN CLAY:** CL.	CL									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

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NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number MW-375

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16–22	13.5 - 22.3' **LEAN CLAY:** CL. *(continued)*	CL									
			22–26	22.3 - 26' **SILT:** ML.	ML									
			26–28	26 - 28' **LEAN CLAY:** to **SILT:** CL.	CL									
			28	28 - 28.4' **SANDY SILT:** s(ML).	s(ML)									
			29–31	28.4 - 31.3' **LEAN CLAY:** CL.	CL									
			31	31.3 - 31.5' **WELL-GRADED SAND WITH GRAVEL:** (SW)g.	(SW)g									
			32–41	31.5 - 43.8' **LEAN CLAY:** CL.	CL									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-375

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			42–43	31.5 - 43.8' **LEAN CLAY:** CL. *(continued)*	CL								
			44	43.8 - 44.8' **SANDY LEAN CLAY WITH GRAVEL:** s(CL)g.	s(CL)g								
1 CORE 1 SS	60 42 5 5	50 for 5"	45	44.8 - 45.3' **WELL-GRADED GRAVEL:** GW, gray, mostly limestone cobbles.	GW								Core 1, RQD=86% Broken limestone in split spoon at 45'.
			46–49	45.3 - 49.3' **SILTY CLAY** CL/ML, dark yellowish brown (10YR 4/6).	CL/ML								
			49–50	49.3 - 50.1' **LEAN CLAY:** CL, dark gray (10YR 4/1).	CL								
2 CORE	24 18		50–51	50.1 - 51.3' **SHALE:** BDX (SH), highly decomposed.	BDX (SH)								Core 2, RQD=33%
3 CORE	36 30.5		51–53	51.3 - 62.8' **SHALEY LIMESTONE:** BDX (LS/SH), gray, thickly bedded, fossiliferous, moderately fractured.	BDX (LS/SH)								Core 3, RQD=85%
4 CORE	60 55		55										Core 4, RQD=95%
5 CORE	60 62		60	59.9' very narrow to narrow apertures.									Core 5, RQD=94%
			63	62.8 - 84.7' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded, slightly fractured (extremely narrow to moderately narrow apertures).	BDX (LS)								
6 CORE	60 55		65	64.9' very narrow apertures.									Core 6, RQD=100%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-375

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			68	62.8 - 84.7' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded, slightly fractured (extremely narrow to moderately narrow apertures). *(continued)*										
7 CORE	60 63		70	69.5' slightly to moderately fractured (very narrow to moderately narrow apertures).										Core 7, RQD=95% Bedrock corehole reamed 6" in diameter to 70' for well installation.
8 CORE	60 62		75	74.9' extremely narrow apertures.	BDX (LS)									Core 8, RQD=100%
9 CORE	60 56		80	80.2' unfractured, cherty.										Core 9, RQD=100%
				84.7' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-377

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	10/29/2015	11/2/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-377	Feet (NAVD88)	418.75 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 554,198.46 N, 2,381,923.68 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 18.1896"
Long -89° 52' 11.0712"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–4	0 - 4' **TOPSOIL:** ML.	ML								0-28.5' Blind Drilled. See log PZ-177 for soil description.
			4–13	4 - 19.3' **LEAN CLAY:** CL.	CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Brad Rudin (signed)

Firm: Natural Resource Technology
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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-377

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			14–19	4 - 19.3' **LEAN CLAY:** CL. *(continued)*	CL									
			20–22	19.3 - 22' **SILT:** ML.	ML									
			22–28	22 - 28.5' **LEAN CLAY:** CL.	CL									
1 SS	24	3 6 9 17	29–30	28.5 - 30.8' **LEAN CLAY:** CL, brownish yellow (10YR 6/6), gray (10YR 5/4) mottling, hard (4.5 tsf).	CL									
2 SS	24 12	12 20 27 30	31	30.8 - 34.9' **SHALE:** BDX (SH), gray, moderately to highly decomposed.	BDX (SH)									
1 CORE	41 51		32–34	31.7' grayish brown mottling, thickly bedded.										Core 1, RQD=92%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-377

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
2 CORE	55.8 16		35	34.9 - 35.3' **LIMESTONE:** BDX (LS), cherty, moderately decomposed, reddish gray mottling, moderately fractured.	BDX (LS)									Core 2, RQD=25%
			36	35.3 - 46.4' **SHALE:** BDX (SH), gray, moderately to highly decomposed.										
3 CORE	60 64.2		40	39.7' - 40.4' gray and brown mottling, highly decomposed, blocky structure. 40.4' - 43.1' highly decomposed, moderately fractured.	BDX (SH)									Core 3, RQD=75%
4 CORE	60 58		45											Core 4, RQD=12%
			46.4	46.4 - 51.1' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured (narrow apertures).	BDX (LS/SH)									
			49.5	49.5 - 49.9' vertical fracture.										
5 CORE	60 50		50											Core 5, RQD=58%
			51.1	51.1 - 55.5' **SHALE:** BDX (SH), gray, thickly bedded.	BDX (SH)									
6 CORE	60 41		55.5	55.5 - 58.2' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured.	BDX (LS/SH)									Core 6, RQD=61%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-377

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			57 58	55.5 - 58.2' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, moderately fractured. *(continued)*	BDX (LS/SH)									
				58.2' End of Boring.										Bedrock corehole reamed 6" in diameter to 58' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-382

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	11/19/2015	11/24/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-382	Feet (NAVD88)	428.67 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,440.86 N, 2,382,404.51 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 40.344"
Long -89° 52' 4.9578"

Local Grid Location
Feet ☐N ☐S Feet ☐E ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0-2	0 - 2' **SILTY CLAY** CL/ML.	CL/ML								0-34' Blind Drilled. See log PZ-182 log for soil description details.
			2-4	2 - 4' Shelby Tube Sample.									
			4-12	4 - 12' **SILTY CLAY** CL/ML.	CL/ML								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signatur Brad Rodes

Firm Natural Resource Technology
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NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number MW-382

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12–14	12 - 14' Shelby Tube Sample.										
			14–22	14 - 22' **SILTY CLAY** CL/ML.	CL/ML									
			22–24	22 - 24' Shelby Tube Sample.										
			24–27	24 - 27' **SILTY CLAY** CL/ML.	CL/ML									
			27–29.1	27 - 29.1' **WELL-GRADED SAND:** SW.	SW									
			29.1–30	29.1 - 30' **SANDY LEAN CLAY WITH GRAVEL:** s(CL)g.	s(CL)g									
			30–32	30 - 34' **SILTY CLAY** CL/ML.	CL/ML									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-382

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	30 - 34' **SILTY CLAY** CL/ML. *(continued)*	CL/ML									
1 SS	23 20	12 20 25 50 for 5"	34–36	34 - 36' **SILTY CLAY** CL/ML, dark gray (10YR 4/1), dark yellowish brown 10YR 4/6 mottling, highly decomposed shale at bottom of spoon, hard (>4.5 tsf).	CL/ML									
1 CORE	53 48.5		36–38.3	36 - 38.3' **SHALE:** BDX (SH), gray, highly decomposed.	BDX (SH)									Core 1, RQD=94%
			38.3–40	38.3 - 40' **LIMESTONE:** BDX (LS), thinly laminated, intensely fractured (extremely narrow apertures).	BDX (LS)									
2 CORE	60 24.5		40–44.5	40 - 44.5' **SHALE:** BDX (SH), gray, highly decomposed.	BDX (SH)									Core 2, RQD=51%
			44.5–45.4	44.5 - 45.4' **LIMESTONE:** BDX (LS), thinly bedded.	BDX (LS)									
3 CORE	54 35		45.4–52	45.4 - 58.4' **SHALE:** BDX (SH), gray, highly decomposed.	BDX (SH)									Core 3, RQD=51%
4 CORE	24 23.5		50	50.1' - 51.2' reddish brown and dark gray mottling.										Core 4, RQD=19%
			51	51.2' - 52.1' limestone, intensely fractured.										

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
5 CORE	41 41		53, 54, 55	45.4 - 58.4' **SHALE:** BDX (SH), gray, highly decomposed. *(continued)* 52.1' gray.	BDX (SH)									Core 5, RQD=63%
6 CORE	30 25		56, 57, 58	55.9' gray to dark gray, intensely fractured, few medium limestone beds.										Core 6, RQD=50%
7 CORE	30 30		59, 60	58.4 - 62' **LIMESTONE:** BDX (LS), cherty, moderately fractured. 59.5' - 59.9' vertical fracture. 60' shale (2" layer).	BDX (LS)									Core 7, RQD=53%
8 CORE	60 59		61	60.4' - 61.4' shaley, intensely fractured.										Core 8, RQD=70%
			62, 63, 64, 65	62 - 67.1' **SHALE:** BDX (SH), gray, hard, slightly fractured.	BDX (SH)									
9 CORE	60 59		66, 67											Core 9, RQD=88%
			68, 69, 70	67.1 - 70.6' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, slightly fractured, (very narrow apertures).	BDX (LS/SH)									Bedrock corehole reamed 6" in diameter to 69' for well installation.
				70.6' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-383

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	12/7/2015	12/21/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-383	Feet (NAVD88)	457.18 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,586.04 N, 2,385,208.26 E E/W
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 41.6862"
Long -89° 51' 29.8296"

Local Grid Location: Feet ☐ N ☐ S, Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24	4 2 2 4	0–1	0 - 16' **FILL, ASH (Coal):** black (10YR 2/1) and dark yellowish brown (10YR 4/4), mostly sand-sized ash, 30-50% cinders, >15% silt-sized ash, very soft (0 tsf).										
2 SS	24	1 3 2 3	2											
3 SS	24 18	1 2 3 7	4											
4 SS	24 18	2 11 11 7	6		(FILL)									
5 SS	24 17	7 4 3 2	8	8' mostly black (10YR 2/1).										
6 SS	24 18	2 4 4 4	10–12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: *Brad Rodes* | Firm: Natural Resource Technology, 234 W. Florida St., Fifth Floor, Milwaukee, WI 53204 | Tel: (414) 837-3607 | Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-383

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24	2 3 4 1	13	0 - 16' **FILL, ASH (Coal):** black (10YR 2/1) and dark yellowish brown (10YR 4/4), mostly sand-sized ash, 30-50% cinders, >15% silt-sized ash, very soft (0 tsf). *(continued)*									
8 SS	24	1 2 1 2	14, 15	14' clay (2" thick layer).	(FILL)								
9 SS	24 10	WOH WOH 2 2	16, 17	16 - 18' **LEAN CLAY:** CL, gray (5Y 5/1), stiff (1.75 tsf).	CL								WOH=weight of hammer
10 SS	24 14	WOH 2 2 2	18, 19	18 - 40' **SILTY CLAY** CL/ML, gray (10YR 6/1), yellowish brown (10YR 5/6) mottling, stiff to very stiff (1.0-3.0 tsf), low plasticity.									
11 SS	24	WOH 2 2 2	20, 21										
			22, 23										Blind drill 22-24' bgs during casing install. Permanent 6" PVC casing was installed to 22.5' bgs.
13 SS	24 13	1 1 3 3	24, 25	24' gray (10YR 5/1), dark yellowish brown (10YR 4/6) mottling.	CL/ML								
14 SS	24 12	1 1 2 3	26, 27	26' dark gray (10YR 5/6) mottling.									
15 SS	24 23	2 4 4 6	28, 29										
16 SS	24 27	4 4 2 7	30, 31, 32	31' trace oxidation staining.									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-383

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 27	4 4 5 5	33	18 - 40' **SILTY CLAY** CL/ML, gray (10YR 6/1), yellowish brown (10YR 5/6) mottling, stiff to very stiff (1.0-3.0 tsf), low plasticity. *(continued)* 32' light brownish gray (10YR 6/2), yellowish brown (10YR 5/6) mottling, very stiff (3.0 tsf).									
18 SS	24 26	2 3 5 6	34, 35	34' gray (10YR 5/1), dark yellowish brown (10YR 4/6) mottling, very stiff (2.0 tsf).									
19 SS	24 14	WOH WOH 3 4	36, 37	36' very soft to stiff (0-1.75 tsf).	CL/ML								
20 SS	24 12	3 4 3 5	38, 39	38' strong brown (7.5YR 4/6), gray (10Y R5/1) mottling, trace sand, very stiff (3.5 tsf).									
21 SS	24 22	1 2 2 2	40	40 - 41' **LEAN CLAY WITH SAND:** (CL)s, gray (10YR 5/1), dark yellowish brown (10YR 4/6) mottling, moderately stiff (0.75 tsf).	(CL)s								
			41	41 - 42' **SILTY SAND:** SM, yellowish brown (10YR 5/6), mostly medium sand, trace coarse sand, soft.	SM								
22 SS	24 24	5 8 9 10	42, 43	42 - 44' **SILTY CLAY** CL/ML, brown (10YR 5/3), >15% sand, moderately stiff (0.75 tsf), nonplastic.	CL/ML								
23 SS	24 20	4 6 8 7	44, 45	44 - 50' **LEAN CLAY:** CL, yellowish brown (10YR 5/6), trace black oxidation staining, very stiff to hard (3.25-4.5+ tsf), plastic.									
24 SS	24 16	4 6 10 11	46, 47		CL								
25 SS	24 19	6 18 21 21	48, 49	48' brown (10YR 5/3), hard (4.25-4.5+), low plasticity.									
26 SS 1 CORE	24 60	8 16 22 32	50, 51, 52	50 - 53.1' **SHALE:** BDX (SH), light olive gray (5Y 6/2), hard, highly decomposed, dry.	BDX (SH)								Core 1, RQD=60%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-383

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
27 SS	24	8 10 15 50/4"		50 - 53.1' **SHALE:** BDX (SH), light olive gray (5Y 6/2), hard, highly decomposed, dry. *(continued)*	BDX (SH)									
			53	53.1 - 55.1' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)									
2 CORE	60		55	55.1 - 58.6' **LIMESTONE:** BDX (LS), slightly fractured.	BDX (LS)									Core 2, RQD=82%
			58	58.6 - 59.5' **SHALE:** BDX (SH), thinly bedded with limestone, moderately fractured.	BDX (SH)									
3 CORE	60		59	59.5 - 70.1' **SHALE:** BDX (SH), gray, moderately decomposed. 60' intensely to moderately fractured.	BDX (SH)									Core 3, RQD=31%
			63	63' moderately fractured.										
4 CORE	60		65											Core 4, RQD=49%
5 CORE	34		70	70.1 - 73' **LIMESTONE:** BDX (LS), unfractured.	BDX (LS)									Core 5, RQD=100%

Depth scale: 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-383

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	70.1 - 73' **LIMESTONE:** BDX (LS), unfractured. *(continued)*	BDX (LS)									
				73' End of Boring.										Bedrock corehole reamed 6" in diameter to 73' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-384

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	12/7/2015	12/16/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-384	Feet (NAVD88)	456.70 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,446.11 N, 2,384,518.72 E E/Ⓦ
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 30.4398"
Long -89° 51' 38.5158"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 / 8	2 3 4 6	0–2.5	0 - 2.5' **FILL, ASH (Coal):** very soft to moderately stiff (0-0.75 tsf).	(FILL)								
2 SS	24 / 19	2 4 3 6	2.5–4	2.5 - 4' **FILL, SILTY CLAY** CL/ML, strong brown (7.5YR 4/6), trace gravel, very soft to very stiff (0-3.5 tsf).	(FILL) CL/ML								
3 SS	24 / 10	1 2 3 4	4–18	4 - 18' **FILL, ASH (Coal):** yellowish red (5YR 4/6) to reddish black (10R 2.5/1), sand-sized ash and cinders, very soft to stiff (0-1.5 tsf).	(FILL)								
4 SS	24	2 2 2 2	6										
5 SS	24	1 2 1 1	8										
6 SS	24	1 2 1 1	10										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

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NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number MW-384

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24	1 5 10 10	13	4 - 18' **FILL, ASH (Coal):** yellowish red (5YR 4/6) to reddish black (10R 2.5/1), sand-sized ash and cinders, very soft to stiff (0-1.5 tsf). *(continued)*									
8 SS	24 14	5 10 11 11	14	14' wet.	(FILL)								
9 SS	24 14	5 8 14 15	16										
10 SS	24 16	2 2 3 4	18	18 - 22' **SILTY CLAY** CL/ML, gray (5Y 6/1), organic odor, stiff to very stiff (1.25-3.75 tsf), wet.	CL/ML								
11 SS	24 18	2 2 6 4	20										
12 SS	24 16	4 4 5 4	22	22 - 24' **SILT:** ML, very dark gray (10YR 3/1), dark yellowish brown (10YR 3/6) mottling, hard (4.25-4.5 tsf).	ML								
13 SS	24 22	1 2 5 7	24	24 - 42.4' **SILTY CLAY** CL/ML, gray (10YR 5/1) with yellowish brown (10YR 5/8), oxidation staining, very soft to hard (<0.25-4.5+ tsf).	CL/ML								Permanent 6" PVC casing set at 25' bgs.
14 SS	24 21	3 4 5 7	26	26' yellowish brown (10YR 5/4), trace yellowish brown (10YR 5/8) and very dark gray (10YR 3/1) mottling, 15-30% silt, 5-15% fine sand, trace fine gravel, stiff to very stiff (1.25-2.5 tsf), low to medium plasticity, moist.									
15 SS	24 21	3 4 5 6	28	28' color grades to gray (10YR 5/1), 30-50% silt, soft to stiff (0.5-1.25 tsf).									
16 SS	24 17.5	1 5 5 7	30	30' yellowish brown (10YR 5/8) mottling (15-30%), trace very dark gray (10YR 3/1) mottling, no gravel, very soft to very stiff (<0.25-2.5 tsf), medium plasticity.									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-384

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 20.5	4 4 4 6	33	24 - 42.4' **SILTY CLAY** CL/ML, gray (10YR 5/1) with yellowish brown (10YR 5/8), oxidation staining, very soft to hard (<0.25-4.5+ tsf). *(continued)* 32' trace yellowish brown (10YR 5/8) and very dark gray (10YR 3/1) mottling, 15-30% silt, stiff to very stiff (1.75-3.5 tsf).	CL/ML								
18 SS	24 22	3 4 5 7	34, 35	34' yellowish brown (10YR 5/8) mottling (15-30%), trace very dark gray (10YR 3/1) mottling, stiff to very stiff (1.5-2.5), dry to moist. 35.3' yellowish brown (10YR 5/8), trace gray (10YR 5/1) and very dark gray (10YR 3/1) mottling.									
19 SS	24 21	4 3 3 4	36, 37	36' gray (10YR 5/1) mottling (15-30%), silt content increasing with depth, moderately stiff to stiff (0.75-1.25 tsf), low plasticity, moist.									
20 SS	24 24	2 4 7 14	38, 39	38' grayish brown (10YR 5/2), trace gray (10YR 5/1), trace strong brown (7.5YR 4/6) mottling, 30-50% silt, soft to very stiff (0.5-3.75 tsf). 38.7' - 40' very dark gray (10YR 3/1) mottling (5-15%), 5-15% fine gravel.									
21 SS	24 25	3 11 21 44	40, 41	40' sand (5-15%), trace gravel, very stiff to hard (3.5-4.5+ tsf). 40.3' wet. 40.8' very stiff to hard (3.5-4.5+ tsf), moist.									
22 SS	24 20	13 11 15 17	42, 43	41.8' fine sand seam (1/4" thick). 42' - 42.4' fine gravel, 30-50% clay, trace sand, wet. 42.4 - 44.3' **CLAYEY SILT** ML/CL, gray (10YR 5/1) to grayish brown (10YR 5/2), 30-50% clay, 5-15% fine sand, trace subrounded gravel, very stiff to hard (3.5-4.5+), nonplastic to low plasticity, moist.	ML/CL								
23 SS	24 17	6 8 10 14	44, 45	43.5' - 44.3' very dark grayish brown (10YR 3/2), brownish yellow trace (10YR 6/6) mottling, trace coal. 44.3 - 56' **LEAN CLAY:** CL, brownish yellow trace (10YR 6/6), trace light brownish gray (10YR 6/2) mottling, 15-30% silt, 5-15% gravel, trace gravel-sized oxidation-stained nodules, very stiff (2.5-3.0 tsf), low to medium plasticity, moist to dry.									
24 SS	24 16	5 10 11 15	46, 47	46' decreasing silt content, trace gravel, clay becoming laminated with depth, very stiff (2.25-3.0 tsf).									
25 SS	24 13.5	6 8 12 22	48, 49	48' silt (5-15%), trace shale gravel, very stiff (3.0 tsf), medium plasticity, dry. 49.2' gravel (2" diameter).	CL								
26 SS	24 16	8 9 15 19	50, 51, 52	50' very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2), trace silt, very stiff (3.5 tsf), medium to high plasticity, highly weathered shale (residual soil).									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-384

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
27 SS	24 22	13 14 9 14	53	44.3 - 56' **LEAN CLAY:** CL, brownish yellow trace (10YR 6/6), trace light brownish gray (10YR 6/2) mottling, 15-30% silt, 5-15% gravel, trace gravel-sized oxidation-stained nodules, very stiff (2.5-3.0 tsf), low to medium plasticity, moist to dry. *(continued)*	CL									
28 SS	24 24	12 12 14 22	54, 55	52' - 54' clay is fractured, light brownish gray (10YR 6/2) to light yellowish brown (10YR 6/4) in fractures. 54' trace very dark brown (10YR 2/2) laminations, hard (>4.5 tsf).										
29 SS	23 20	11 14 20 50/5"	56	56 - 58.2' **SHALE:** BDX (SH), very dark gray (10YR 3/1), highly weathered, fissile, totally healed fractures, very weak, highly decomposed [light brownish gray (10YR 6/2) in fractures], very intensely fractured (closed to narrow apertures).	BDX (SH)									3" steel casing set at 57.7 ft bgs.
1 CORE	24 40		57, 58	57' light yellowish brown (10YR 6/4) to very dark gray (10YR 3/1) layers, thinly bedded, highly decomposed to residual soil.										Core 1, RQD=36%
2 CORE	60 64		59, 60	58.2 - 60.8' **LIMESTONE:** BDX (LS), light greenish gray (GLEY 1 7/10Y), microcrystalline, trace fossils, moderately strong to strong, medium bedded, slightly to moderately decomposed, moderately fractured.	BDX (LS)									Core 2, RQD=73%
			61, 62, 63	60.8 - 64' **SHALEY LIMESTONE:** BDX (LS/SH), weak, thin to medium bedded, moderately decomposed, slightly to moderately disintegrated.	BDX (LS/SH)									
3 CORE	60 73		64, 65, 66, 67	64 - 82.6' **SHALE:** BDX (SH), greenish gray (GLEY 1 5/10Y), very weak, thinly bedded, highly to moderately decomposed, slightly to moderately disintegrated, intensely fractured (very narrow to moderately narrow apertures).	BDX (SH)									Core 3, RQD= 58%
			68	67.9' - 68.8' shale clasts within decomposed shale matrix.										
4 CORE	60 63		69, 70, 71, 72	68.8' - 69.2' light yellowish brown (10YR 6/4), trace dark yellowish brown (10YR 3/6) layers. 69.2' - 74' intensely fractured (extremely narrow to narrow aperture).										Core 4, RQD=46%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-384

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	64 - 82.6' **SHALE:** BDX (SH), greenish gray (GLEY 1 5/10Y), very weak, thinly bedded, highly to moderately decomposed, slightly to moderately disintegrated, intensely fractured (very narrow to moderately narrow apertures). *(continued)*										
5 CORE	60 20		74	74' - 79' intensely to very intensely fractured.										Core 5, RQD=0%
			75											
			76											
			77		BDX (SH)									Bedrock corehole reamed 6" in diameter to 77' for well installation.
			78											
6 CORE	60 64		79	79' - 82.6' intensely fractured.										Core 6, RQD=64%
			80											
			81											
			82											
			83	82.6 - 83.9' **SHALEY LIMESTONE:** BDX (LS/SH), light greenish gray (GLEY 1 7/10Y), fossiliferous, intensely fractured (extremely narrow to narrow apertures), slightly decomposed.	BDX (LS/SH)									
7 CORE	60 37		84	83.9 - 85.6' **SHALE:** BDX (SH), greenish gray (GLEY 1 5/10Y), very weak, medium bedded, highly to moderately decomposed, slightly to moderately disintegrated, intensely fractured (extremely narrow to narrow apertures).	BDX (SH)									Core 7, RQD=15%
			85											
			86	85.6 - 88.7' **SHALEY LIMESTONE:** BDX (LS/SH), light greenish gray (GLEY 1 7/10Y), shaley, fossiliferous, intensely fractured (extremely narrow to narrow apertures), slightly decomposed. 86.4' - 87' SHALE layer, greenish gray (GLEY 1 5/10Y), very weak, medium bedded.	BDX (LS/SH)									
			87											
			88											
8 CORE	60 50		89	88.7 - 94.1' **SHALE:** BDX (SH), greenish gray (GLEY 1 5/10Y), very weak, medium bedded, highly to moderately decomposed, slightly to moderately disintegrated, intensely fractured (extremely narrow to narrow apertures).	BDX (SH)									Core 8, RQD=49%
			90											
			91											
			92											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-384

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93 94	88.7 - 94.1' **SHALE:** BDX (SH), greenish gray (GLEY 1 5/10Y), very weak, medium bedded, highly to moderately decomposed, slightly to moderately disintegrated, intensely fractured (extremely narrow to narrow apertures). *(continued)* 92.5' - 93.2' light greenish gray (GLEY 1 7/10Y), shaley, fossiliferous, intensely fractured, slightly decomposed.	BDX (SH)									
				94.1' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-385

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	12/4/2015	12/16/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-385	Feet (NAVD88)	454.82 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,417.12 N, 2,382,285.24 E E/W (W circled)
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 30.2244"
Long -89° 52' 6.492"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 13	2 3 3 5	0–1	0 - 0.3' **FILL, ASH (Coal):** dark yellowish brown (10YR 4/6), sand and silt-sized ash, dark gray (10YR 4/1) slag pieces, dry to moist.	(FILL)								
				0.3 - 19.7' **FILL, LEAN CLAY:** CL, brown (10YR 5/3) to yellowish brown (10YR 5/4) inside, 10-30% silt, cohesive, stiff to hard (1.0-4.5 tsf), medium plasticity, moist.									
2 SS	24 9	1 2 2 3	2	2' dark gray (10YR 4/1) mottling (15-30%), moist.									
3 SS	24 15	1 3 4 5	4	4' trace sand, trace dark yellowish brown (10YR 4/6) oxidation staining, moist to dry.									
4 SS	24 16	1 3 5 6	6	6' dry to moist.	(FILL) CL								
5 SS	24 9	WOH 1 3 4	8	8' increased dark gray (10YR 4/1) mottling 20-30%, dry to moist.									WOH=weight of hammer
6 SS	24 13	1 2 3 5	10	10' moist.									
7 SS	24 18	WOH 2 5 7	12–13	12' moist to dry. 12.3' mostly dark gray (10YR 4/1), no mottling.									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Pale M. Hale

Firm: Natural Resource Technology
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Tel: (414) 837-3607
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NATURAL RESOURCE TECHNOLOGY

Boring Number MW-385

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				0.3 - 19.7' **FILL, LEAN CLAY:** CL, brown (10YR 5/3) to yellowish brown (10YR 5/4) inside, 10-30% silt, cohesive, stiff to hard (1.0-4.5 tsf), medium plasticity, moist. *(continued)*										
8 SS	24 12	WOH WOH 3 3	14	13' mostly brown (10YR 4/3), dark gray (10YR 4/1) mottling.										
			15	14' some dark gray (10YR 4/1) mottling, trace yellowish brown (10YR 5/6) oxidation staining, trace very dark grayish brown (10YR 3/2) mottling, moist.										
9 SS	24 16	WOH 1 3 4	16	16' moist.	(FILL) CL									
			17	16.5' dark gray (10YR 4/1) with dark yellowish brown (10YR 4/6) mottling, cohesive, medium to high plasticity.										
10 SS	24 24	WOH WOH 2 3	18	18' dark gray (10YR 4/1), dark yellowish brown (10YR 4/6) mottling, softer than above, moist to wet.										
			19											
11 SS	24 24	WOH WOH WOH 1	20	19.7 - 31.9' **FILL, ASH (Coal):** very dark grayish brown (10YR 3/2) to very dark brown (10YR 2/2), silt-sized ash, trace sand-sized ash, cohesive, very soft (0 tsf), non-plastic, wet.										
			21	20' very dark grayish brown (10YR 3/2), trace sand seams, wet.										
12 SS	48 24	WOH 1 WOH 1	22	22' trace fine-grained sand seams.										
			23											
			24											
			25											
13 SS	24 21	1 WOH 1 WOH	26	25.7' medium-grained sand seam (2" thick).	(FILL)									
			27											
14 SS	24 24	1 2 2 1	28											
			29											
15 SS	24 24	WOH WOH WOH WOH	30											
			31											
			32	31.9 - 38' **SILT:** to **LEAN CLAY:** ML, olive gray (5Y 5/2), cohesive, very soft to soft (0.25-0.5 tsf), low to medium plasticity, moist to wet.										
			33		ML									
16 SS	24 24	WOH WOH WOH	34											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-385

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
		WOH	35	31.9 - 38' **SILT:** to **LEAN CLAY:** ML, olive gray (5Y 5/2), cohesive, very soft to soft (0.25-0.5 tsf), low to medium plasticity, moist to wet. *(continued)*	ML									
17 SS	24 24	2 4 6 6	38	38 - 59' **LEAN CLAY:** CL, olive gray (5Y 5/2), dark yellowish brown (10YR 4/6) mottling, moist to dry.	CL									
18 SS	24 14	WOH 2 3 4	42	42' medium plasticity, moist.										Augered with 8" plug to 42' bgs.
19 SS	24 23	1 3 4 6	44											Permanent 6"PVC casing set at 45' bgs.
20 SS	24 27	2 3 3 5	46											
21 SS	24 16	WOH 2 4 4	48	48' gray (10YR 6/1), dark yellowish brown (10YR4/6), stiff (1.5 tsf), plastic.										
22 SS	24 24	WOH 3 4 4	50											
			51	51' trace sand, very stiff (2.5 tsf).										
23 SS	24 24	3 4 4 7	52											
24 SS	24 22	WOH 2 3 4	54	54' increase in sand content, stiff (1.75 tsf).										
25	24	WOH	56	56' trace root structures, oxidation staining.										

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-385

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
SS	21	3 3 4	57	38 - 59' **LEAN CLAY:** CL, olive gray (5Y 5/2), dark yellowish brown (10YR 4/6) mottling, moist to dry. *(continued)*	CL									
26 SS	24 23	WOH 5 11 27	58											
			59	59 - 60' **POORLY-GRADED SAND WITH CLAY:** SP-SC, fine-grained, trace coarse-grained sand, and trace gravel, very stiff (2.25 tsf).	SP-SC									
27 SS	24 22	6 8 13 13	60	60 - 61' **SILTY CLAY** to **POORLY-GRADED SAND:** CL/ML, yellowish brown (10YR 5/6), gray (10YR 5/1) mottling.	CL/ML									
			61	61 - 62' **LEAN CLAY:** to **SHALE:** CL, very dark gray (10YR 3/1), weathered, hard (>4.5 tsf), dry.	CL									
28 SS	24 22	9 13 15 50/4"	62	62 - 63.8' **SILTY CLAY** to **SHALE:** CL/ML, grayish brown (10YR 5/2), dark yellowish brown (10YR 4/6) mottling, weathered.	CL/ML									
			63											
			64	63.8 - 65' **SHALE:** BDX (SH), weathered.	BDX (SH)									
1 CORE	12 11													Core 1, RQD=0%
			65	65 - 65.9' **SHALEY LIMESTONE:** BDX (LS/SH).	BDX (LS/SH)									
2 CORE	60 48													Core 2, RQD=63%
			66	65.9 - 76.3' **SHALE:** BDX (SH), gray, decomposed, intensely to moderately fractured.	BDX (SH)									
			67											
			68											
			69											
			70											
3 CORE	60 55		71	71.2' - 72.5 vertical fracture (tight aperture).										Core 3, RQD=82%
			72											
			73											
			74											
			75											
4 CORE	60 60		76											Core 4, RQD=74%
				76.3 - 76.9' **LIMESTONE:** BDX (LS).	BDX (LS)									
			77	76.9 - 78.9' **SHALE:** BDX (SH), dark gray, moderately fractured.	BDX (SH)									
			78											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-385

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				76.9 - 78.9' **SHALE:** BDX (SH), dark gray, moderately fractured. *(continued)*	BDX (SH)									
			79	78.9 - 81.1' **LIMESTONE:** BDX (LS), cherty, slightly fractured.	BDX (LS)									
			80											
5 CORE	60 54.5		81											Core 5, RQD=62%
				81.1 - 82.2' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured.	BDX (LS/SH)									
			82	82.2 - 82.9' **LIMESTONE:** BDX (LS), moderately fractured.	BDX (LS)									
			83	82.9 - 83.5' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured.	BDX (LS/SH)									
			84	83.5 - 87.4' **SHALE:** BDX (SH), gray.	BDX (SH)									
			85											
6 CORE	60 65		86											Core 6, RQD=58%
			87											
			88	87.4 - 93' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, intensely to moderately fractured.	BDX (LS/SH)									
			89											
			90											
7 CORE	30 30		91											Core 7, RQD=100%
			92											
			93	93' End of Boring.										Bedrock corehole reamed 6" in diameter to 93' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-386

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	12/1/2015	12/11/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-386	Feet (NAVD88)	454.67 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒	Lat / Long	Local Grid Location
State Plane 554,585.18 N, 2,382,713.22 E E/Ⓦ 1/4 of 1/4 of Section , T N, R	Lat 38° 11' 21.9876" Long -89° 52' 1.167"	Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 16	3 3 7 5		0 - 0.5' **FILL, WELL-GRADED SAND:** SW, dark brown (10YR 3/3) to black (10YR 2/1), fine to coarse sand-sized ash and slag, moist.	(FILL) SW								
			1	0.5 - 2.6' **FILL, SILT:** ML, dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/8) mottling, 20-40% clay, cohesive, hard (4.5 tsf), nonplastic, dry.	(FILL) ML								
2 SS	24 16	2 4 4 6	2	2' - 2.6' clay content increases with depth to mostly clay at 2.6', dry.									
			3	2.6 - 24.5' **FILL, LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), trace gray (10YR 5/1) mottling, 20-40% silt, cohesive, very stiff (2.0-4.0 tsf), high plasticity, moist.									
3 SS	24 17	2 4 4 5	4	4' gray (10YR 5/1), 20-30% yellowish brown (10YR 5/8) mottling, trace medium-grained sand, moist to dry.									
			5										
4 SS	24 12	3 2 3 4	6	6' trace sand, moist to dry.									
			7		(FILL) CL								
5 SS	24 14.5	2 2 4 5	8	8' moist.									
			9										
6 SS	24 12	2 2 3 4	10	10' stiff (1.75 tsf).									
			11										
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
(signature)	Natural Resource Technology 234 W. Florida St., Fifth Floor, Milwaukee, WI 53204 Tel: (414) 837-3607 Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-386

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 16	2 2 3 7	13	2.6 - 24.5' **FILL, LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), trace gray (10YR 5/1) mottling, 20-40% silt, cohesive, very stiff (2.0-4.0 tsf), high plasticity, moist. *(continued)* 13.2' dark gray (10YR 4/1), trace sand, stiff to hard (1.5-4.5+ tsf), high plasticity, dry.									
8 SS	24 17	2 3 3 5	14, 15	14' dark gray (10YR 4/1), dark yellowish brown (10YR 4/6), high plasticity, dry to moist.									
9 SS	24 14	2 2 3 3	16, 17	16' dark yellowish brown (10YR 4/6), decrease to 30% dark gray (10YR 4/1), soft to very stiff (1.0-4.0 tsf), dry, increasing moisture content with depth.									
10 SS	24 15	1 1 2 2	18, 19	18' brownish yellow (10YR 6/8) mottling, silt content increases with depth to 30-50%, trace fine gravel, very soft to very stiff (0.0 to 3.0 tsf), moist to wet.	(FILL) CL								
11 SS	24 24	3 2 2 4	20, 21	20' yellowish brown (10YR 5/6), 30% dark gray (10YR 4/1) mottling, 20-40% silt, trace sand, trace fine gravel, soft to stiff (0.5-1.5 tsf), moist.									
12 SS	24 5	2 1 2 2	22, 23	22' trace yellowish red (5YR 4/6), 5-15% sand, stiff (1.5 tsf).									
13 SS	24 24	2 2 1 1	24, 25	24.5 - 26' **FILL, SILT:** ML, very dark grayish brown (10YR 3/2), low to medium plasticity, wet.	(FILL) ML								
14 SS	24 6	WOH WOH WOH WOH	26, 27	26 - 28.2' **FILL, LEAN CLAY:** CL, dark yellowish brown (10YR 4/6), 30-50% silt, cohesive, moderately stiff (0.75 tsf), medium to low plasticity, wet.	(FILL) CL								WOH=weight of hammer
15 SS	24 24	1 1 1 1	28, 29	28.2 - 44.3' **FILL, ASH (Coal):** very dark grayish brown (10YR 3/2), mostly silt-sized ash, 15-30% sand-sized ash, sand-sized ash seams, noncohesive, nonplastic.									
16 SS	24 24	2 3 1 1	30, 31, 32	30' wet.	(FILL)								

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-386

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 24	WOH WOH WOH WOH	33	28.2 - 44.3' **FILL, ASH (Coal):** very dark grayish brown (10YR 3/2), mostly silt-sized ash, 15-30% sand-sized ash, sand-sized ash seams, noncohesive, nonplastic. *(continued)*										
18 SS	24 24	WOH WOH 2 1	34, 35	34' trace dark gray (10YR 4/1) mottling of silt-sized ash, trace black (10YR 2/1) mottling of sand-sized ash, trace dark yellowish brown (10YR 4/6) mottling of clay-sized ash, very soft (0 tsf), wet.										
19 SS	24 23	1 WOH WOH WOH	36, 37											
20 SS	24 19	2 WOH WOH WOH	38, 39	38' mostly fine to medium sand-sized ash, 15-30% silt-sized ash, wet. 38.5' very dark grayish brown (10YR 3/2), black (10YR 2/1) mottling, mostly silt-sized ash, sand-sized ash seams, cohesive, nonplastic, wet.	(FILL)									
21 SS	24 24	1 2 WOH WOH	40, 41	40' dark gray (10YR 4/1) and black (10YR 2/1) mottling, wet.										
22 SS	24 21	1 WOH WOH WOH	42, 43											
23 SS	24 18	WOH 2 3 3	44, 45	44.3 - 46' **SILT:** ML, grades from very dark gray (10YR 3/1) to dark gray (10YR 4/1) with depth, 15-30% clay, cohesive, low plasticity, moist to wet.	ML									
24 SS	24 24	WOH 2 2 5	46, 47	46 - 60' **SILTY CLAY** CL/ML, gray (10YR 5/1) with yellowish brown (10YR 4/5), 20-40% silt, cohesive, stiff (1.75 tsf), medium plasticity, moist.										
25 SS	24 24	WOH 2 4 6	48, 49	48' dry to moist.	CL/ML									Permanent 6" PVC casing set at 48.5' bgs.
26 SS	24 12	2 4 5 5	50, 51, 52	50' oxidation-stained nodules (15-30%), trace sand.										

