Luminant

Phil Morris
Illinois Power Resources Generating, LLC
1500 Eastport Plaza Drive
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April 18, 2024

Francisco J. Herrera
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794

Re: Illinois Power Resources Generating, LLC - Edwards Power Plant
Log No. 2021-100016
Bureau ID # W1 43 8050005
CCR Surface Impoundment Operating and Construction Permit Application Review Letter Response

Mr. Herrara:

Illinois Power Resources Generating, LLC (IPRG) received the Edwards Power Plant CCR Surface Impoundment Operating and Construction Permit Application Review Letter dated October 10, 2023. At this time, we submit the below responses to Illinois Environmental Protection Agency's (IEPA's) initial comments.

As discussed more specifically below, IPRG will produce data and information requested by IEPA in two productions, starting concurrently with this letter by producing data and information that is reasonably and readily available and producing the remaining information, as indicated in the below responses, when it is available. All documents and responses will be provided in hard copy, as requested by IEPA, as well as through a courtesy email and temporary file-sharing service. As noted below, IPRG will also be producing electronic data deliverables ("EDDs"), which can only be shared electronically and will be provided via the temporary file-sharing service.

Within the below responses, IPRG requests additional information and clarification regarding several comments. To further discuss those requests, IPRG will schedule meetings with IEPA to ensure IPRG is providing complete responses.

Initial Operating Permit Application

History of Construction [35 Ill. Adm. Code 845.230(d)(2)(A)]

Comment 1: *To comply with the application requirements of 35 Ill. Adm. Code 845.230(d)(2)(A), the applicant must provide a written history of construction containing the information specified in 35 Ill. Adm. Code 845.220(a)(1). The history of construction information submitted in the initial operating permit* *application at Attachment B has items indicated as "not reasonable and readily available" and were not provided in the updated history of construction dated October 11, 2021 in Attachment U. A written history of construction needs to be submitted to the Agency in accordance with the requirements of 35 Ill. Adm. Code 845.220(a)(1).*

Response: In preparing its Operating Permit application, IPRG reviewed all available files and identified and interviewed all employees that could potentially have relevant information. Additionally, IPRG conducted no less than 3 plant visits. Despite its efforts and due to the age of the Edwards Ash Pond, IPRG was unable to find information related to the topics within the History of Construction that it previously identified as "not reasonably and readily available." Specifically, IPRG was unable to locate information related to the following and given the age of the unit is not able to generate this information:

- The Edwards Ash Pond's method of site preparation;
- The Edwards Ash Pond's area of capacity curves; and
- The Ash Pond's construction specifications.

Waste Characterization and CCR Characterization [35 Ill. Adm. Code 845.230(d)(2)(B) and 845.230(d)(2)(C)]

Comment 2: *The CCR waste characterization must include all waste streams as defined by SW846, incorporated by reference in Section 845.150, which includes appropriate number of samples to characterize each waste type and identification of all waste types which includes solids, semi-solids, liquids, and air born parts that come from the CCR. SW846 Chapter 9 defines a minimum number of samples of each waste stream as totaling four and must include additional sampling as warranted. Additional sampling for the following waste streams must be provided, at a minimum:*

- *Fly Ash and Fly Ash Sluice Water*
- *Bottom Ash, Economizer Ash pyrites sluice water*
- *Non-chemical metal cleaning wastewater*
- *Boiler and Turbine Room Sumps*
- *Coal Pile Runoff*
- *Yard Substation and Track Drains*
- *Water treatment wastewater*

Response: The existing characterization is consistent with Part 845. While it is true that SW846 is incorporated by reference into Part 845 by Section 845.150, inclusion in the general "incorporations by reference" section of Part 845 does not create an affirmative obligation to use SW846 in all circumstances. The Board has explained that where Illinois rules incorporate analytical methods by reference via a "centralized listing of incorporations by reference" such as Section 845.150, "Illinois rules further indicate where each method is used *in the body of the* *substantive provisions*." *See In the Matter of: SDWA Update, USEPA Amendments (January 1, 2013 through June 30, 2013)*, R 2014-008, Opinion of the Board at 24–25 (Jan. 23, 2014) (emphasis added).

Further, Chapter 2 of SW846 states that the methods in that document are not "mandatory" unless specifically specified as such by regulation. United States Environmental Protection Agency ("USEPA"), *SW-846 Update V* at 1 (July 2014).[1] USEPA guidance also makes clear that SW846 is only legally required where "explicitly specified" in a regulation. USEPA, *Disclaimer for Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* at 1 (July 2014).[2] The only substantive provision of Part 845 specifically requiring analysis using SW846 is Section 845.640(e), which applies to analyzing groundwater monitoring samples under a groundwater monitoring program and is not at issue here. 35 Ill. Admin. Code § 845.640(e). There is no requirement to use SW846 under Section 845.230(d)(2). The plain language of Part 845 does not require the utilization of SW846 for purposes of waste and CCR characterization.

IPRG followed best practices in the industry in conducting its "analysis of the chemical constituents found within the CCR to be placed in the CCR surface impoundment" and "analysis of the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained in the CCR surface impoundment." IPRG collected porewater, which is the most representative of the chemical constituents from the leachate of the impoundment. Testing of the actual porewater from a CCR surface impoundment is more appropriate than SW846's use of leach test results to estimate a total potential for chemical leaching from CCR into groundwater. The porewater analysis used is the best and most accurate scientifically available information for source characterization. *See, e.g.,* US EPA, Industrial Environmental Research Laboratory, Chemical and Biological Characterization of Leachates from Coal Solid Wastes, EPA-600/7-80-039, March 1980; US EPA & TVA, Effects of Coal-ash Leachate on Ground Water Quality, EPA-600/7-80-066, March 1980; US EPA, Office of Research and Development, Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data, EPA-600/R-09/151, December 2009; see also X.Wang, et al., Leaching and Geochemical Evaluation of Oxyanion Partitioning Within an Active Coal Ash Management Unit, Chemical Engineering Journal, Vol. 454, Part 4, at 140406 (Feb. 15, 2023).

Prior to performing hydrogeologic investigations in 2021, Ramboll completed a review of existing data to determine whether sufficient information existed to meet the requirements of 35 I.A.C. § 845. Based on the review, Ramboll developed an approach to fully characterize the CCR material as part of the 2021 investigation. Three locations for porewater wells were selected by evaluating the extent of ash through time on aerial photographs (Figure 1 in Attachment A), identifying visible

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[1] Available at https://www.epa.gov/sites/default/files/2015-10/documents/chap2_1.pdf.

[2] Available at https://www.epa.gov/sites/default/files/2015-10/documents/disclaim.pdf.

differences (color) in surficial materials, and capturing a representative spatial distribution (both vertically and horizontally). A total of three porewater wells were installed in 2021.

Emergency Action Plan [35 Ill. Adm. Code 845.230(d)(2)(G)]

Comment 3: *The Emergency Action Plan must be updated to include all contact information of emergency responders including internal contacts and must state how the annual coordination meetings will be documented in the facility's operating record.*

Response: The submitted Emergency Action Plan satisfies the requirements of Section 845.520(b) and need not be revised. IPRG submitted as Attachment F to its Edwards Ash Pond Operating Permit Application an Emergency Action Plan. Page 7 of that Emergency Action Plan lists internal and external emergency responder contact information, as required by 35 Ill. Admin. Code § 845.520(b)(3). Further, Section 845.520 does not require, as IEPA purports, that the Emergency Action Plan state how the annual coordination meetings will be documented in the facility's operating record. See 35 Ill. Admin. Code § 845.520(b) (minimum requirements for the Emergency Action Plan). It simply requires that such documentation be placed in the operating report. 35 Ill. Admin. Code § 845.520(g). As required by Section 845.520(g), IPRG has committed in the Emergency Action Plan to conduct annual "coordination meeting[s] . . . between representatives of the [IPRG] and local emergency responders." Edwards Ash Pond Operating Permit Application (Oct. 25, 2021), Attachment F at 14. Additionally, as required by Sections 845.520(g) and 845.800(d)(10), IPRG will place documentation of the annual meeting in the facility's operating record.

Hydrogeologic Site Characterization [35 Ill. Adm. Code 845.230(d)(2)(I)(i)]

Comment 4: *The laboratory reports must be provided to prove the groundwater analytical results in Table 4-1 of Attachment H.*

Response: On December 19, 2023, IPRG technical staff and IEPA met to discuss IEPA's Initial Review Letter. Pursuant to that discussion, IPRG is producing the electronic data deliverable ("EDD") responsive to the above request concurrently with this response. Given the nature of the data to be shared, IPRG will provide IEPA with a link to a temporary file-sharing service containing the EDD.

Groundwater Sampling and Analysis Program [35 Ill. Adm. Code 845.230(d)(2)(I)(iii)]

Comment 5: *The laboratory reports, field stabilization records, and purge documentation must be provided to sufficiently address the requirements in Section 845.640(a). The state-certified laboratory used during the time of groundwater sampling must also be identified.*

Response: On December 19, 2023, IPRG technical staff and IEPA met to discuss IEPA's Initial Review Letter. Pursuant to that discussion, IPRG is producing the EDD responsive to the above request concurrently with this response. Given the nature of the data to be shared, IPRG will provide IEPA with a link to a temporary file-sharing service containing the EDD.

Comment 6: *The appropriate minimum detection limits for each constituent must be used to evaluate the constituent statistically and to compare against the numerical groundwater protection standard in 35 IAC 845.600(a)(1). The following constituents have a calculated groundwater protection/background value that does not exhibit the correct use of the statistics:*

- *Arsenic*
- *Barium*
- *Cobalt*
- *Lead*
- *Lithium*
- *pH*
- *Radium 226 and 228 combined*

Response: IPRG has received and is reviewing IEPA's December 28, 2023, letter regarding its Comments on Statistical Methods Proposed in Initial Operating Permit. IPRG has scheduled a meeting with IEPA to further discuss this comment in the initial review letter and the comments in IEPA's December 28 letter. Following that meeting, IPRG will provide IEPA written responses to the December 28 letter, which will also serve as its response to the above comment.

Preliminary Written Closure Plan [35 IAC 845.230(d)(2)(J)]

Comment 7: *To comply with the application requirements of 35 Ill. Adm. Code 845.230(d)(2)(J), the applicant must provide a preliminary written closure plan containing the information specified in 35 Ill. Adm. Code 845.720(a). A preliminary written closure plan was not provided in the initial operating permit application.*

Response: The Edwards Ash Pond is required to close under 35 Ill. Admin. Code § 845.700. Therefore, a preliminary closure plan is not required for the unit. Section 845.720(a)(1) requires a preliminary written closure plan only for those units "***not required to close under Section 845.700***." 35 Ill. Admin. Code § 845.720(a)(1) (emphasis added).

Liner Status or Statement [35 IAC 845.230(d)(2)(L)]

Comment 8: *To comply with the application requirements of 35 Ill. Adm. Code 845.230(d)(2)(L), the applicant must provide a certification from a qualified professional engineer attesting that the CCR surface impoundment meets the requirements of Section 845.400(a) or provided a statement that the CCR surface impoundment does not have a liner that meets the requirements of Section 845.400(b) or (c). No* *certification or statement of the CCR surface impoundment meeting or not meeting requirements under Section 845.400 was provided in the initial operating permit application.*

Response: As required by Section 845.230(d)(2)(L), IPRG states that the Edwards Ash Pond does not have a liner that meets the requirements of Section 845.400(b) or (c).

History of Known Groundwater Exceedances [35 IAC 845.230(d)(2)(M)]

Comment 9: *The history of known groundwater exceedances in Attachment M does not contain actual data for review by the Agency. The values provided are statistical analyses results. The laboratory reports and raw data used as inputs for the statistical analyses must be provided for the Agency to review and approve.*

Response: On December 19, 2023, IPRG technical staff and IEPA met to discuss IEPA's Initial Review Letter. Pursuant to that discussion, IPRG is producing the EDD responsive to the above request concurrently with this response. Given the nature of the data to be shared, IPRG will provide IEPA with a link to a temporary file-sharing service containing the EDD.

Comment 10: *Please see comments above for correcting calculated groundwater protection/ background value.*

Response: IPRG has received and is reviewing IEPA's December 28, 2023, letter regarding its Comments on Statistical Methods Proposed in Initial Operating Permit. IPRG has scheduled a meeting with IEPA to further discuss this comment in the initial review letter and the comments in IEPA's December 28 letter. Following that meeting, IPRG will provide IEPA written responses to the December 28 letter, which will also serve as its response to the above comment.

Hazard Potential Classification Assessment and Certification [35 IAC 845.230(d)(2)(M)]

Comment 11: *The hazard potential classification assessment in Attachment O and addendum in Attachment U indicate a classification of a high hazard potential for the CCR surface impoundment in accordance with 40 CFR 257.73(a)(2). The hazard potential classification assessment for the CCR surface impoundment must be in accordance with Section 845.440.*

Please explain how the initial hazard potential classification assessment provided in the initial operating permit application meets Section 845.210(d)(3).

Response: Part 845 allows a previous hazard potential classification assessment to be submitted under Section 845.210(d)(3) if the previously completed assessment was completed less than five years ago, and it meets the applicable requirements of Section 845.440. Section 845.440 requires classification of a unit as either a "a Class 1 or Class 2 CCR surface impoundment." IPRG submitted as Attachment O to its Ash Pond Operating Permit Application an Initial Hazard Potential Classification Assessment conducted on October 12, 2016, pursuant to 40 C.F.R. §

257.73(a)(2). Additionally, Attachment U of the Ash Pond Operating Permitting Application includes a Periodic Hazard Potential Assessment, dated October 11, 2021, in which an introductory letter notes that the periodic assessment was conducted to meet all the necessary requirements of 40 C.F.R. 257.73(a)(2) and Section 845.440. The initial and periodic assessment classify the Ash Pond as a "high" hazard potential under 40 C.F.R. § 257.73(a)(2), which Attachment U further notes is equivalent to a "Class 2" hazard potential under Section 845.440(a)(1). The initial and periodic assessments are also certified by a qualified professional engineer, satisfying Section 845.440(b). Therefore, the initial and periodic hazard potential classification assessment provided in the initial operating permit application meets the requirements of Sections 845.210(d)(3) and 845.440.

Structural Stability Assessment and Certification [35 IAC 845.230(d)(2)(P)]

Comment 12: *The initial structural stability assessment in Attachment P must use a hazard potential classification in accordance with Section 845.440. The structural stability assessment must also document compliance with Section 845.450(a)(6) with respect to negative affects to the CCR surface impoundments.*

Please explain how the initial structural stability assessment provided in the initial operating permit application meets Section 845.210(d)(3).

Response: As an initial note, IPRG states that the Agency's comment is unclear. Section 845.450 is not dependent on the hazard potential classification determined under Section 845.440 and neither incorporates nor requires the classifications used during the structural stability assessment.