NATURAL RESOURCE TECHNOLOGY

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number MW-386

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
27 SS	24 17	1 6 12 14	53	46 - 60' **SILTY CLAY** CL/ML, gray (10YR 5/1) with yellowish brown (10YR 4/5), 20-40% silt, cohesive, stiff (1.75 tsf), medium plasticity, moist. *(continued)* 52' trace oxidation staining, very stiff (>4.5 tsf).							
28 SS	24 17	25 24	54, 55								
29 SS	24 12	8 16 33 24	56, 57	56' laminated weathered shale, dry.	CL/ML						
30 SS	24 24	7 11 15 24	58, 59								
31 SS	24 21	6 10 15 18	60, 61	60 - 60.3' **GRAVELLY FAT CLAY:** g(CH), black.	g(CH)						
				60.3 - 63.5' **SILTY CLAY** CL/ML, gray (10YR 5/1), dark yellowish brown (10YR 4/6) mottling, hard (>4.5 tsf).							
32 SS	24 18	9 15 50/5"	62		CL/ML						
1 CORE	28 35		63	63' gravel (>15%).							Core 1, RQD=34%
			64	63.5 - 64.8' **SHALE:** BDX (SH), weathered.	BDX (SH)						
			65	64.8 - 65.2' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)						
2 CORE	60 45		66, 67, 68, 69, 70	65.2 - 71' **SHALE:** BDX (SH), gray, slightly to moderately fractured, highly decomposed, some material washed-out.	BDX (SH)						Core 2, RQD=93%
3 CORE	60 28		71, 72	71 - 76' **LIMESTONE:** BDX (LS), vertical fracture, intensely fractured.	BDX (LS)						Core 3, RQD=18%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-386

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	71 - 76' **LIMESTONE:** BDX (LS), vertical fracture, intensely fractured. *(continued)* 72.3' vertical fracture.										
			74		BDX (LS)									
			75											
4 CORE	60 57													Core 4, RQD=37%
			76	76 - 77.2' **SHALE:** BDX (SH), dark gray, moderately fractured.	BDX (SH)									
			77	77.2 - 81.3' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.										
			78	78.2' - 78.9 vertical fracture.										
			79	79.6' - 79.8' vertical fracture.	BDX (LS/SH)									
5 CORE	60 55		80	80.3' - 80.5' vertical fracture.										Core 5, RQD=69%
			81	81.3 - 82.2' **SHALE:** to **LIMESTONE:** BDX (SH), slightly fractured.	BDX (SH)									
			82	82.2 - 86.3' **SHALE:** BDX (SH), gray, slightly to moderately fractured.										
			83											
			84		BDX (SH)									
			85											
6 CORE	48 48													Core 6, RQD=65%
			86	86.3 - 89' **SHALEY LIMESTONE:** BDX (LS/SH), slightly fractured.										
			87											
			88		BDX (LS/SH)									
			89	89' End of Boring.										Bedrock corehole reamed 6" in diameter to 89' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-387

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	11/13/2015	11/18/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-387	Feet (NAVD88)	424.01 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,111.17 N, 2,380,474.78 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 27.258"
Long -89° 52' 29.1828"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 16	2 7 6 6	0–2	0 - 4' **FILL, SILTY CLAY** CL/ML, brown (10YR 5/3), trace roots, stiff to very stiff (2.5-4 tsf), low plasticity, dry.	(FILL) CL/ML								
2 SS	24 18	2 5 5 7	2–4	3' trace fine sand.									
3 SS	24 18	2 4 4 5	4–6	4 - 10.8' **SILTY CLAY** CL/ML, dark yellowish brown (10YR 4/4), stiff to hard (1.5-4.5 tsf), medium plasticity, moist.	CL/ML								
4 SS	24 21	3 4 4 5	6–8	6' dark yellowish brown (10YR 3/4), trace oxidation staining.									
5 SS	24 0		8–10										
6 SS	24 16	WOH 3 4 5	10–12	10.8 - 12' **CLAYEY SILT** ML/CL, dark yellowish brown (10YR 4/4), nonplastic.	ML/CL								WOH=weight of hammer

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-387

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 24	WOH 3 4 4	13	12 - 24' **SILTY CLAY** CL/ML, dark yellowish brown (10YR 3/4), stiff to very stiff (1.5-2.75 tsf). 12.5' - 12.6' black staining. 13' increased silt content, moist.										
8 SS	24 24	1 2 4 5	14 15	14' dark yellowish brown (10YR 4/6). 15' trace oxidation staining, medium plasticity, moist.										
9 SS	24 26	2 3 5 6	16 17											
10 SS	24 25	1 3 4 5	18 19	18' low plasticity. 19' medium plasticity.	CL/ML									
11 SS	24 23	1 2 3 3	20 21	20' dark yellowish brown (10YR 4/4), grayish brown (10YR 5/2) mottling.										
12 SS	24 24	1 4 5 7	22 23											
13 SS	24 26	1 4 5 6	24 25	24 - 27.4' **LEAN CLAY:** CL, gray (10YR 5/1), stiff to very stiff (1.5-2.5 tsf), high plasticity.										
14 SS	24 24	1 3 6 4	26 27	26' trace black oxidation staining.	CL									
15 SS	24 24	1 2 2 3	28 29	27.4 - 28.5' **SILTY SAND:** to **LEAN CLAY:** SM, mostly fine sand, wet. 28.5 - 32.5' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), trace sand, very soft to very hard (0-4.5+ tsf).	SM									
16 SS	24 20	WOH 1 4 7	30 31 32	30' dark yellowish brown (10YR 3/4), oxidation-stained nodules (1" layer). 31' brown (10YR 4/3).	CL/ML									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-387

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 16	1 1 1 2												
			33	32.5 - 34' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/4), mostly medium sand, sand grain size decreasing with depth, silt and clay content increasing with depth.	SP									
18 SS	24	4 10 12 14	34	34 - 34.5' **SILTY SAND:** SM, yellowish brown (10YR 5/4), mostly fine sand.	SM									
			35	34.5 - 36' **SILTY CLAY** CL/ML, brown (10YR 4/3), very stiff to hard (2.5-4.5 tsf), low plasticity.	CL/ML									
19 SS 1 CORE	3 3 39 39	50 for 3"	36	36 - 40.6' **LIMESTONE:** BDX (LS), light gray, cherty, intensely fractured (fractures partly healed with shale).	BDX (LS)									Core 1, RQD=44%
			37											
			38											
			39											
			40											
2 CORE	60 49		41	40.6 - 43.9' **SHALE:** BDX (SH), dark gray, intensely fractured.	BDX (SH)									Core 2, RQD=61%
			42											
			43											
			44	43.9 - 45.3' **SHALEY LIMESTONE:** BDX (LS/SH), intensely fractured.	BDX (LS/SH)									
			45											
3 CORE	60 61		46	45.3 - 48.8' **LIMESTONE:** BDX (LS), fossiliferous, moderately fractured (fractures partly healed with shale).	BDX (LS)									Core 3, RQD=75%
			47											
			48											
			49	48.8 - 53.9' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)									
			50											
4 CORE	64 64		51											Formation taking water during coring.
			52											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-387

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	48.8 - 53.9' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured. *(continued)*	BDX (LS/SH)									Core 4, RQD=92%
			54	53.9 - 55' **SHALE:** BDX (SH), dark gray, moderately fractured, slightly decomposed.	BDX (SH)									
5 CORE	60 59		55	55 - 56.3' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)									Core 5, RQD=100%
			56 57 58 59 60	56.3 - 60.1' **LIMESTONE:** BDX (LS), fossiliferous, slightly fractured to unfractured.	BDX (LS)									
			61	60.1 - 61.3' Overdrilled for Well Installation.										
				61.3' End of Boring.										Bedrock corehole reamed 6" in diameter to 61.3' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-388

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Jim Dittmaier Bulldog Drilling	11/10/2015	11/12/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-388	Feet (NAVD88)	406.28 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 555,429.08 N, 2,379,624.09 E E/W
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 30.426"
Long -89° 52' 39.8274"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 11	2 5 10 8	0–2	0 - 4' **FILL, SILTY CLAY** CL/ML, dark yellowish brown (10YR 3/4), 30-50% silt, organic material at surface, very soft to very stiff (0.0-4.0 tsf), moist.	(FILL) CL/ML								
2 SS	24 18	3 6 8 9	2–4										
3 SS	24 15	3 4 8 9	4–6	4 - 18' **SILTY CLAY** CL/ML, brown (10YR 5/3), 30-50% silt, very soft to very stiff (0.0-4.0 tsf), moist.	CL/ML								
4 SS	24 18	1 4 6 4	6–8	6' yellowish brown (7.5YR 5/6), 30-50% fine sand.									
5 SS	24 22	1 1 2 4	8–10	8' yellowish brown (10YR 5/4).									
6 SS	24 21	2 2 3 3	10–12	10' brown (10YR 4/3), yellow (10YR 7/8) mottling.									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rodes

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
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SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-388

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 25	1 2 3 3		4 - 18' **SILTY CLAY** CL/ML, brown (10YR 5/3), 30-50% silt, very soft to very stiff (0.0-4.0 tsf), moist. *(continued)*										
			13	13.3' brown (10YR 5/3), trace sand.										
8 SS	24 20	1 2 4 7	14	14' grayish brown (10YR 5/2), increasing coarse sand content.										
			15		CL/ML									
9 SS	24 21	2 4 5 8	16	16' brownish yellow (10YR 6/8) mottling, very dark brown (10YR 2/2) stringers.										
			17	17 - 18' **SILTY CLAY WITH SAND** (CL/ML)S, yellowish brown (10YR 5/8).	(CL/ML)S									
10 SS	24 22	1 2 2 3	18	18 - 20' **SILTY CLAY** CL/ML, 30-50% silt, very soft to very stiff (0.0-4.0 tsf), slow dilatancy, wet.										
			19		CL/ML									
11 SS	24 14	WOH 2 4 7	20	20 - 23.5' **SILT WITH SAND:** (ML)s, yellowish brown (10YR 5/6), fine sand, rapid dilatancy, very soft (0.0 tsf), wet.										WOH=weight of hammer
			21											
12 SS	24 22	3 9 12 9	22	22' yellowish brown (10YR 5/4), with clay.	(ML)s									
			23											
13 SS	24 18	WOH 4 6 9	24	23.5 - 26.5' **SILTY CLAY WITH SAND** (CL/ML)S, grayish brown (10YR 5/2), fine sand, very stiff (2.5-3.0 tsf), wet. 24' gray (10YR 5/1), no fine sand.										
			25		(CL/ML)S									
14 SS	8 7	4 50 for 2"	26											
				26.5 - 27' **SHALE:** BDX (SH), gray, decomposed.	BDX (SH)									
1 CORE	35 31		27	27 - 30' **LIMESTONE:** BDX (LS), fossiliferous, thickly bedded, slightly fractured (narrow to moderately narrow apertures).										Core 1, RQD = 97%
			28											
			29		BDX (LS)									
2 CORE	60 40		30	30 - 45' **SHALEY LIMESTONE:** BDX (LS/SH), highly decomposed, intensely fractured.										Core 2, RQD = 68%
			31		BDX (LS/SH)									
			32											

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-388

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				30 - 45' **SHALEY LIMESTONE:** BDX (LS/SH), highly decomposed, intensely fractured. *(continued)*										
			33											
			34											
3 CORE	60 57.5		35	34.9' moderately fractured.										Core 3, RQD = 93%
			36											
			37	37' - 43.5' fossiliferous.										
			38											
			39		BDX (LS/SH)									
			40	40.1' slightly fractured.										
4 CORE	60 60.5		41	40.9' fossiliferous.										Core 4, RQD = 100%
			42											
			43											
			44											
			45	45 - 45.2' Overdrilled for Well Installation.										
				45.2' End of Boring.										Bedrock corehole reamed 6" in diameter to 45.2' for well installation.

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-389

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Tom Marlo Bulldog Drilling	11/25/2015	12/1/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-389	Feet (NAVD88)	417.30 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,119.33 N, 2,379,809.87 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 37.2444"
Long -89° 52' 37.4736"
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 16	1 3 7 13		0 - 16' **SILTY CLAY** CL/ML, brown (7.5YR 4/4), stiff to very hard (1-4.5+ tsf), low plasticity.									
			1										
2 SS	24 18	2 6 9 9	2										
			3										
3 SS	24 19.5	1 3 3 3	4	4.5' moist.									
			5										
4 SS	24 17	1 2 3 1	6		CL/ML								
			7	7' trace root structures.									
5 SS	24 17	2 2 4 5	8	8' black (10YR 2/1) oxidation mottling.									
			9										
6 SS	24 20	2 2 4 4	10	10' decreasing mottling, increasing silt content.									
			11										
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brad Rader

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-389

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 21	2 3 2 3	13	0 - 16' **SILTY CLAY** CL/ML, brown (7.5YR 4/4), stiff to very hard (1-4.5+ tsf), low plasticity. *(continued)* 12' dark yellowish brown (10YR 4/4), wet.										
8 SS	24 20	2 3 3 5	14, 15	14' brown (10YR 5/3), dark yellowish brown (10YR4/6) mottling.	CL/ML									
9 SS	24 24	1 3 5 6	16, 17	16 - 23' **FAT CLAY:** CH, grayish brown (10YR 5/2), yellowish brown (10YR 5/6) mottling, trace sand, stiff to very stiff (1.75-3.0 tsf), medium plasticity.										
10 SS	24 24	1 3 4 4	18, 19	18' black (10YR 2/1) oxidation nodules.										
11 SS	24 24	2 3 4 5	20, 21		CH									
12 SS	24 27	1 3 3 4	22											
			23	23 - 28.3' **SILTY CLAY WITH SAND** (CL/ML)S, yellowish brown (10YR 5/4), grayish brown (10YR 5/2) mottling, trace fine gravel, stiff to hard (1.5-4.5 tsf), medium plasticity.										
13 SS	24 27	1 2 4 4	24, 25											
14 SS	24 26	1 3 5 10	26, 27	27' low plasticity.	(CL/ML)S									
15 SS	24	1 3 8 11	28	28.3 - 28.8' **POORLY-GRADED SAND WITH CLAY:** SP-SC, yellowish brown (10YR 5/6).	SP-SC									
			29	28.8 - 36' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), trace sand, oxidation nodules, and fine gravel, very stiff to hard (2.5-4.5 tsf), wet.										
16 SS	24	1 3 5 10	30, 31, 32		CL/ML									

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-389

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 SS	24 23	1 3 5 8	33	28.8 - 36' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), trace sand, oxidation nodules, and fine gravel, very stiff to hard (2.5-4.5 tsf), wet. *(continued)*										
18 SS	24 26	1 3 8 13	34 35	34' increasing gravel content.	CL/ML									
19 SS	4 4	50 for 4"	36	36 - 37.3' **SHALEY LIMESTONE:** BDX (LS/SH), moderately fractured.	BDX (LS/SH)									
1 CORE	46 45		37											Core 1, RQD=86%
				37.3 - 37.7' **SHALE:** BDX (SH), decomposed, moderately fractured.	BDX (SH)									
			38 39	37.7 - 39.3' **LIMESTONE:** BDX (LS), shale at fractures, moderately fractured.	BDX (LS)									
2 CORE	13 12		40	39.3 - 46.8' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous, decomposed, moderately fractured.	BDX (LS/SH)									Core 2, RQD=67%
3 CORE	56 56		41 42 43 44 45	40.4' - 41' intensely fractured.										Core 3, RQD=65%
4 CORE	63 63		46	45.2' slightly fractured.										Core 4, RQD=89%
			47 48 49 50	46.8 - 50.5' **LIMESTONE:** BDX (LS), fossiliferous, slightly fractured.	BDX (LS)									
5 CORE	60 59		51 52	50.5 - 52.1' **SHALEY LIMESTONE:** BDX (LS/SH), fossiliferous.	BDX (LS/SH)									Core 5, RQD=100%

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-389

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53 54 55	52.1 - 55.7' **LIMESTONE:** BDX (LS), fossiliferous, slightly fractured.	BDX (LS)									Bedrock corehole reamed 6" in diameter to 55' for well installation.
				55.7' End of Boring.										

APPENDIX D

GROUNDWATER QUALITY DATA

Appendix D - Groundwater Quality Data
Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan
Baldwin Fly Ash Pond System
Baldwin Energy Center

Well		Sample Date	Temperature (deg. C)	Specific Cond (Field) (micromhos/cm)	pH (field) (SU)	Alkalinity, total (mg/L)	Total Dissolved Solids (mg/L)	Nitrite nitrogen, total (mg/L)	Nitrate nitrogen, diss (mg/L)	Nitrate nitrogen, total (mg/L)	Cyanide, total (mg/L)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Arsenic, dissolved (mg/L)	Barium, dissolved (mg/L)	Beryllium, dissolved (mg/L)	Boron, dissolved (mg/L)	Cadmium, dissolved (mg/L)	Chromium, dissolved (mg/L)	Cobalt, dissolved (mg/L)	Copper, dissolved (mg/L)	Iron, total (mg/L)	Iron, dissolved (mg/L)	Lead, dissolved (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)	Thallium, dissolved (mg/L)	Nickel, dissolved (mg/L)	Silver, dissolved (mg/L)	Zinc, dissolved (mg/L)	Antimony, dissolved (mg/L)	Selenium, dissolved (mg/L)	Mercury, dissolved (mg/L)
Class II Standard			ns	ns	6.5-9.0	ns	1200	ns	100	100	0.6	ns	ns	ns	ns	200	400	4.0	0.2	2.0	0.5	2.0	0.05	1.0	1.0	0.65	5.0	5.0	0.1	10	10	0.02	2.0	0.05	10	0.024	0.05	0.01
Max (Unlithified)			27.5	3890	12.4	700	3470	0.16	18	10.7	<0.008	289	126	168	77.54	140	2050	0.865	0.032	0.24	<0.005	45.3	<0.002	<0.005	0.01	0.016	69.4	18	0.005	24.4	6.8	<0.002	<0.005	0.006	0.014	<0.005	0.016	<0.002
Min (Unlithified)			2	301	5.6	46	188	<0.05	<0.05	<0.05	<0.007	54.17	1.0	20	<1	4.1	23	0.119	<0.005	0.0094	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	<0.02	<0.01	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Bedrock)			28.1	7057	12.9	808	1709	0.35	2.04	1.13	<0.008	533	46	207	89	642	65	0.756	0.011	1.6	<0.005	1.88	<0.002	<0.005	<0.005	<0.005	3.82	1.6	<0.005	0.58	0.87	<0.002	0.007	0.01	0.006	0.0075	<0.01	<0.002
Min (Bedrock)			5.8	600	6.5	16	375	0.33	0.06	0.103	<0.007	45	2.1	29	<1	9	<10	0.174	<0.005	0.098	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	0.02	0.011	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Leachate)			17.7	6240	11.9		5120									109	2820					94.7					90.6	0.06		1.58	<0.005							
Min (Leachate)			13.3	1070	7.6		1130									12	495					36.3					0.57	<0.02		0.01	<0.005							
Upgradient Wells (Unlithified Materials)																																						
MW104D	(N)	11/16/2010	15	1226	7		785		0.07		<0.007					15.7	245	0.469	<0.005	0.03	<0.005	<0.02	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.02	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104D		3/23/2011	16.7	1176	7	406	801		0.07		<0.007	143	58	63	<1	17	241	0.422	<0.005	0.0311	<0.005	0.021	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.04	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104D		6/7/2011	16.8	1213	6.9	404	776		<0.05		<0.007	134	58	58	<1	19	250	0.379	<0.005	0.033	<0.005	0.019	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.013	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104DR		9/13/2011	16	1164	6.7	418	768		0.07		<0.007	134	49	58	2.2	18	225	0.37	<0.005	0.042	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.024	<0.005		0.42	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104DR		12/8/2011	13.7	1127	6.8	410	739		0.06		<0.007	137	52	51	1.5	18	222	0.4	<0.005	0.038	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.025	<0.005		0.28	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104DR		3/8/2012	11.3	1094	7.6	416	724		0.55		<0.008	145	58	56	1.3	24	214	0.31	<0.005	0.035	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.011	<0.005		0.21	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104DR		9/16/2013	15.5	1130	6.9		676																				4.82			0.93								
MW104DR		11/20/2013	13.6	1250	6.8		630									16	194					0.02						0.07			0.29							
MW104DR		2/18/2014	12.2	991	6.8		652									18	175					<0.02						<0.02			0.04							
MW104DR		6/11/2014	14.3	1060	7		676									18	186					<0.02						0.028			0.123							
MW104DR		3/25/2015	14.4	775	7.1		630	<0.05		0.955						21	179					<0.02					0.54	<0.02		0.177	0.092							
MW104DR		6/24/2015	14.8	1030	7		718	<0.05		0.673						23	187					<0.02					0.77	<0.02		0.206	0.13							
MW104DR		9/25/2015	15.4	1090	7.1		634	<0.05		0.847						24	178					<0.02					0.74	<0.02		0.224	0.15							
MW104DR		11/10/2015	15.2	997	6.8		644	<0.05		0.924						25	195					<0.02					0.33	<0.02		0.234	0.172							
MW104S	(N)	11/16/2010	11.8	1550	6.6		943		<0.05		<0.007					33.7	148	0.629	0.032	0.15	<0.005	0.16	<0.002	<0.005	<0.005	<0.005		18	<0.005		6.8	<0.002	<0.005	<0.005	0.009	<0.005	<0.01	<0.002
MW104S		3/23/2011	15.9	1142	6.5	446	742		<0.05		<0.007	106	42	104	<1	56	169	0.401	0.0082	0.0899	<0.005	0.146	<0.002	<0.005	<0.005	<0.005		1.85	<0.005		3.0	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104S		6/7/2011	21.8	1290	6.5	550	824		0.07		<0.008	121	46	105	1.8	58.7	114	0.561	0.012	0.24	<0.005	0.22	<0.002	<0.005	<0.005	<0.005		14	<0.005		4.0	<0.002	<0.005	<0.005	0.009	<0.005	<0.01	<0.002
MW104SR		9/13/2011	19.9	1286	6.4	654	909		0.37		<0.007	157	65	92	<1	32	164	0.54	0.0058	0.059	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.08	<0.005		1.2	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104SR		12/8/2011	12.3	1405	6.9	616	965		0.14		<0.007	167	70	84	<1	31	237	0.523	<0.005	0.076	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.19	<0.005		1.1	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104SR		3/8/2012	10.1	1521	6.9	700	886		0.09		<0.008	168	77	85	<1	34	140	0.549	<0.005	0.097	<0.004	0.06	<0.002	<0.005	<0.005	<0.005		0.61	<0.005		1.9	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW104SR		9/16/2013	17	1310	6.7		724																				3.18			4.97								
MW104SR		11/20/2013	15.1	1320	6.7		770									19	134					0.04						1.44			2.2							
MW104SR		2/18/2014	12.8	809	6.7		792									18	138					0.05						<0.02			0.59							
MW104SR		6/11/2014	14.9	1260	6.5		792									16	68					0.147						0.806			1.7							
MW104SR		3/25/2015	10.9	1000	6.8		770	<0.05		0.058						14	100					0.086					0.48	0.207		2.66	2.1							
MW104SR		6/24/2015	15.4	1390	6.6		880	<0.05		<0.05						23	47					0.178					7.12	3.74		3.46	3.1							
MW104SR		9/25/2015	18.7	1330	6.7		744	<0.05		<0.05						19	23					0.237					3.62	3.35		2.54	2.52							
MW104SR		11/10/2015	17	1150	6.3		732	0.06		0.321						19	57					0.149					0.98	1.19		2.78	3.09							
TPZ158		9/17/2013	16.4	720	7.1		394																				6.93			0.12								
TPZ158		11/20/2013	14.9	984	7.3		976									81	39					<0.02						1.43			0.35							
TPZ158		2/18/2014	10.2	584	6.7		380									65	44					<0.02						<0.02			<0.005							
TPZ158		6/12/2014	14.8	645	6.1		408									62	37					0.03						0.085			<0.005							
Downgradient Wells (Unlithified Materials)																																						
MW150	(N)	11/15/2010	13.5	1467	7.3		1133		<0.05		<0.007					65.4	507	0.826	0.005	0.02	<0.005	0.31	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW150		3/23/2011	15.3	1681	7.3	378	1205		0.06		<0.008	132	95	131	<1	65	555	0.841	0.006	0.0161	<0.005	0.473	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW150		6/7/2011	16.7	1910	7.1	370	1396		0.06		<0.008	138	105	134	<1	57.7	696	0.791	<0.005	0.017	<0.005	0.4	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW150		9/13/2011	14.4	1620	7.2	376	1162		0.05		<0.007	135	82	123	1.0	66	513	0.86	<0.005	0.017	<0.004	0.36	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW150		12/7/2011	13.1	1744	7.1	390	1278		<0.05		<0.007	136	92	126	<1	77	585	0.865	0.0053	0.019	<0.004	0.47	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	0.01	<0.002
MW150		3/7/2012	16.1	1704	7.3	388	1334		<0.05		<0.007	128	108	134	<1	69	584	0.798	<0.005	0.015	<0.004	0.56	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW150		9/16/2013	14.8	1350	7.5		1090																				20.1			0.32								
MW150		11/20/2013	13.3	1530	7.1		1090									51	502					0.65						0.07			0.03							
MW150		2/19/2014	12.7	1330	7		1200									51	521					0.8						<0.02			<0.005							
MW150		6/11/2014	13	1680	7.3		1300									49	552					0.98						<0.02			0.006							
MW150		3/25/2015	13.7	1290	7.4		1270	<0.05		0.134						47	550					1.19					14.5	<0.02		0.215	0.024							
MW150		6/24/2015	13.5	1650	7.2		1340	<0.05		<0.05						50	565					1.25					0.81	0.035		0.016	0.003							
MW150		9/25/2015	14	1710	7.2		1210	<0.05		<0.05						52	632					1.5					0.22	0.127		0.016	0.013							
MW150		11/10/2015	13.5	1550	7		1180	<0.05		0.057						54	584					1.47					0.08	0.0388		0.007	0.005							
MW151	(N)*	11/15/2010	15.3	1022	7.1		580		<0.05		<0.007					39.9	76.5	0.536	0.007	0.05	<0.005	0.25	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.14	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		3/23/2011	13.2	974	6.9	414	568		<0.05		<0.007	117	46	46	1.1	40	77	0.531	<0.005	0.0396	<0.005	0.226	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.064	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		6/7/2011	15	1001	6.9	410	539		<0.05		<0.007	97	45	45	1.0	38.7	82.3	0.483	<0.005	0.0396	<0.005	0.22	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.032	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		9/13/2011	22.8	1010	6.8	442	587		<0.05		<0.007	109	42	52	1.3	44	78	0.53	<0.005	0.041	<0.004	0.22	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.059	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		12/8/2011	9.2	953	7.8	430	576		<0.05		<0.007	114	45	48	1.0	40	77	0.54	0.006	0.049	<0.004	0.25	<0.002	<0.005	<0.005	<0.005		0.011	<0.005		0.021	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		3/7/2012	13.2	941	8.1	446	569		0.09		<0.007	119	48	48	<1	38	75	0.479	<0.005	0.039	<0.004	0.22	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.010	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW151		9/16/2013	17.3	855	7.2		526																				19.3			1.53								
MW151		11/20/2013	14.2	970	7.1		542									36	78					0.24						<0.02			<0.005							
MW151		2/19/2014	8.5	852	7.1		538									35	74					0.23						<0.02			<0.005							
MW151		6/12/2014	13.8	983	6.3		562									35	63					0.217						<0.02			0.005							
MW152	(N)	11/15/2010	15	2030	7		1759		0.17		<0.007					84.1	859	0.348	0.008	0.01	<0.005	12	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.05	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		3/23/2011	11.2	2128	7.4	360	1768		0.31		<0.007	249	104	131	1.4	75	914	0.268	0.0073	0.0109	<0.005	8.974	<0.002	<0.005	<0.005	<0.005		0.04	<0.005		0.021	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		6/7/2011	15.5	2103	7.3	408	1634		0.24		<0.007	205	100	148	1.0	53.7	772	0.274	<0.005	0.01	<0.005	3.6	<0.002	<0.005	<0.005	<0.005		0.026	<0.005		0.013	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		9/13/2011	17.6	2052	7.2	420	1607		0.09		<0.007	212	97	146	1.1	69	1000	0.3	<0.005	0.01	<0.004	7.8	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.072	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		12/6/2011	10.8	2299	6.5	420	1983		<0.05		<0.007	289	126	131	<1	140	1030	0.281	0.008	0.014	<0.004	18	<0.002	<0.005	<0.005	<0.005		0.012	<0.005		0.018	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		3/7/2012	13.7	2092	6.7	420	1511		0.25		<0.007	190	91	130	<1	52	700	0.258	<0.005	0.0094	<0.004	3.7	<0.002	<0.005	<0.005	<0.005		0.02	<0.005		0.0093	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW152		9/16/2013	16.2	1920	7		1620																				19.4			1.37								
MW152		11/20/2013	13.7	1950	7.2		1720									55	857					9.92						0.07			0.005							
MW152		2/19/2014	9.5	1880	6.4		1770									56	898					12.7						0.05			<0.005							
MW152		6/12/2014	12.9	1890	6.5		1530									32	636					2.36						0.456			0.102							
MW152		3/25/2015	10	1880	6.9		2150	<0.05		<0.05						71	1020					26.8					12.4	0.044		0.367	0.01							
MW152		6/24/2015	14	2580	6.8		2150	<0.05		0.207						68	978					19.5					16.6	0.118		0.639	0.091							
MW152		9/25/2015	16.3	2530	6.8		1920	<0.05		<0.05						63	949					17.7					2.65	0.033		0.105	0.019							
MW152		11/10/2015	15.2	2110	6.7		1920	<0.05		<0.05						27	965					16.9					3.93	0.076		0.158	0.040							
MW153	(N)	11/16/2010	14.8	730	7.1		462		13.2		<0.007					34.4	88.5	0.44	<0.005	0.03	<0.005	<0.02	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		3/23/2011	21.2	736	7.4	192	430		14.91		<0.007	58	24	59	<1	30	93	0.383	<0.005	0.025	<0.005	<0.02	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.0091	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		6/7/2011	20.2	732	7.5	200	449		12		<0.007	56	24	56	<1	31.5	82.5	0.388	<0.005	0.025	<0.005	0.014	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.0053	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		9/14/2011	16.2	718	6.9	194	446		18		<0.007	55	23	65	<1	33	83	0.4	<0.005	0.025	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.011	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		12/8/2011	5.5	789	7	206	451		15		<0.007	61	26	61	<1	34	93	0.41	<0.005	0.028	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.015	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		3/8/2012	11.9	669	7.3	200	416		12.9		<0.007	57	24	57	<1	29	81	0.394	<0.005	0.024	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.0077	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW153		9/17/2013	15.5	778	7.3		448																				7.34			0.16								
MW153		11/21/2013	14.1	730	6.6		384									28	98					<0.02						<0.02			0.03							
MW153		2/19/2014	13.7	561	7.2		402									22	81					<0.02						<0.02			<0.005							
MW153		6/11/2014	13.2	686	7		426									21	80					<0.02						<0.02			0.009							
MW153		3/25/2015	12.9	491	7.3		354	<0.05		10.5						18	77					<0.02					0.64	<0.02		0.03	0.016							

Appendix D - Groundwater Quality Data
Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan
Baldwin Fly Ash Pond System
Baldwin Energy Center