Further, Part 845 allows a previous structural stability assessment to be submitted if, under Section 845.210(d)(3), the previously completed assessment was completed less than five years ago and meets the applicable requirements of Section 845.450. IPRG submitted as Attachment P to its Ash Pond Operating Permit Application an Initial Structural Stability Assessment conducted on October 13, 2016, pursuant to 40 C.F.R. § 257.73(d)(1). Further, Attachment U of the Ash Pond Operating Permit Application includes a Periodic Structural Stability Assessment, dated October 11, 2021, in which an introductory letter notes that the periodic assessment was conducted to meet all the necessary requirements of 40 C.F.R. § 257.73(d)(1) and Section 845.450.

Additional details concerning structural stability are included in the 2016 AECOM CCR Certification Report included as attachment B to this letter.

Safety Factor Assessment and Certification [35 IAC 845.230(d)(2)(Q)]

Comment 13: *Please explain how the initial safety factor assessment provided in the initial operating permit application meets Section 845.210(d)(3).*

Response: Part 845 allows a previous safety factor assessment to be submitted if, under Section 845.210(d)(3), the previously completed assessment was completed less than five years ago and meets the applicable requirements of Section 845.460(a) & (b). IPRG submitted as Attachment Q to its Ash Pond Operating Permit Application an Initial Safety Factor Assessment conducted on October 13, 2016, pursuant to 40 C.F.R. § 257.73(e). Additionally, Attachment U of the Ash Pond Operating Permitting Application includes the Periodic Safety Factor Assessment, dated October 11, 2021, in which an introductory letter notes that the periodic assessment was conducted to meet all the necessary requirements of Section 845.460 and 40 C.F.R. § 257.73(e). The requirements contained in Section 845.460 are identical to those required by 40 C.F.R. § 257.73(e), and the initial and periodic assessments are also certified by a qualified professional engineer, satisfying Section 845.460(b).

Additional details concerning the safety factor assessment are included in the 2016 AECOM CCR Certification Report included as attachment B to this letter.

Inflow Design Flood Control System Plan and Certification [35 IAC 845.230(d)(2)(R)]

Comment 14: *The inflow design flood control system plan must specify how discharges from the CCR surface impoundment will be handled with in accordance with Section 845.110(b)(3).*

The inflow design flood control system plan certification must be certified by a qualified professional engineer to meet the requirements of Section 845.510.

Response: The Inflow Design Flood Control System Plan attached to the initial operating permit application as Attachment R, satisfies all the requirements of Section 845.510 and is certified by a qualified professional engineer. *See* Initial Operating Permit Application Edwards Ash Pond, Attachment R.

Additional details concerning the inflow design flood control system plan are included in the 2016 AECOM CCR Certification Report included as Attachment B to this letter. Discharges from the impoundment will be managed in accordance with the site's NPDES permit.

Safety and Health Plan (35 IAC 845.540)

Comment 15: *The Safety and Health Plan in Attachment S must address the response and procedure for using, inspecting, repairing, and replacing facility emergency and monitoring requirements in accordance with Section 845.530(c).*

Response: IPRG has provided as Attachment C to this letter a revised Safety and Health Plan dated December 2023 as requested by IEPA.

Construction Permit Application

History of Construction [35 Ill. Adm. Code 845.220(a)(I)]

Comment 16: *To comply with the application requirements of 35 Ill. Adm. Code 845.220(a)(1), the applicant must provide a written history of construction containing the information specified in 35 Ill. Adm. Code 845.220(a)(1). The history of construction information submitted in the initial operating permit application at Attachment B has items indicated as "not reasonable and readily available" and were not provided in the updated history of construction dated October 11, 2021 in Attachment U. A written history of construction needs to be submitted to the Agency in accordance with the requirements of 35 Ill. Adm. Code 845.220(a)(1).*

Response: In preparing its Construction Permit application, IPRG reviewed all available files and identified and interviewed all employees that could potentially have relevant information. Additionally, IPRG conducted no less than 3 plant visits. Despite its efforts and due to the age of the Edwards Ash Pond, IPRG was unable to find information related to the topics within the History of Construction that it previously identified as "not reasonably and readily available." Specifically, IPRG was unable to locate information related to the following and given the age of the unit is not able to generate this information:

- The Edwards Ash Pond's method of site preparation;
- The Edwards Ash Pond's area of capacity curves; and
- The Ash Pond's construction specifications.

Comment 17: *In addition, the geotechnical explorations and laboratory testing used to create Tables 1 and 2 in Appendix B must be provided.*

Response: The requested information is contained in the 2016 AECOM CCR Certification Report and included as attachment B to this letter.

Narrative Description of the Facility [35 Ill. Adm. Code 845.220(a)(2)]

Comment 18: *To comply with the application requirements of 35 Ill. Adm. Code 845.220(a)(2), the applicant must provide all the types of CCR expected in the CCR surface impoundment including a chemical analysis of each type and the rate of non-CCR waste streams entering the CCR surface impoundment in accordance with Sections 845.220(a)(2)(A) and (B). The CCR characterization must be sampled in compliance with SW846, incorporated by reference in Section 845.150*

Response: The existing characterization is consistent with Part 845. While it is true that SW846 is incorporated by reference into Part 845 by Section 845.150, inclusion in the general "incorporations by reference" section of Part 845 does not create an affirmative obligation to use SW846 in all circumstances. The Board has explained that where Illinois rules incorporate analytical methods by reference via a "centralized listing of incorporations by reference" such as Section 845.150, "Illinois rules further indicate where each method is used *in the body of the substantive provisions*." *See In the Matter of: SDWA Update, USEPA Amendments (January 1, 2013 through June 30, 2013)*, R 2014-008, Opinion of the Board at 24–25 (Jan. 23, 2014) (emphasis added).

Further, Chapter 2 of SW846 states that the methods in that document are not "mandatory" unless specifically specified as such by regulation. United States Environmental Protection Agency ("USEPA"), *SW-846 Update V* at 1 (July 2014).[3] USEPA guidance also makes clear that SW846 is only legally required where "explicitly specified" in a regulation. USEPA, *Disclaimer for Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* at 1 (July 2014).[4] The only substantive provision of Part 845 specifically requiring analysis using SW846 is Section 845.640(e), which applies to analyzing groundwater monitoring samples under a groundwater monitoring program and is not at issue here. 35 Ill. Admin. Code § 845.640(e). There is no requirement to use SW846 under Section 845.220(a). The plain language of Part 845 does not require the utilization of SW846 for purposes of waste and CCR characterization.

IPRG followed best practices in the industry in conducting its "analysis of the chemical constituents found within the CCR to be placed in the CCR surface impoundment" and "analysis of the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained in the CCR surface impoundment." IPRG collected porewater, which is the most representative of the chemical constituents from the leachate of the impoundment. Testing of the actual porewater from a CCR surface impoundment is more appropriate than SW846's use of leach test results to estimate a total potential for chemical leaching from CCR into groundwater. The porewater analysis used is the best and most accurate scientifically available information for source characterization. See, e.g., US EPA, Industrial Environmental Research Laboratory, Chemical and Biological Characterization of Leachates from Coal Solid Wastes, EPA-600/7-80-039, March 1980; US EPA & TVA, Effects of Coal-ash Leachate on Ground Water Quality, EPA-600/7-80-066, March 1980; US EPA, Office of Research and Development, Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data, EPA-600/R-09/151, December 2009; see also X.Wang, et al., Leaching and Geochemical Evaluation of Oxyanion Partitioning Within an Active Coal Ash Management Unit, Chemical Engineering Journal, Vol. 454, Part 4, at 140406 (Feb. 15, 2023).

Prior to performing hydrogeologic investigations in 2021, Ramboll completed a review of existing data to determine whether sufficient information existed to meet the requirements of 35 I.A.C. § 845. Based on the review, Ramboll developed an approach to fully characterize the CCR material as part of the 2021 investigation. Three locations for porewater wells were selected by evaluating the extent of ash

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[3] Available at https://www.epa.gov/sites/default/files/2015-10/documents/chap2_1.pdf.
[4] Available at https://www.epa.gov/sites/default/files/2015-10/documents/disclaim.pdf.

through time on aerial photographs (Figure 1 in Attachment A), identifying visible differences (color) in surficial materials, and capturing a representative spatial distribution (both vertically and horizontally). A total of three porewater wells were installed in 2021.

Final Closure Plan and Closure Alternatives Analysis [35 Ill. Adm. Code 845.220(d)(2)]

Comment 19: *The final closure plan must include a survey, conducted by a licensed surveyor, of the final extents of the CCR surface impoundment prior to commencement of construction activities in accordance with Section 845.750.*

Response: IPRG will conduct a survey of the final extents of the CCR surface impoundment prior to commencement of construction activities and will include this information in the closure report required to be submitted to the Agency pursuant to Section 845.760(e).

Comment 20: *The proposed cover system soils must come from a borrow source that has been tested to ensure contaminants are not being introduced to the site and contribute to exceedances of groundwater protection standards, in Section 845.600, at the waste boundary. Borrow source material must be certified "uncontaminated soil" to ensure that the borrow source material does not pose a risk to human health and the environment.*

Response: Part 845 does not require IPRG to verify that the proposed cover system soils come from an uncontaminated borrow source or, alternatively, to certify the borrow source as "uncontaminated soil." Further, to the extent IEPA is relying on 35 Ill. Admin. Code Part 1100 to require certified "uncontaminated soil" to be used as fill material at the site, it does not. Part 1100's application is limited to uncontaminated soil fill operations and clean construction demolition debris (CCDD) fill operations. The Edwards Ash Pond is neither. None the less, IPRG is committed to using borrow sourced from a location that has no known surface soil contamination of such a level to pose a significant risk to human health or the environment.

Comment 21: *The laboratory documents used to create Tables 2.2 and 2.3 in Appendix H, Attachment A must be provided to validate the groundwater and surface water summary tables.*

Response: On December 19, 2023, IPRG technical staff and IEPA met to discuss IEPA's Initial Review Letter. Pursuant to that discussion, IPRG is producing the EDD responsive to the above request concurrently with this response. Given the nature of the data to be shared, IPRG will provide IEPA with a link to a temporary file-sharing service containing the EDD. Note that the EDD will only contain groundwater data, and that the surface water data is included as Attachment D to this letter.

Comment 22: *The groundwater data in Tables 2.2, 3.1, and 3.2 in Appendix H, Attachment A must include concentrations for pH.*

Response: Measurements of pH were not included in the referenced tables because pH is not a parameter that is typically evaluated in risk assessments, as there are no risk-based criteria that have been developed for pH (i.e., pH is not included on the US EPA Regional Screening Levels (RSL) list). However, pH values were provided in Table 4-1 of Appendix E (the Hydrogeologic Characterization Report (Ramboll, 2022)) and are provided in the EDDs referenced in Comment 9. With respect to the Closure Alternatives Analysis tables 2.2, 3.1, and 3.2 that did not include pH; review of the data indicates pH concentrations in monitoring wells ranged from 6.2 to 7.9 Standard Units (SU) from 2015 to 2021. The GWPS for pH at the Edwards Power Plant is 6.3 to 9.0 SU. Two results fell below the GWPS, but the lowest values (6.2 SU) were measured only during a single event at APW17 and AP07S. Given the isolated and limited detection of pH outside the GWPS, including pH does not change the results of the evaluation which concluded current conditions do not present a risk to human health or the environment. pH data from groundwater sampling is included in the EDDs, and surface water results are included in Attachment D.

Groundwater Modeling [35 Ill. Adm. Code 845.220(d)(3)]

Comment 23: *The Agency requires all constituents listed in Section 845.600 that have been found to be present in the CCR surface impoundment to be assessed in the groundwater model. The permit application states that Boron is commonly used as an indicator parameter, however, boron does not represent all constituents flow rate and leachability.*

Response: Part 845 does not require that groundwater models developed in support of the closure alternative analysis evaluate all constituents listed in Section 845.600 that have been found to be present in the CCR surface impoundment. Part 845 requires that groundwater modeling evaluate only "how the closure alternative will achieve compliance with the applicable groundwater protection standards" 35 Ill. Admin. Code § 845.710(d)(2). There is no language in Part 845 requiring that the groundwater model must evaluate all constituents that have been detected in a surface impoundment. Further, as discussed in Attachment E, modeling selected constituents is a common industry approach for evaluation of environmental systems and is sufficient to achieve the modeling objectives in support of the closure alternatives analysis. Attachment E at 4. IPRG selected, as a surrogate, boron as the constituent at the site that will likely require the longest time to achieve the groundwater protection standards. Id. This surrogate constituent is appropriate to determine when the closure of each unit will achieve the groundwater protection standards as required by Section 845.710(d)(2). Id. at 5, 9–11.

In addition, IPRG will be providing hydrogeologic and geochemical conceptual site models as components of the nature and extent report required by 35 Ill. Admin. Code § 845.650(d)(1). The nature and extent report will be submitted concurrent with the corrective measures assessment report (due no later than May 2024 for all units). Further, IPRG will be conducting fate and transport modeling for evaluation of potential corrective measures in the corrective action alternatives analysis

(CAAA) report (due no later than May 2025 for all units) using boron as a surrogate constituent. A geochemical evaluation report will also be submitted concurrently with the CAAA that discusses the expected transport and fate of all 845.600 constituents that have been detected above the GWPS and are attributable to a CCR unit. These activities will address the concerns posed by IEPA in its Initial Review Letter.

Training Program Statement [35 Ill. Adm. Code 845.500, 845.520, and 845.530]

Comment 24: *A certification or statement must be provided that ensures personnel and contractors/subcontractors will comply with Sections 845.500, 845.520, and 845.530.*

Response: Section 845.220 does not require such a statement or certification to be submitted with the closure construction permit application. Further, Sections 845.500, 845.520, and 845.530 similarly do not require such a statement or certification. IPRG further notes that an Emergency Action Plan (Section 845.520) and a Safety and Health Plan (Section 845.530) are not required to be submitted with a closure construction permit application. *See* 35 Ill. Admin. Code 845.220(d).

Should you have any questions or comments regarding the above responses, please contact Rhys Fuller at rhys.fuller@vistracorp.com or (618) 975-1799.

Sincerely,

Phil Morris, P.E.
Sr. Director, Environmental

Fuller, Rhys

From:	Fuller, Rhys
Sent:	Thursday, April 18, 2024 5:38 PM
To:	Herrera, Francisco
Cc:	LeCrone, Darin; Hunt, Lauren; EPA.CCR.Part845.Coordinator@Illinois.gov; Morris, Phil
Subject:	Edwards Part 845 Response to Comments (Log No. 2021-100016)

Francisco,

Please find at the link provided below a copy of our initial response to the review letter provided by IEPA concerning our Part 845 operating and closure construction permit applications for the Edwards Power Plant's Ash Pond. A hard copy of the submittal should have been delivered to IEPA's Springfield Office earlier today. Also linked below is a folder containing the electronic data deliverables which can only be shared electronically.