Well		Sample Date	Temperature (deg. C)	Specific Cond (Field) (micromhos/cm)	pH (field) (SU)	Alkalinity, total (mg/L)	Total Dissolved Solids (mg/L)	Nitrite nitrogen, total (mg/L)	Nitrate nitrogen, diss (mg/L)	Nitrate nitrogen, total (mg/L)	Cyanide, total (mg/L)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Arsenic, dissolved (mg/L)	Barium, dissolved (mg/L)	Beryllium, dissolved (mg/L)	Boron, dissolved (mg/L)	Cadmium, dissolved (mg/L)	Chromium, dissolved (mg/L)	Cobalt, dissolved (mg/L)	Copper, dissolved (mg/L)	Iron, total (mg/L)	Iron, dissolved (mg/L)	Lead, dissolved (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)	Thallium, dissolved (mg/L)	Nickel, dissolved (mg/L)	Silver, dissolved (mg/L)	Zinc, dissolved (mg/L)	Antimony, dissolved (mg/L)	Selenium, dissolved (mg/L)	Mercury, dissolved (mg/L)
Class II Standard			ns	ns	6.5-9.0	ns	1200	ns	100	100	0.6	ns	ns	ns	ns	200	400	4.0	0.2	2.0	0.5	2.0	0.05	1.0	1.0	0.65	5.0	5.0	0.1	10	10	0.02	2.0	0.05	10	0.024	0.05	0.01
Max (Unlithified)			27.5	3890	12.4	700	3470	0.16	18	10.7	<0.008	289	126	168	77.54	140	2050	0.865	0.032	0.24	<0.005	45.3	<0.002	<0.005	0.01	0.016	69.4	18	0.005	24.4	6.8	<0.002	<0.005	0.006	0.014	<0.005	0.016	<0.002
Min (Unlithified)			2	301	5.6	46	188	<0.05	<0.05	<0.05	<0.007	54.17	1.0	20	<1	4.1	23	0.119	<0.005	0.0094	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	<0.02	<0.01	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Bedrock)			28.1	7057	12.9	808	1709	0.35	2.04	1.13	<0.008	533	46	207	89	642	65	0.756	0.011	1.6	<0.005	1.88	<0.002	<0.005	<0.005	<0.005	3.82	1.6	<0.005	0.58	0.87	<0.002	0.007	0.01	0.006	0.0075	<0.01	<0.002
Min (Bedrock)			5.8	600	6.5	16	375	0.33	0.06	0.103	<0.007	45	2.1	29	<1	9	<10	0.174	<0.005	0.098	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	0.02	0.011	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Leachate)			17.7	6240	11.9		5120									109	2820					94.7					90.6	0.06		1.58	<0.005							
Min (Leachate)			13.3	1070	7.6		1130									12	495					36.3					0.57	<0.02		0.01	<0.005							
MW153		6/24/2015	14.3	648	7.2		442	<0.05		10.6						21	73					<0.02					0.18	<0.02		0.015	0.009							
MW153		9/25/2015	15.2	654	6.8		354	<0.05		10.5						22	75					<0.02					0.21	<0.02		0.014	0.0084							
MW153		11/10/2015	15.5	620	7.1		360	<0.05		10.7						22	75					<0.02					0.3	<0.02		0.017	0.0087							
MW154	(N)	3/23/2011	11.5	911	7.3	424	559		1.28		<0.007	110	40	53	1.2	12	94	0.623	0.0057	0.073	<0.005	0.026	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	0.0159	<0.002
MW154		6/7/2011	14.5	874	7.1	384	508		0.53		<0.007	106	38	28	<1	9.53	71.9	0.501	<0.005	0.076	<0.005	0.026	<0.002	<0.005	<0.005	<0.005		0.018	<0.005		0.18	<0.002	<0.005	<0.005	0.014	<0.005	<0.01	<0.002
MW154		9/12/2011																																				
MW154		12/7/2011	13.8	665	6.7	324	346		0.25		<0.007	89	25	22	<1	4.1	29	0.525	<0.005	0.1	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.0062	<0.002	<0.005	<0.005	0.007	<0.005	<0.01	<0.002
MW154		3/6/2012	12.9	861	7.1	406	476		4.49		<0.007	114	40	20	<1	5.5	38	0.516	<0.005	0.08	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW154		9/17/2013	16	869	7.3		516																				7.1			0.19								
MW154		2/19/2014	11.3	713	7.4		454									8	48					0.02						<0.02			<0.005							
MW154		6/12/2014	13.3	825	6.9		492									12	30					<0.02						<0.02			<0.005							
MW154		3/25/2015	9.9	692	7.3		494	<0.05		0.957						7	39					<0.02					1.55	<0.02		0.019	<0.003							
MW154		6/30/2015	15	751	6.9		468	<0.05		<0.05						6	29					0.021					0.34	0.078		0.05	0.032							
MW154		9/25/2015	16.4	1040	6.9		550	<0.05		<0.05						9	49					<0.02					3.9	0.042		0.132	0.083							
MW155	(N)	11/16/2010	13.8	600	7.1		470		4.46		<0.007					6.55	61.8	0.39	<0.005	0.03	<0.005	<0.02	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.038	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW155		3/23/2011	15.5	763	7.1	360	455		1.98		<0.007	88	45	24	<1	10	53	0.398	<0.005	0.025	<0.005	<0.02	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.28	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW155		6/7/2011	16.1	806	7.1	400	487		1.4		<0.007	86	46	25	<1	8.58	49.6	0.385	<0.005	0.024	<0.005	0.012	<0.002	<0.005	<0.005	<0.005		0.016	<0.005		0.062	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW155		9/12/2011	19.3	526	6.8	376	470		2.1		<0.007	86	42	28	<1	9.3	50	0.38	<0.005	0.022	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.013	<0.005		0.37	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW155		12/7/2011	8.3	528	6.9	366	450		2		<0.007	91	44	26	<1	11	51	0.417	<0.005	0.023	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.015	<0.005		0.18	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW155		3/6/2012	16.3	774	6.9	392	446		1.85		<0.008	93	49	28	<1	8.8	49	0.401	<0.005	0.019	<0.004	<0.05	<0.002	<0.005	<0.005	0.016		<0.01	<0.005		0.081	<0.002	<0.005	<0.005	0.014	<0.005	<0.01	<0.002
MW155		9/17/2013	14.1	773	7.4		470																				48.3			24.4								
MW155		2/19/2014	13.7	3890	7		1080									8	54					<0.02						0.48			0.35							
MW155		6/12/2014	15	799	6.5		484									8	41					<0.02						<0.02			<0.005							
MW155		3/25/2015	13.6	588	7.3		402	<0.05		1.61						7	50					<0.02					0.09	<0.02		0.073	<0.003							
MW155		6/24/2015	13.5	796	7.2		498	<0.05		1.64						8	53					<0.02					0.23	<0.02		0.291	0.008							
MW155		9/25/2015	14.9	849	7.2		438	<0.05		1.82						9	50					<0.02					0.21	<0.02		0.132	0.0112							
MW155		11/10/2015	14.2	774	7		436	<0.05		2.13						9	51					<0.02					0.6	<0.02		0.273	<0.003							
MW252	(N)	11/15/2010	13.8	1730	7.8		1318		<0.05		<0.007					52.8	528	0.233	0.008	0.04	<0.005	0.97	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		1.7	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW252		3/23/2011	15.3	1845	7	534	1335		0.06		<0.007	232	90	100	5.3	61	559	0.25	0.006	0.039	<0.005	1.47	<0.002	<0.005	<0.005	0.0072		<0.01	<0.005		0.93	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW252		6/7/2011	14	1833	7.8	524	1341		0.05		<0.008	210	84	99	2.1	61.4	578	0.224	<0.005	0.04	<0.005	0.31	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.61	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW252		9/13/2011	14.9	1806	7.5	526	1301		<0.05		<0.007	206	78	104	3	52	510	0.22	0.0061	0.029	<0.004	0.32	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.97	<0.002	<0.005	<0.005	0.007	<0.005	<0.01	<0.002
MW252		12/6/2011	9.8	1745	6.8	524	1224		<0.05		<0.007	221	83	99	1.9	50	490	0.232	0.007	0.04	<0.004	0.29	<0.002	<0.005	0.01	<0.005		<0.01	<0.005		1.2	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW252		3/7/2012	21.6	1910	7	528	1286		<0.05		<0.007	225	91	99	1.4	49	576	0.21	<0.005	0.022	<0.004	0.19	<0.002	<0.005	<0.005	<0.005		0.026	<0.005		0.44	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW252		9/16/2013	14.1	1650	7		1260																				9.04			1.3								
MW252		11/20/2013	13.8	1670	7.1		1250									41	463					0.23						0.07			0.11							
MW252		2/19/2014	10.9	1320	8.1		1310									41	480					0.23						<0.02			0.01							
MW252		6/12/2014	14.3	1790	6.4		1390									38	447					0.223						<0.02			0.057							
MW252		3/25/2015	12.8	1350	7		1270	<0.05		<0.05						38	487					0.155					1.15	<0.02		0.324	0.053							
MW252		6/24/2015	13.7	1680	6.7		1320	<0.05		<0.05						41	488					0.132					12.3	0.1		0.585	0.198							
MW252		9/25/2015	14.5	1800	6.8		1250	<0.05		<0.05						38	459					0.14					2.09	<0.02		0.655	0.582							
MW252		11/10/2015	13.7	1600	6.6		1250	<0.05		<0.05						38	493					0.134					15.5	0.0221		0.717	0.152							
MW253	(N)	11/16/2010	13.4	765	6.9		1441		0.38		<0.007					27.4	806	0.408	0.008	0.02	<0.005	0.24	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		0.37	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW253		3/23/2011	25.9	1971	7.7	580	854		0.08		<0.008	54	1.0	168	78	26	262	0.119	0.0063	0.066	<0.005	0.124	<0.002	<0.005	<0.005	<0.005		<0.01	0.005		<0.005	<0.002	<0.005	0.006	<0.005	<0.005	<0.01	<0.002
MW253		6/7/2011	27.5	1564	11.3	187	698		0.06		<0.007	104	<5	108	18	22.2	411.4	0.369	<0.005	0.054	<0.005	0.064	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW253		9/14/2011	17.5	958	9.8	46	639		0.12		<0.007	61	15	95	9.1	23	424	0.29	<0.005	0.031	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.013	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW253		12/8/2011	2	908	7.4	105	744		<0.05		<0.007	76	48	94	4.9	27	483	0.349	0.0064	0.026	<0.004	0.11	<0.002	<0.005	<0.005	<0.005		0.014	<0.005		0.0071	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW253		3/8/2012	9.6	1142	11	115	634		<0.05		<0.007	110	2.8	86	6.4	22	406	0.246	<0.005	0.036	<0.004	0.076	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW253		9/17/2013	15.6	833	10.6		546																				0.16			0.02								
MW253		11/21/2013	13.9	735	8.6		602									18	405					0.09						<0.02			<0.005							
MW253		2/19/2014	14.4	833	7.8		564									16	368					0.06						<0.02			<0.005							
MW253		6/11/2014	14.1	1460	11.4		668									14	313					0.083						<0.02			<0.005							
MW253		3/25/2015	14.1	1910	12.4		820	<0.05		0.109						12	247					0.093					<0.02	<0.02		0.003	<0.003							
MW253		6/24/2015	14.8	3410	12.4		928	0.16		<0.05						10	142					0.05					0.09	<0.02		0.005	<0.003							
MW253		9/25/2015	14.6	631	11.1		346	<0.05		<0.05						12	241					0.044					<0.02	<0.02		<0.003	<0.003							
MW253		11/10/2015	14.8	589	10.1		300	<0.05		<0.05						12	216					0.033					<0.02	<0.02		<0.003	<0.003							
MW156	(N)	11/15/2010																																				
MW156		3/23/2011																																				
MW156		6/6/2011																																				
MW156		9/12/2011																																				
MW156		12/8/2011																																				
MW156		3/8/2012																																				
MW156		9/16/2013	16.4	814	6.7		480																				2.04			0.07								
MW156		11/21/2013	15.2	684	6.6		466									60	93					<0.02						0.06			0.05							
MW156		2/18/2014	13.3	662	6.8		470									55	88					0.03						<0.02			<0.005							
MW156		6/11/2014	15	825	6.8		506									60	86					0.024						<0.02			<0.005							
MW156		3/25/2015	11.8	611	7																																	
MW156		6/24/2015	15.9	794	6.8																																	
MW156		9/25/2015	18.3	848	7																																	
MW156		11/10/2015	16.6	778	6.8																																	
OW256		9/16/2013	15.1	862	7.1		520																				4.6			0.44								
OW256		11/21/2013	15.7	723	6.6		488									65	88					0.16						0.02			0.13							
OW256		2/18/2014	10.7	723	6.8		508									57	90					0.15						<0.02			<0.005							
OW256		6/11/2014	15.4	881	7.1		522									54	66					0.146						0.076			0.342							
MW157S	(N)	11/15/2010																																				
MW157S		3/23/2011																																				
MW157S		6/6/2011																																				
MW157S		9/12/2011																																				
MW157S		12/8/2011																																				
MW157S		3/8/2012																																				
MW157S		9/16/2013	16.4	3270	7.6		3170																				12.7			0.26								
MW157S		11/21/2013	15.1	2940	6.4		3160									121	1870					45.2						0.05			0.14							
MW157S		2/18/2014	13	3150	6.6		3180									124	2050					45.3						<0.02			0.13							
MW157S		6/11/2014	14.2	3560	6.3		3470									118	2000					44.6						0.03			0.13							

Appendix D - Groundwater Quality Data
Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan
Baldwin Fly Ash Pond System
Baldwin Energy Center

Well		Sample Date	Temperature (deg. C)	Specific Cond (Field) (micromhos/cm)	pH (field) (SU)	Alkalinity, total (mg/L)	Total Dissolved Solids (mg/L)	Nitrite nitrogen, total (mg/L)	Nitrate nitrogen, diss (mg/L)	Nitrate nitrogen, total (mg/L)	Cyanide, total (mg/L)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)
Class II Standard			ns	ns	6.5-9.0	ns	1200	ns	100	100	0.6	ns	ns	ns	ns	200	400
Max (Unlithified)			27.5	3890	12.4	700	3470	0.16	18	10.7	<0.008	289	126	168	77.54	140	2050
Min (Unlithified)			2	301	5.6	46	188	<0.05	<0.05	<0.05	<0.007	54.17	1.0	20	<1	4.1	23
Max (Bedrock)			28.1	7057	12.9	808	1709	0.35	2.04	1.13	<0.008	533	46	207	89	642	65
Min (Bedrock)			5.8	600	6.5	16	375	0.33	0.06	0.103	<0.007	45	2.1	29	<1	9	<10
Max (Leachate)			17.7	6240	11.9		5120									109	2820
Min (Leachate)			13.3	1070	7.6		1130									12	495
MW157S		3/25/2015	12.6	3870	6.5												
MW157S		6/24/2015	15.1	3730	6.3												
MW157S		9/25/2015	18.4	3030	6.3												
MW157S		11/10/2015	17.3	3370	6.2												
OW257		9/16/2013	15.7	1430	7		960										
OW257		11/21/2013	14.6	1180	7.1		958									21	312
OW257		2/18/2014	13.1	1120	7.1		900									18	310
OW257		6/11/2014	15.8	1370	6.6		916									15	250
MW161		9/16/2013	15.1	746	6.9		446										
MW161		11/21/2013	13.2	625	7.1		756									6	44
MW161		2/18/2014	14.2	603	7		430									5	44
MW161		6/11/2014	14.5	796	6.8		450									5	31
MW262		9/16/2013	14.8	448	7		318										
MW262		11/21/2013	15.4	369	7.1		228									<5	40
MW262		2/19/2014	14.7	301	7.5		188									<5	24
MW262		6/11/2014	15.5	469	6.9		310									<5	44
TPZ159		9/17/2013	17.9	849	6.6		588										
TPZ159		11/21/2013	14.5	642	6.5		448									35	96
TPZ159		2/18/2014	15.1	593	6.5		480									35	98
TPZ159		6/12/2014	18.6	674	5.6		460									34	92
TPZ160		9/17/2013	17.7	880	7.2		490										
TPZ160		11/21/2013	15.6	659	7.3		454									42	60
TPZ160		2/18/2014	13.4	682	7		510									44	63
TPZ160		6/11/2014	15.2	806	6.8		494									42	46
TPZ166		9/17/2013	16.5	612	7		396										
TPZ166		11/20/2013	14.7	951	7.7		304									12	56
TPZ166		2/18/2014	13.5	423	7.2		306									12	38
TPZ166		6/12/2014	15.8	495	5.8		302									12	23
Downgradient Wells (Bedrock)																	
MW350	(N)	11/15/2010	11.4	629	12.2		375		<0.05		<0.007					21.4	53.7
MW350		3/23/2011	18.7	1268	11.7	307	885		<0.05		<0.007	108	<5	182	84	27	30
MW350		6/7/2011	16.4	5144	12.2	561	1257		<0.05		<0.008	218	<5	207	89	25.8	42.5
MW350		9/13/2011	18.4	4508	12.1	505	1196		<0.05		<0.007	202	<5	200	70	34	46
MW350		12/7/2011	7	5529	12.6	778	1423		<0.05		<0.007	323	<5	166	57	31	41
MW350		3/7/2012	14	7057	12.9	808	1709		<0.05		<0.007	533	<5	149	43	32	62
MW350		9/16/2013	14.6	5190	12.3		1640										
MW350		11/20/2013	13.5	4140	11.8		1370									34	11
MW350		2/19/2014	13.3	4170	8.1		1420									33	<10
MW350		6/11/2014	14.3	6120	12.4		1580									38	<50
MW350		3/25/2015	14.4	6580	12.8		1430	0.35		<0.1						46	15
MW350		6/24/2015	14.4	5990	12.5		1430	0.33		0.103						48	11
MW350		9/25/2015	13.8	4200	12.6		1140	0.34		<0.05						43	27
MW350		11/10/2015	13.5	2790	12.2		690	<0.05		<0.05						40	38
MW352	(N)	11/15/2010	13.2	1102	10.6		779		<0.05		<0.007					521	12.6
MW352		3/23/2011	16.8	1877	11.6	102	783		<0.05		<0.007	93	<5	182	19	535	14
MW352		6/7/2011	23.8	1922	11.2	70	862		<0.05		<0.007	79	<5	180	15	514.4	15.2
MW352		9/13/2011	28.1	1704	11	39	735		0.06		<0.007	60	2.1	185	12	603	16
MW352		12/8/2011	5.8	1426	10.7	20	706		<0.05		<0.007	70	6.2	190	9.6	642	14
MW352		3/7/2012	20.1	1381	10.2	16	891		<0.05		<0.007	45	22	200	6.3	611	11
MW352		9/16/2013	14.6	1740	9.4		1130										
MW352		11/20/2013	13.3	1740	7.3		996									583	11
MW352		2/19/2014	11.5	1530	6.5		768									390	18
MW352		6/12/2014	14.3	1920	8.9		1090									569	<20
MW352		3/25/2015	13.3	1350	9		874	<0.05		0.606						415	12
MW352		6/24/2015	14.6	1870	8.6		1100	<0.05		<0.05						508	<10
MW352		9/25/2015	15.3	2070	8		1210	<0.05		<0.05						597	<10
MW352		11/10/2015	13.8	1850	7.6		1100	<0.05		<0.05						567	<10
MW355	(N)	11/16/2010	13.6	934	7		532		0.95		<0.007					14	56
MW355		3/23/2011	15.5	848	7.1	432	486		0.56		<0.007	96	45	32	<1	14	36
MW355		6/7/2011	17	841	7.2	404	491		0.21		<0.007	85	43	30	<1	13.4	45.9
MW355		9/12/2011	17	824	6.7	396	490		1.6		<0.007	87	41	34	<1	12	53
MW355		12/7/2011	8.2	812	6.8	412	486		0.82		<0.007	105	46	33	<1	14	48
MW355		3/6/2012	16.3	879	6.8	396	447		2.04		<0.008	88	46	29	<1	12	50
MW355		9/17/2013	14.1	811	7.4		468										
MW355		11/21/2013	13.1	682	7.2		450									11	61
MW355		2/19/2014	13.5	691	7		458									11	65
MW355		6/12/2014	14.8	797	6.8		532									10	51
MW355		3/25/2015	14.2	600	7.5		418	<0.05		0.63						9	61
MW355		6/24/2015	14.2	781	7.2		526	<0.05		1.13						9	58
MW355		9/25/2015	14.2	826	7.1		422	<0.05		0.28						10	56
MW355		11/10/2015	13.7	772	7		438	<0.05		1.06						10	57

Well		Sample Date	Fluoride, dissolved (mg/L)	Arsenic, dissolved (mg/L)	Barium, dissolved (mg/L)	Beryllium, dissolved (mg/L)	Boron, dissolved (mg/L)	Cadmium, dissolved (mg/L)	Chromium, dissolved (mg/L)	Cobalt, dissolved (mg/L)	Copper, dissolved (mg/L)	Iron, total (mg/L)	Iron, dissolved (mg/L)	Lead, dissolved (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)	Thallium, dissolved (mg/L)	Nickel, dissolved (mg/L)	Silver, dissolved (mg/L)	Zinc, dissolved (mg/L)	Antimony, dissolved (mg/L)	Selenium, dissolved (mg/L)	Mercury, dissolved (mg/L)
Class II Standard			4.0	0.2	2.0	0.5	2.0	0.05	1.0	1.0	0.65	5.0	5.0	0.1	10	10	0.02	2.0	0.05	10	0.024	0.05	0.01
Max (Unlithified)			0.865	0.032	0.24	<0.005	45.3	<0.002	<0.005	0.01	0.016	69.4	18	0.005	24.4	6.8	<0.002	<0.005	0.006	0.014	<0.005	0.016	<0.002
Min (Unlithified)			0.119	<0.005	0.0094	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	<0.02	<0.01	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Bedrock)			0.756	0.011	1.6	<0.005	1.88	<0.002	<0.005	<0.005	<0.005	3.82	1.6	<0.005	0.58	0.87	<0.002	0.007	0.01	0.006	0.0075	<0.01	<0.002
Min (Bedrock)			0.174	<0.005	0.098	<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	0.02	0.011	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Leachate)							94.7					90.6	0.06		1.58	<0.005							
Min (Leachate)							36.3					0.57	<0.02		0.01	<0.005							
MW157S		3/25/2015																					
MW157S		6/24/2015																					
MW157S		9/25/2015																					
MW157S		11/10/2015																					
OW257		9/16/2013										0.24			0.99								
OW257		11/21/2013					3.28						0.02			0.68							
OW257		2/18/2014					2.88						<0.02			0.01							
OW257		6/11/2014					2.25						0.027			0.309							
MW161		9/16/2013										11.8			1.84								
MW161		11/21/2013					<0.02						0.09			1.28							
MW161		2/18/2014					<0.02						<0.02			0.83							
MW161		6/11/2014					<0.02						0.047			0.272							
MW262		9/16/2013										69.4			2.42								
MW262		11/21/2013					<0.02						0.12			0.01							
MW262		2/19/2014					<0.02						0.02			0.02							
MW262		6/11/2014					<0.02						0.031			<0.005							
TPZ159		9/17/2013										1.77			0.47								
TPZ159		11/21/2013					0.11						0.06			0.68							
TPZ159		2/18/2014					0.12						<0.02			0.51							
TPZ159		6/12/2014					0.087						0.069			0.387							
TPZ160		9/17/2013										8.62			0.36								
TPZ160		11/21/2013					0.24						0.05			0.12							
TPZ160		2/18/2014					0.21						0.39			0.16							
TPZ160		6/11/2014					0.205						<0.02			0.215							
TPZ166		9/17/2013										0.09			0.23								
TPZ166		11/20/2013					0.1						<0.02			0.02							
TPZ166		2/18/2014					0.06						<0.02			0.28							
TPZ166		6/12/2014					0.028						<0.02			0.431							
Downgradient Wells (Bedrock)																							
MW350	(N)	11/15/2010	0.51	<0.005	0.23	<0.005	0.6	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW350		3/23/2011	0.46	0.0079	0.46	<0.005	0.417	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	0.009	<0.005	<0.005	<0.01	<0.002
MW350		6/7/2011	0.365	<0.005	0.87	<0.005	0.26	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	0.007	<0.005	<0.005	<0.01	<0.002
MW350		9/13/2011	0.33	0.0064	0.76	<0.004	0.21	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	0.005	<0.005	0.0075	<0.01	<0.002
MW350		12/7/2011	0.289	0.011	1.2	<0.004	0.13	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	0.006	<0.005	0.0069	<0.01	<0.002
MW350		3/7/2012	0.174	0.005	1.6	<0.004	0.056	<0.002	<0.005	<0.005	<0.005		0.011	<0.005		<0.005	<0.002	<0.005	0.01	<0.005	0.0075	<0.01	<0.002
MW350		9/16/2013										0.14			<0.005								
MW350		11/20/2013					0.03						<0.02			<0.005							
MW350		2/19/2014					0.03						<0.02			<0.005							
MW350		6/11/2014					0.021						<0.02			<0.005							
MW350		3/25/2015					0.032					0.08	<0.02		<0.003	<0.003							
MW350		6/24/2015					0.034					0.1	<0.02		<0.003	<0.003							
MW350		9/25/2015					0.103					0.04	<0.02		<0.003	<0.003							
MW350		11/10/2015					0.191					0.03	<0.02		<0.003	<0.003							
MW352	(N)	11/15/2010	0.692	0.005	0.18	<0.005	0.9	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW352		3/23/2011	0.696	0.0066	0.27	<0.005	0.869	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	0.007	<0.005	<0.005	<0.01	<0.002
MW352		6/7/2011	0.698	<0.005	0.29	<0.005	0.84	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW352		9/13/2011	0.7	0.0082	0.19	<0.004	0.76	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW352		12/8/2011	0.652	0.0091	0.19	<0.004	0.76	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW352		3/7/2012	0.756	<0.005	0.11	<0.004	0.86	<0.002	<0.005	<0.005	<0.005		<0.01	<0.005		<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW352		9/16/2013										0.17			0.007								
MW352		11/20/2013					1.47						<0.02			<0.005							
MW352		2/19/2014					0.82						<0.02			<0.005							
MW352		6/12/2014					1.53						<0.02			<0.005							
MW352		3/25/2015					1.05					0.02	<0.02		0.004	<0.003							
MW352		6/24/2015					1.23					0.09	<0.02		0.004	<0.003							
MW352		9/25/2015					1.88					0.03	<0.02		0.007	0.007							
MW352		11/10/2015					1.79					0.03	<0.02		0.007	0.005							
MW355	(N)	11/16/2010	0.403	<0.005	0.1	<0.005	0.02	<0.002	<0.005	<0.005	<0.005		1.6	<0.005		0.87	<0.002	0.007	<0.005	<0.005	<0.005	<0.01	<0.002
MW355		3/23/2011	0.405	0.0061	0.10	<0.005	0.021	<0.002	<0.005	<0.005	<0.005		0.60	<0.005		0.45	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW355		6/7/2011	0.397	<0.005	0.12	<0.005	0.03	<0.002	<0.005	<0.005	<0.005		0.41	<0.005		0.2	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW355		9/12/2011	0.41	0.0074	0.11	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.55	<0.005		0.34	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW355		12/7/2011	0.412	<0.005	0.14	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.59	<0.005		0.43	<0.002	<0.005	<0.005	0.006	<0.005	<0.01	<0.002
MW355		3/6/2012	0.42	<0.005	0.098	<0.004	<0.05	<0.002	<0.005	<0.005	<0.005		0.26	<0.005		0.13	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
MW355		9/17/2013										3.82			0.58								
MW355		11/21/2013					0.03						0.62			0.06							
MW355		2/19/2014					0.02						0.03			0.05							
MW355		6/12/2014					0.024						0.071			0.024							
MW355		3/25/2015					0.024					0.3	0.072		0.031	0.015							
MW355		6/24/2015					0.024					0.51	0.022		0.042	0.01							
MW355		9/25/2015					0.025					0.3	0.056		0.073	0.062							
MW355		11/10/2015					<0.02					0.18	0.033		0.031	0.043							

Appendix D - Groundwater Quality Data
Supplemental Hydrogeologic Site Characterization Report and Groundwater Monitoring Plan
Baldwin Fly Ash Pond System
Baldwin Energy Center

Well	Sample Date	Temperature (deg. C)	Specific Cond (Field) (micromhos/cm)	pH (field) (SU)	Alkalinity, total (mg/L)	Total Dissolved Solids (mg/L)	Nitrite nitrogen, total (mg/L)	Nitrate nitrogen, diss (mg/L)	Nitrate nitrogen, total (mg/L)	Cyanide, total (mg/L)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Arsenic, dissolved (mg/L)	Barium, dissolved (mg/L)
Class II Standard		ns	ns	6.5-9.0	ns	1200	ns	100	100	0.6	ns	ns	ns	ns	200	400	4.0	0.2	2.0
Max (Unlithified)		27.5	3890	12.4	700	3470	0.16	18	10.7	<0.008	289	126	168	77.54	140	2050	0.865	0.032	0.24
Min (Unlithified)		2	301	5.6	46	188	<0.05	<0.05	<0.05	<0.007	54.17	1.0	20	<1	4.1	23	0.119	<0.005	0.0094
Max (Bedrock)		28.1	7057	12.9	808	1709	0.35	2.04	1.13	<0.008	533	46	207	89	642	65	0.756	0.011	1.6
Min (Bedrock)		5.8	600	6.5	16	375	0.33	0.06	0.103	<0.007	45	2.1	29	<1	9	<10	0.174	<0.005	0.098
Max (Leachate)		17.7	6240	11.9		5120									109	2820			
Min (Leachate)		13.3	1070	7.6		1130									12	495			
Leachate Wells in Old East, East and West Fly Ash Ponds (Screened in Fill/CCRs to be Abandoned)																			
TPZ163	9/17/2013	15.6	1650	9.7		1410													
TPZ163	11/20/2013	13.3	1350	8.8		1130									19	626			
TPZ163	2/18/2014	13.4	1070	7.6		1160									15	610			
TPZ163	6/12/2014	14.9	1340	9.5		1150									12	495			
TPZ167	9/17/2013	17.7	3830	9.9		3250													
TPZ167	11/20/2013	16	2920	8.2		3010									100	1850			
TPZ167	2/18/2014	14.3	3540	7.7		3040									100	1840			
TPZ167	6/11/2014	17.2	4240	10		3590									101	1650			
TPZ168	9/17/2013	16.4	5330	10.8		3910													
TPZ168	11/20/2013	14.4	5140	9.2		3680									109	2760			
TPZ168	2/18/2014	15.3	6020	8.1		5120									103	2820			
TPZ168	6/11/2014	16.2	6240	11.9		4610									101	2240			

Well	Sample Date	Beryllium, dissolved (mg/L)	Boron, dissolved (mg/L)	Cadmium, dissolved (mg/L)	Chromium, dissolved (mg/L)	Cobalt, dissolved (mg/L)	Copper, dissolved (mg/L)	Iron, total (mg/L)	Iron, dissolved (mg/L)	Lead, dissolved (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)	Thallium, dissolved (mg/L)	Nickel, dissolved (mg/L)	Silver, dissolved (mg/L)	Zinc, dissolved (mg/L)	Antimony, dissolved (mg/L)	Selenium, dissolved (mg/L)	Mercury, dissolved (mg/L)
Class II Standard		0.5	2.0	0.05	1.0	1.0	0.65	5.0	5.0	0.1	10	10	0.02	2.0	0.05	10	0.024	0.05	0.01
Max (Unlithified)		<0.005	45.3	<0.002	<0.005	0.01	0.016	69.4	18	0.005	24.4	6.8	<0.002	<0.005	0.006	0.014	<0.005	0.016	<0.002
Min (Unlithified)		<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	<0.02	<0.01	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Bedrock)		<0.005	1.88	<0.002	<0.005	<0.005	<0.005	3.82	1.6	<0.005	0.58	0.87	<0.002	0.007	0.01	0.006	0.0075	<0.01	<0.002
Min (Bedrock)		<0.004	<0.02	<0.002	<0.005	<0.005	<0.005	0.02	0.011	<0.005	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.01	<0.002
Max (Leachate)			94.7					90.6	0.06		1.58	<0.005							
Min (Leachate)			36.3					0.57	<0.02		0.01	<0.005							
TPZ163	9/17/2013							7.86			0.13								
TPZ163	11/20/2013		37.2						<0.02			<0.005							
TPZ163	2/18/2014		37.8						<0.02			<0.005							
TPZ163	6/12/2014		36.3						<0.02			<0.005							
TPZ167	9/17/2013							0.57			0.01								
TPZ167	11/20/2013		53						<0.02			<0.005							
TPZ167	2/18/2014		54.5						<0.02			<0.005							
TPZ167	6/11/2014		60						<0.02			<0.005							
TPZ168	9/17/2013							90.6			1.58								
TPZ168	11/20/2013		87.2						<0.02			<0.005							
TPZ168	2/18/2014		78.8						0.06			<0.005							
TPZ168	6/11/2014		94.7						0.055			<0.005							

[Cr By: JAZ 1/28/16, Chd By:GFF 1/29/16]

Notes:
(N) = NPDES permit monitoring well; * = added to NPDES well network
Red = Exceedance of Class II Groundwater Standard in wells screened in Unlithified Materials

APPENDIX E

STATISTICAL PROCEDURE FOR BACKGROUND

APPENDIX E
STATISTICAL PROCEDURE FOR CALCULATION OF BACKGROUND
Baldwin Fly Ash Pond System Closure
Groundwater Monitoring Plan
Baldwin Energy Complex, Baldwin, Illinois

Introduction

The purpose of the statistical calculations documented in this appendix is to determine the maximum background concentrations likely to occur upgradient of the Baldwin Old East and East Fly Ash ponds in the upper water bearing zone, which typically corresponds to the unlithified glacial materials. High predicted background concentrations relative to the Illinois Class II groundwater quality standards may suggest that downgradient concentrations for those parameters in the upper water bearing zone are due to a background source.

The statistical analysis procedures used here are consistent with procedures described in the document: 2009 Unified Guidance. "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance," March 2009, EPA 530/R-09-2007 (USEPA, 2009).

Compliance Data Operations - Limit Calculations

The range of potential background concentrations was statistically determined using parametric and non-parametric tolerance intervals. Tolerance intervals were chosen rather than prediction intervals because a tolerance interval makes no assumption about the future number of samples, while a prediction interval assumes a finite, and known, future number of samples.

The flow diagram (Figure E-1) outlines the logic flow for calculation of limits. Background values were calculated using parametric tolerance intervals for normally distributed data, and non-parametric tolerance intervals for data with no underlying distribution or with non-detect frequencies greater than 50 percent. Parametric tolerance intervals were calculated at a 95 percent coverage rate and a Type I individual comparison error level of 0.01 (i.e., false positive rate). Parameters with 100 percent non-detects were handled with the upper tolerance limit being set to the last Reporting Limit (RL).

Statistical Data Evaluation and Results

The input dataset (Appendix E-1) for background calculations were evaluated for the quarterly data from monitoring wells MW-104S/SR and MW-104D/DR, collected from November 2010 through December 2015, for the inorganic parameters listed in 35 IAC 620.410(a) and excluding vanadium, radium-226, radium-228, and perchlorate. All water quality data were stored, prepared, and statistically analyzed using MANAGES™ Version 3.4.49 software (EPRI, March 2014).

A statistical summary of the background water quality data from MW-104S/SR and MW-104D/DR is provided in Appendix E-2, and includes the mean, median, minimum, maximum, standard deviation, Sen Slope trend, normality determination, and percent non-detects for the background dataset. The statistical analysis procedure inputs and results are provided in Appendix E-3.

Calculated background values for the tested inorganic constituents and pH are listed in the following Table E-1 along with the percent non-detects, normal or lognormal distribution, test method, and confidence level.