PDF Edwards 845 Permit Application Response to Comments.pdf

Edwards EDD Files

We will continue to schedule meetings with you all in order to fully resolve the comments as indicated in the written response letter.

Please let us know if you have any additional questions or if you have difficulty accessing the files via the links above.

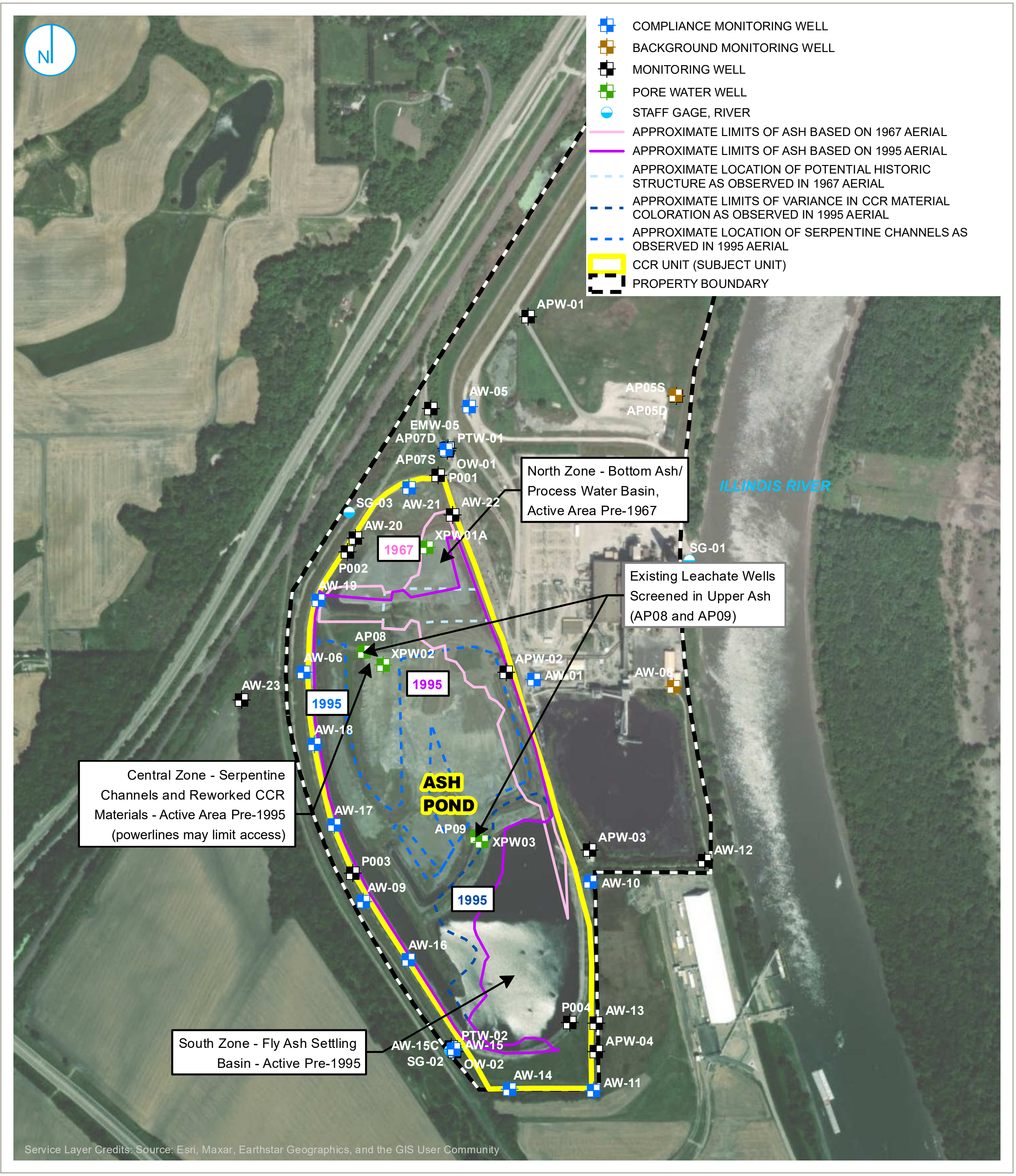
Thanks,

Rhys Fuller
Vistra Corp.
618-975-1799

Attachment A

Y:\Mapping\Projects\22\2285\MXD\845\Edwards\Response\EPA_2024\Figure 1. Edwards_CCR Characterization.mxd

PROJECT: 169000XXXX | DATED: 3/11/2024 | DESIGNER: GALARNMC



CCR CHARACTERIZATION MAP

EDWARDS ASH POND (UNIT ID: 301)

FIGURE 1

0 400 800
Feet

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

Attachment B

AECOM

Submitted to
Illinois Power Resources
Generating, LLC
7800 S. Cilco Lane
Bartonville, IL 61607

Submitted by
AECOM
1001 Highlands Plaza Drive West,
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St. Louis, MO 63110

October 2016

CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan

For

Ash Pond

At Edwards Power Station

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Executive Summary

The initial structural stability assessment, initial safety factor assessment, and initial inflow design flood control system plan for the Ash Pond at the Edwards Power Station have been prepared in accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule 40 Code of Federal Regulations (CFR) §257.73(d), §257.73(e), and §257.82, respectively. These regulations require that the specified structural stability, safety factor, and hydrologic and hydraulic (supporting the inflow design flood control system plan) assessments for an existing CCR surface impoundment be completed by October 17, 2016.

The engineering investigations, analyses, and evaluations determined that the Ash Pond meets all requirements for the safety factor assessment and hydrologic and hydraulic analysis, as summarized in Table ES-1. All requirements for structural stability are met, except for the structural integrity of hydraulic structures (§257.73(d)(1)(vi)). In accordance with §257.73(d)(2), AECOM recommends that a CCTV pipe inspection be performed on the hydraulic structure pipes as soon as feasible and that this assessment report be updated with documentation of that inspection.

Table ES-1 – Certification Summary

Report Section	CCR Rule Reference	Requirement Summary	Requirement Met?	Comments
Initial Structural Stability Assessment				
3.1	§257.73(d)(1)(i)	Stable foundations and abutments	Yes	Foundations and abutments were found to be stable.
3.2	§257.73(d)(1)(ii)	Adequate slope protection	Yes	Slope protection is adequate.
3.3	§257.73(d)(1)(iii)	Sufficiency of dike compaction	Yes	Dike compaction is sufficient for expected ranges in loading conditions.
3.4	§257.73(d)(1)(iv)	Presence and condition of slope vegetation	Yes	Vegetation is present on interior and exterior slopes and is maintained. Interior slopes also have alternate protection (crushed stone) in some areas.
3.5	§257.73(d)(1)(v)(A) and (B)	Adequacy of spillway design and management	Yes	Spillways are adequately designed and constructed and adequately manage flow during the probable maximum flood (PMF).
3.6	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	No	Requirement cannot be certified at this time due to inability to complete CCTV pipe inspections of the hydraulic structures. AECOM recommends CCTV inspections of the pipes as soon as feasible to address this issue.
3.7	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body	Not Applicable	Inundation of exterior slopes is not expected.
Initial Safety Factor Assessment				
4.1	§257.73(e)(1)(i)	Maximum storage pool safety factor must be at least 1.50	Yes	Safety factors were calculated to be 1.54 and higher.
4.2	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	Safety factors were calculated to be 1.54 and higher.
4.3	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.08 and higher.
4.4	§257.73(e)(1)(iv)	For dikes constructed of soils that have susceptibility to liquefaction safety factor must be at least 1.20	Not Applicable	Dike soils are not susceptible to liquefaction.
Initial Inflow Design Flood Control System Plan				
5.1	§257.82(a)(1), (2), (3)	Adequacy of inflow design flood control system	Yes	Flood control system adequately manages inflow and peak discharge during the 1,000-hour, 24-hour, Inflow Design Flood.
5.2	§257.82(b)	Discharge from the CCR Unit	Yes	Discharge from CCR Unit is routed through a NPDES-permitted outfall during both normal and 1,000-year, 24-hour, Inflow Design Flood conditions.

1 Introduction

This report documents that the structural stability assessment, safety factor assessment, and inflow design flood control system plan meet the requirements specified in 40 CFR §257.73(d), §257.73(e), and §257.82, respectively, to support the certification required under each of those regulatory provisions for the Edwards Power Station Ash Pond, except as noted herein. The Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the specified initial structural stability assessment, initial safety factor assessment, and initial inflow design flood control system plan (i.e., hydrologic and hydraulic analysis) for an existing CCR surface impoundment be completed by October 17, 2016.

The Edwards Power Station has one existing CCR surface impoundment, the Ash Pond. The Ash Pond has been evaluated to determine whether the structural stability, safety factor, and inflow design flood control system plan requirements are met. The following sections describe the evaluations performed and the results from the analyses, as supported by the underlying data and analyses included in the appendices.

2 Facility Description and Location Map

2.1 Overview of Existing Surface Impoundments

The Edwards Power Station is a coal-fired power plant located near Bartonville, Illinois in Peoria County. The Edwards Power Station is located on the west bank of the Illinois River, and the Ash Pond is located approximately 0.1 miles west of the station. A site location map showing the Edwards Power Station is in **Figure 1. Figure 2** presents the Edwards Power Station site plan.

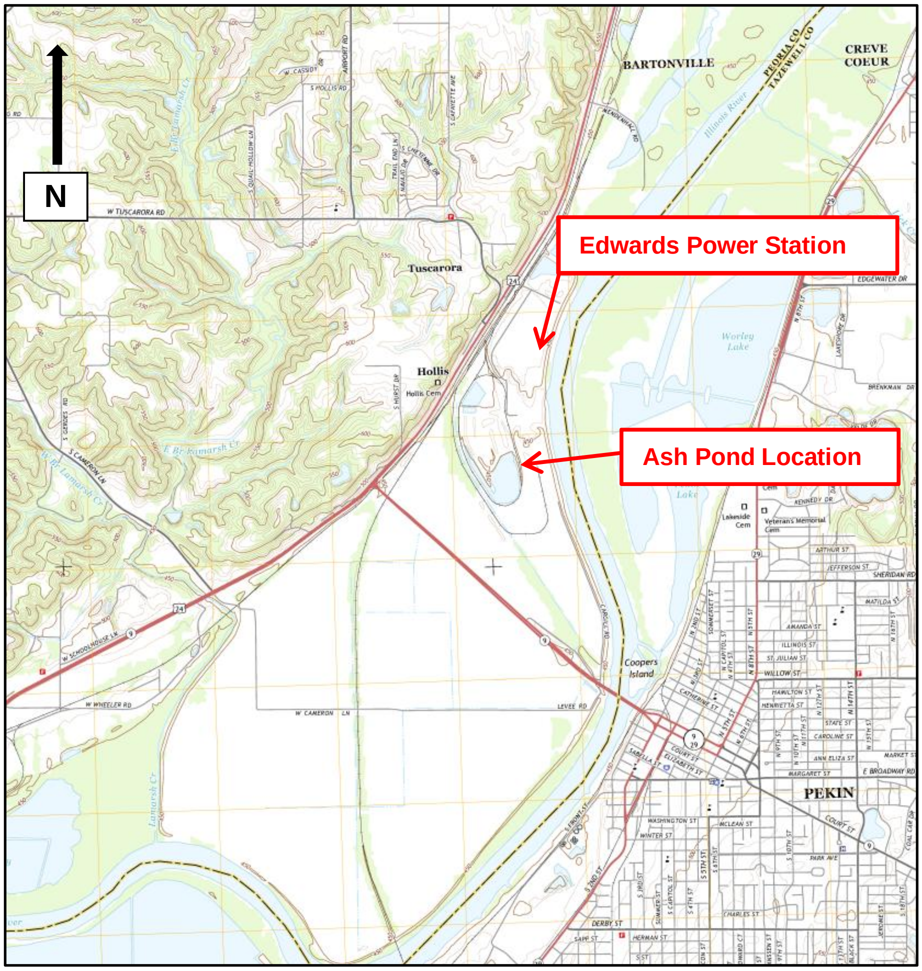

Figure 1 – Edwards Power Station Location Map

(from United States Geological Survey Pekin, IL 7.5' Topographic Maps, 2015)

One active CCR surface impoundment – the Ash Pond – is utilized for managing CCRs generated by the Edwards Power Station. The Ash Pond has a high hazard potential based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with 257.73(a)(2).

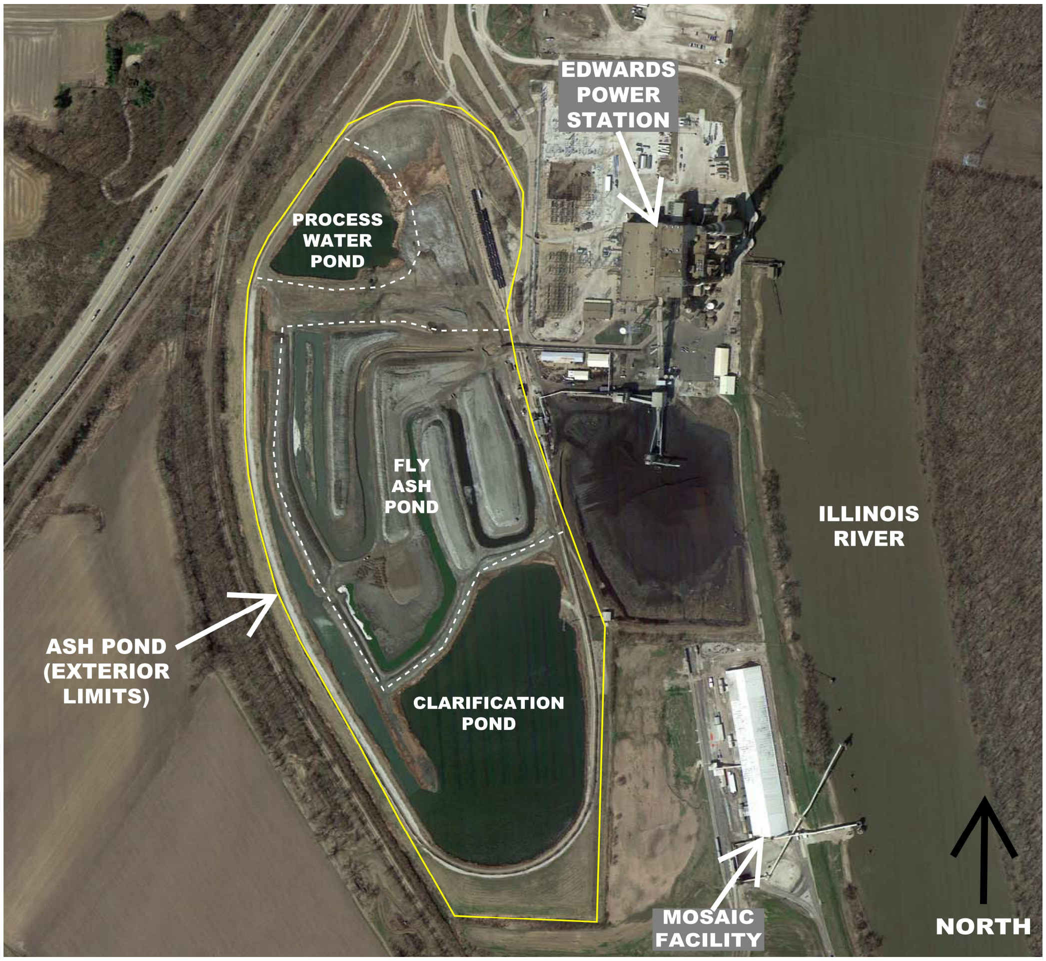

Figure 2 – Edwards Power Station Site Plan
(Imagery from Google Earth Pro, 2016)