Figure E-1. Statistical Analysis Flowchart

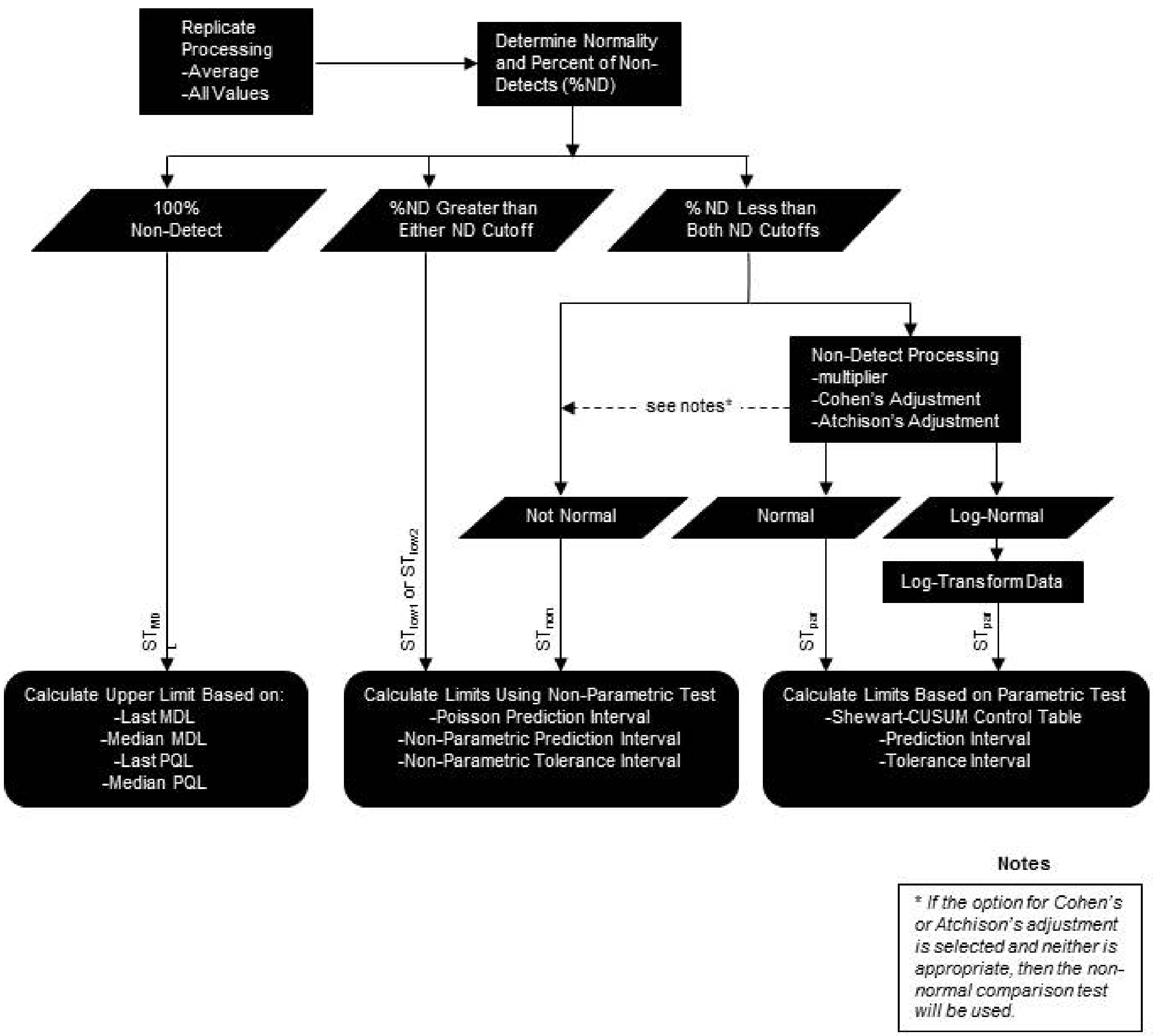

Table E-1. Tolerance Limits for Background Monitoring Wells MW-104S/SR and MW-104D/DR

Parameter	Count of Backround Results	Percent of Non Detects	Normal/ Lognormal	Test	Confidence Level	Upper Limit	Lower Limit
Ag, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
As, diss, mg/L	12	66.67	No/No	STlow2	N/A	0.032	
Ba, diss, mg/L	12	0.00	No/Yes	Stpar	99.00	0.621	
Be, diss, mg/L	12	100.00	Yes/No	STmdl	N/A	0.004	
B, diss, mg/L	26	46.20	No/No	Stnon	73.65	0.237	
Cd, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.002	
Cl, diss, mg/L	28	0.00	No/No	STnon	76.22	58.7	
CN, total, mg/L	12	100.00	No/No	STmdl	N/A	0.008	
Co, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
Cu, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
Cr, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
F, diss, mg/L	12	0.00	Yes/Yes	STpar	99.00	0.793	
Hg, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.002	
Fe, diss, mg/L	26	34.62	No/No	STnon	73.65	18.0	
Fe, tot, mg/L	10	0.00	Yes/Yes	STpar	99.00	11.0	
Mn, diss, mg/L	26	0.00	No/Yes	STpar	99.00	48.8	
Mn, tot, mg/L	10	0.00	Yes/Yes	STpar	99.00	8.2	
Ni, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
NO3, diss, mg/L	12	25.00	No/Yes	STpar	99.00	2.25	
Pb, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
pH (field), std	28	0.00	Yes/Yes	Stpar	99.00	7.55	6.06
Sb, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.005	
Se, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.010	
SO4, diss, mg/L	28	0.00	Yes/Yes	STpar	99.00	328	
TDS, mg/L	28	0.00	Yes/Yes	STpar	99.00	999	
Tl, diss, mg/L	12	100.00	No/No	STmdl	N/A	0.002	
Zn, diss, mg/L	12	83.33	No/N9o	STlow2	45.96	0.009	

* Key to Tests

STmdl = Comparison method if all background results are non-detect = Last MDL
STpar = Parametric Tolerance Interval on background
STlow1 = Non-Parametric Tolerance Interval on background (ND Frequency > 50%)
STnon = Non-Parametric Tolerance Interval on background

Baldwin Ash Ponds - Upgradient Monitoring Wells: Upper Water-Bearing Zone (Unlitified Materials)

Date Range: 11/01/2010 to 12/31/2015

Well Id	Date Sampled	Lab Id	Arsenic, dissolved, mg/L	Barium, dissolved, mg/L	Beryllium, dissolved, mg/L	Boron, dissolved, mg/L	Cadmium, dissolved, mg/L	pH (field), SU
MW104D	11/16/2010		<0.005	0.030	<0.005	<0.020	<0.002	6.980
	03/23/2011		<0.005	0.031	<0.005	0.021	<0.002	7.010
	06/07/2011		<0.005	0.033	<0.005	0.019	<0.002	6.880
MW104DR	09/13/2011		<0.005	0.042	<0.004	<0.050	<0.002	6.710
	12/08/2011		<0.005	0.038	<0.004	<0.050	<0.002	6.790
	03/08/2012		<0.005	0.035	<0.004	<0.050	<0.002	7.650
	09/16/2013							6.900
	11/20/2013					0.020		6.820
	02/18/2014					<0.020		6.750
	06/11/2014					<0.020		6.990
	03/25/2015					<0.020		7.110
	06/24/2015					<0.020		6.990
	09/25/2015					<0.020		7.090
	11/10/2015					<0.020		6.800
MW104S	11/16/2010		0.032	0.150	<0.005	0.160	<0.002	6.580
	03/23/2011		0.008	0.090	<0.005	0.146	<0.002	6.550
	06/07/2011		0.012	0.240	<0.005	0.220	<0.002	6.500
MW104SR	09/13/2011		0.006	0.059	<0.004	<0.050	<0.002	6.440
	12/08/2011		<0.005	0.076	<0.004	<0.050	<0.002	6.900
	03/08/2012		<0.005	0.097	<0.004	0.060	<0.002	6.880
	09/16/2013							6.720
	11/20/2013					0.040		6.710
	02/18/2014					0.050		6.730
	06/11/2014					0.147		6.500
	03/25/2015					0.086		6.790
	06/24/2015					0.178		6.650
	09/25/2015					0.237		6.740
	11/10/2015					0.149		6.320

Baldwin Ash Ponds - Upgradient Monitoring Wells: Upper Water-Bearing Zone (Unlitified Materials)

Date Range: 11/01/2010 to 12/31/2015

Well Id	Date Sampled	Lab Id	Chloride, dissolved, mg/L	Chromium, dissolved, mg/L	Cobalt, dissolved, mg/L	Copper, dissolved, mg/L	Cyanide, total, mg/L	Fluoride, dissolved, mg/L
MW104D	11/16/2010		15.700	<0.005	<0.0050	<0.005	<0.007	0.469
	03/23/2011		16.749	<0.005	<0.0050	<0.005	<0.007	0.422
	06/07/2011		18.500	<0.005	<0.0050	<0.005	<0.007	0.379
MW104DR	09/13/2011		18.000	<0.005	<0.0050	<0.005	<0.007	0.370
	12/08/2011		18.000	<0.005	<0.0050	<0.005	<0.007	0.400
	03/08/2012		24.000	<0.005	<0.0050	<0.005	<0.008	0.310
	09/16/2013		20.000					
	11/20/2013		16.000					
	02/18/2014		18.000					
	06/11/2014		18.000					
	03/25/2015		21.000					
	06/24/2015		23.000					
	09/25/2015		24.000					
	11/10/2015		25.000					
MW104S	11/16/2010		33.700	<0.005	<0.0050	<0.005	<0.007	0.629
	03/23/2011		56.480	<0.005	<0.0050	<0.005	<0.007	0.401
	06/07/2011		58.700	<0.005	<0.0050	<0.005	<0.008	0.561
MW104SR	09/13/2011		32.000	<0.005	<0.0050	<0.005	<0.007	0.540
	12/08/2011		31.000	<0.005	<0.0050	<0.005	<0.007	0.523
	03/08/2012		34.000	<0.005	<0.0050	<0.005	<0.008	0.549
	09/16/2013		19.000					
	11/20/2013		19.000					
	02/18/2014		18.000					
	06/11/2014		16.000					
	03/25/2015		14.000					
	06/24/2015		23.000					
	09/25/2015		19.000					
	11/10/2015		19.000					

Baldwin Ash Ponds - Upgradient Monitoring Wells: Upper Water-Bearing Zone (Unlitified Materials)

Date Range: 11/01/2010 to 12/31/2015

Well Id	Date Sampled	Lab Id	Iron, dissolved, mg/L	Iron, total, mg/L	Lead, dissolved, mg/L	Manganese, dissolved, mg/L	Manganese, total, mg/L	Mercury, dissolved, mg/L
MW104D	11/16/2010		<0.010		<0.005	0.020		<0.0020
	03/23/2011		<0.010		<0.005	0.040		<0.0020
	06/07/2011		<0.010		<0.005	0.013		<0.0020
MW104DR	09/13/2011		0.024		<0.005	0.420		<0.0020
	12/08/2011		0.025		<0.005	0.280		<0.0020
	03/08/2012		0.011		<0.005	0.210		<0.0020
	09/16/2013			4.820			0.930	
	11/20/2013		0.070			0.290		
	02/18/2014		<0.020			0.040		
	06/11/2014		0.028			0.123		
	03/25/2015		<0.020	0.542		0.092	0.177	
	06/24/2015		<0.020	0.767		0.130	0.206	
	09/25/2015		<0.020	0.744		0.150	0.224	
	11/10/2015		<0.020	0.333		0.172	0.234	
MW104S	11/16/2010		18.000		<0.005	6.800		<0.0020
	03/23/2011		1.852		<0.005	3.014		<0.0020
	06/07/2011		14.000		<0.005	4.000		<0.0020
MW104SR	09/13/2011		0.080		<0.005	1.200		<0.0020
	12/08/2011		0.190		<0.005	1.100		<0.0020
	03/08/2012		0.610		<0.005	1.900		<0.0020
	09/16/2013			3.180			4.970	
	11/20/2013		1.440			2.200		
	02/18/2014		<0.020			0.590		
	06/11/2014		0.806			1.690		
	03/25/2015		0.207	0.476		2.100	2.660	
	06/24/2015		3.740	7.120		3.100	3.460	
	09/25/2015		3.350	3.620		2.520	2.540	
	11/10/2015		1.190	0.979		3.090	2.780	

Baldwin Ash Ponds - Upgradient Monitoring Wells: Upper Water-Bearing Zone (Unlitified Materials)

Date Range: 11/01/2010 to 12/31/2015

Well Id	Date Sampled	Lab Id	Nickel, dissolved, mg/L	Nitrate nitrogen, diss, deg. C	Residue, total filtrable, mg/L	Selenium, dissolved, mg/L	Silver, dissolved, mg/L	Sulfate, dissolved, mg/L
MW104D	11/16/2010		<0.005	0.07	785	<0.010	<0.005	245.000
	03/23/2011		<0.005	0.07	801	<0.010	<0.005	241.400
	06/07/2011		<0.005	<0.05	776	<0.010	<0.005	250.300
MW104DR	09/13/2011		<0.005	0.07	768	<0.010	<0.005	225.000
	12/08/2011		<0.005	0.06	739	<0.010	<0.005	222.000
	03/08/2012		<0.005	0.55	724	<0.010	<0.005	214.000
	09/16/2013				676			198.000
	11/20/2013				630			194.000
	02/18/2014				652			175.000
	06/11/2014				676			186.000
	03/25/2015				630			179.000
	06/24/2015				718			187.000
	09/25/2015				634			178.000
	11/10/2015				644			195.000
MW104S	11/16/2010		<0.005	<0.05	943	<0.010	<0.005	148.000
	03/23/2011		<0.005	<0.05	742	<0.010	<0.005	168.800
	06/07/2011		<0.005	0.07	824	<0.010	<0.005	114.400
MW104SR	09/13/2011		<0.005	0.37	909	<0.010	<0.005	164.000
	12/08/2011		<0.005	0.14	965	<0.010	<0.005	237.000
	03/08/2012		<0.005	0.09	886	<0.010	<0.005	140.000
	09/16/2013				724			43.000
	11/20/2013				770			134.000
	02/18/2014				792			138.000
	06/11/2014				792			68.000
	03/25/2015				770			100.000
	06/24/2015				880			47.000
	09/25/2015				744			23.000
	11/10/2015				732			57.000

Baldwin Ash Ponds - Upgradient Monitoring Wells: Upper Water-Bearing Zone (Unlitified Materials)

Date Range: 11/01/2010 to 12/31/2015

Well Id	Date Sampled	Lab Id	Thallium, dissolved, mg/L	Zinc, dissolved, mg/L
MW104D	11/16/2010		<0.002	<0.005
	03/23/2011		<0.002	<0.005
	06/07/2011		<0.002	<0.005
MW104DR	09/13/2011		<0.002	<0.005
	12/08/2011		<0.002	<0.005
	03/08/2012		<0.002	<0.005
MW104S	11/16/2010		<0.002	0.009
	03/23/2011		<0.002	<0.005
	06/07/2011		<0.002	0.009
MW104SR	09/13/2011		<0.002	<0.005
	12/08/2011		<0.002	<0.005
	03/08/2012		<0.002	<0.005

Appendix E-2

Baldwin Ash Ponds: Statistical Summary for Pooled Upgradient Monitoring Well Locations

User Supplied Information

Date Range: 11/01/2010 to 12/31/2015 **Option for LT Pts: x 0.5**

Pooled Locations: MW104D,MW104DR,MW104S,MW104SR

Parameter	Units	Count	Mean	Median	Maximum	Minimum	Std Dev	Sen Slope Units/yr	Normal / Log Normal	% of Non-Detects
Antimony, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00
Arsenic, dissolved	mg/L	12	0.006	0.003	0.032	0.003	0.009	0.000	No / No	66.67
Barium, dissolved	mg/L	12	0.077	0.051	0.240	0.030	0.063	0.023	No / Yes	0.00
Beryllium, dissolved	mg/L	12	0.002	0.002	0.003	0.002	0.000	0.000	No / No	100.00
Boron, dissolved	mg/L	26	0.066	0.025	0.237	0.010	0.073	0.010	No / No	46.15
Cadmium, dissolved	mg/L	12	0.001	0.001	0.001	0.001	0.000	0.000	No / Yes	100.00
Chloride, dissolved	mg/L	28	23.887	19.000	58.700	14.000	10.977	0.263	No / No	0.00
Chromium, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00
Cobalt, dissolved	mg/L	12	0.0025	0.0025	0.0025	0.0025	0.0000	0.0000	No / No	100.00
Copper, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00
Cyanide, total	mg/L	12	0.004	0.004	0.004	0.004	0.000	0.000	No / No	100.00
Fluoride, dissolved	mg/L	12	0.463	0.446	0.629	0.310	0.097	0.019	Yes / Yes	0.00
Iron, dissolved	mg/L	26	1.758	0.049	18.000	0.005	4.349	0.046	No / No	34.62
Iron, total	mg/L	10	2.258	0.873	7.120	0.333	2.331	0.401	No / Yes	0.00
Lead, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00
Manganese, dissolved	mg/L	26	1.357	0.505	6.800	0.013	1.651	0.476	No / Yes	0.00
Manganese, total	mg/L	10	1.818	1.735	4.970	0.177	1.697	1.139	Yes / No	0.00
Mercury, dissolved	mg/L	12	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000	No / Yes	100.00
Nickel, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00
Nitrate nitrogen, diss	deg. C	12	0.130	0.068	0.554	0.025	0.163	0.076	No / Yes	25.00
pH (field)	SU	28	6.803	6.790	7.650	6.320	0.258	-0.049	Yes / Yes	0.00
Residue, total filtrable	mg/L	28	761.643	756.000	965.000	630.000	92.687	0.000	Yes / Yes	0.00
Selenium, dissolved	mg/L	12	0.005	0.005	0.005	0.005	0.000	0.000	No / No	100.00
Silver, dissolved	mg/L	12	0.003	0.003	0.003	0.003	0.000	0.000	No / No	100.00

Shapiro-Wilk Normality test performed at 0.05 significance level.

Baldwin Ash Ponds: Statistical Summary for Pooled Upgradient Monitoring Well Locations

User Supplied Information

Date Range: 11/01/2010 to 12/31/2015 **Option for LT Pts: x 0.5**

Pooled Locations: MW104D,MW104DR,MW104S,MW104SR

Parameter	Units	Count	Mean	Median	Maximum	Minimum	Std Dev	Sen Slope Units/yr	Normal / Log Normal	% of Non-Detects
Sulfate, dissolved	mg/L	28	159.711	176.500	250.300	23.000	65.781	-35.529	Yes / No	0.00
Thallium, dissolved	mg/L	12	0.001	0.001	0.001	0.001	0.000	0.000	No / Yes	100.00
Zinc, dissolved	mg/L	12	0.004	0.003	0.009	0.003	0.003	0.000	No / No	83.33

Shapiro-Wilk Normality test performed at 0.05 significance level.

Baldwin Ash Pond System: Background Statistics- Upper Water Bearing Zone (Unlithified Materials)

Background Date Range: 11/01/2010 to 12/31/2015
Background Locations: MW104D,MW104DR,MW104S,MW104SR

Compliance Date Range: 11/01/2010 to 04/01/2015
Compliance Locations: MW104SR

Comparison Method if all Background Results are Non-Detect:	STmdl = Last MDL
Statistical Test for Parametric Background Data Distributions:	STpar = Parametric Tolerance Interval on Background
Statistical Test for Cases with High Percentage of Non-Detect Background Data:	STlow1 = Non-Parametric Prediction Interval on Background (ND Frequency > 50%)
Statistical Test for Cases with High Percentage of Non-Detect Background Data:	STlow2 = Non-Parametric Tolerance Interval on background (ND Frequency > 50%)
Statistical Test for Non-Parametric Background Data Distributions:	STnon = Non-Parametric Tolerance Interval on background
Background Comparison:	Interwell
Number of Verification Samples:	0
Default Type 1 Individual Comparison Error Level (False Positive Rate) for tests other than Prediction Interval	0.01
Non-Detect Processing (Parametric Tests):	<=15% using MDL * 0.5 >15% using MDL * 0.5
Non-Detect Processing (All Other):	<=50% using MDL * 0.5 >50% using MDL * 0.5

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	Antimony, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	
MW104SR	Arsenic, dissolved, mg/L	09/13/2011	12	66.67	No/No	STlow2	45.96	0.032		0.006	No	
		12/08/2011	12	66.67	No/No		45.96	0.032		<0.005	No	
		03/08/2012	12	66.67	No/No		45.96	0.032		<0.005	No	
MW104SR	Barium, dissolved, mg/L	09/13/2011	12	0.00	No/Yes	STpar	99.00	0.621		0.059	No	
		12/08/2011	12	0.00	No/Yes		99.00	0.621		0.076	No	
		03/08/2012	12	0.00	No/Yes		99.00	0.621		0.097	No	
MW104SR	Beryllium, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.004		<0.004	No	
		12/08/2011	12	100.00	No/No		N/A	0.004		<0.004	No	
		03/08/2012	12	100.00	No/No		N/A	0.004		<0.004	No	
MW104SR	Boron, dissolved, mg/L	09/13/2011	26	46.15	No/No	STnon	73.65	0.237		<0.050	No	
		12/08/2011	26	46.15	No/No		73.65	0.237		<0.050	No	
		03/08/2012	26	46.15	No/No		73.65	0.237		0.060	No	
		11/20/2013	26	46.15	No/No		73.65	0.237		0.040	No	
		02/18/2014	26	46.15	No/No		73.65	0.237		0.050	No	
		06/11/2014	26	46.15	No/No		73.65	0.237		0.147	No	
		03/25/2015	26	46.15	No/No		73.65	0.237		0.086	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	Cadmium, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.002		<0.002	No	
		12/08/2011	12	100.00	No/No		N/A	0.002		<0.002	No	
		03/08/2012	12	100.00	No/No		N/A	0.002		<0.002	No	
MW104SR	Chloride, dissolved, mg/L	09/13/2011	28	0.00	No/No	STnon	76.22	58.700		32.000	No	
		12/08/2011	28	0.00	No/No		76.22	58.700		31.000	No	
		03/08/2012	28	0.00	No/No		76.22	58.700		34.000	No	
		09/16/2013	28	0.00	No/No		76.22	58.700		19.000	No	
		11/20/2013	28	0.00	No/No		76.22	58.700		19.000	No	
		02/18/2014	28	0.00	No/No		76.22	58.700		18.000	No	
		06/11/2014	28	0.00	No/No		76.22	58.700		16.000	No	
		03/25/2015	28	0.00	No/No		76.22	58.700		14.000	No	
MW104SR	Chromium, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	
MW104SR	Cobalt, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.0050		<0.0050	No	
		12/08/2011	12	100.00	No/No		N/A	0.0050		<0.0050	No	
		03/08/2012	12	100.00	No/No		N/A	0.0050		<0.0050	No	
MW104SR	Copper, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	Cyanide, total, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.008		<0.007	No	
		12/08/2011	12	100.00	No/No		N/A	0.008		<0.007	No	
		03/08/2012	12	100.00	No/No		N/A	0.008		<0.008	No	
MW104SR	Fluoride, dissolved, mg/L	09/13/2011	12	0.00	Yes/Yes	STpar	99.00	0.793		0.540	No	
		12/08/2011	12	0.00	Yes/Yes		99.00	0.793		0.523	No	
		03/08/2012	12	0.00	Yes/Yes		99.00	0.793		0.549	No	
MW104SR	Iron, dissolved, mg/L	09/13/2011	26	34.62	No/No	STnon	73.65	18.000		0.080	No	
		12/08/2011	26	34.62	No/No		73.65	18.000		0.190	No	
		03/08/2012	26	34.62	No/No		73.65	18.000		0.610	No	
		11/20/2013	26	34.62	No/No		73.65	18.000		1.440	No	
		02/18/2014	26	34.62	No/No		73.65	18.000		<0.020	No	
		06/11/2014	26	34.62	No/No		73.65	18.000		0.806	No	
		03/25/2015	26	34.62	No/No		73.65	18.000		0.207	No	
MW104SR	Iron, total, mg/L	09/16/2013	10	0.00	Yes/Yes	STpar	99.00	10.986		3.180	No	
		03/25/2015	10	0.00	Yes/Yes		99.00	10.986		0.476	No	
MW104SR	Lead, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	
MW104SR	Manganese, dissolved, mg/L	09/13/2011	26	0.00	No/Yes	STpar	99.00	48.767		1.200	No	
		12/08/2011	26	0.00	No/Yes		99.00	48.767		1.100	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	Manganese, dissolved, mg/L	03/08/2012	26	0.00	No/Yes	STpar	99.00	48.767		1.900	No	
		11/20/2013	26	0.00	No/Yes		99.00	48.767		2.200	No	
		02/18/2014	26	0.00	No/Yes		99.00	48.767		0.590	No	
		06/11/2014	26	0.00	No/Yes		99.00	48.767		1.690	No	
		03/25/2015	26	0.00	No/Yes		99.00	48.767		2.100	No	
MW104SR	Manganese, total, mg/L	09/16/2013	10	0.00	Yes/Yes	STpar	99.00	8.173		4.970	No	
		03/25/2015	10	0.00	Yes/Yes		99.00	8.173		2.660	No	
MW104SR	Mercury, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.0020		<0.0020	No	
		12/08/2011	12	100.00	No/No		N/A	0.0020		<0.0020	No	
		03/08/2012	12	100.00	No/No		N/A	0.0020		<0.0020	No	
MW104SR	Nickel, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	
MW104SR	Nitrate nitrogen, diss, deg. C	09/13/2011	12	25.00	No/Yes	STpar	99.00	2.25		0.37	No	
		12/08/2011	12	25.00	No/Yes		99.00	2.25		0.14	No	
		03/08/2012	12	25.00	No/Yes		99.00	2.25		0.09	No	
MW104SR	Nitrate nitrogen, total, mg/L	03/25/2015	8	25.00	Yes/Yes	STpar	99.00	2.264		0.058	No	
MW104SR	pH (field), SU	09/13/2011	28	0.00	Yes/Yes	STpar	99.00	7.547	6.059	6.440	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	pH (field), SU	12/08/2011	28	0.00	Yes/Yes	STpar	99.00	7.547	6.059	6.900	No	
		03/08/2012	28	0.00	Yes/Yes		99.00	7.547	6.059	6.880	No	
		09/16/2013	28	0.00	Yes/Yes		99.00	7.547	6.059	6.720	No	
		11/20/2013	28	0.00	Yes/Yes		99.00	7.547	6.059	6.710	No	
		02/18/2014	28	0.00	Yes/Yes		99.00	7.547	6.059	6.730	No	
		06/11/2014	28	0.00	Yes/Yes		99.00	7.547	6.059	6.500	No	
		03/25/2015	28	0.00	Yes/Yes		99.00	7.547	6.059	6.790	No	
MW104SR	Residue, total filtrable, mg/L	09/13/2011	28	0.00	Yes/Yes	STpar	99.00	999		909	No	
		12/08/2011	28	0.00	Yes/Yes		99.00	999		965	No	
		03/08/2012	28	0.00	Yes/Yes		99.00	999		886	No	
		09/16/2013	28	0.00	Yes/Yes		99.00	999		724	No	
		11/20/2013	28	0.00	Yes/Yes		99.00	999		770	No	
		02/18/2014	28	0.00	Yes/Yes		99.00	999		792	No	
		06/11/2014	28	0.00	Yes/Yes		99.00	999		792	No	
		03/25/2015	28	0.00	Yes/Yes		99.00	999		770	No	
MW104SR	Selenium, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.010		<0.010	No	
		12/08/2011	12	100.00	No/No		N/A	0.010		<0.010	No	
		03/08/2012	12	100.00	No/No		N/A	0.010		<0.010	No	
MW104SR	Silver, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.005		<0.005	No	
		12/08/2011	12	100.00	No/No		N/A	0.005		<0.005	No	
		03/08/2012	12	100.00	No/No		N/A	0.005		<0.005	No	
MW104SR	Sulfate, dissolved, mg/L	09/13/2011	28	0.00	Yes/No	STpar	99.00	327.885		164.000	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
MW104SR	Sulfate, dissolved, mg/L	12/08/2011	28	0.00	Yes/No	STpar	99.00	327.885		237.000	No	
		03/08/2012	28	0.00	Yes/No		99.00	327.885		140.000	No	
		09/16/2013	28	0.00	Yes/No		99.00	327.885		43.000	No	
		11/20/2013	28	0.00	Yes/No		99.00	327.885		134.000	No	
		02/18/2014	28	0.00	Yes/No		99.00	327.885		138.000	No	
		06/11/2014	28	0.00	Yes/No		99.00	327.885		68.000	No	
		03/25/2015	28	0.00	Yes/No		99.00	327.885		100.000	No	
MW104SR	Thallium, dissolved, mg/L	09/13/2011	12	100.00	No/No	STmdl	N/A	0.002		<0.002	No	
		12/08/2011	12	100.00	No/No		N/A	0.002		<0.002	No	
		03/08/2012	12	100.00	No/No		N/A	0.002		<0.002	No	
MW104SR	Zinc, dissolved, mg/L	09/13/2011	12	83.33	No/No	STlow2	45.96	0.009		<0.005	No	
		12/08/2011	12	83.33	No/No		45.96	0.009		<0.005	No	
		03/08/2012	12	83.33	No/No		45.96	0.009		<0.005	No	

APPENDIX F

GROUNDWATER SAMPLING PROTOCOL

Groundwater Sampling Protocol

The following procedures shall be used in sampling groundwater at the site. This sampling protocol shall apply to the routine quarterly (or modified semi-annual or annual) sampling events. A sample collector's worksheet, comparable to the one located in Exhibit 1, may be used for noting relevant information in regard to each well.

Water Levels

Water levels shall be taken in each well prior to purging and/or sampling. Water levels should be taken as close together as practical, to prevent any time distortion of the water surface data. The following steps shall be followed to obtain accurate water level readings:

1. Note the general condition of the monitoring well on the worksheet. This shall include, but is not limited to the condition of the casing, the lock, evidence of tampering, condition of the pad, and any standing water.
2. Remove the lock and open the monitoring well. Note the condition of the interior of the casing and the condition of the well cap and riser. Open the cap, taking care not to allow dirt or foreign material into the monitoring well.
3. The technician shall rinse the probe and cable of the water level meter with decon water.
4. Slowly lower the probe into the monitoring well until the meter indicates the water surface has been reached.
5. Note the depth to water (to the nearest 0.01 ft) and the time on the worksheet.
6. Lower the probe to the bottom of well. (If a dedicated pump is installed in the well, skip this step). Note the well depth on the worksheet. The depth of the well will be measured on an annual basis, at wells that do not contain dedicated pumps. The depth of wells with dedicated pumps will be measured at least once every 5 years, or whenever the pump is removed.
7. Slowly remove the probe from the well. Rinse the probe and line with decon water.
8. Replace cap. Close and lock the well. Proceed to the next well, and repeat.

Purging of Monitoring Well – Pump Method

After all water level measurements have been taken, the monitoring wells shall be purged to provide a representative sample. Each groundwater monitoring well shall be purged by using a dedicated pump. The pump construction shall consist of inert materials consistent with the monitoring well construction (e.g., stainless steel pump bodies installed in stainless steel wells).

Purging shall be conducted utilizing a "low-flow" or minimal drawdown technique. Flow rates for this technique will typically fall below 0.5 liters/minutes, with an overall goal of not reducing the water level in the monitoring well by more than 0.3 ft during purging. Water levels should be checked frequently to ensure that the drawdown in the well does not exceed the 0.3-ft limits. Every 3 minutes to 5 minutes, readings shall be taken on the following water quality indicators to determine if a representative water sample is available.

- pH (in SU),
- Specific Conductance (in µmhos/cm or µS/cm),
- Temperature (in ºF),
- And, it is suggested, at least one of the following:
  - Redox Potential (in mV);
  - Dissolved Oxygen (in mg/L); and/or
  - Turbidity (in NTU).

The water quality indicators will be considered stabilized when the following tolerances are reached after three consecutive readings:

- pH.................................... ±0.05 SU
- Specific Conductance ...... ±5 percent
- Temperature.................... ±0.5ºF
- Redox Potential .... ±10 percent
- Dissolved Oxygen........... ±10 percent
- Turbidity.......................... ±10 percent

Slow recovering wells require special consideration. If a well is dry, or is purged below the bottom of the pump intake, the well will be allowed to recharge for at least 12 hours. Samples shall be collected until all sample containers have been filled or the well becomes dry. Notes shall be kept on the worksheet with regard to water levels, times, volume of water removed, and any other parameters considered to be relevant.

Purging of Monitoring Well – Bailer Method

Purging and sample collection with a bailer shall be performed in the event of a non-functioning pump or from a well that does not have a dedicated pump installed. A sample shall be collected utilizing a factory packaged, clean, disposable bailer with an appropriate length of new, clean rope attached.

Calculate the number of bailer volumes of water needed to remove one (1) well volume of water.

<u>Well Volume Calculations (2-inch well):</u>

Schedule 40 PVC has an inside diameter of 2.067 inches.

$\therefore$ ((2.067 inches/12 inches/ft)/2)^2 • π • 1 ft of water = 0.0233 ft^3/ft of water.

0.0233 ft^3/ft • 7.48 gallons/ft^3 = 0.174 gallon/ft

Schedule 5 Stainless Steel (304 or 316) has an inside diameter of 2.245 inches.

$\therefore$ ((2.245 inches/12 inches/ft)/2)^2 • π • 1 ft of water = 0.0275 ft^3/ft of water.

0.0275 ft^3/ft • 7.48 gallons/ft^3 = 0.206 gallon/ft

Volume of well (in gallons) = well type gallon/ft • (DTB - DTW); where,
DTB $\equiv$ depth to bottom of well (from measuring point), and
DTW $\equiv$ depth to water (from measuring point)

<u>Bailer Volumes:</u>

Disposable bailer volumes will vary by type and manufacturer. Volume information should be obtained before going to the site. For comparison, a 3 ft stainless steel bailer has a volume of approximately 1220 cc or 0.322 gallon and a 5 ft PVC bailer of approximately 1085 cc or 0.287 gallon.

Open monitoring well, being careful that no potential contaminant enters the well.

Remove one (1) bailer volume of water from the monitoring well. Test pH, specific conductance and temperature. Note values on worksheet. (Turbidity, redox potential and dissolved oxygen will vary considerably due to the agitation a bailer will cause in the well. Testing for these parameters is not recommended with this method.)

Remove one-half (½) gallon of water from the monitoring well. Test pH, specific conductance and temperature. Note values on worksheet.

Remove ½ to 1 gallon of water. Test pH, specific conductance and temperature. Record data on worksheet.

Repeat until pH, specific conductance and temperature stabilize or three (3) well volumes of water have been removed.

If the monitoring well becomes dry, or there is insufficient water to obtain all necessary samples, the monitoring well will be allowed to recharge for 24 hours. Samples shall be collected until all sample containers are filled or the well becomes dry. Notes shall be kept on the worksheet regarding water levels, times, volume of water removed, and any other parameters considered by the technician to be relevant.

If there is sufficient water volume in the monitoring well to obtain all samples, sample collection shall begin at this time.

Sample Collection Order

Samples shall be collected starting at the monitoring well with the least likelihood for contamination. Sampling shall proceed from the well with the lowest potential for contamination to the well with the highest potential for contamination.

Field Measurements

General

Upon arrival at each groundwater monitoring well, the technician shall note on the sampler's worksheet or in a field notebook the date, time, ambient air temperature, general weather conditions, and individuals present, including sample team members and any observers. (Note: Any observers shall need at a minimum, the same personal protective gear as the members of the sample team.)

Establish a "clean area" near the monitoring well where the sample containers and equipment can be stored while not in use. Every effort should be made to keep the sampling equipment and containers from contacting the ground surface. If necessary, a disposable, plastic tarp can be used as a ground cover to prevent potential contamination of the sample containers and equipment. Typically, the back of the field vehicle will be used as the "clean area".

Any non-dedicated sampling equipment (meter probes, thermometers, etc.) shall be washed in a commercial, laboratory cleaner (Alconox®, Liquinox®, or equivalent), and thoroughly rinsed in decon water before each use. Calibration shall be performed at each new monitoring location after the initial decontamination. After use, each device shall be powered down (if necessary) decontaminated, and stored in its manufacturer-approved container.

Temperature

Obtain a water sample from the well. Place the sample aliquot in a disposable container, insert the thermometer (or electronic probe), wait until the readings have stabilized, and record the temperature on the worksheet. Temperature for a glass thermometer should be noted to the nearest degree Fahrenheit (1ºF). For electronic thermometers (thermocouples), temperature should be noted to the nearest tenth degree Fahrenheit (0.1ºF). The thermometer or probe shall be cleaned and rinsed with decon water after use.

pH

Confirm calibration of the instrument by comparing with an appropriate buffer solution. Adjust for temperature compensation (if meter is not self-compensating). Rinse probe with decon water. Obtain a sample from the well and place the probe in sample aliquot. Note the pH and record on the sample worksheet. Note pH readings to the nearest tenth unit (0.1).