The Ash Pond receives sluiced CCR materials and plant process water from the Edwards Power Station through sluice pipes that discharge into the eastern side of the Ash Pond, immediately west of the Edwards Power Station. Within the Ash Pond, there are three separate sub-basins: the Process Water Pond, the Fly Ash Pond, and the Clarification Pond. The Process Water Pond is located within the northwest portions of the Ash Pond, and receives water from miscellaneous sumps, pumps, and processes at the Edwards Power Station, as well as stormwater. The Process Water Pond transmits outflow to the Clarification Pond, which is located in the southern portion of the Ash Pond, through a 24-inch diameter corrugated metal pipe (CMP) culvert. The Fly Ash Pond receives sluiced bottom ash and fly ash from the plant and directs it into a settling channel, where ash is mechanically dipped out and stacked in windrows within the Fly Ash Pond. The Fly Ash Pond discharges into the Clarification Pond through a reinforced concrete pipe (RCP) culvert. The Clarification Pond then discharges the clear water to the Illinois River through a 36-inch diameter vertical drop inlet spillway structure (invert elevation of 447.2 feet, as listed in the 2011 Kleinfelder site assessment report) (all elevations in this report are in the NAVD88 datum, unless stated otherwise), with a skimmer/trash rack structure. Original design drawings indicate that the vertical morning glory spillway is a CMP; however, 2004 design drawings for replacement of the skimmer/trash rack indicate that the vertical portions of the spillway may have been replaced with RCP pipe at some time. The pipe material has not been verified as it is typically submerged and high flows into the pipe have prevented inspection. Within the embankment, the spillway structure transitions to a nearly horizontal 36-inch CMP that discharges to the Illinois River at the site's NPDES-permitted outfall. A flap gate backflow prevention device is present at the pipe's discharge. A sanitary sewer force main, consisting of 6-inch high-density polyethylene (HDPE) pipe, crosses the Ash Pond, between the Process Water Pond and the Fly Ash Pond, and is buried at a shallow depth within the Ash Pond. However, the pipe penetrates the west dike of the Ash Pond at a depth of approximately 10 feet. The pipe was installed in 2008 and transmits sewer flow from east to west.

The Ash Pond earthen embankments were constructed in the 1960s and an engineered raise of the embankment was completed in 2004 to facilitate the addition of a rail loop at the crest of the embankment. The engineered raise included increasing the dike height from its original elevation of approximately 455 feet (based on the 2015 Maurer-Stutz survey) to approximately 460 feet (Clarification Pond) and 461 feet (Process Water Pond) using fly ash as a beneficial use material. The maximum height above the exterior grade of the current embankment is approximately 29 feet. Within the southern portions of the Clarification Pond, the rail loop was constructed approximately 250 feet inside the crest of the earthen embankment out of crushed stone. This effectively cut off a portion of the Ash Pond from the Clarification Pond, creating an area which was filled with CCR and vegetated. The original embankment acts as the perimeter of the Ash Pond at the southern end of the filled and vegetated area, and was also raised in 2004 to a similar elevation as the remainder of the embankment.

The perimeter embankment forms the exterior of the impoundment on all but the northeast side of the Ash Pond. The northeast side is bordered by the Edwards Station building grounds and switch yard which are at approximately the same elevation as the top of the pond embankment. The perimeter dike was constructed to include a crest width of approximately 15 to 42 feet with narrower crest widths along the northern portion of the embankment, and wider crest widths along the south, east, and west sides of the embankment. Both the rail loop and a gravel crest access road are located at the crest of the embankment. Based on 2015 LiDAR data from the State of Illinois, the exterior slopes have orientations ranging from 2.5H:1V (southern end of Ash pond) to 3.4H:1V (western side of Ash Pond). The interior slopes have a typical orientation of 2H:1V. Based on the 2015 Maurer-Stutz survey, minimum crest elevations range from 458.8 feet for the Process Water Pond to 459.6 feet for the Clarification Pond, although the typical crest elevations are similar to the design crest elevations of 460 feet and 461 feet for each pond, respectively.

An engineered liner system is not present at the Ash Pond. As currently operated, the normal pool of the Process Water Pond is El. 449.5 feet, as controlled by the 24-inch diameter CMP connecting it to the Clarification Pond. The normal pool of the Clarification Pond is El. 447.2 feet (as listed in the 2011 Kleinfelder site assessment report), as controlled by the 36-inch diameter morning glory spillway. The Ash Pond is approximately 95 acres in size and has a total perimeter length of approximately 8,800 feet, as measured in 2016 aerial photography from Google Earth. Additional details about the geometry and configuration of the pond are provided in the Geotechnical Report in **Appendix B**.

3 Initial Structural Stability Assessment

40 CFR §257.73(d)(1)
The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with [the standards in (d)(1)(i)-(vii)].

Analyses completed for the initial structural stability assessment of the Edwards Power Station's Ash Pond are described in this section. Data and analysis results in the following subsections were developed using recent and historical data provided by Illinois Power Resources Generating, LLC (IPRG), including impoundment design information, spillway design information, survey data, historical data, analysis reports, and information about operational and maintenance procedures. These data were supplemented with subsurface investigation and laboratory data collected by AECOM in 2015.

IPRG's operation of the Ash Pond is consistent with the design and construction of the CCR unit. IPRG follows an established maintenance program that quickly identifies and resolves issues of concern.

3.1 Foundations and Abutments (§257.73(d)(1)(i))

CCR unit designed, constructed, operated, and maintained with stable foundations and abutments.

Stability of the foundations of the Ash Pond was evaluated by reviewing soil consistencies and phreatic data estimated from Standard Penetration Test (SPT) values, Cone Penetration testing (CPT), piezometer installation, and collected soil laboratory test data from the 2015 AECOM field investigation, which is discussed in more detail in **Section 4**. Based on these data, foundation materials generally consist of stiff alluvial clay, overlying soft to medium stiff alluvial clay, which in turn overlies shale bedrock. The phreatic surface is typically located above the embankment/foundation interface beneath the crest of the dike and at the embankment/foundation interface near the toe of the dike.

This information was used to perform slope stability analyses as required by §257.73(e)(1), which is discussed in more detail in **Section 4**. Safety factors for slip surfaces passing through the dike and foundation were found to meet or exceed the minimum requirements required by §257.73(e)(1), which indicates that the foundation of the Ash Pond is stable. One stability analysis cross-section representing the abutments of the Ash Pond was also analyzed, and was found to exceed the minimum requirements required by §257.73(e)(1).