Specific Conductance

Confirm calibration of the instrument by comparing against an appropriate buffer solution. Adjust for temperature compensation (if meter is not self-compensating). Rinse the probe with decon water. Obtain a sample from the well and place the probe in sample aliquot. Note the specific conductance and record on the sample worksheet. Specific conductance should be noted to the nearest micromhos per centimeter (µmhos/cm) or microSiemens per centimeter (µS/cm).

Sample Collection Procedures

Jars and vials may ship pre-labeled from the laboratory, identifying the analysis and preservative for each type of sample. Dependent upon circumstances, sample containers may be prepared by non-laboratory personnel. If so, this should be noted on the sample worksheet or in the field notebook.

A technician shall remove a sample container from the cooler, affix a label, and in indelible, waterproof ink write the well number and/or sample I.D., the facility name, the sample collection date and time, the type of sample in the container, and the sample collector's name. A technician shall organize the containers in the following sampling order:

- Metals and Minerals (dissolved)
- Anions (dissolved)
- Total Dissolved Solids (TDS)
- Cyanides (total)

Dissolved parameters include dissolved metals and minerals, total dissolved solids (TDS), and nitrogen should be field filtered. Samples should be filtered using a 0.45-micron filter attached to the sample pump line. Other filter apparatus may be utilized as long as Illinois EPA guidelines are followed. Filters should be replaced no less frequently than at each new well, and may need to be replaced more often if flow is restricted due to particulate matter in the sample water.

Transportation of Monitoring Samples

Sample Preservation Techniques

The preservation techniques utilized in the groundwater samples will typically adhere to those listed in *Handbook for Sampling and Sample Preservation of Water and Wastewater*, U.S. EPA, EPA-600/4-82-029, September 1982 and/or *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, EPA/530/SW-846, 3$^{rd.}$ Edition, Final Update IV (January 2008).

Transportation of Samples

Samples shall be transported to the laboratory in sealed, insulated shipping containers, ice chests, or coolers. The shipping containers should be sturdy, and if samples are contained in glass bottles, dividers and/or bubble wrap should be used to restrict potential breakage. All samples will be packed in ice or a packaged refrigerant as necessary for proper preservation. Samples should be packed to maintain sample temperatures as close to 4ºC (degrees Celsius) or 39ºF as possible from the time the samples are collected to the time the samples are received by the laboratory. The samples should be shipped/delivered to the laboratory as soon as practical, preferably within 24 hours of sample collection.

All samples shall be accompanied by a chain-of-custody record. The sampler shall retain a copy of the record and forward the original with the samples to the analytical laboratory. Once the laboratory has received the samples, a representative from the laboratory is to complete the record, retain the original and return a copy with the chemical analysis reports to the sampler. The chain-of-custody shall contain the facility name, the wells sampled, time and date of sampling, members of the sampling party, type of samples (i.e. water, soil, leachate, etc.), number of sample bottles, requested analysis, overnight courier, etc. A sample chain-of-custody record is provided in Exhibit 2.

Attachments
Exhibit 1: Groundwater Sampling Worksheet
Exhibit 2: Example Chain-of-Custody Record

ATTACHMENT 9-7

Ramboll. 2023a. *40 C.F.R. § 257.95(g)(3)(ii): Alternative Source Demonstration. Baldwin Power Plant. Baldwin Bottom Ash Pond, CCR Unit 601*. Ramboll Americas Engineering Solutions, Inc. April.

Intended for
Dynegy Midwest Generation, LLC

Date
April 30, 2023

Project No.
1940102203-001

40 C.F.R. § 257.95(g)(3)(ii): ALTERNATE SOURCE DEMONSTRATION

BALDWIN POWER PLANT

BOTTOM ASH POND

CCR UNIT 601

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: April 30, 2023

I, Anne Frances Ackerman, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Anne Frances Ackerman
Qualified Professional Engineer
062-060586
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: April 30, 2023

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APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
35 I.A.C.	Title 35 of the Illinois Administrative Code
A5D	Assessment Monitoring Sampling Event A5D
ASD	Alternate Source Demonstration
BAP	Bottom Ash Pond
bgs	below ground surface
BPP	Baldwin Power Plant
CCR	coal combustion residuals
cm/s	centimeters per second
FAPS	Fly Ash Pond System
GWPS	groundwater protection standard
IEPA	Illinois Environmental Protection Agency
LOE(s)	line(s) of evidence
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NRT	Natural Resource Technology, Inc.
NRT/OBG	Natural Resource Technology, an OBG Company
PMP	potential migration pathways
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SEP	Sequential extraction procedure
SSI	statistically significant increase
SSL	statistically significant level
XRD	X-ray diffraction

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.95(g)(3)(ii) allows the owner or operator of a coal combustion residuals (CCR) unit 90 days from the date of determination of statistically significant levels (SSLs) over groundwater protection standards (GWPS) of groundwater constituents listed in Appendix IV of 40 C.F.R. § 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSL(s) (Alternate Source Demonstration [ASD]), or that the SSL(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC, by Ramboll Americas Engineering Solutions, Inc. (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for the Baldwin Power Plant (BPP) Bottom Ash Pond (BAP) located near Baldwin, Illinois.

The most recent Assessment Monitoring sampling event (A5D) was completed on September 30, 2022, and analytical data was received on November 15, 2022. Additional background and compliance monitoring wells were installed around the BAP in September and October of 2022. Following the well installations, eight monthly rounds of groundwater sampling were initiated per 35 I.A.C. § 845. Analytical data from all monitoring events, from December 2015 through A5D, were evaluated in accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017a) to determine any statistically significant increases (SSIs) of Appendix III parameters over background concentrations or SSLs of Appendix IV parameters over GWPSs. That evaluation identified one SSL at a compliance monitoring well as follows:

- Lithium at well MW-370

Pursuant to 40 C.F.R. § 257.95(g)(3)(ii), the lines of evidence (LOEs) presented in **Section 3** demonstrate that sources other than the BAP were the cause of the lithium SSL listed above. This ASD was completed by April 30, 2023, within 90 days of determination of the SSLs (January 30, 2023), as required by 40 C.F.R. § 257.95(g)(3)(ii).

2. BACKGROUND

2.1 Site Location and Description

The BPP is located in southwest Illinois in Randolph and St. Clair Counties. The Randolph County portion of the BPP is located within Sections 2, 3, 4, 9, 10, 11, 14, 15, and 16 of Township 4 South and Range 7 West. The St. Clair County portion of the property is located within Sections 33, 34, and 35 of Township 3 South and Range 7 West. The BAP is approximately one-half mile west-northwest of the Village of Baldwin.

The BPP property is bordered to the west by the Kaskaskia River; to the east by Baldwin Road, farmland, and strip-mining areas; to the southeast by the Village of Baldwin; to the south by the Illinois Central Gulf railroad tracks, scattered residences, and State Route 154; and to the north by farmland. The St. Clair/Randolph County Line crosses east-west at approximately the midpoint of Baldwin Lake (Cooling Pond). **Figure 1** shows the location of the BAP, as well as the Fly Ash Pond System (FAPS), Secondary Pond, Tertiary Pond, and Baldwin Lake (Cooling Pond). The BAP is adjacent to the FAPS, which was approved for closure by Illinois Environmental Protection Agency (IEPA) on August 16, 2016.

2.2 Groundwater Monitoring

The BAP groundwater monitoring system for compliance with 40 C.F.R. § 257 consists of two background monitoring wells (MW-304 and MW-306) and four compliance monitoring wells (MW-356, MW-369, MW-370, and MW-382). A map showing the groundwater monitoring system, including the CCR unit and all background and compliance monitoring wells, is presented in **Figure 1**. **Figure 1** also shows porewater location TPZ-164, as well as the monitoring wells that were installed in 2022. New monitoring well MW-358 was installed in 2022 upgradient of the BAP and compliance monitoring well MW-370 (compliance monitoring well with identified lithium SSL) with a well screen (363.7 to 373.7 feet North American Vertical Datum of 1988 [NAVD88]) that overlaps with MW-370 well screen elevations (355.6 to 365.6 feet NAVD88).

Groundwater samples are collected and analyzed in accordance with the Sampling and Analysis Plan prepared for the BAP (NRT/OBG, 2017b). Statistical evaluation of analytical data is performed in accordance with the Statistical Analysis Plan (NRT/OBG, 2017a).

2.3 Site Hydrogeology and Stratigraphy

Three hydrostratigraphic units are present at the Site, including CCR, an upper unit, and a bedrock unit. These units are described in detail in the Supplemental Hydrogeologic Site Characterization and Groundwater Monitoring Plan (Natural Resources Technology, Inc. [NRT], 2016) and the Hydrogeologic Site Characterization Report (Ramboll, 2021); and are summarized below.

- **CCR:** CCR, consisting primarily of fly ash, bottom ash, and boiler slag. Also includes earthen fill deposits of predominantly clay and silt materials from on-site excavations that were used to construct berms and roads surrounding the various impoundments across the Site. The 2022 Site Investigation observed up to 28.2 feet of bottom ash towards the center of the BAP (XPW05).
- **Upper Unit:** Predominantly clay with some silt and minor sand, silt layers, and occasional sand lenses. Includes the lithologic layers identified as the Cahokia Alluvium, Peoria Loess,

Equality Formation, and Vandalia Till Member. This unit is composed of unlithified natural geologic materials and extends from the water table to the bedrock. Thin sand seams and the interface (contact) between the Upper Unit and bedrock have been identified as potential migration pathways (PMPs). No continuous sand seams were observed in the Upper Unit within or immediately adjacent to the BAP; however, the sand seams may act as a PMP due to relatively higher hydraulic conductivities (on the order of 10^{-4} centimeters per second [cm/s]) than the surrounding clays (on the order of 10^{-5} cm/s).

- **Bedrock Unit:** Shallow bedrock beneath the BAP yields small amounts of water from interconnected pores, cracks, fractures, crevices, joints, and bedding planes and is the only water-bearing unit that is continuous across the Site; this unit is considered the Uppermost Aquifer (UA) and is composed of Pennsylvanian and Mississippian-aged interbedded shale and limestone bedrock having a regional strike that is generally north to northeast with a dip of 2 to 3 degrees to the east into the Illinois Basin (Breeden et. al, 2018; Bristol and Howard, 1971). The surface elevation varies across the site, generally sloping downward from east to west, and the unlithified Upper Unit thins from east to west. The top of bedrock depth ranges between 12.5 feet below ground surface (bgs) near the Kaskaskia River and 70 feet bgs within the East Fly Ash Pond (part of the FAPS). Limestone layers intercepted at the Site are generally light to dark gray, fine-grained, thin bedded, banded, argillaceous, and competent except where weathered. Weathering of the limestone produces a calcareous clay. The limestone layers are interbedded with thin shale layers and are sometimes fossiliferous or sandy. The shale layers are generally weathered, competent, silty, slightly micaceous, fissile, and dark gray. Where highly weathered shale (*i.e.,* decomposed bedrock) was encountered, the shale was non-fissile and resembled an unlithified stiff clay with medium to high plasticity. Bedrock in the vicinity of

Water quality in the Uppermost Aquifer (*i.e.,* Pennsylvanian and Mississippian-aged bedrock) degrades with increasing depth as water becomes increasingly mineralized. Therefore, water quality at monitoring wells with screens placed in deeper bedrock layers (*e.g.,* MW-358 and MW-370) would be expected to demonstrate more influence from the naturally increased mineralization than wells screened shallower in the bedrock. Groundwater flow in bedrock is toward the northwest in the east and central areas of the BAP, and southwest in the east area of the FAPS. The Secondary and Tertiary ponds were created in a former drainage channel and bedrock groundwater flows toward these ponds as illustrated in **Figure 2**. Groundwater elevations vary seasonally, generally less than 7 feet, although flow directions are generally consistent. Groundwater elevations across the Site range between approximately 370 and 450 feet NAVD88.

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

This ASD is based on the following LOEs:

1. The lithium concentration in the BAP porewater is lower than the concentrations observed in compliance monitoring well location MW-370.
2. Compliance monitoring well MW-370 has a similar ionic composition to upgradient monitoring well MW-358.
3. An aquifer solids evaluation identified naturally occurring lithium associated with the shale bedrock as a source for lithium in the Uppermost Aquifer.

These LOEs are described and supported in greater detail below. Monitoring wells and the BAP porewater sample locations are shown in **Figure 1**.

3.1 LOE #1: The lithium concentration in the BAP porewater is lower than the concentrations observed in compliance monitoring well location MW-370.

Table A below provides summary statistics for lithium in background wells, MW-370 and BAP porewater collected from TPZ-164, and the five new porewater wells installed in 2022.

Table A. Summary Statistics for Lithium in MW-370 and BAP Porewater (December 2015 to March 2023).

Sample Location	Lithium (milligrams per liter [mg/L])		
	Minimum	Maximum	Median
Background Groundwater[1]	0.010	0.096	0.055
Exceedance Groundwater (MW-370)	0.098	0.22	0.14
BAP Porewater[2]	<0.005	0.035	0.013

Notes:
[1]Background groundwater was collected at monitoring wells MW-304 and MW-306.
[2]BAP porewater was collected at TPZ-164 (September 2018 through November 2022), XPW01, XPW02, XPW04, XPW05, and XPW06 (October 2022 through January 2023).

The following observations can be made from **Table A** above:

- Concentrations of lithium in background wells ranged from 0.010 to 0.096 mg/L, with a median concentration of 0.055 mg/L.
- Concentrations of lithium in downgradient compliance monitoring well MW-370 ranged from 0.098 to 0.22 mg/L, with a median concentration of 0.14 mg/L.
- Concentrations of lithium in BAP porewater ranged from non-detect (<0.005 mg/L) to 0.035 mg/L, with a median concentration of 0.013 mg/L.
- The median lithium concentration observed in porewater is an order of magnitude lower than the median lithium concentrations observed in compliance monitoring well MW-370.
- The highest observed lithium concentration in porewater is approximately six times lower than the maximum concentration observed in compliance monitoring well MW-370.

If the BAP was the source of lithium in downgradient groundwater, BAP porewater concentrations of lithium would be expected to be higher than the groundwater concentrations. The median lithium concentration observed in porewater is below the median lithium concentrations observed in both background and compliance groundwater monitoring wells, indicating that lithium concentrations are not related to the BAP.

3.2 LOE #2: Compliance monitoring well MW-370 has a similar ionic composition to upgradient monitoring well MW-358.

Stiff diagrams graphically represent ionic composition of aqueous solutions. **Figure A** on the following page shows a series of Stiff diagrams that display the ionic compositions of groundwater from background monitoring wells (brown); compliance monitoring wells (blue); and upgradient monitoring well MW-358 (tan). Polygons with similar shapes on Stiff diagrams indicate solutions with similar ionic compositions, whereas polygons with different shapes indicate solutions with dissimilar ionic compositions. The larger the area of the polygon, the greater the concentration of the various ions. A Stiff diagram was included in **Figure A** for one out-of-network, upgradient, monitoring well, MW-358, due to similarities with MW-370 with respect to ionic composition, well screen elevation, and the composition of the bedrock material.

Compliance monitoring well MW-370 has chloride as the dominant anion and a substantially higher proportion of Na+K, similar to upgradient well MW-358. Upgradient monitoring well MW-358 is screened in a similar shaley bedrock material and at a similar elevation to MW-370 (**Figures 3 and 4**). The similarity in ionic composition in compliance well MW-370 and upgradient well MW-358 suggests that groundwater at these locations and depths is from a similar lithologic material that has undergone a similar amount of naturally occurring dissolution, and supports the conclusion that natural variability of groundwater in the Uppermost Aquifer is responsible for the lithium SSL at MW-370.

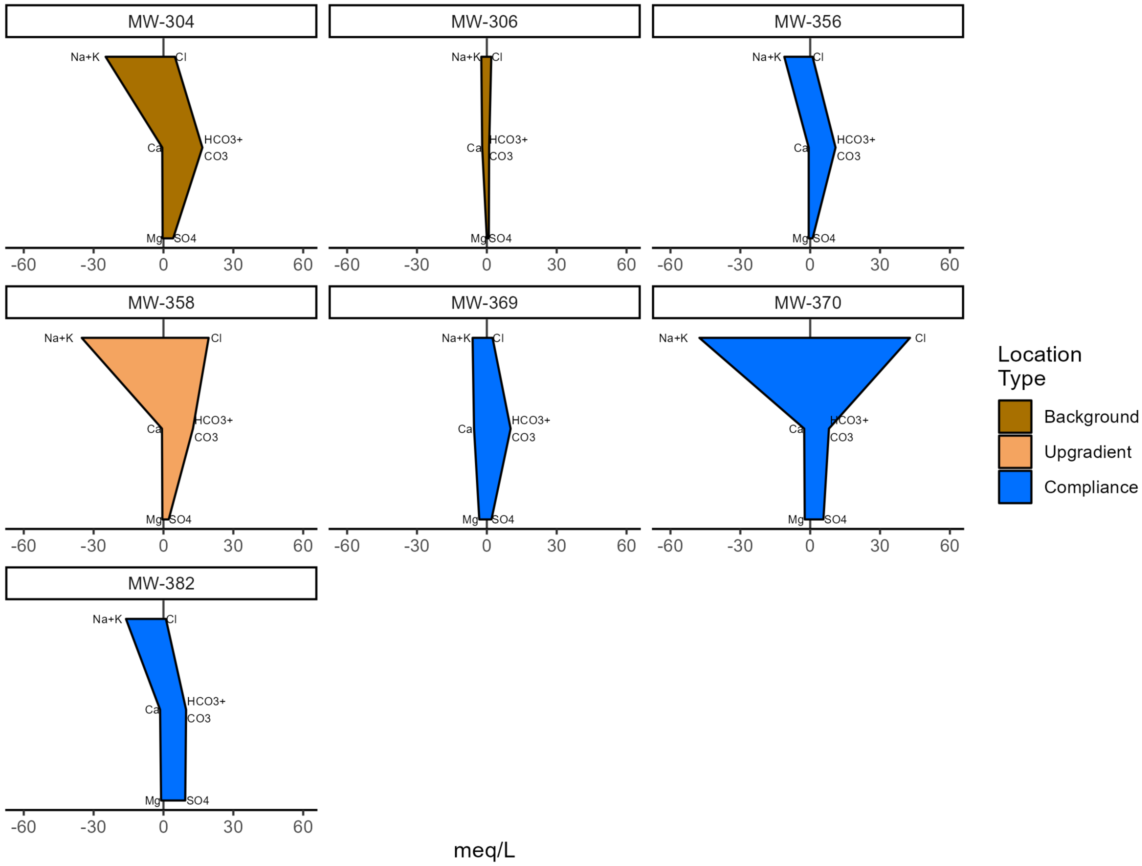

Figure A. Stiff Diagram Showing Ionic Composition of Samples of BAP Background (Brown), Compliance Groundwater (Blue), and Upgradient Groundwater (Tan).

3.3 LOE #3: An aquifer solids evaluation identified naturally occurring lithium associated with the shale bedrock as a source of lithium in the Uppermost Aquifer

Solid phase analyses were completed on samples collected from the Site to support the conclusion that lithium concentrations in groundwater at MW-370 are associated with naturally occurring lithium in the Uppermost Aquifer materials (limestone and shale bedrock formation). A review of the geochemical and site conditions was completed by Geosyntec Consultants, Inc. and is included as **Appendix A**. The following conclusions were made based on the results of the aquifer solids evaluation:

- Lithium host-minerals occur in the UA throughout the Site and constitute natural sources of lithium in BAP soils.
- Lithium is present in both upgradient and downgradient shale samples at the Site, with the largest concentrations observed in upgradient solids samples.
- Natural lithium occurrence in aquifer material from the Site is associated with multiple phases and therefore interacts with groundwater through different mechanisms at different locations and depths.

- Naturally occurring lithium associated with the shale bedrock comprising the UA at the Site was identified as a source of lithium in Site groundwater.

4. CONCLUSIONS

Based on the following three LOEs, it has been demonstrated that the lithium SSL at MW-370 is not due to the BAP:

1. The lithium concentration in the BAP porewater is lower than the concentrations observed in compliance monitoring well location MW-370.
2. Compliance monitoring well MW-370 has a similar ionic composition to upgradient monitoring well MW-358.
3. An aquifer solids evaluation identified naturally occurring lithium associated with the shale bedrock as a source for lithium in the Uppermost Aquifer.

This information serves as the written ASD prepared in accordance with 40 C.F.R. § 257.95(g)(3)(ii) that the SSL observed during the A5D sampling event was not due to the BAP. Therefore, a corrective measures assessment is not required, and the BAP will remain in assessment monitoring. Additional data is being collected to identify the source of the SSLs.

5. REFERENCES

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FIGURES

Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Dem\Baldwin_AP\2023\Figure 1_Sampling Location Map.mxd

PROJECT: 169000XXXX | DATED: 4/25/2023 | DESIGNER: GALARNMC

BACKGROUND WELL
COMPLIANCE WELL
MONITORING WELL
PORE WATER WELL

REGULATED UNIT (SUBJECT UNIT)
FLY ASH POND SYSTEM (CLOSED)
SITE FEATURE
CAPPED AREA
PROPERTY BOUNDARY

0 400 800 Feet

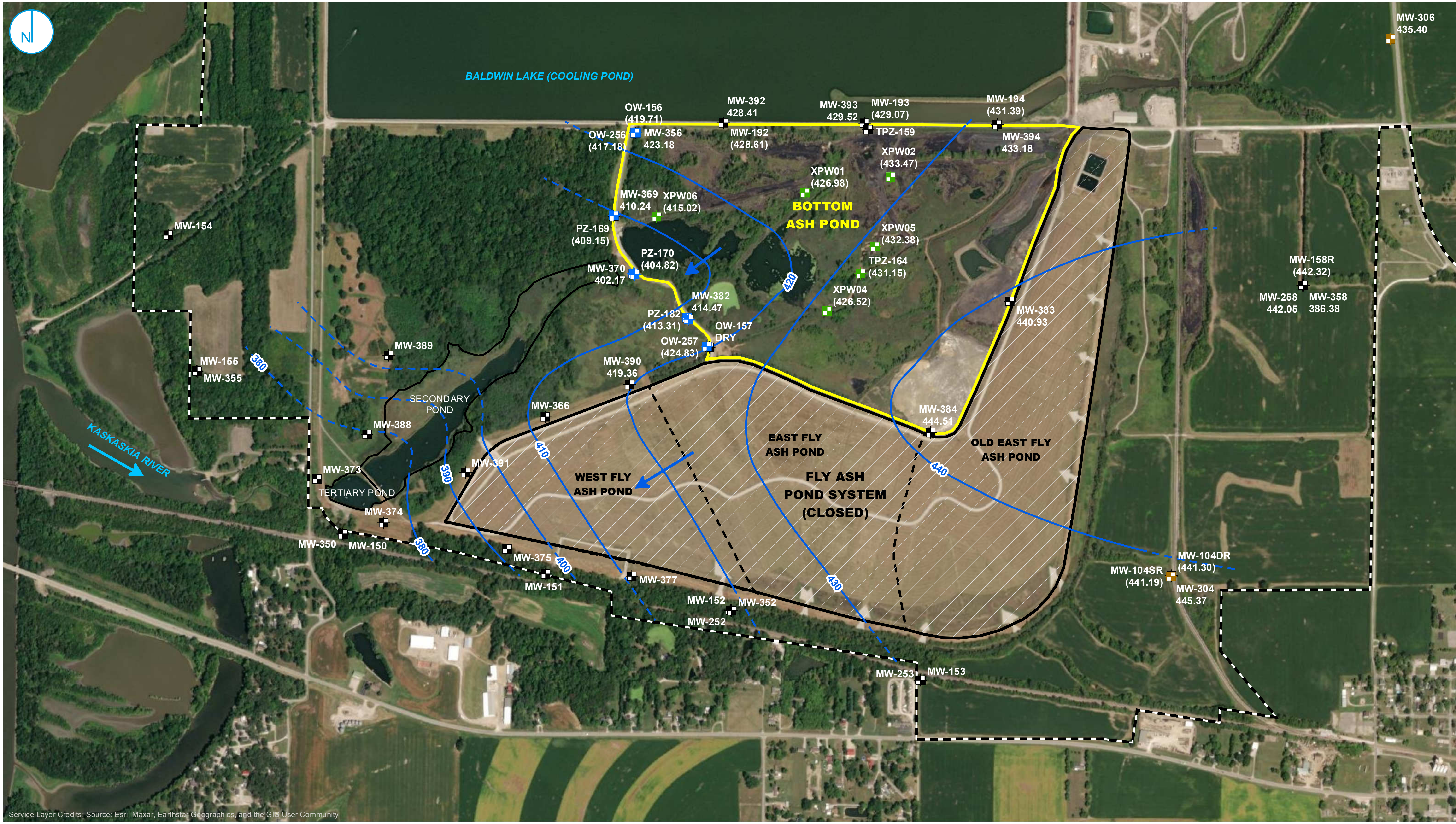
SAMPLING LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Dem\Baldwin_AP\2023\Figure 2_BAL BAP 601 845 Pot Surface 20221212.mxd

PROJECT: 169000XXXX | DATED: 4/20/2023 | DESIGNER: GALARNMC

- COMPLIANCE WELL
- BACKGROUND WELL
- PORE WATER WELL
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (10-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- FLY ASH POND SYSTEM (CLOSED)
- SITE FEATURE
- CAPPED AREA
- PROPERTY BOUNDARY

0 400 800 Feet

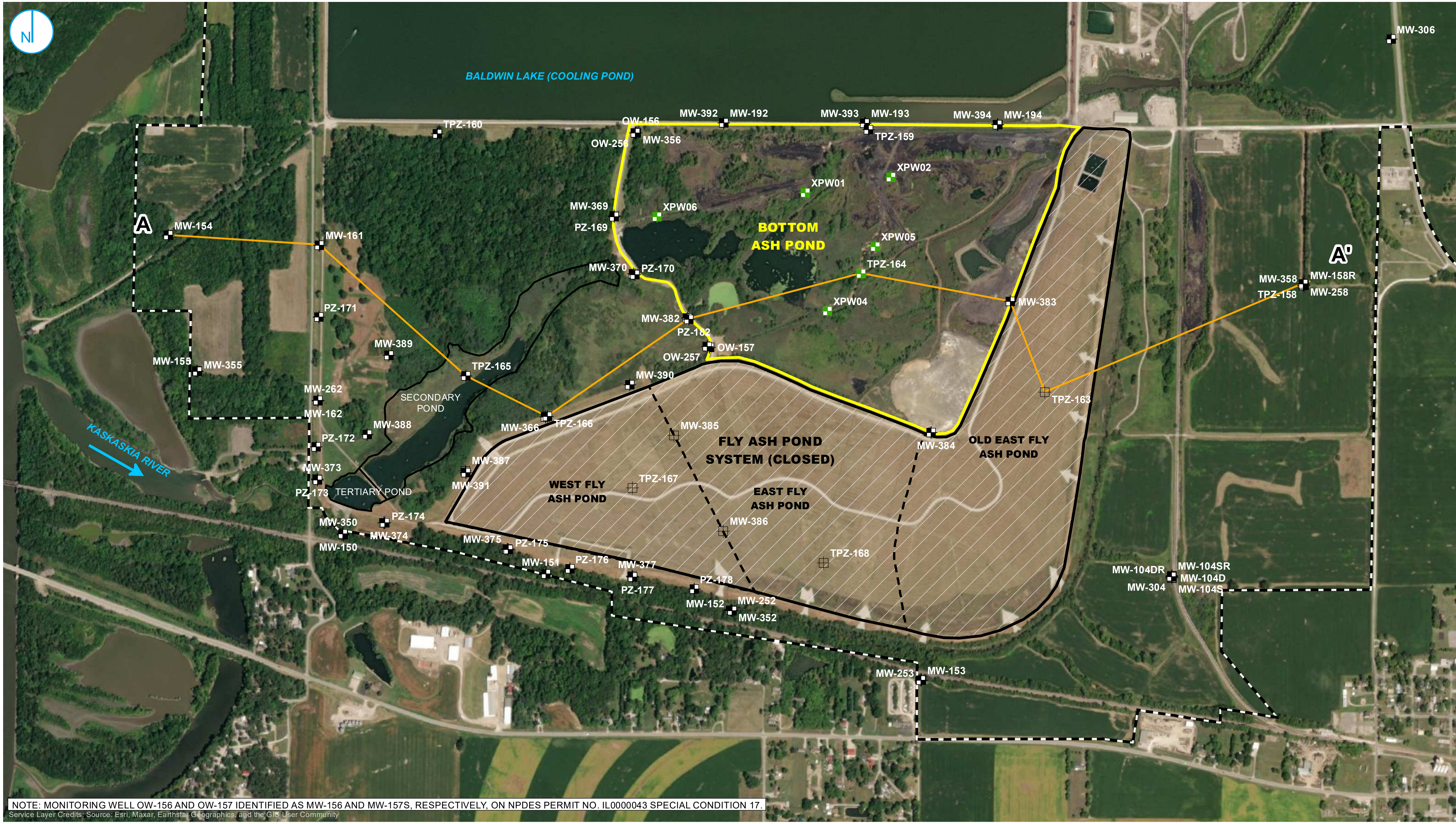
NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP DECEMBER 12, 2022

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



MONITORING WELL AND PIEZOMETER LOCATION
PORE WATER WELL
CLOSED MONITORING WELL
CCR SOURCEWATER SAMPLE

CROSS SECTION TRANSECT

A to A'

0 400 800 Feet

REGULATED UNIT (SUBJECT UNIT) FLY ASH
POND SYSTEM (CLOSED)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

CROSS SECTION LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

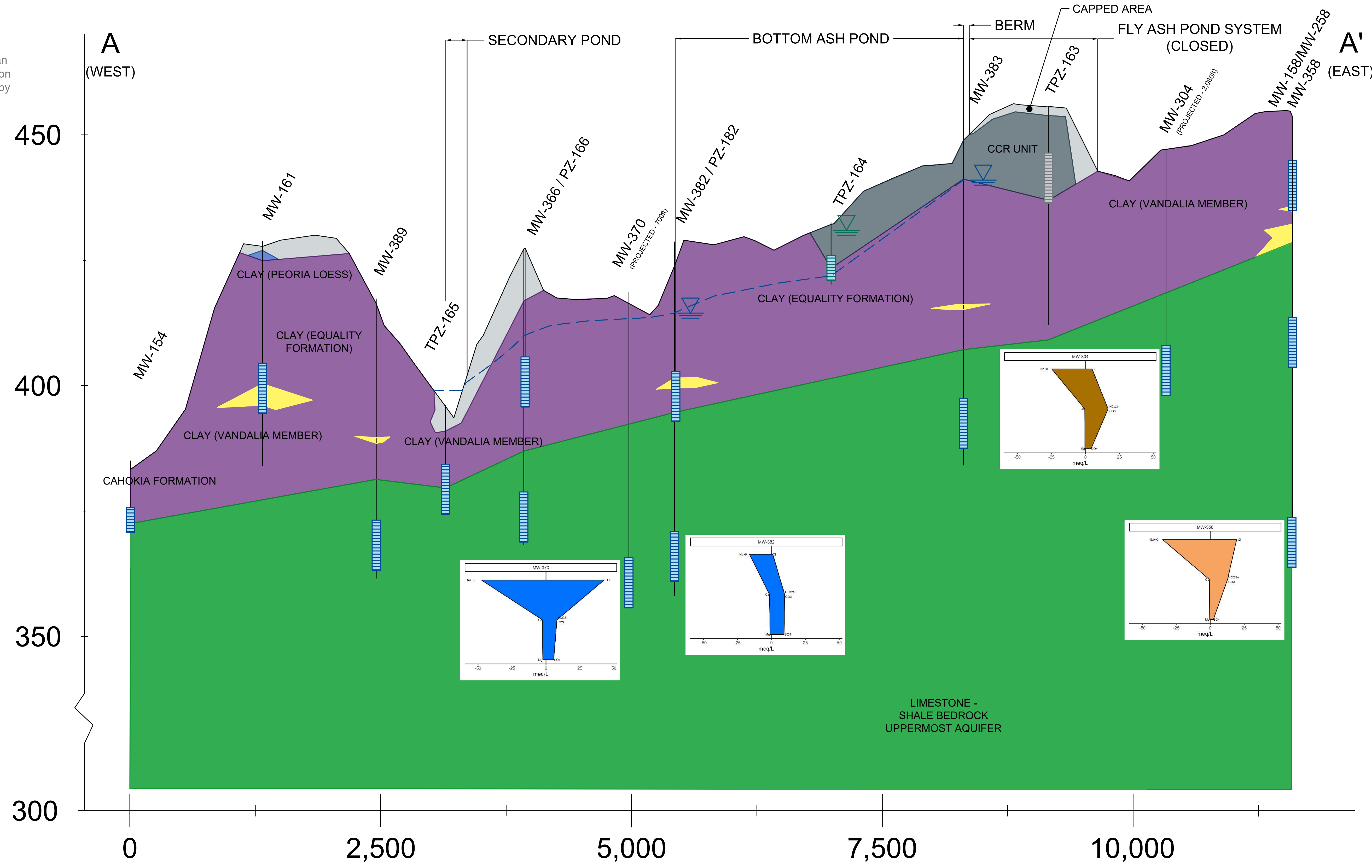
FIGURE 3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

PROJECT: 169000XXXX | DATED: 4/24/2023 | DESIGNER: GALARNMC

Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Dem\Baldwin_AP\2023\Figure 3_Cross Section Locations.mxd

NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 50X.
4. Groundwater elevations measured on December 12, 2022.



LEGEND
- COAL COMBUSTION RESIDUALS (CCR)
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPERMOST AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

20'
0
1,000'

CROSS SECTION A-A'

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILINOIS

FIGURE 4

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

APPENDICES

APPENDIX A
TECHNICAL MEMORANDUM - EVALUATION OF LITHIUM SOURCES WITHIN AQUIFER SOLIDS, BALDWIN POWER STATION - BOTTOM ASH POND (GEOSYNTEC CONSULTANTS, INC., 2023)

Geosyntec consultants

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DRAFT – SUBJECT TO CHANGE. PRIVILEGED & CONFIDENTIAL

TECHNICAL MEMORANDUM

Date:	April 24, 2023
To:	Brian Voelker - Vistra
Copies to:	Stu Cravens and Phil Morris - Vistra
From:	Allison Kreinberg and Ryan Fimmen, Ph.D. - Geosyntec Consultants
Subject:	Evaluation of Lithium Sources within Aquifer Solids Baldwin Power Station – Bottom Ash Pond

Geosyntec Consultants, Inc. (Geosyntec) has completed a review of geochemical and site conditions at the Baldwin Power Plant Bottom Ash Pond (BAP; the Site) to evaluate the influence of the bedrock lithology on groundwater composition at downgradient monitoring well MW-370.

Alternate source demonstrations (ASDs) prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) concluded that sources other than the BAP were the cause of statistically significant levels (SSL) of lithium at MW-370. This technical review has identified naturally occurring lithium associated with the shale bedrock as a source of elevated lithium in Site groundwater.

SITE CONDITIONS

The groundwater monitoring network for the BAP consists of four downgradient compliance wells (MW-356, MW-369, MW-370, and MW-382) and two upgradient background wells (MW-304 and MW-306). These monitoring locations are shown in the map provided as **Attachment 1**. Site geology consists of glacial drift deposits comprised of clastic material overlying Pennsylvanian and Mississippian-age bedrock (Ramboll, 2021). The geologic units comprising subsurface lithologies at the Site are listed in descending order:

- Equality Formation: predominantly clay and sandy clay, with intermittent sand lenses and some secondary carbonate concretions
- Pearl Formation: predominantly fine-medium grained sand with intermittent gravel
- Vandalia Till: clay and sandy clay diamicton with intermittent silt, sand, and gravel lenses
- Bedrock: Mississippian-age limestone and shale which underlies unconsolidated material beneath the western portion of the Site, and Pennsylvanian-age limestone and shale which

underlies unconsolidated material beneath the eastern portion of the Site. The gradual change from Mississippian bedrock to Pennsylvanian bedrock is believed to occur approximately beneath the central portion of the Site (Willman et al., 1967).

Limestone bedrock at the Site is generally thinly bedded, argillaceous, and competent, with localized areas of increased weathering (Ramboll, 2021). The result of this limestone weathering is a calcareous clay lithology. Layers of limestone bedrock are interbedded with thin shale layers which are sometimes calcareous and sometimes siliciclastic. The shale layers are generally more weathered than the limestone bedrock but are generally still competent. Locations of highly weathered, non-fissile, clay-like shale with medium to high plasticity have been observed.

The Uppermost Aquifer (UA) in the vicinity of the BAP is the shallow limestone/shale bedrock. Although sand lenses are present within the unconsolidated material overlying bedrock, these lenses have not been found to be laterally continuous. Groundwater in the vicinity of the BAP flows through bedrock from east to west primarily through secondary porosity features, predominantly joints and fractures, which are present at variable frequencies within the UA.

Geologic cross-sections of the lithology underlying the BAP are provided as **Attachment 2**. The fracture network within the deeper portions of the UA bedrock is overlain by unconsolidated, predominantly low permeability clay with some silt, resulting in confined to semi-confined groundwater conditions with mostly upward vertical gradients and or flowing artesian conditions observed in the unconsolidated and UA bedrock units across the Site. The observed upward vertical gradients (upwelling) result in deeper groundwater characteristic of older lithologies mixing with shallow formation water in the UA. The flat horizontal groundwater gradient beneath the Site and the mostly upward vertical gradients also suggests the BAP is not an area of significantly increased recharge or infiltration to the UA. Groundwater quality in the UA has observed to decrease with increasing depths as confined formation water is increasingly mineralized (Ramboll, 2021).

GROUNDWATER CONDITIONS

The observed lithium SSL was identified by comparing the reported groundwater concentrations at downgradient monitoring well MW-370 to the site-specific groundwater protection standard (GWPS). The site-specific GWPS for lithium was established at 0.0958 mg/L, as the Site background concentrations were greater than the health-based level of 0.040 mg/L established in 40 CFR § 257.95(h)(2). Groundwater samples collected from recently installed upgradient monitoring well MW-358, which is screened in the Mississippian-age limestone and shale bedrock strata, contained lithium concentrations ranging from 0.0592 to 0.0957 mg/L. These upgradient concentrations, as well as previously observed results from background well MW-304, are elevated with respect to the health-based GWPS. This observation indicates that lithium is present at concentrations across the Site which suggest that a naturally occurring geogenic source of lithium to groundwater is present in these strata.

AQUIFER SOLIDS EVALUATION

Geosyntec reviewed the results of analyses completed on solid phase samples collected from the Site to support the conclusion that the lithium concentrations in groundwater at MW-370 in excess of the site-specific GWPS are associated with the limestone and shale bedrock formation.

Samples were collected from soil borings advanced in September and October 2022 at one location upgradient of the BAP (MW-358) and three locations downgradient of the BAP (MW-392, MW-393, and MW-394). These boring logs, plus the boring log for monitoring well MW-370, are provided as **Attachment 3**. Additional information regarding monitoring well construction and lithology depths of these locations and MW-370 is provided in **Table 1**. Three samples each were collected from various depth intervals/lithologies at MW-358 and MW-392, and one sample each was collected from the unconsolidated overburden at MW-393 and MW-394[1]. The samples were submitted for analysis of mineralogy via X-ray diffraction (XRD), total lithium, and lithium distribution within the aquifer solids using sequential extraction procedure (SEP). SEP uses progressively stronger reagents to solubilize metals from increasingly recalcitrant phases. Although these procedures do not identify the specific metal phases in a soil/aquifer matrix, they do provide a means to evaluate association of constituents with different classes of solids (Tessier et al, 1979).

Results for total and SEP analyses of lithium in these samples are presented in **Table 2** and the analytical laboratory reports are provided as **Attachment 4**. As a first step to evaluate data quality in an SEP analysis, the sum of individual extraction steps from the SEP was compared to the total lithium concentration. The sum of the SEP procedure is not expected to be exactly equal to the total metals analysis but should generally be consistent with the total metals analysis. As can be seen in **Table 2**, the total lithium concentrations ranged from 6.0 micrograms per gram of material (µg/g) to 20 µg/g in the shale samples. The summed concentrations of lithium from the SEP analyses ranged from 7 to 73 µg/g. The results were generally consistent between the total metals analyses and the summed SEP steps, indicating good metals recovery and data quality. One notable exception is the sample collected from 86-88 feet (ft.) below ground surface (bgs) at upgradient location MW-358, which had a total lithium concentration of 20.0 µg/g and a summed SEP total of 73 µg/g. While a difference was observed, both results indicate lithium is present within shale materials upgradient of the Site.

[1] Select samples, including those collected from MW-393 and MW-394, are excluded from subsequent results tables and discussion to emphasize findings associated with the bedrock lithologies.

These results indicate that lithium is present in both upgradient and downgradient shale samples at the Site, with the largest concentrations observed in upgradient samples. Most lithium in these samples was found to be associated with the residual metals fraction, which is typically considered to be immobile and not readily soluble. The abundance of lithium within the residual fraction indicates association with inseparable primary mineral phases such as clay minerals (Tessier et al., 1979). Lithium was also found to be associated with iron/manganese oxides in multiple samples (maximum of 25% associated with iron/manganese oxides in the sample collected from the 47-49 ft. bgs samples from MW-358), and a small component of lithium was found to be associated with organic material in the 86-88 ft. bgs sample collected from MW-358. These results indicate that natural lithium occurrence in aquifer material from the Site is associated with multiple phases and therefore interacts with groundwater through different mechanisms at different locations and depths.

Clay minerals are known to be common geosorbents for naturally occurring lithium (Starkey, 1982). Lithium is known to leach from lithium-hosting igneous rocks and micas through weathering processes. Mineral alteration reactions occurring in micas may result in lithium-rich micas transforming directly to illitic clays, and then to mixed-layer and smectite clays. The lithium within these primary minerals either becomes incorporated directly into the crystal structures of these clay minerals or is transported in solution and later concentrated in brines through evaporation (Ronov et al., 1970). Lithium-enriched brines constitute a common source of lithium in clay minerals, as eroded fine-grained materials deposited in these brines are capable of housing aqueous lithium within vacant sites in octahedral layers comprising their crystal structures (Schultz, 1969). SEP results from **Table 2** support the conclusion that naturally occurring lithium is observed in soils around the BAP, and that the majority of this lithium is associated with the residual solids fraction which consists of primary minerals. Field lithologic descriptions of samples indicate that nearly all of the samples collected and analyzed consist of clay or shale, both of which are comprised primarily of mica and clay minerals which are known to be hosts of natural lithium. Based on SEP results and lithologic observations, the data suggests that lithium in BAP soils is naturally occurring and primarily associated with micas and clays, with a smaller component associated with leachable oxides and organic material.

Mineralogical analyses were completed using X-ray diffraction (XRD) to evaluate whole rock mineralogy and evaluate the abundance of clays and micas within the aquifer solids. Whole rock mineralogy results are provided in **Table 3**. Sample mineralogy consists predominantly of quartz, mica (muscovite), feldspars (albite and microcline), and clay minerals (chlorite, kaolinite) (**Table 3**). Of these minerals, muscovite and clays are known hosts of natural lithium within their crystal structures (Zawidzki, 1976; Starkey, 1982). The combined abundances of muscovite or clay minerals account for between 30 to 49% of samples within the bedrock shale samples, with an average value of 43%. As indicated on **Table 3**, these minerals are present at sizeable abundances both upgradient and downgradient of the BAP, indicating that these lithium-host minerals occur in the UA throughout the Site and constitute natural sources of lithium.

MW-370 is screened from 53-63 ft. bgs within an interval of shaley limestone, with additional shale and clay directly overlying this material, as indicated by the boring log included in **Attachment 3**. It is likely that lithium-hosting micas and clay minerals are present within the screened interval of this monitoring well, the leachable component of which may act as a geogenic source of lithium in groundwater. Additionally, groundwater downgradient of the BAP may be mixing with deeper groundwater in contact with lithium-bearing micas and clay minerals within the deep shale lithologies observed upgradient of the Site due to the observed upward vertical gradient within the bedrock unit.

CONCLUSION

Naturally occurring lithium associated with the shale bedrock comprising the UA at the Site was identified as a source for lithium in Site groundwater. Solid phase samples collected from upgradient and downgradient locations around the BAP contained variable lithium, with the highest total lithium concentration observed in the upgradient deep shale sample. SEP analyses of the solid phase samples determined that the majority of lithium in the solid phase is associated with the residual metals fraction. The residual metals fraction corresponds to primary minerals such as micas and clay minerals, which are known to host natural lithium in their crystal structures, either as a result of mineral formation (micas) or depositional/alteration processes (clays). XRD confirmed the presence of micas and clay minerals in the aquifer solids at an average of 43% of the bedrock total mineralogy, suggesting an abundance of common lithium-hosting minerals which may release lithium to groundwater. This solid phase assessment supports the determination that MW-370 groundwater geochemistry appears to be related to shaley aquifer solid material.

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Zawidzki, Pawel. 1976. Lithium distribution in micas and its bearing on the lithium geochemistry of granitoids. Polska Akademia Nauk, Archiwum Mineralogiczne. v. 32, p. 95-152.

TABLES

Table 1 - Relevant Monitoring Well Information
Baldwin Power Plant

Monitoring Well	Well Classification	Screened Interval	Depth of Well	Geologic Material Within Screened Interval	Interval of Observed Alluvial Clay	Interval of Observed Bedrock
MW-370	Downgradient	53-63	66	Shaley limestone, Limestone	0-28.5	28.5-66
MW-358	Upgradient	80-90	90	Limestone, Shale	4-21	21-90
MW-392	Downgradient	74-84	84	Shale, Limestone	1-33	52-84
MW-393	Downgradient	75-85	85	Shale	1-27, 31-40	57-85
MW-394	Downgradient	73-83	85	Shale, Limestone	3-20, 22-37	37-85

Notes:
Depths provided in units of feet below ground surface
Observed clay and bedrock intervals are based on the boring logs provided in Attachment 3.

Table 2 - Lithium SEP Results Summary
Baldwin Power Plant

Well ID	MW-358		MW-358		MW-392		MW-392	
Depth (ft)	(47-49)		(86-88)		(66-68)		(80-82)	
Location	Upgradient		Upgradient		Downgradient		Downgradient	
Boring Log Description	Shallow Shale		Deeper Shale Body		Shale		Shale transitioning to limestone	
Total Lithium	6.0		20.0		15.0		8.0	
SEP Results								
	Concentration	% of Total	Concentration	% of Total	Concentration	% of Total	Concentration	% of Total
Water Soluble Fraction	<2	--	<2	--	<2	--	<2	--
Exchangeable Metals Fraction	<2	--	<2	--	<2	--	<2	--
Metals Bound to Carbonates Fraction	<2	--	<2	--	<2	--	<2	--
Metals Bound to Fe/Mn Oxides Fraction	3.0	25%	5.0	7%	2.0	10%	<2	--
Bound to Organic Material Fraction	<2	--	3.0	4%	<2	--	<2	--
Residual Metals Fraction	9.0	75%	65.0	89%	19.0	90%	7.0	100%
SEP Total	12.0	100%	73.0	100%	21.0	100%	7.0	100%

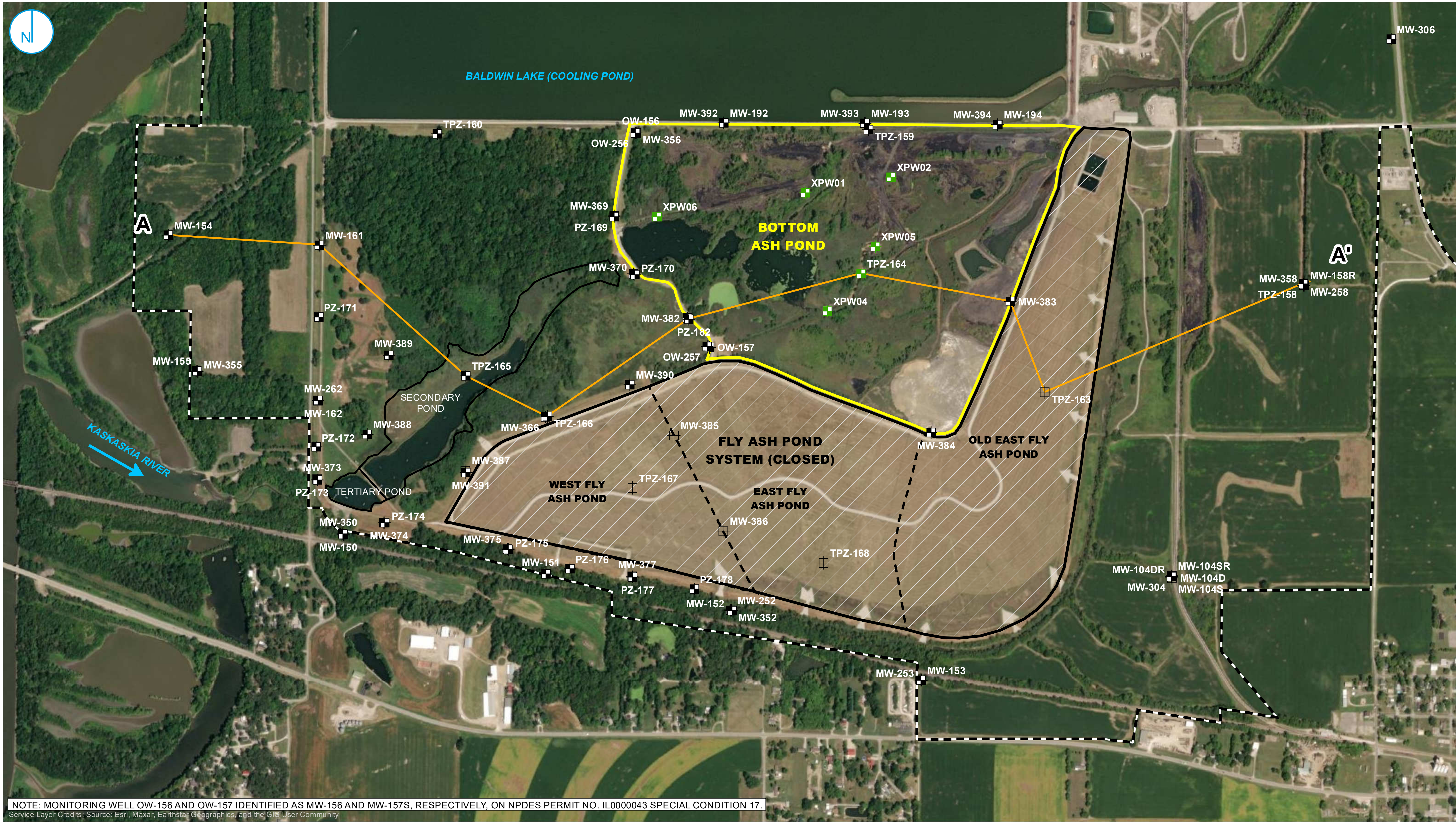
Notes:
SEP - sequential extraction procedure
All results shown in microgram of lithium per gram of soil (µg/g).
Total lithium was analyzed using aqua regia digest, ICP-MS
Non-detect values are shown as less than the detection limit.
The lithium fraction associated with each SEP phase is shown.
% of total lithium is calculated from the sum of the SEP fractions.

Table 3 - Summary of Rietveld Quantitative Analysis
X-Ray Diffraction Results
Baldwin Power Plant

Well ID			**MW-358**	**MW-358**	**MW-392**	**MW-392**
Depth (ft bgs)			**(47-49)**	**(86-88)**	**(66-68)**	**(80-82)**
Location			**Upgradient**	**Upgradient**	**Downgradient**	**Downgradient**
Boring Log Description			**Shallow Shale**	**Deeper Shale Body**	**Shale**	**Shale transitioning to limestone**
Mineral/Compound	**Formula**	**Mineral Type**	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	SiO_2	Silicate	33.0	34.9	27.2	29.1
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Mica	37.6	30.5	29.7	14.5
Albite	$NaAlSi_3O_8$	Feldspar	8.2	3.4	4.5	1.0
Microcline	$KAlSi_3O_8$	Feldspar	9.4	8.1	6.9	2.9
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Clay	-	-	16.3	6.8
Diaspore	aAlO.OH	Oxyhydroxide	-	-	-	-
Pyrite	FeS_2	Sulfide	1.0	0.8	-	1.2
Kaolinite	$Al_2Si_2O_5(OH)_4$	Clay	9.0	18.4	-	8.2
Calcite	$CaCO_3$	Carbonate	1.8	1.7	14.8	31.5
Anatase	TiO_2	Oxide	-	2.1	0.7	0.4
Leucite	$KAlSi_2O_6$	Zeolite	-	-	-	2.4
Siderite	$FeCO_3$	Carbonate	-	-	-	1.9
Dolomite	$CaMg(CO_3)_2$	Carbonate	-	-	-	-
Gypsum	$CaSO_4{\cdot}2H_2O$	Sulfate	-	-	-	-
Diopside	$CaMgSi_2O_6$	Pyroxene	-	-	-	-
Clay Minerals Total			9	18	16	15
Clays + Muscovite Total			47	49	46	30

Notes
Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample
The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.
Sample depths are shown in feet below ground surface (ft bgs).

ATTACHMENT 1
Cross Section Location Map



Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Demo\Baldwin_AP\2023\Figure 3_Cross Section Locations.mxd

PROJECT: 169000XXXX | DATED: 4/24/2023 | DESIGNER: GALARNMC

MONITORING WELL AND PIEZOMETER LOCATION
PORE WATER WELL
CLOSED MONITORING WELL
CCR SOURCEWATER SAMPLE

CROSS SECTION TRANSECT

A to A'

0 400 800 Feet

REGULATED UNIT (SUBJECT UNIT) FLY ASH
POND SYSTEM (CLOSED)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

CROSS SECTION LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

FIGURE 3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

ATTACHMENT 2
Cross Section A-A'

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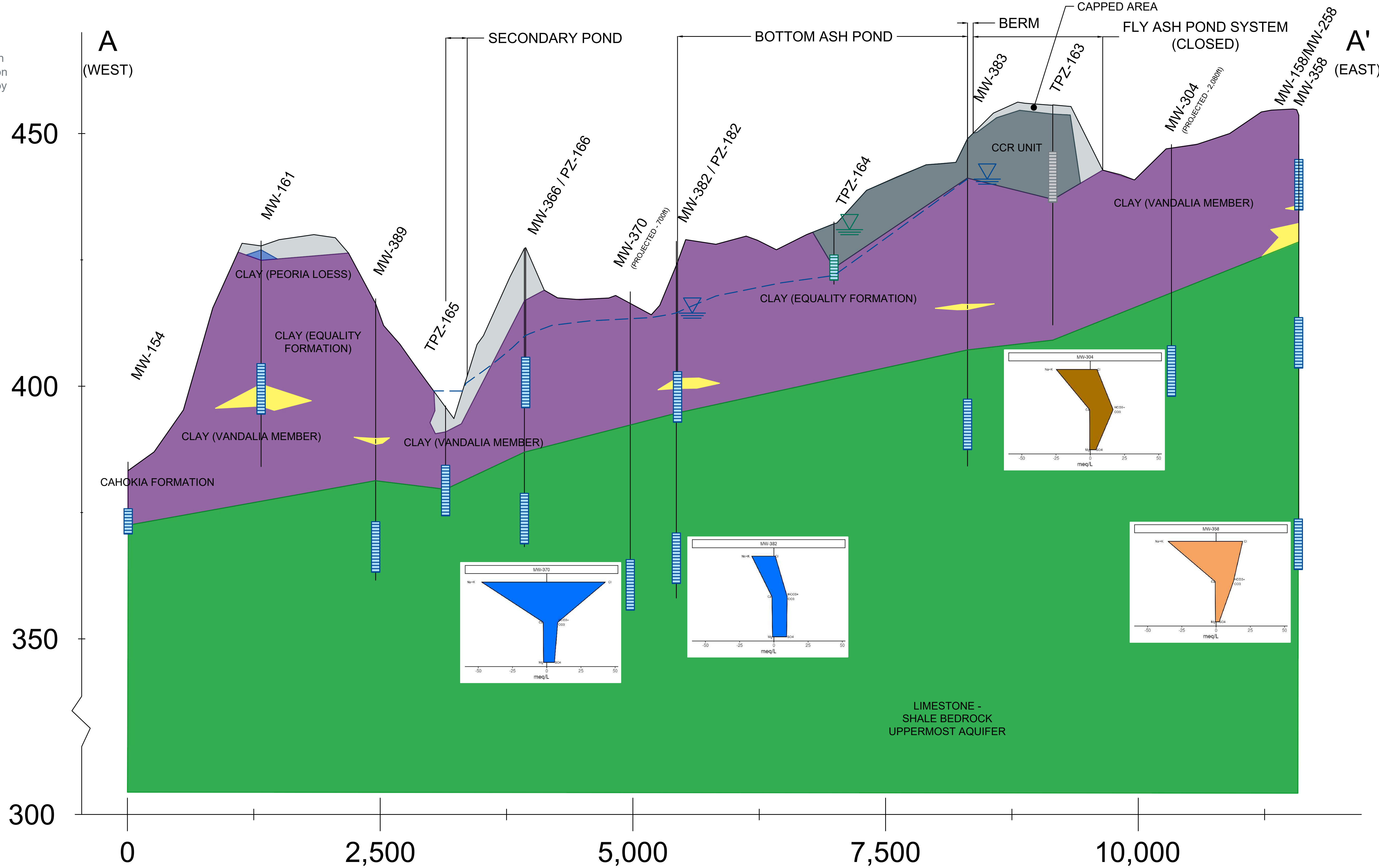
NOTES

1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 50X.
4. Groundwater elevations measured on December 12, 2022.



STIFF DIAGRAM LOCATION TYPE:

- BACKGROUND
- UPGRADIENT
- COMPLIANCE

PROJECT: 1940100806 DATED: 4/24/2023 2:04 PM DESIGNER: ENGELHSA

LEGEND

- COAL COMBUSTION RESIDUALS (CCR)
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPERMOST AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

20'
0
1,000'

CROSS SECTION
A-A'

ALTERNATE SOURCE DEMONSTRATION
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILINOIS

FIGURE 4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

ATTACHMENT 3
Boring Logs

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Energy Complex		MW-370

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Baetje Bulldog Drilling	11/20/2015	11/24/2015	4 1/4 HSA and rotary

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-370	Feet (NAVD88)	418.67 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 556,826.50 N, 2,381,936.14 E E/W
1/4 of 1/4 of Section , T N, R

Lat 38° 11' 44.1702"
Long -89° 52' 10.8084"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	Illinois	Baldwin

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0-2	0 - 2' **SILTY CLAY** CL/ML.	CL/ML								0-28' Blind Drilled. See log PZ-170 for soil description.
			2-4	2 - 4' Shelby Tube Sample.									
			4-8	4 - 8' **SILTY CLAY** CL/ML.	CL/ML								
			8-10	8 - 10' **SILTY CLAY** to **LEAN CLAY:** CL/ML.	CL/ML								
			10-12	10 - 12' **LEAN CLAY:** CL.	CL								

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-370

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12 - 14	12 - 14' Shelby Tube Sample.										
			14 - 24	14 - 24' **SILTY CLAY** CL/ML.	CL/ML									
			24 - 26	24 - 26' Shelby Tube Sample.										
			26 - 28	26 - 28' **SILTY CLAY** CL/ML.	CL/ML									
1 SS	10 10	23 50/4"	28	28 - 28.4' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), trace angular limestone gravel, soft, medium plasticity, moist.	CL									
1 CORE	60 18.5		29	28.4 - 28.9' **SHALE:** BDX (SH), gray, highly decomposed, very weak.	BDX (SH)									Core 1, RQD=51%
			29 - 32	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong.	BDX (LS/SH)									

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	28.9 - 38.1' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to moderately narrow apertures), medium to thickly bedded, microcrystalline, moderately decomposed, very strong. *(continued)*									
2 CORE	51.5 12		34	33.9' - 38.1' gray, greenish gray in fractures, trace fossils, moderately to highly decomposed, slightly to moderately disintegrated, clay in shoe with a hard, reddish brown inclusion.									Core 2, RQD=0%
			35		BDX (LS/SH)								
			36	36' - 37.9' vertical fracture.									
			37										
3 CORE	24 25		38	38.1 - 44' **SHALE:** BDX (SH), bluish gray, intensely fractured (extremely narrow to narrow apertures), highly decomposed, weak.									Core 3, RQD=40%
			39										
4 CORE	24 11		40										Core 4, RQD=0%
5 CORE	36 32		41	40.6' - 40.8 shaley limestone layer, light gray to gray, microcrystalline, moderately decomposed, very strong. 41.1' - 43.2 gray, moderately to highly decomposed.	BDX (SH)								Core 5, RQD=78%
			42										
			43										
6 CORE	12 28		44	44 - 45.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (extremely narrow to narrow apertures), thin to medium bedded, microcrystalline, slightly decomposed, clay cement in apertures, very strong.									Core 6, RQD=29%
7 CORE	45 27		45	45' shale layer, bluish gray, moderately fractured (extremely narrow to narrow apertures), highly decomposed, weak.	BDX (LS/SH)								Core 7, RQD=65%
			46	45.7 - 52.2' **SHALE:** BDX (SH), bluish gray, moderately fractured (tight to narrow), highly decomposed, weak.									
			47										
			48										
			49		BDX (SH)								
8 CORE	24 30		50										Core 8, RQD=78%
			51										
9 CORE	24 24		52										Core 9, RQD=0%

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-370

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				52' clay cement.										
10 CORE	24 36		53–55	52.2 - 61.7' **SHALEY LIMESTONE:** BDX (LS/SH), light gray to gray, intensely fractured (very narrow to narrow), thin to medium bedded, microcrystalline, slightly decomposed, cemented clay in apertures, very strong. 52.7' - 53' clayey sand in aperture. 53' - 53.1 shale bed, bluish gray, fossiliferous, moderately fractured (very narrow to narrow), highly decomposed, weak. 53.1' white to bluish gray, gray in the fractures (extremely narrow to moderately narrow apertures), thinly to medium bedded, slightly to moderately disintegrated.	BDX (LS/SH)									Core 10, RQD=0%
11 CORE	24 30		56–57	55.7' moderately disintegrated.										Core 11, RQD=18%
12 CORE	30 27		58–60	58.1' highly decomposed.										Core 12, RQD=39%
13 CORE	36 53		61											Core 13, RQD=89%
			62–65	61.7 - 65.3' **LIMESTONE:** BDX (LS).	BDX (LS)									
			66	65.3 - 66' Overdrilled for Well Installation.										
				66' End of Boring.										Bedrock corehole reamed 6" in diameter to 66' for well installation.

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW358

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	10/5/2022	10/8/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW358	Feet (NAVD88)	453.59 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒		Local Grid Location
State Plane 556,726.26 N, 2,387,756.63 E E/W 1/4 of 1/4 of Section , T N, R	Lat 38° 11' 42.9882" Long -89° 50' 57.9018"	Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	180 97		0–3.8	0 - 3.8' **SILT:** ML, very dark grayish brown (10YR 3/2), organic material (0-10%), moist to wet. 2.1' dry.	ML									CS= Core Sample Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
			3.8–8.9	3.8 - 8.9' **CLAYEY SILT:** ML/CL, light gray (10YR 7/2), very dark grayish brown (10YR 3/2) and yellowish brown (10YR 5/8) mottling (20-30%), dry.	ML/CL									
			8.9–12	8.9 - 13' **SILTY CLAY WITH SAND:** (CL/ML)S, grayish brown (10YR 5/2), strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) mottling (20-30%), organic material (0-10%), low toughness, low to medium plasticity, stiff.	(CL/ML)S									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
[signature]	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204	Tel: (414)837-3607 Fax: (414)837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
					(CL/ML)S									
			13	13 - 17.8' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2), strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) mottling (20-30%), low toughness, medium to high plasticity, stiff to very stiff.	CL/ML									
2 CS	60 60		15											
			16	16.1' mottling discontinues.										
			18	17.8 - 21' **SILTY CLAY WITH SAND:** (CL/ML)S, brown (10YR 5/3), strong brown (7.5YR 5/6) and gray (10YR 6/1) mottling (20-30%), gravel (5-15%), no dilatancy, high toughness, low to medium plasticity, hard, moist.	(CL/ML)S									
3 CS	48 36		20											
			21	21 - 26.5' **SHALE:** BDX (SH), dark gray (GLEY 1 4/N), weathered, thin bedding, moderately fractured.	BDX (SH)									
4 CORE	36 32		24	24' -25.2' wet.										RUN #4: Modified RQD = (21/32) = 66%
			26.5	26.5 - 27.5' **LIMESTONE:** BDX (LS), dark gray (5Y 4/1), shaley, fossiliferous, very strong.	BDX (LS)									
5 CORE	36 29		27.5	27.5 - 31.3' **SHALE:** BDX (SH), grayish black (N2), weathered, highly decomposed to residual soil, wet to moist.	BDX (SH)									RUN #5: Modified RQD = (0/29) = 0%
			29	29.3' thinly bedded, moderately decomposed.										
6 CORE	72 60		30	30' slightly decomposed to competent, moderately fractured.										RUN #6: Modified RQD = (45/60) = 75%
			31.3	31.3 - 32' **COAL:** COAL, black (N1).	COAL									
			32											

Boring Number MW358

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			32 – 33	32 - 33' **SHALE:** BDX (SH), grayish black (N2), slightly decomposed to competent, moderately fractured, wet to moist.	BDX (SH)									
			33 – 36	33 - 36' **SHALEY LIMESTONE:** BDX (LS/SH), medium gray (N5), weathered, shaley, higly decomposed, slightly fractured.	BDX (LS/SH)									
7 CORE	72 71		36 – 40.8	36 - 40.8' **SHALEY LIMESTONE:** to **SHALE:** BDX (LS/SH), interbedded shale.	BDX (LS/SH)									RUN #7: Modified RQD = (67/71) = 94%
			40.8 – 42	40.8 - 42' **LIMESTONE:** BDX (LS), medium light gray (N6), strong to moderately fractured, slightly decomposed, narrow apertures.	BDX (LS)									
8 CORE	96 85		42 – 52	42 - 58.9' **SHALE:** BDX (SH), medium gray (N5) to medium dark gray (N4), weathered, weak, thinly bedded, moderately to highly fractured.	BDX (SH)									RUN #8: Modified RQD = (81/85) = 94%
			47.5	47.5' dark grayish brown (10YR 4/2), pale olive (5Y 6/4) discoloration, more competent.										
9 CORE	60 60		50.2	50.2' weak to moderate.										RUN #9: Modified RQD = (52/60) = 87%
			50.8	50.8' olive gray (5Y 5/2).										

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	42 - 58.9' **SHALE:** BDX (SH), medium gray (N5) to medium dark gray (N4), weathered, weak, thinly bedded, moderately to highly fractured. *(continued)* 52.2' dark grayish green (5GY 4/2).										
			54	54.1' medium dark gray (N4) to medium gray (N5), weak, highly decomposed, no visible bedding, dry.										
10 CORE	60 58		55		BDX (SH)									RUN #10: Modified RQD = (42/58) = 72%
			56	55.7' dark grayish green (5GY 4/2).										
			57	57.2' light brownish gray (10YR 6/2), thinly bedded, laminated.										
			58	58.2' medium dark gray (N4), strong, intensely fractured, thinly bedded.										
			59	58.9 - 64' **LIMESTONE:** BDX (LS), medium gray (N5), very strong, moderately fractured, visible laminations.	BDX (LS)									
11 CORE	36 31		60, 61, 62											RUN #11: Modified RQD = (8/31) = 26%
12 CORE	36 36		63											RUN #12: Modified RQD = (31/36) = 86%
			64, 65	64 - 75.3' **SHALE:** BDX (SH), medium dark gray (N4) to medium gray (N5), strong, thinly bedded to laminated, moderately fractured. 64.3' grayish green (5GY 5/2), weathered, weak, decomposed.	BDX (SH)									
13 CORE	48 48		66, 67, 68											RUN #13: Modified RQD = (43/48) = 90%
			69	69.3' medium dark gray (N4), weathered, moderate strength.										
14 CORE	60 58		70, 71, 72											RUN# 14: Modified RQD = (57/58) = 99%

Boring Number MW358

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			73, 74, 75	64 - 75.3' **SHALE:** BDX (SH), medium dark gray (N4) to medium gray (N5), strong, thinly bedded to laminated, moderately fractured. *(continued)*	BDX (SH)									
15 CORE	60 56		76, 77	75.3 - 77.1' **LIMESTONE:** BDX (LS), gray (5Y 6/1), fossiliferous, very strong.	BDX (LS)									RUN #15: Modified RQD = Not Recorded
			78	77.1 - 78.2' **SHALE:** BDX (SH), medium dark gray (N4), weathered, weak to moderate strength, moderately decomposed.	BDX (SH)									
16 CORE	60 51		79, 80, 81, 82, 83, 84	78.2 - 84.8' **LIMESTONE:** BDX (LS), medium dark gray (N4) to medium gray (N5), shaley, fossiliferous, very strong, moderately fractured, laminations (0-5%).	BDX (LS)									RUN #16: Modified RQD = (23/51) = 45%
17 CORE	60 60		85, 86, 87, 88, 89, 90	84.8 - 90' **SHALE:** BDX (SH), dark gray (N3), weathered, weak to moderate strength, moderately decomposed, moderately fractured, thin bedding.	BDX (SH)									RUN #17: Modified RQD = (28/60) = 47%
				90' End of Boring.										

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SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW392

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/9/2022	9/26/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW392	Feet (NAVD88)	434.07 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 558,140.20 N, 2,382,717.92 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 57.132"
Long -89° 52' 0.9632"
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 46			0 - 1.2' **FILL, WELL-GRADED GRAVEL WITH CLAY:** GW-GC, pinkish gray (7.5YR 6/2), angular, moist.	(FILL) GW-GC									CS= Core Sample
			1	1.2 - 16' **FILL, LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	(FILL) CL									Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
2 CS	120 62		10											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
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Boring Number MW392

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13–16	1.2 - 16' **FILL, LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist. *(continued)*	(FILL) CL									
			16–20	16 - 20' **LEAN CLAY:** CL, light brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	CL									
3 CS	120 33		20	20 - 33' **LEAN CLAY:** CL, pinkish gray (7.5YR 6/2), sand (0-5%), medium to high plasticity, stiff, moist.	CL									
4 CS	120 104		30	30' increasing sand and gravel content.										

Depth scale: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32

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Boring Number MW392

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				20 - 33' **LEAN CLAY:** CL, pinkish gray (7.5YR 6/2), sand (0-5%), medium to high plasticity, stiff, moist. *(continued)*	CL									
			33	33 - 35' **WELL-GRADED SAND WITH SILT AND GRAVEL:** (SW-SM)g, fine to medium sand, dry.	(SW-SM)g									
			34											
			35	35 - 36.5' **SANDY SILT WITH GRAVEL:** s(ML)g, light yellowish brown (10YR 6/4), dry.	s(ML)g									
			36											
				36.5 - 39' **CLAYEY SILT:** ML/CL, gray (7.5YR 5/1), sand (5-10%), coal (0-5%), gravel (0-5%), dry.	ML/CL									
			37											
			38											
			39	39 - 40' **SILTY CLAY:** CL/ML, sand (0-5%), low to medium plasticity, stiff.	CL/ML									
5 CS	120 108		40	40 - 48' **SILT WITH SAND:** (ML)s, light brownish gray (10YR 6/2), dry.	(ML)s									
			41											
			42											
			43											
			44	44' increasing clay content.										
			45	45' (2.5Y 6/2).										
			46											
			47											
			48	48 - 52' **SILT:** ML, gray (2.5Y 5/1), sand (0-5%), dry.	ML									
			49											
6 CS	84 81		50											
			51											
			52											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	52 - 57' **SHALE:** BDX (SH), dark gray (5Y 4/1), highly weathered, hard, dry. 53' very dark gray (7.5YR 3/1).	BDX (SH)									
7 CORE	60 4		57	57 - 57.5' **LIMESTONE:** BDX (LS), gray (5Y 6/1), slightly fractured.	BDX (LS)									RUN #7: Modified RQD = 0% (No Solid Recovery > 4")
			58	57.5 - 70' **SHALE:** BDX (SH), dark gray (5Y 4/1), weathered, soft, moderately fractured to highly fractured limestone beds (0-5%).	BDX (SH)									
8 CORE	96 78		62											RUN #8: Modified RQD = (28/78) = 36%
			66	66.3' - 67.2' highly fractured, very soft, wet.										
9 CORE	120 62		70	70 - 74.4' **LIMESTONE:** BDX (LS), gray (5Y 6/1), moderately to intensely fractured, moderately wide apertures.	BDX (LS)									RUN #9: Modified RQD = (28/78) = 36%

Depth scale: 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72

Boring Number MW392

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73 74	70 - 74.4' **LIMESTONE:** BDX (LS), gray (5Y 6/1), moderately to intensely fractured, moderately wide apertures. *(continued)*	BDX (LS)									
10 CORE	48 48		75 76 77 78 79 80 81	74.4 - 81.8' **SHALE:** BDX (SH), medium dark gray (N4) to dark gray (N3), slightly weathered, moderately fractured, thinly bedded.	BDX (SH)									RUN #10: Modified RQD = (28/48) = 58%
			82 83 84	81.8 - 84' **LIMESTONE:** BDX (LS), medium light gray (N6), shaley, fossiliferous, moderately fractured, thinly bedded. 83.2' medium gray (N5).	BDX (LS)									
				84' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW393

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/9/2022	10/4/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW393	Feet (NAVD88)	434.59 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒

State Plane 558,133.57 N, 2,383,944.49 E E/W

1/4 of 1/4 of Section , T N, R

Lat 38° 11' 57.027"

Long -89° 51' 45.5976"

Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 86		0	0 - 1' **FILL, WELL-GRADED GRAVEL:** GW, pinkish gray (7.5YR 6/2), angular, moist.	(FILL) GW									CS= Core Sample
			1	1 - 20' **FILL, LEAN CLAY:** CL, brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist.	(FILL) CL									Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
2 CS	120 120		10	10' sand (0-5%), iron concretions (0-5%).										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Ramboll
234 W Florida Street, 5th Floor, Milwaukee, WI 53204
Tel: (414)837-3607
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Boring Number MW393

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13–20	1 - 20' **FILL, LEAN CLAY:** CL, brown (7.5YR 6/4), sand (0-5%), no dilatancy, low to medium plasticity, moist. *(continued)* 18' medium to high plasticity.	(FILL) CL									
3 CS	120 120		20–24	20 - 24' **LEAN CLAY:** CL, light brown (7.5YR 6/4), mottling, sand (0-5%), medium to high plasticity, cohesive, moist.	CL									
			24–27	24 - 27' **CLAYEY SAND:** SC, gray (10YR 6/1), fine to medium sand, wet.	SC									
			27–31	27 - 31' **SILT WITH SAND:** (ML)s, dark gray (7.5YR 4/1), sand (0-5%), moist.	(ML)s									
4 CS	120 105		30	30' coal fragments (0-5%).										
			31–32	31 - 40' **SILTY CLAY:** CL/ML, dark gray (7.5Y 4/1), organic material (0-5%), gravel (0-5%), stiff to very stiff, moist.	CL/ML									

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33–39	31 - 40' **SILTY CLAY:** CL/ML, dark gray (7.5Y 4/1), organic material (0-5%), gravel (0-5%), stiff to very stiff, moist. *(continued)*	CL/ML									
5 CS	120 120		40–49	40 - 50' **SILT:** ML, grayish brown (2.5Y 5/2), very stiff to hard, platy, dry.	ML									
6 CS	120 92		50–52	50 - 55' **SILT:** ML, dark gray (7.5YR 4/1), sand (0-5%), very stiff to hard, dry.	ML									

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Boring Number MW393

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53, 54	50 - 55' **SILT:** ML, dark gray (7.5YR 4/1), sand (0-5%), very stiff to hard, dry. *(continued)*	ML									
			55, 56	55 - 57' **CLAYEY SILT:** ML/CL, gray (10YR 6/1), sand (0-5%), gravel (0-5%), medium plasticity, moist.	ML/CL									
			57, 58, 59	57 - 60' **LIMESTONE:** BDX (LS), gray (10YR 6/1), rock flour and angular chips (<2").	BDX (LS)									
7 CORE	120 60		60, 61, 62, 63, 64, 65, 66, 67, 68, 69	60 - 70' **SHALE:** BDX (SH), medium gray (N5), weathered, very weak, residual soil, soft, slightly fractured.	BDX (SH)									RUN #7: Modified RQD = (31/60) = 52%
8 CORE	42 40		70, 71, 72	70 - 73.5' **LIMESTONE:** BDX (LS), medium dark gray (N4), weathered, shaley, thinly bedded, moderately fractured.	BDX (LS)									RUN #8: Modified RQD = (32/40) = 80%

Boring Number MW393

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	70 - 73.5' **LIMESTONE:** BDX (LS), medium dark gray (N4), weathered, shaley, thinly bedded, moderately fractured. *(continued)* 72' medium gray (N5).	BDX (LS)									
9 CORE	78 40		74–85	73.5 - 85' **SHALE:** BDX (SH), medium gray (N5), weathered, moderately to slightly fractured, thinly laminated.	BDX (SH)									RUN #9: Modified RQD = (30/40) = 75%
10 CORE	60 45													RUN #10: Modified RQD = (34/45) = 76%
				83.5' more competent.										
			85	85' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Baldwin Power Plant		MW394

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Blake Weller Cascade Drilling	9/25/2022	10/5/2022	Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW394	Feet (NAVD88)	435.51 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 558,123.63 N, 2,385,095.76 E E/W
1/4 of 1/4 of Section , T N, R
Lat 38° 11' 56.8911"
Long -89° 51' 31.1756"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Randolph	IL	Baldwin

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	72 67			0 - 2.6' **FILL, WELL-GRADED GRAVEL WITH CLAY:** GW-GC, brown (10YR 4/3), angular, moist.	(FILL) GW-GC									CS= Core Sample
			1											Measured Rock Quality Designation (RQD) was modified due to drilling methods, modified RQD equals the sum of recovered core sections greater than 4 inches in length divided by total core recovery.
			2											
			3	2.6 - 20' **LEAN CLAY:** CL, brown (10YR 5/3), reddish brown bottling (20%), sand (0-5%), low to medium plasticity, very stiff to hard, moist.					4					
			4											
			5						4					
2 CS	120 120		6											
			7						2.5					
					CL				3.5					
			8						2					
			9	9.2' brown (7.5YR 5/3), medium to high plasticity.					2					
			10						3					
			11						2.25					
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
	Ramboll 234 W Florida Street, 5th Floor, Milwaukee, WI 53204	Tel: (414)837-3607 Fax: (414)837-3608

Boring Number MW394

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				2.6 - 20' **LEAN CLAY:** CL, brown (10YR 5/3), reddish brown bottling (20%), sand (0-5%), low to medium plasticity, very stiff to hard, moist. *(continued)*					2.25					
			13											
			14	14' low to medium plasticity.					2.5					
			15											
3 CS	120 120		16		CL									
			17	16.5' increasing sand and gravel content, gray (GLEY 1 5/1) iron concretions (50%).										
			18											
			19											
			20	20 - 22.1' **SILTY SAND:** SM, yellowish brown (10YR 5/6), fine sand, clay (0-5%), moist.										
			21		SM									
			22	22.1 - 36.8' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), greenish gray (GLEY 1 5/10Y) and yellowish brown (10YR 5/6) mottling, sand (0-5%), medium to high plasticity, hard, moist.										
			23						4.5					
			24						4.5					
			25						4.5					
4 CS	120 112		26						4.5					
			27		CL				4.5					
			28						4.5					
			29						4.5					
			30						4.5					
			31						4.5					
			32											

Boring Number MW394

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	22.1 - 36.8' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), greenish gray (GLEY 1 5/10Y) and yellowish brown (10YR 5/6) mottling, sand (0-5%), medium to high plasticity, hard, moist. *(continued)*					3.75					
			34						4.25					
			35	34.4' olive yellow (5Y 6/6), low to medium plasticity.	CL				4.5					
5 CS	120 113		36											
			37	36.8 - 48' **Weathered SHALE Bedrock:** BDX (SH), pale olive (5Y 6/3), weathered, argillaceous, fissile, moist.										
			38											
			39											
			40	40' olive gray (5Y 5/2).										
			41											
			42											
			43		BDX (SH)									
			44											
			45											
6 CS	96 96		46											
			47											
			48	48 - 58' **LIMESTONE:** to **SHALE:** BDX (LS), olive gray (5Y 4/2), interbedded limestone and shale, fissile.										
			49											
			50	50' - 50.2' limestone, very strong.	BDX (LS)									
			51											
			52											

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				48 - 58' **LIMESTONE:** to **SHALE:** BDX (LS), olive gray (5Y 4/2), interbedded limestone and shale, fissile. *(continued)*										
			53											
7 CS	48 48		54	53.7' - 53.9' limestone, very strong. 54' - 55.6' dark gray (10YR 4/1) to gray (10YR 5/1), more competent.										
			55		BDX (LS)									
			56	55.6' gray (10YR 6/1) to dark gray (10YR 4/1), more competent.										
			57											
8 CORE	18 14		58	58 - 59.7' **LIMESTONE:** BDX (LS), medium gray (N5), shaley, laminated, moderately fractured.	BDX (LS)									RUN #8: Modified RQD = (4/14) = 29%
			59											
9 CORE	60 60		60	59.7 - 68' **SHALE:** BDX (SH), medium dark gray (N4), weathered, very weak to weak, thinly bedded, moderately fractured.										RUN #9: Modified RQD = (48/60) = 80%
			61											
			62											
			63											
			64		BDX (SH)									
10 CORE	57 56		65	64.5 - 67.2' highly decomposed, weathered, wet.										RUN #10: Modified RQD = Not Recorded
			66											
			67											
			68	68 - 68.4' **LIMESTONE:** BDX (LS), light olive gray (5Y 6/2) to olive gray (5/2).	BDX (LS)									
			69	68.4 - 70.8' **SHALE:** BDX (SH), medium dark gray (N4), weathered, very weak to weak, thinly bedded, moderately fractured.	BDX (SH)									
11 CORE	68 68		70											RUN #11: Modified RQD = (42/68) = 62%
			71	70.8 - 71' **LIMESTONE:** BDX (LS), dark gray (N3), shaley.	BDX (LS)									
				71 - 77.6' **SHALE:** BDX (SH), dark gray (N3),										
			72											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	strong, thinly bedded, moderately fractured. 71 - 77.6' **SHALE:** BDX (SH), dark gray (N3), strong, thinly bedded, moderately fractured. *(continued)*										
			74											
12 CORE	60 59		75		BDX (SH)									RUN #12: Modified RQD = (44/59) = 75%
			76											
			77											
			78	77.6 - 80' **LIMESTONE:** BDX (LS), medium gray (N5), shaley, weak, moderately fractured.	BDX (LS)									
			79											
13 CORE	60 48		80	80 - 85' **SHALE:** BDX (SH), medium dark gray (N4), weathered, weak, thinly bedded, moderately fractured, moist to wet.	BDX (SH)									RUN #13: Modified RQD = (40/48) = 83%
			81											
			82											
			83											
			84											
			85	85' End of Boring.										

ATTACHMENT 4
Analytical Laboratory Reports

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19218-NOV22**
Reference: Baldwin Power Plant Drilling

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)
Sample Date & Time					05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00
Ag [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	30	540	380	18
As [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	0.4	11	4.2	< 0.1
Be [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.02	0.06	0.05	< 0.02
B [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 1	8	10	3
Bi [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	21	300	140	75
Cd [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.01	0.04	0.86	0.02
Cr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.1	< 0.1	0.1	< 0.1
Fe [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	17	240	190	< 1
K [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	7	250	190	41
Li [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 2	< 2	< 2	< 2
Mg [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	9	210	150	19
Mn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	0.6	0.9	< 0.5
Mo [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.1	< 0.1	< 0.1	< 0.1
Na [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	65	1800	1600	850
Ni [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	1.2	< 0.5
P [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 3	6	< 3	< 3
Pb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.1	< 0.1	0.2	< 0.1
Si [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	100	950	750	59
Sb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.7	< 0.7	< 0.7	< 0.7
Sr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	0.1	13	5.9	1.4
Sn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	< 0.5	< 0.5
Ti [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	1.1	0.6	0.5	0.6
Tl [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.002	0.006	0.029	< 0.002
V [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 3	< 3	< 3	< 3
Zn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.7	< 0.7	< 0.7	< 0.7

OnLine LIMS

0003245943

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA19218-NOV22**

Analysis	9: MW-392 (32-33.5)	10: MW-393 (24-25.5)	11: MW-394 (20.5-22)	12: MW-392 (66-68)
Sample Date & Time	27-Sep-22 09:00	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	33	26	24	59
As [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	0.5	0.3	0.3	0.3
Be [µg/g]	< 0.02	< 0.02	< 0.02	< 0.02
B [µg/g]	< 1	< 1	< 1	5
Bi [µg/g]	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	130	28	25	89
Cd [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	0.02	< 0.01	0.01	0.02
Cr [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Fe [µg/g]	27	14	20	28
K [µg/g]	16	9	12	92
Li [µg/g]	< 2	< 2	< 2	< 2
Mg [µg/g]	40	12	12	44
Mn [µg/g]	1.4	0.7	0.6	< 0.5
Mo [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Na [µg/g]	44	49	43	720
Ni [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
P [µg/g]	< 3	< 3	< 3	< 3
Pb [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Si [µg/g]	100	80	91	140
Sb [µg/g]	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7	< 0.7
Sr [µg/g]	0.3	< 0.1	< 0.1	1.8
Sn [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Ti [µg/g]	0.6	0.6	0.9	0.5
Tl [µg/g]	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	< 0.002	< 0.002	< 0.002	< 0.002
V [µg/g]	< 3	< 3	< 3	< 3
Zn [µg/g]	< 0.7	< 0.7	< 0.7	< 0.7

Water Soluble Fraction

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST
ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003245943

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
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Phone: 705-652-2000 FAX: 705-652-6365

Tessier Leach Fraction 2 - Exchangeable Metals

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19219-NOV22**
Reference: Baldwin Power Plant Drilling

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)
Sample Date & Time					05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00
Ag [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	9	17	8	9
As [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	48	55	15	3.0
Be [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.02	< 0.02	< 0.02	< 0.02
B [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 1	< 1	1	< 1
Bi [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	2000	2500	1300	3500
Cd [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.01	< 0.01	0.58	0.24
Cr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 0.1	< 0.1	< 0.1	< 0.1
Fe [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	2	21	< 1	12
K [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	37	430	300	160
Li [µg/g]	19-Jan-23	23:42	31-Jan-23	09:43	< 2	< 2	< 2	< 2
Mn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	6.5	0.7	1.8	3.6
Mo [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.1	< 0.1	< 0.1	< 0.1
Na [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	45	3200	2600	420
Ni [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.5	< 0.5	< 0.5	0.7
Pb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.1	< 0.1	< 0.1	< 0.1
P [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 3	4	< 3	43
Sb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.7	< 0.7	< 0.7	< 0.7
Sn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	11	100	52	76
Ti [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	0.9	0.3	0.2	0.1
Tl [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.002	0.009	0.006	0.043
V [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 3	< 3	< 3	< 3
Zn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:44	< 0.7	< 0.7	< 0.7	< 0.7

OnLine LIMS

0003245960

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Tessier Leach Fraction 2 - Exchangeable Metals

LR Report : CA19219-NOV22

Analysis	9: MW-392 (32-33.5)	10: MW-393 (24-25.5)	11: MW-394 (20.5-22)	12: MW-392 (66-68)
Sample Date & Time	27-Sep-22 09:00	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	10	12	12	10
As [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	16	16	10	4.3
Be [µg/g]	< 0.02	< 0.02	< 0.02	< 0.02
B [µg/g]	< 1	< 1	< 1	2
Bi [µg/g]	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	2500	1400	2100	3700
Cd [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	0.02	< 0.01	< 0.01	0.02
Cr [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Fe [µg/g]	8	9	8	10
K [µg/g]	44	35	60	360
Li [µg/g]	< 2	< 2	< 2	< 2
Mn [µg/g]	3.5	1.7	3.2	2.5
Mo [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Na [µg/g]	17	22	30	480
Ni [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Pb [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
P [µg/g]	< 3	< 3	4	< 3
Sb [µg/g]	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7	< 0.7
Sn [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	6.5	4.3	7.4	75
Ti [µg/g]	0.1	0.6	0.3	< 0.1
Tl [µg/g]	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	< 0.002	< 0.002	< 0.002	0.004
V [µg/g]	< 3	< 3	< 3	< 3
Zn [µg/g]	< 0.7	< 0.7	< 0.7	< 0.7

Fraction 2 Exchangeable Metals

Catharine Arnold

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
CATHARINE ARNOLD
CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Tessier Leach Fraction 3 - Metals Bound to Carbonates

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19220-NOV22**
Reference: Ramboll Power Plant Drilling

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)
Sample Date & Time					05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00
Ag [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	30	55	56	25
As [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	25	23	6.9	2.8
Be [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	0.09	0.10	0.07	0.03
B [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 1	2	3	4
Bi [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	110	1300	770	52000
Cd [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	0.04	0.02	2.3	1.0
Cr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	0.6	0.2	0.6	0.2
Fe [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	40	45	42	25
K [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	15	180	120	90
Li [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 2	< 2	< 2	< 2
Mn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	13	7.0	4.3	77
Mo [µg/g]	19-Jan-23	23:42	31-Jan-23	09:45	< 0.1	< 0.1	< 0.1	< 0.1
Ni [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.5	< 0.5	1.9	2.7
Pb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	0.2	0.1	0.9	1.9
P [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 3	13	< 3	100
Sb [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.7	< 0.7	< 0.7	< 0.7
Si [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	96	160	150	33
Sn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	0.5	10	7.3	99
Ti [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	0.8	0.6	0.5	1.0
Tl [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	0.19	0.094	0.13	0.31
V [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 3	< 3	< 3	< 3
Zn [µg/g]	19-Jan-23	23:42	31-Jan-23	09:46	< 0.7	< 0.7	< 0.7	3.7

OnLine LIMS

0003245975

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Tessier Leach Fraction 3 - Metals Bound to Carbonates

LR Report : CA19220-NOV22

Analysis	9: MW-392 (32-33.5)	10: MW-393 (24-25.5)	11: MW-394 (20.5-22)	12: MW-392 (66-68)
Sample Date & Time	27-Sep-22 09:00	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Al [µg/g]	30	28	23	28
As [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	19	15	12	5.0
Be [µg/g]	0.06	0.04	0.04	0.07
B [µg/g]	< 1	< 1	< 1	3
Bi [µg/g]	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	1500	56	140	35000
Cd [µg/g]	< 0.05	< 0.05	< 0.05	< 0.05
Co [µg/g]	0.05	0.02	0.03	0.27
Cr [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Cu [µg/g]	0.8	0.2	0.2	0.6
Fe [µg/g]	9	14	10	300
K [µg/g]	16	10	15	130
Li [µg/g]	< 2	< 2	< 2	< 2
Mn [µg/g]	20	4.4	7.0	144
Mo [µg/g]	< 0.1	< 0.1	< 0.1	< 0.1
Ni [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Pb [µg/g]	0.2	0.1	0.1	0.4
P [µg/g]	< 3	< 3	4	< 3
Sb [µg/g]	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7	< 0.7
Si [µg/g]	130	90	99	96
Sn [µg/g]	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	1.5	0.3	0.8	59
Ti [µg/g]	0.1	1.9	0.6	< 0.1
Tl [µg/g]	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	0.12	0.14	0.17	0.100
V [µg/g]	< 3	< 3	< 3	< 3
Zn [µg/g]	< 0.7	< 0.7	< 0.7	1.0

Fraction 3 Metals Bound to Carbonates

Catharine Arnold

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
CATHARINE ARNOLD
CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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SGS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Tessier Leach Fraction 4 - Metals Bound to Fe and Mn Oxides

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19221-NOV22**
Reference: Baldwin Power Plant Drilling

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)	9: MW-392 (32-33.5)
Sample Date & Time			05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00	27-Sep-22 09:00
Ag [µg/g]	31-Jan-23	09:47	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Al [µg/g]	31-Jan-23	09:47	290	310	340	220	220
As [µg/g]	31-Jan-23	09:47	< 0.5	< 0.5	< 0.5	1.3	< 0.5
Ba [µg/g]	31-Jan-23	09:47	16	6.4	1.6	4.1	56
Be [µg/g]	31-Jan-23	09:47	0.26	0.16	0.15	0.15	0.21
B [µg/g]	31-Jan-23	09:47	< 1	5	6	6	< 1
Bi [µg/g]	31-Jan-23	09:47	< 0.09	< 0.09	< 0.09	0.14	< 0.09
Ca [µg/g]	31-Jan-23	09:47	71	320	250	130000	2300
Cd [µg/g]	31-Jan-23	09:47	< 0.05	< 0.05	< 0.05	0.13	0.18
Co [µg/g]	31-Jan-23	09:47	3.8	0.33	3.0	2.3	5.1
Cr [µg/g]	31-Jan-23	09:47	2.3	1.2	1.3	1.0	0.9
Cu [µg/g]	31-Jan-23	09:47	1.6	0.4	0.7	0.1	2.9
Fe [µg/g]	31-Jan-23	09:47	1600	1600	1200	1800	1100
K [µg/g]	31-Jan-23	09:47	16	140	110	43	19
Li [µg/g]	31-Jan-23	09:47	< 2	3	5	< 2	< 2
Mn [µg/g]	31-Jan-23	09:47	240	3.1	2.9	190	500
Mo [µg/g]	31-Jan-23	09:47	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ni [µg/g]	31-Jan-23	09:47	3.1	2.7	4.5	6.5	3.1
Pb [µg/g]	31-Jan-23	09:47	3.3	0.2	1.2	8.4	3.7
P [µg/g]	31-Jan-23	09:47	19	110	77	400	31
Sb [µg/g]	31-Jan-23	09:47	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	31-Jan-23	09:47	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Si [µg/g]	31-Jan-23	09:47	920	910	710	270	600
Sn [µg/g]	31-Jan-23	09:47	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	31-Jan-23	09:47	0.4	3.1	2.8	237	1.7
Ti [µg/g]	31-Jan-23	09:47	0.4	0.1	0.3	< 0.1	< 0.1
Tl [µg/g]	31-Jan-23	09:47	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
U [µg/g]	31-Jan-23	09:47	0.26	0.068	0.17	0.62	0.15
V [µg/g]	31-Jan-23	09:47	5	< 3	< 3	< 3	3
Zn [µg/g]	31-Jan-23	09:47	2.9	1.9	1.9	13	3.8

OnLine LIMS

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SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Analysis	**10: MW-393 (24-25.5)**	**11: MW-394 (20.5-22)**	**12: MW-392 (66-68)**
Sample Date & Time	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.01	0.02	< 0.01
Al [µg/g]	290	270	490
As [µg/g]	< 0.5	< 0.5	< 0.5
Ba [µg/g]	45	35	1.5
Be [µg/g]	0.16	0.18	0.18
B [µg/g]	< 1	< 1	4
Bi [µg/g]	< 0.09	< 0.09	0.14
Ca [µg/g]	100	350	7600
Cd [µg/g]	0.06	0.14	< 0.05
Co [µg/g]	4.3	3.5	0.62
Cr [µg/g]	1.2	1.2	2.0
Cu [µg/g]	1.5	2.0	0.9
Fe [µg/g]	1500	1200	2700
K [µg/g]	15	22	120
Li [µg/g]	< 2	< 2	2
Mn [µg/g]	380	260	63
Mo [µg/g]	< 0.1	< 0.1	< 0.1
Ni [µg/g]	3.2	3.7	2.5
Pb [µg/g]	3.5	2.1	0.9
P [µg/g]	17	91	110
Sb [µg/g]	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7
Si [µg/g]	660	850	650
Sn [µg/g]	< 0.5	< 0.5	< 0.5
Sr [µg/g]	0.5	1.3	26
Ti [µg/g]	0.3	0.2	0.2
Tl [µg/g]	< 0.02	< 0.02	< 0.02
U [µg/g]	0.12	0.18	0.082
V [µg/g]	< 3	5	< 3
Zn [µg/g]	4.3	7.8	2.8

Fraction 4 Metals Bound to Fe and Mn Oxides

Catharine Arnold

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
CATHARINE ARNOLD
CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
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OnLine LIMS

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SGS Canada Inc.
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Tessier Leach Fraction 5 - Bound to Organic Material

28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19222-NOV22**
Reference: Baldwin Power plant Drilling

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)	9: MW-392 (32-33.5)
Sample Date & Time			05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00	27-Sep-22 09:00
Ag [µg/g]	31-Jan-23	09:48	0.14	0.15	0.08	0.07	0.06
Al [µg/g]	31-Jan-23	09:48	980	1300	1100	130	610
As [µg/g]	31-Jan-23	09:48	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ba [µg/g]	31-Jan-23	09:48	15	11	1.8	3.6	36
Be [µg/g]	31-Jan-23	09:48	0.13	0.32	0.16	0.07	0.12
B [µg/g]	31-Jan-23	09:48	< 1	2	2	2	< 1
Bi [µg/g]	31-Jan-23	09:48	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Ca [µg/g]	31-Jan-23	09:48	160	490	220	8600	840
Cd [µg/g]	31-Jan-23	09:48	< 0.05	< 0.05	< 0.05	0.20	< 0.05
Co [µg/g]	31-Jan-23	09:48	1.4	0.45	9.7	3.3	1.3
Cr [µg/g]	31-Jan-23	09:48	2.1	1.0	1.2	< 0.5	1.6
Cu [µg/g]	31-Jan-23	09:48	0.5	1.0	1.8	1.9	0.4
Fe [µg/g]	31-Jan-23	09:48	150	610	1800	220	83
K [µg/g]	31-Jan-23	09:48	15	104	79	25	15
Li [µg/g]	31-Jan-23	09:48	< 2	< 2	3	< 2	< 2
Mg [µg/g]	31-Jan-23	09:48	170	1100	870	200	500
Mn [µg/g]	31-Jan-23	09:48	85	3.6	15	16	92
Mo [µg/g]	31-Jan-23	09:48	< 0.1	< 0.1	< 0.1	0.2	0.4
Na [µg/g]	31-Jan-23	09:48	110	180	150	90	75
Ni [µg/g]	31-Jan-23	09:48	1.9	4.3	13	15	2.1
Pb [µg/g]	31-Jan-23	09:48	1.6	0.1	1.6	3.8	1.3
P [µg/g]	31-Jan-23	09:48	< 3	< 3	< 3	290	5
Sb [µg/g]	31-Jan-23	09:48	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	31-Jan-23	09:48	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Si [µg/g]	31-Jan-23	09:48	590	480	420	130	530
Sn [µg/g]	31-Jan-23	09:48	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sr [µg/g]	31-Jan-23	09:48	0.5	5.1	2.8	48	0.9
Ti [µg/g]	31-Jan-23	09:48	0.7	< 0.1	< 0.1	< 0.1	2.9
Tl [µg/g]	31-Jan-23	09:48	< 0.02	< 0.02	0.02	0.05	< 0.02
U [µg/g]	31-Jan-23	09:48	0.17	0.13	0.19	0.25	0.060
V [µg/g]	31-Jan-23	09:48	< 3	< 3	< 3	< 3	3
Zn [µg/g]	31-Jan-23	09:48	1.4	< 0.7	1.8	41	1.7

OnLine LIMS

0003245986

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Tessier Leach Fraction 5 - Bound to Organic Material

LR Report : CA19222-NOV22

Analysis	10: MW-393 (24-25.5)	11: MW-394 (20.5-22)	12: MW-392 (66-68)
Sample Date & Time	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.05	< 0.05	< 0.05
Al [µg/g]	660	870	820
As [µg/g]	< 0.5	< 0.5	< 0.5
Ba [µg/g]	33	45	1.5
Be [µg/g]	0.08	0.15	0.18
B [µg/g]	< 1	< 1	2
Bi [µg/g]	< 0.09	< 0.09	< 0.09
Ca [µg/g]	88	300	2400
Cd [µg/g]	< 0.05	< 0.05	< 0.05
Co [µg/g]	1.2	2.3	0.68
Cr [µg/g]	1.2	1.5	1.1
Cu [µg/g]	0.3	0.8	1.4
Fe [µg/g]	93	120	680
K [µg/g]	14	21	70
Li [µg/g]	< 2	< 2	< 2
Mg [µg/g]	150	280	730
Mn [µg/g]	100	164	15
Mo [µg/g]	0.1	0.3	< 0.1
Na [µg/g]	48	170	95
Ni [µg/g]	1.6	3.5	2.9
Pb [µg/g]	1.7	1.3	0.9
P [µg/g]	4	8	< 3
Sb [µg/g]	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7
Si [µg/g]	470	650	470
Sn [µg/g]	< 0.5	< 0.5	< 0.5
Sr [µg/g]	0.3	1.2	9.8
Ti [µg/g]	2.1	2.5	< 0.1
Tl [µg/g]	< 0.02	< 0.02	< 0.02
U [µg/g]	0.065	0.16	0.080
V [µg/g]	< 3	4	< 3
Zn [µg/g]	1.6	4.0	0.9

Fraction 5 Bound to Organic Material

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003245986

SGS Canada Inc.
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28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19223-NOV22**
Reference: Baldwin Power Plant Drilling

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: MW-358 (13-15)	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)	9: MW-392 (32-33.5)
Sample Date & Time			05-Oct-22 14:05	06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00	27-Sep-22 09:00
Ag [µg/g]	31-Jan-23	09:48	0.09	< 0.05	< 0.05	< 0.05	0.07
Al [µg/g]	31-Jan-23	09:48	44000	63000	71000	27000	45000
As [µg/g]	31-Jan-23	09:48	5.8	2.3	9.8	10	8.6
Ba [µg/g]	31-Jan-23	09:48	390	150	140	56	320
Be [µg/g]	31-Jan-23	09:48	0.65	1.4	1.5	0.68	0.87
B [µg/g]	31-Jan-23	09:48	13	60	62	26	21
Bi [µg/g]	31-Jan-23	09:48	0.25	0.26	0.18	0.14	0.25
Ca [µg/g]	31-Jan-23	09:48	2500	150	120	20000	1400
Cd [µg/g]	31-Jan-23	09:48	0.06	< 0.05	< 0.05	0.11	0.08
Co [µg/g]	31-Jan-23	09:48	3.3	7.2	6.4	2.0	6.4
Cr [µg/g]	31-Jan-23	09:48	34	69	75	37	40
Cu [µg/g]	31-Jan-23	09:48	10	9.9	5.7	7.2	15
Fe [µg/g]	31-Jan-23	09:48	22000	42000	22000	14000	28000
K [µg/g]	31-Jan-23	09:48	11000	18000	16000	5100	13000
Li [µg/g]	31-Jan-23	09:48	18	9	65	7	20
Mg [µg/g]	31-Jan-23	09:48	2700	7800	7600	4100	3300
Mn [µg/g]	31-Jan-23	09:48	110	70	51	50	130
Mo [µg/g]	31-Jan-23	09:48	0.9	0.3	0.1	0.1	0.9
Na [µg/g]	31-Jan-23	09:48	6700	560	830	550	5200
Ni [µg/g]	31-Jan-23	09:48	14	32	29	13	21
Pb [µg/g]	31-Jan-23	09:48	10	8.0	7.0	17	12
P [µg/g]	31-Jan-23	09:48	260	240	160	7200	300
Sb [µg/g]	31-Jan-23	09:48	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	31-Jan-23	09:48	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Si [µg/g]	31-Jan-23	09:48	160000	66000	51000	73000	65000
Sn [µg/g]	31-Jan-23	09:48	5.4	5.8	5.8	4.9	5.2
Sr [µg/g]	31-Jan-23	09:48	89	30	25	130	79
Ti [µg/g]	31-Jan-23	09:48	2400	670	570	520	980
Tl [µg/g]	31-Jan-23	09:48	0.47	0.42	0.42	0.17	0.51
U [µg/g]	31-Jan-23	09:48	1.3	0.30	0.99	2.7	1.1
V [µg/g]	31-Jan-23	09:48	54	73	86	95	57
Zn [µg/g]	31-Jan-23	09:48	37	47	32	43	53

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA19223-NOV22**

Analysis	10: MW-393 (24-25.5)	11: MW-394 (20.5-22)	12: MW-392 (66-68)
Sample Date & Time	04-Oct-22 16:00	25-Sep-22 16:00	26-Sep-22 12:00
Ag [µg/g]	< 0.05	< 0.05	< 0.05
Al [µg/g]	33000	45000	59000
As [µg/g]	10	9.8	0.9
Ba [µg/g]	300	410	93
Be [µg/g]	0.56	0.83	1.2
B [µg/g]	15	16	53
Bi [µg/g]	0.18	0.27	0.20
Ca [µg/g]	1700	3000	170
Cd [µg/g]	< 0.05	0.11	< 0.05
Co [µg/g]	3.2	5.0	6.4
Cr [µg/g]	24	35	71
Cu [µg/g]	9.9	13	12
Fe [µg/g]	19000	27000	43000
K [µg/g]	12000	14000	17000
Li [µg/g]	13	16	19
Mg [µg/g]	2200	3400	9500
Mn [µg/g]	80	140	47
Mo [µg/g]	0.7	2.7	0.2
Na [µg/g]	5100	7700	490
Ni [µg/g]	13	18	31
Pb [µg/g]	9.1	13	4.1
P [µg/g]	230	460	170
Sb [µg/g]	< 0.8	< 0.8	< 0.8
Se [µg/g]	< 0.7	< 0.7	< 0.7
Si [µg/g]	61000	43000	62000
Sn [µg/g]	4.6	5.2	5.6
Sr [µg/g]	70	110	22
Ti [µg/g]	780	1100	560
Tl [µg/g]	0.35	0.50	0.36
U [µg/g]	0.61	1.1	0.097
V [µg/g]	35	57	70
Zn [µg/g]	37	54	48

Fraction 6 Residual metals

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST
ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003246014

Trace Metals - Aqua Regia Digest, ICP-MS

SGS Canada Inc.
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28-February-2023

Ramboll Americas Engineering Solutions, Inc.
Attn : Evvan Plank

P.O# Box 4873
Syrascuse, New York
13221-7873, USA

Phone: 315-463-7554
Fax:

Date Rec. : 24 November 2022
LR Report: **CA19224-NOV22**
Reference: Baldwon Power Plant Drilling

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	6: MW-358 (47-49)	7: MW-358 (86-88)	8: MW-392 (80-82)	12: MW-392 (66-68)
Sample Date & Time					06-Oct-22 15:00	08-Oct-22 18:00	26-Sep-22 16:00	26-Sep-22 12:00
Hg MS [ug/g]	09-Dec-22	16:29	12-Dec-22	15:05	< 0.05	< 0.05	< 0.05	< 0.05
As [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	2.1	11	17	1.0
B [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	11	16	16	13
Ba [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	140	45	40	21
Be [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	0.85	0.67	0.85	0.70
Cd [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	< 0.02	< 0.02	0.36	0.09
Co [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	4.4	23	12	6.2
Cr [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	9.5	12	17	16
Li [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	6	20	8	15
Mo [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	0.3	0.3	0.3	0.3
Pb [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	5.7	9.6	17	4.9
Se [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	< 0.7	< 0.7	1.4	< 0.7
Tl [µg/g]	09-Dec-22	16:29	12-Dec-22	15:05	0.05	0.06	0.04	0.03

Catharine Arnold

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
CATHARINE ARNOLD
CHEMIST

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003246025

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Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Environmental Services*
Project Number/ LIMS No.	*Custom XRD/MI4508-DEC22*
Sample Receipt:	*December 7, 2022*
Sample Analysis:	*December 15, 2022*
Reporting Date:	*December 21, 2022*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 35 kV, 40 mA; Detector: LYNXEYE Regular Scanning: Step: 0.02°, Step time: 0.75s, 2θ range: 6-80°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Natural Resources is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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a division of SGS Canada Inc. | Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

Mineral/Compound	MW-358 (13-15) DEC4508-01 (wt %)	MW-358 (47-49) DEC4508-02 (wt %)	MW-358 (86-88) DEC4508-03 (wt %)	MW-392 (80-82) DEC4508-04 (wt %)
Quartz	58.9	33.0	34.9	29.1
Muscovite	11.2	37.6	30.5	14.5
Albite	13.3	8.2	3.4	1.0
Microcline	5.3	9.4	8.1	2.9
Chlorite	10.8	-	-	6.8
Diaspore	0.5	-	-	-
Pyrite	-	1.0	0.8	1.2
Kaolinite	-	9.0	18.4	8.2
Calcite	-	1.8	1.7	31.5
Anatase	-	-	2.1	0.4
Leucite	-	-	-	2.4
Siderite	-	-	-	1.9
Dolomite	-	-	-	-
Gypsum	-	-	-	-
Diopside	-	-	-	-
TOTAL	100	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Mineral/Compound	Formula
Quartz	SiO_2
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Albite	$NaAlSi_3O_8$
Microcline	$KAlSi_3O_8$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Diaspore	aAlO.OH
Pyrite	FeS_2
Kaolinite	$Al_2Si_2O_5(OH)_4$
Calcite	$CaCO_3$
Anatase	TiO_2
Leucite	$KAlSi_2O_6$
Siderite	$FeCO_3$
Dolomite	$CaMg(CO_3)_2$
Gypsum	$CaSO_4 \cdot 2H_2O$
Diopside	$CaMgSi_2O_6$

Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

Mineral/Compound	MW-392 (32-33.5) DEC4508-05 (wt %)	MW-393 (24-25.5) DEC4508-06 (wt %)	MW-394 (20.5-22) DEC4508-07 (wt %)	MW-392 (66-68) DEC4508-08 (wt %)
Quartz	53.5	68.2	54.9	27.2
Muscovite	13.1	13.0	11.7	29.7
Albite	8.5	7.4	13.1	4.5
Microcline	6.8	9.5	6.7	6.9
Chlorite	7.0	-	7.0	16.3
Diaspore	-	-	-	-
Pyrite	-	0.3	0.3	-
Kaolinite	7.5	-	5.0	-
Calcite	-	-	-	14.8
Anatase	-	-	-	0.7
Leucite	-	-	-	-
Siderite	-	-	-	-
Dolomite	1.2	-	-	-
Gypsum	0.4	-	-	-
Diopside	1.7	1.6	1.4	-
TOTAL	100	100	100	100

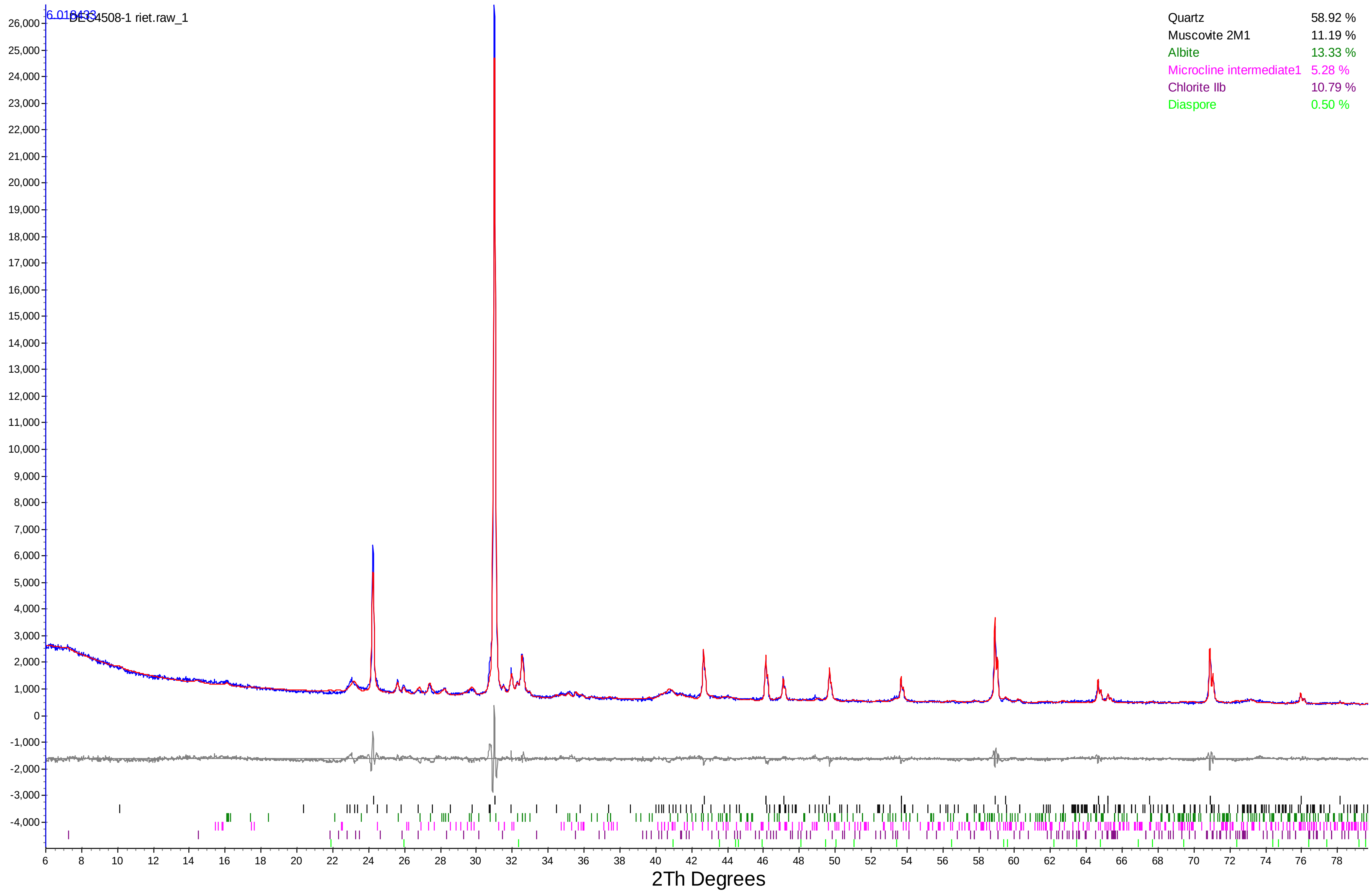
Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

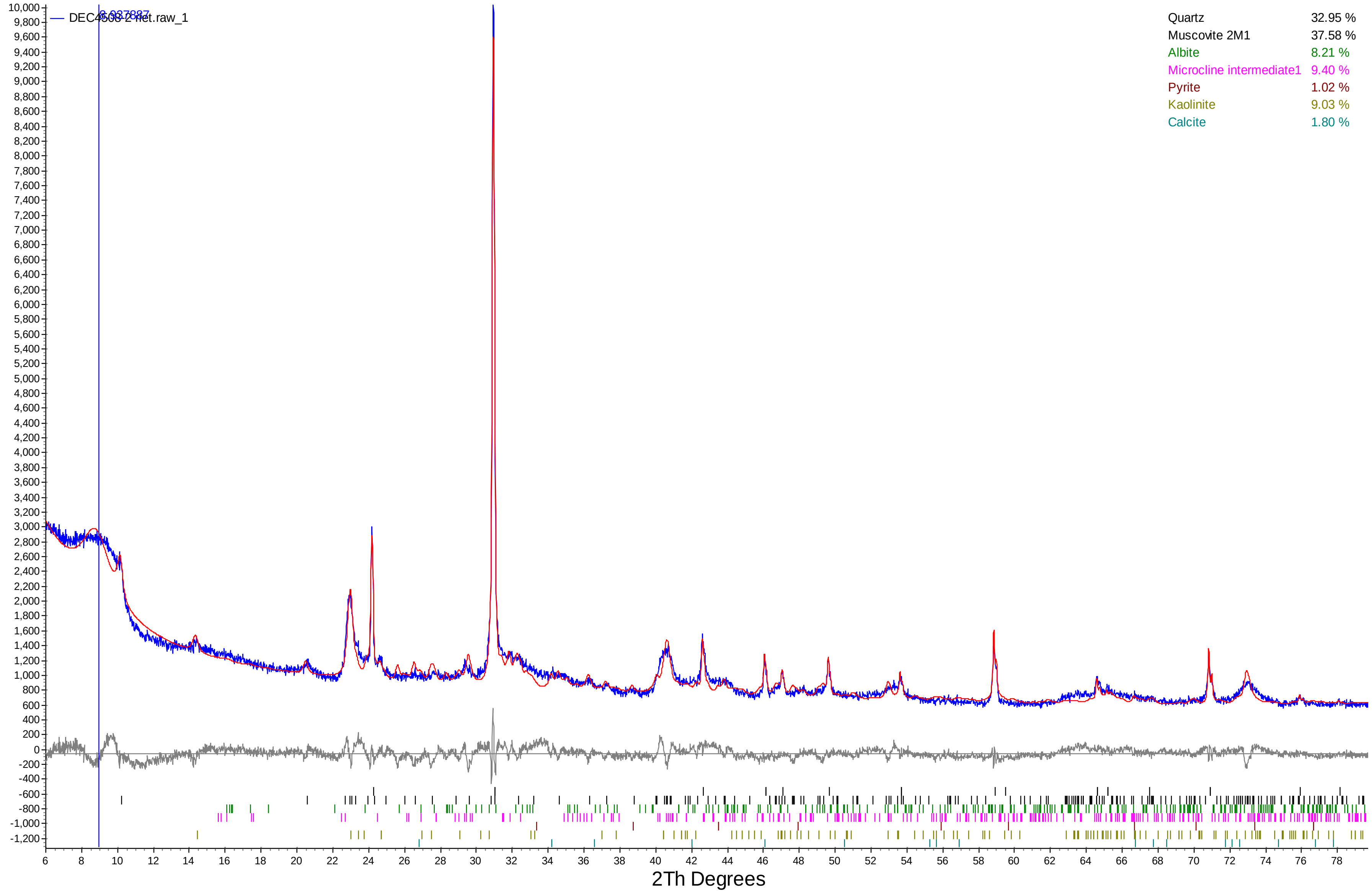
Mineral/Compound	Formula
Quartz	SiO_2
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Albite	$NaAlSi_3O_8$
Microcline	$KAlSi_3O_8$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Diaspore	aAlO.OH
Pyrite	FeS_2
Kaolinite	$Al_2Si_2O_5(OH)_4$
Calcite	$CaCO_3$
Anatase	TiO_2
Leucite	$KAlSi_2O_6$
Siderite	$FeCO_3$
Dolomite	$CaMg(CO_3)_2$
Gypsum	$CaSO_4 \cdot 2H_2O$
Diopside	$CaMgSi_2O_6$

MW-358 (13-15)


DEC4508-1 riet.raw_1
Quartz 58.92 %
Muscovite 2M1 11.19 %
Albite 13.33 %
Microcline intermediate1 5.28 %
Chlorite IIb 10.79 %
Diaspore 0.50 %
2Th Degrees

Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

MW-358 (47-49)



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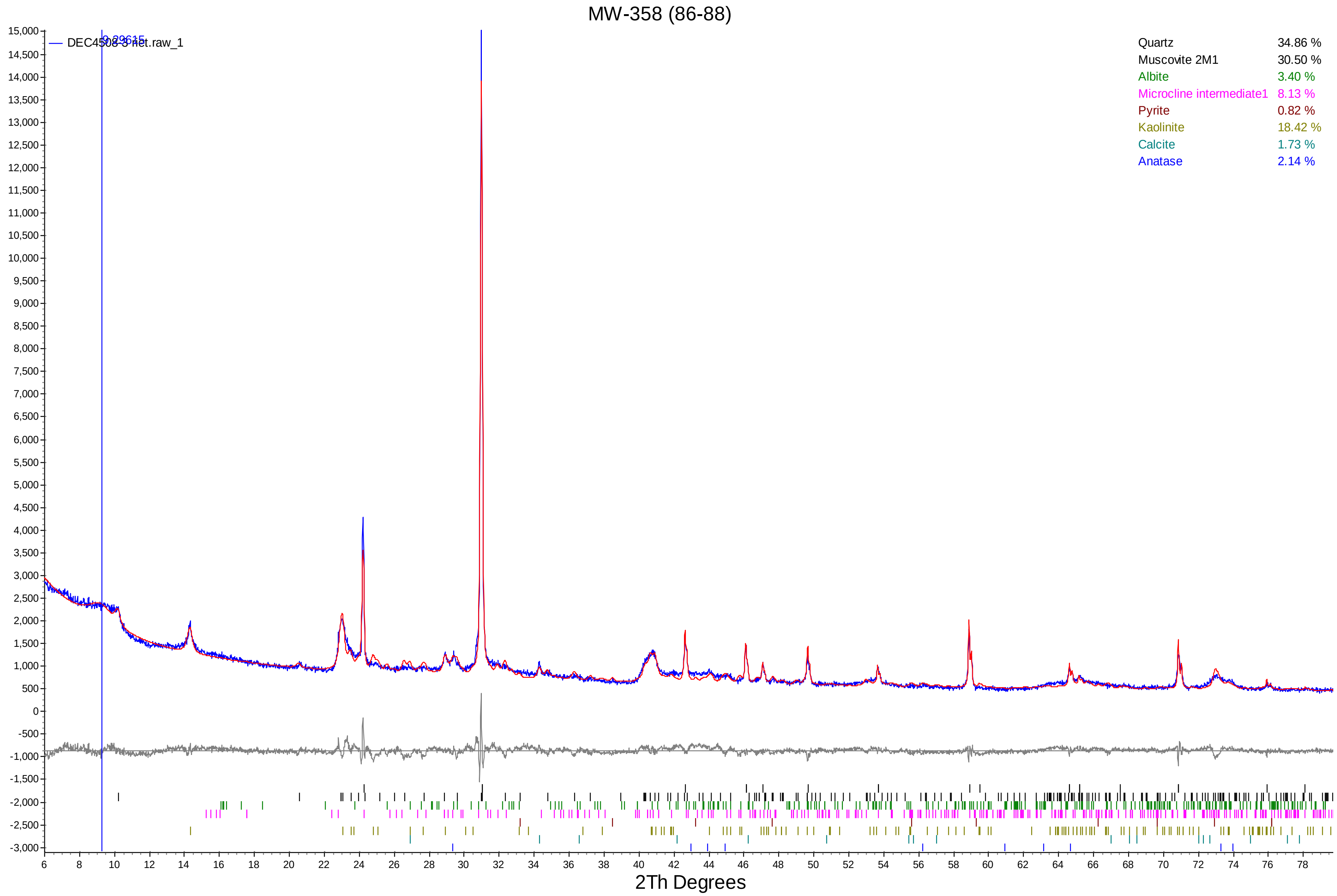
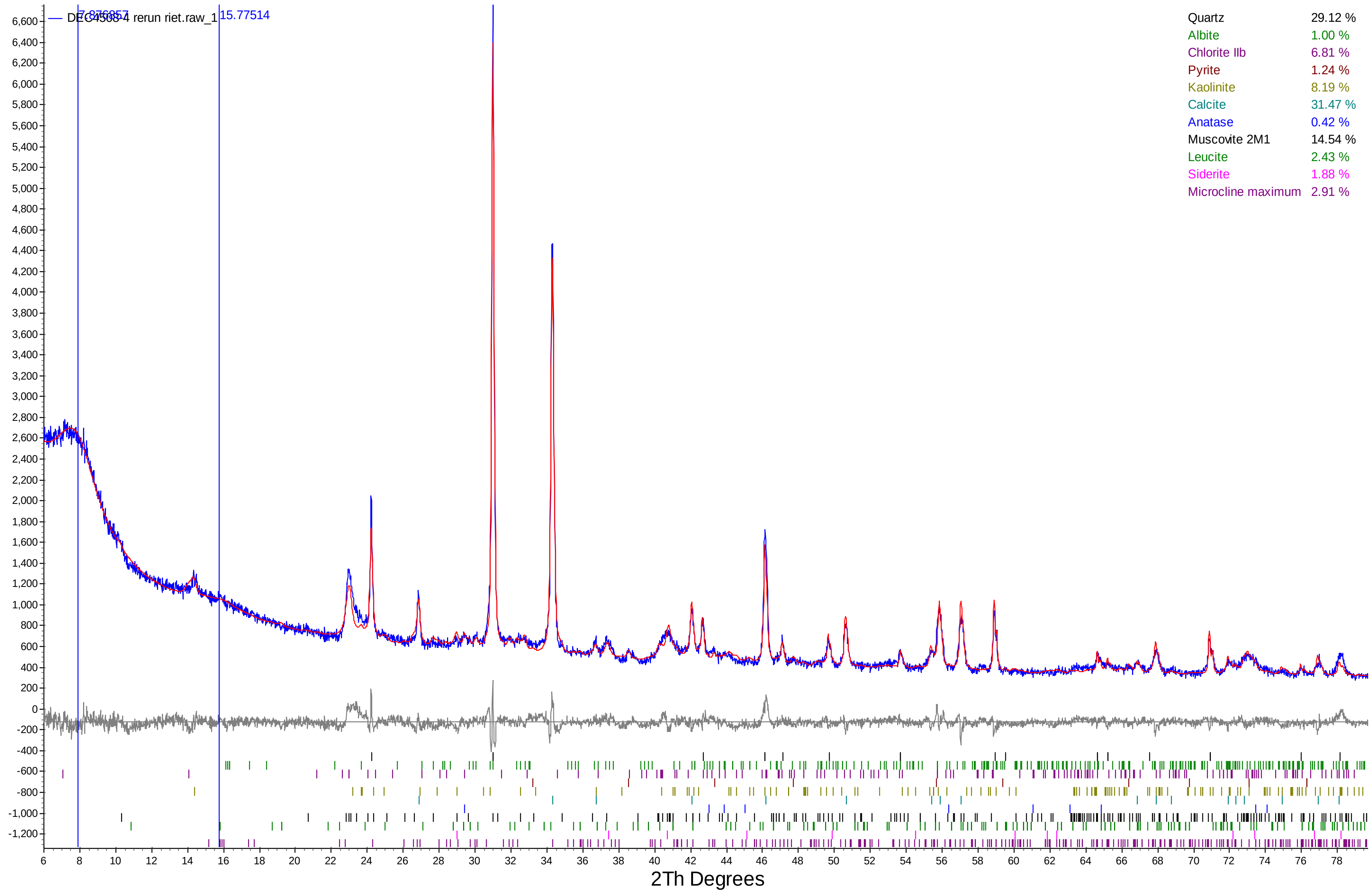
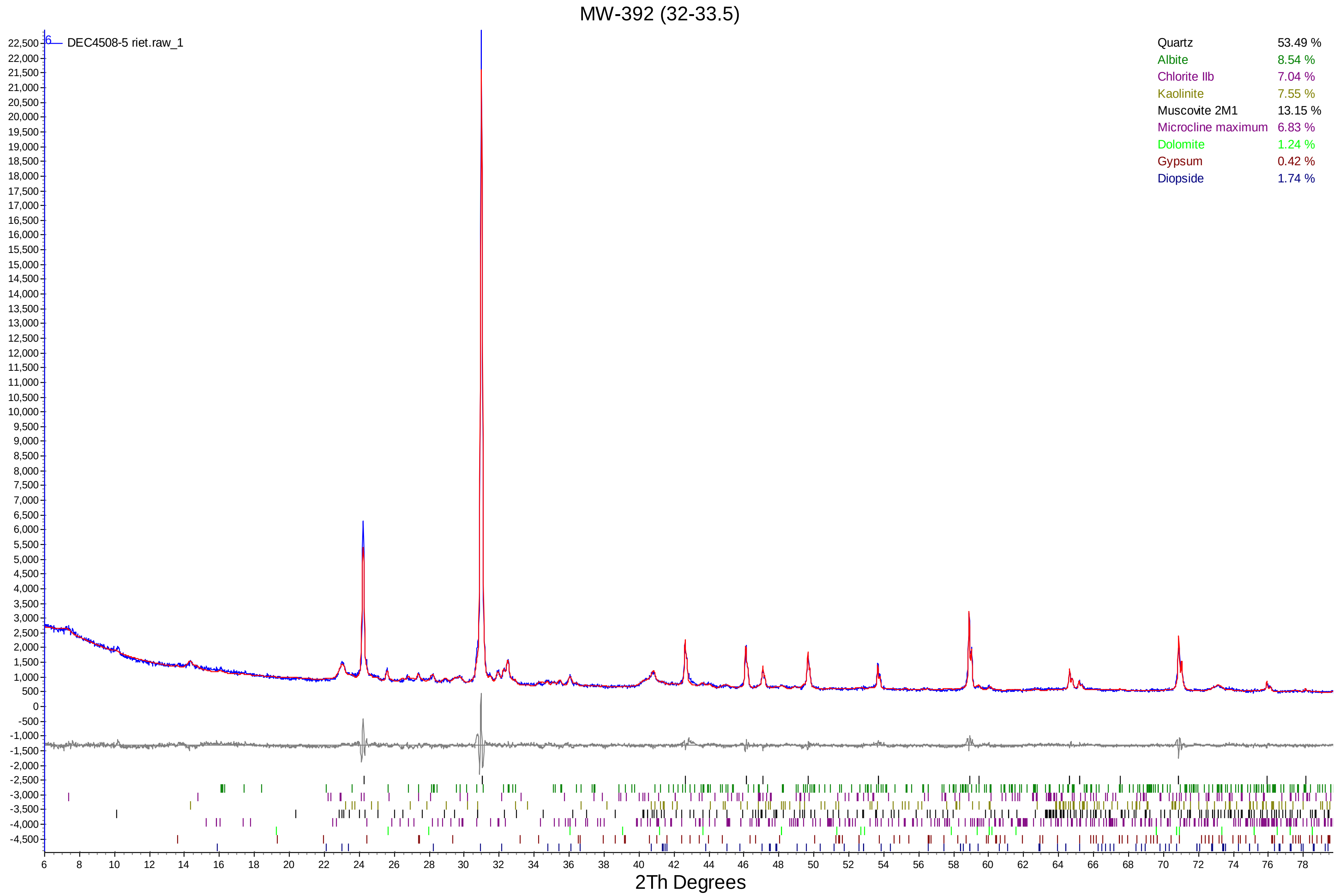
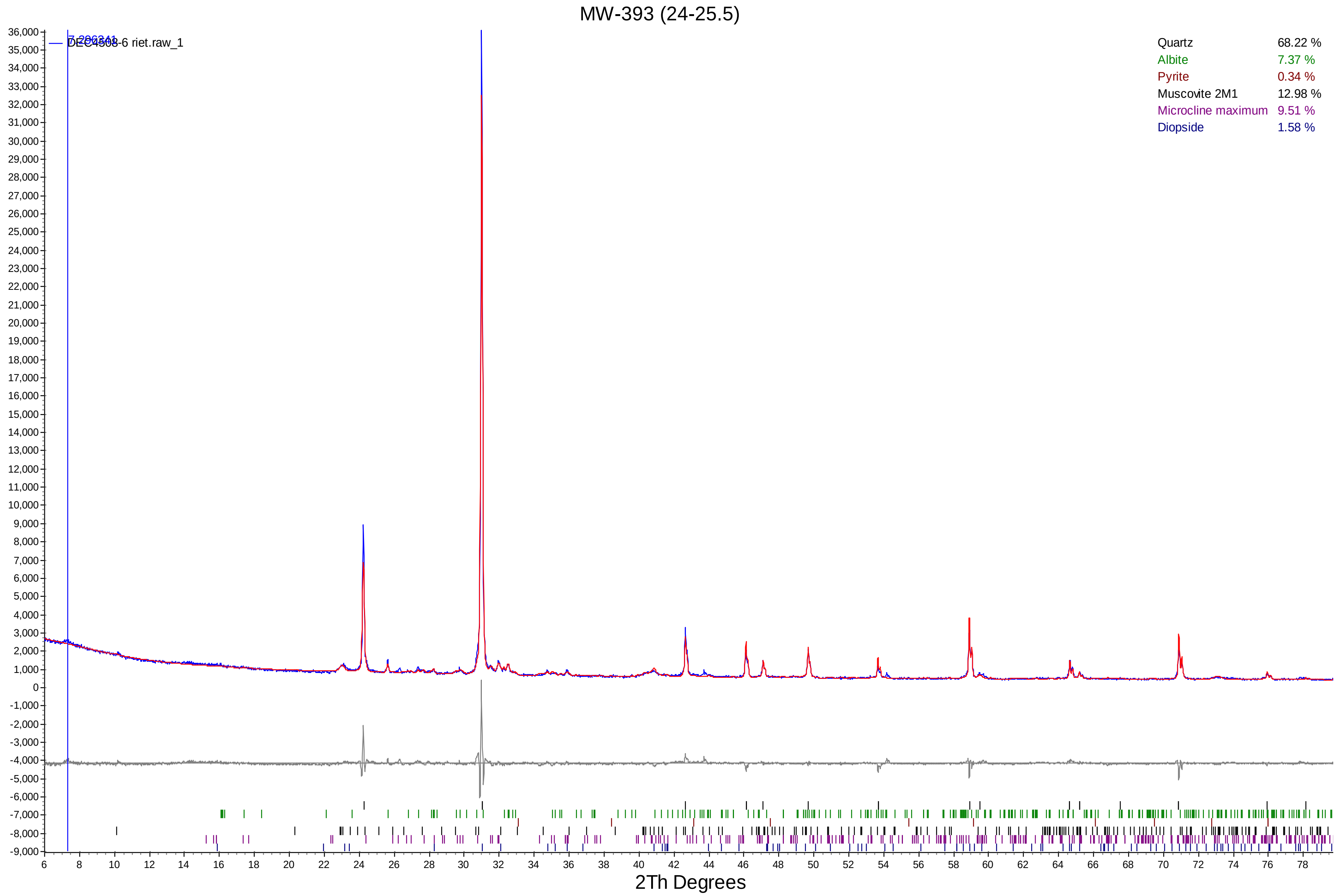


MW-392 (80-82)


DEC4508-4 rerun riet.raw_1
7.876857
15.77514
Quartz 29.12 %
Albite 1.00 %
Chlorite IIb 6.81 %
Pyrite 1.24 %
Kaolinite 8.19 %
Calcite 31.47 %
Anatase 0.42 %
Muscovite 2M1 14.54 %
Leucite 2.43 %
Siderite 1.88 %
Microcline maximum 2.91 %
2Th Degrees

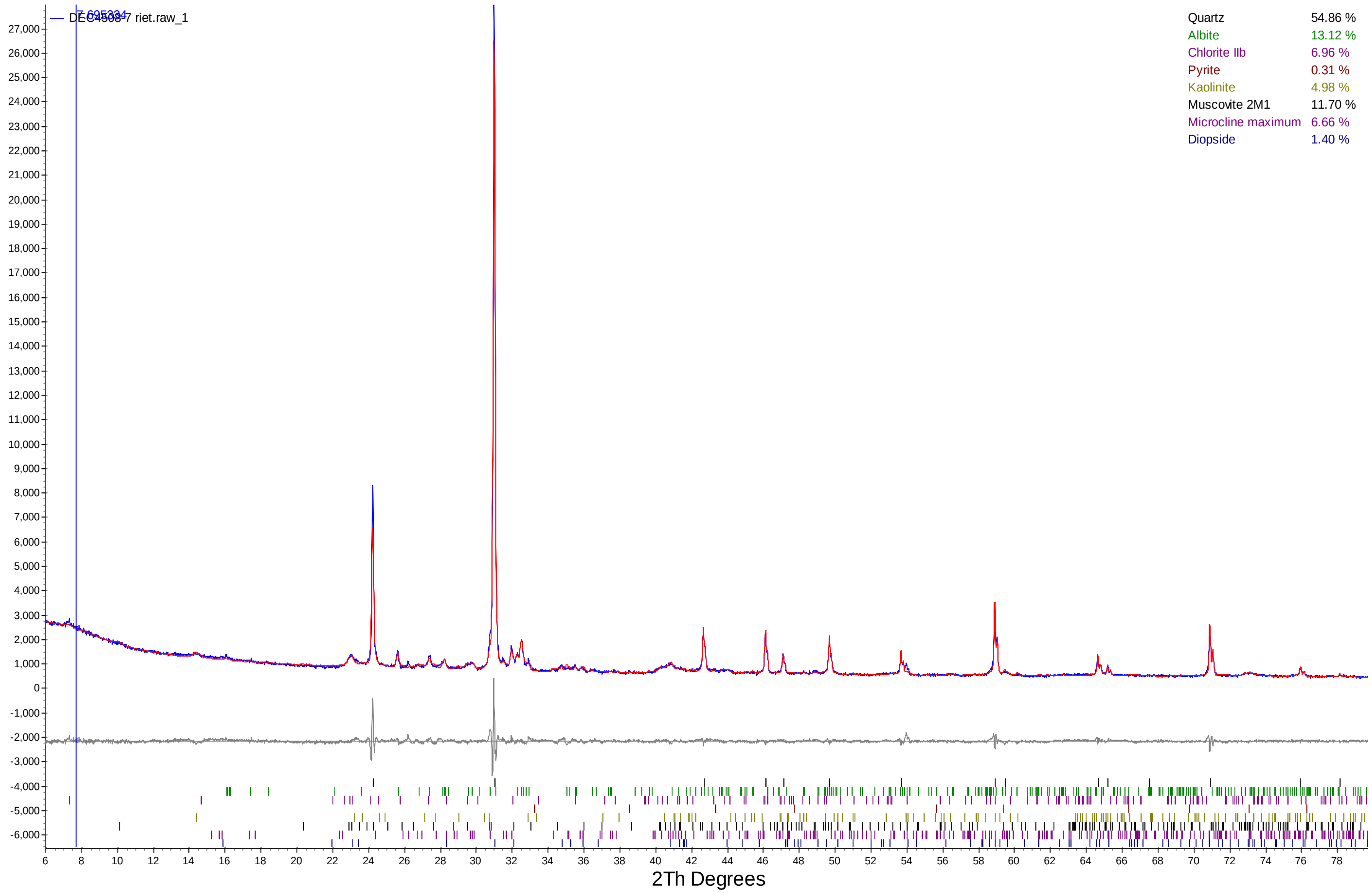
Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22



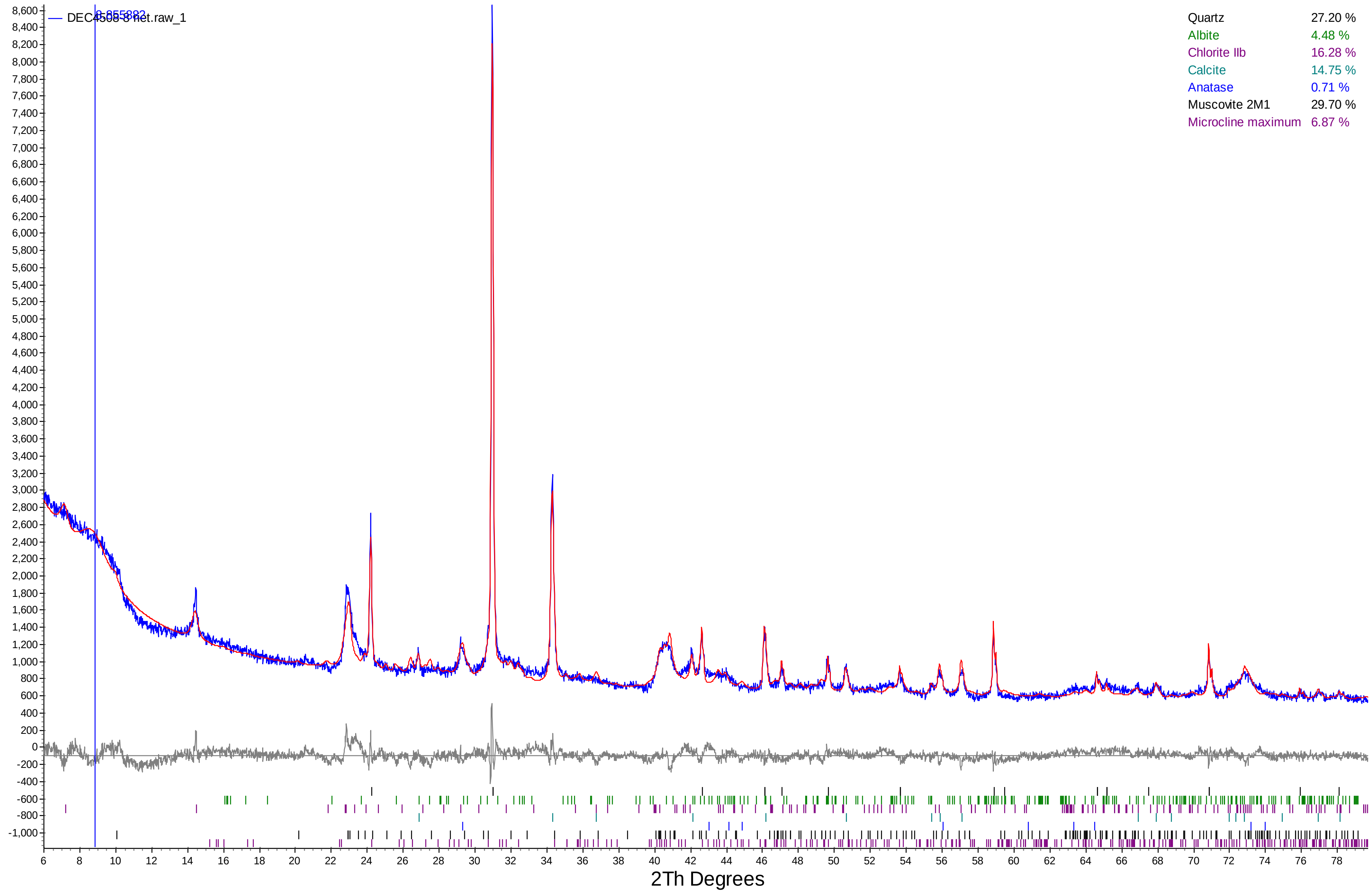

MW-393 (24-25.5)
DEC4508-6 riet.raw_1
Quartz 68.22 %
Albite 7.37 %
Pyrite 0.34 %
Muscovite 2M1 12.98 %
Microcline maximum 9.51 %
Diopside 1.58 %
2Th Degrees

Environmental Services
Custom XRD/MI4508-DEC22
21-Dec-22

MW-394 (20.5-22)



MW-392 (66-68)


DEC4508-8-net.raw_1
Quartz 27.20 %
Albite 4.48 %
Chlorite IIb 16.28 %
Calcite 14.75 %
Anatase 0.71 %
Muscovite 2M1 29.70 %
Microcline maximum 6.87 %
2Th Degrees