Based on this evaluation, the Ash Pond meets the requirements presented in §257.73(d)(1)(i). A detailed presentation of the field and laboratory data collected for the foundations and the completed slope stability analyses can be found in **Appendix B**.

3.2 Slope Protection (§257.73(d)(1)(ii))

CCR unit designed, constructed, operated, and maintained with adequate slope protection to protect against surface erosion, wave action and adverse effects of sudden drawdown.

The adequacy of slope protection present at the Ash Pond was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field during AECOM's June 10, 2015 site visit.

The exterior dike slopes have a 2.5H:1V or shallower orientation and are covered with vegetation for slope protection, although some limited areas of crushed stone are present. IPRG regularly maintains the slopes, including repairing observed surface erosion and addressing areas of poor vegetation growth, as required. As the exterior slopes are not adjacent to a downstream water body, they are not susceptible to wave action or sudden drawdown. AECOM observed the vegetation to be adequately protecting against surface erosion.

The interior dike slopes have a 2H:1V orientation and are covered with crushed stone in most areas and vegetation in some areas for erosion protection. IPRG regularly maintains the interior slopes, including repairing observed surface erosion or wave action by backfilling the erosion with soil or crushed stone and addressing areas of poor vegetation growth.

The pool level in the Ash Pond is controlled by the vertical 36-inch drop inlet spillway and several interior culverts which separate the Process Water Pond and Fly Ash Pond sub-basins from the Clarification Pond sub-basin. The drop inlet spillway structure and interior culverts do not include low-level outlets or any means to lower the pool below the normal pool elevation of 449.5 feet for the Process Water Pond and 447.2 feet for the Clarification Pond. Therefore, an intentional or unintentional sudden drawdown of the pool level in the Ash Pond is not expected to occur as the pool cannot be drawn down suddenly using the existing spillway structures. Therefore, slope protection to protect against the adverse effects of sudden drawdown is not required.

Based on this evaluation, the Ash Pond meets the requirements in §257.73(d)(1)(ii).

3.3 Dike Compaction (§257.73(d)(1)(iii))

CCR unit designed, constructed, operated, and maintained with dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.

Compaction of the Ash Pond dikes was evaluated using field data obtained from the 2015 AECOM geotechnical investigation and by reviewing design drawings and operational and maintenance procedures. Based on the 2015 AECOM data, the embankment materials consist of soft to very stiff materials that are stiff on average, which is indicative of mechanically-compacted dikes. Slope stability analyses as required by §257.73(e)(1) found acceptable safety factors for each required loading condition, as presented in **Section 4**. Therefore, the dike compaction and density is sufficient for withstanding required ranges in loading conditions.

Based on this evaluation, the Ash Pond meets the requirements in §257.73(d)(1)(iii). A detailed presentation of the field and laboratory data collected for the dikes and the completed slope stability analyses can be found in **Appendix B**.

3.4 Vegetated Slopes (§257.73(d)(1)(iv))[1]

CCR unit designed, constructed, operated, and maintained with vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection.

The adequacy of slope vegetation at the Ash Pond was evaluated by reviewing conditions observed in the field during AECOM's June 10, 2015 site visit and by reviewing design drawings and operational and maintenance procedures. At the time of the site visit, the exterior slopes were vegetated and the interior slopes were covered with vegetation or crushed stone, which is an alternate form of vegetation. The vegetation on the exterior and interior slopes is well-maintained. Regular maintenance manages the vegetation as described in this section.

Based on this evaluation, the Ash Pond meets the requirements in §257.73(d)(1)(iv).

3.5 Spillways (§257.73(d)(1)(v))

CCR unit designed, constructed, operated, and maintained with a single spillway or a combination of spillways configured as specified in [paragraph (A) and (B)]:

(A) All spillways must be either:
  (1) of non-erodible construction and designed to carry sustained flows; or
  (2) earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.
(B) The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:
  (1) Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or
  (2) 1000-year flood for a significant hazard potential CCR surface impoundment; or
  (3) 100-year flood for a low hazard potential CCR surface impoundment.

The spillway at the Ash Pond were evaluated using hydrologic and hydraulic analyses, conditions observed during AECOM's June 10, 2015 site visit, and historic design and construction information provided by IPRG. The Ash Pond has a high hazard

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[1] As modified by court order issued June 14, 2016, Utility Solid Waste Activities Group v. EPA, D.C. Cir. No. 15-1219 (order granting remand and vacatur of specific regulatory provisions).

potential; therefore, the Probable Maximum Flood (PMF) storm event is the design flood event for the Ash Pond, per §257.73(d)(1)(v)(B).

The spillway system for the Ash Pond includes a 36-inch diameter CMP or RCP drop inlet spillway, either of which is a non-erodible material designed to carry sustained flows. Interior pipes between the various sub-basins are not considered spillways, as they are used to manage flow within the Ash Pond and do not manage ultimate discharge leaving the Ash Pond. The capacity of the spillway was evaluated using hydrologic and hydraulic analyses. The analysis found that the spillway can adequately manage flow during peak discharge resulting from the PMF storm event without overtopping of the embankments, as discussed in more detail in **Section 5**.

Based on these evaluations, the Ash Pond meets the requirements in §257.73(d)(1)(v). A detailed presentation of the hydraulic and hydrologic analyses can be found in **Appendix C**.

3.6 Stability and Structural Integrity of Hydraulic Structures (§257.73(d)(1)(vi))

CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.

The structural stability and integrity of the Ash Pond hydraulic structures were evaluated using design drawings, operational and maintenance procedures, conditions observed in the field, inspection data, and structural analyses collected and performed by AECOM. There are two hydraulic structures that pass through the dike of the Ash Pond, the 36-inch primary spillway (either CMP or RCP) and a 6-inch HDPE sewer force main. No other hydraulic structures are known to pass through the dike of or underlie the base of the Edwards Ash Pond.

An evaluation of both the primary spillway and the sewer force main design drawings, operational and maintenance procedures, and conditions observed in the field did not identify any issues. Inspection of both the primary spillway and sewer force main was attempted on July 19, 2016, using closed-circuit television (CCTV) inspection equipment. The primary spillway could not be inspected due to high sustained flows in the pipe, which are critical to station operation and preclude camera inspection. Approximately 600 feet of the approximately 2,400-foot long sewer force main was inspected, but available access points on the sewer force main did not allow the CCTV rover to access the entirety of the pipe. The portion of the pipe that passes through the Ash Pond dike could not be inspected. The inspected portions of the sewer force main were free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris.

Because a thorough visual inspection of the sewer force main and the primary spillway pipes has not yet been completed, AECOM cannot currently conclude that the §257.73(d)(1)(vi) requirements have been met for the sewer force main and primary spillway at the Edwards Power Station. As a corrective measure, AECOM recommends that the sewer force main and the primary spillway pipes be inspected using CCTV equipment as soon as feasible and that this assessment be updated with documentation of the inspection at that time.

3.7 Downstream Slope Inundation/Stability (§257.73(d)(1)(vii))

CCR unit designed, constructed, operated, and maintained with, for CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.

The structural stability of the downstream slope of the Ash Pond was evaluated by comparing the location of the Ash Pond relative to adjacent water bodies. The FEMA Federal Insurance Rate Map (FIRM) map for the County of Peoria, Illinois shows the Ash Pond as being within the flood zone of the Illinois River. However, a United States Army Corps of Engineers (USACE) levee protects the Ash Pond from slope inundation. The USACE levee was constructed to an elevation of 462.0 feet, which is 3 feet higher than the flood pool of the Illinois River listed on the FIRM (El. 459 feet). Therefore, adjacent water bodies that can inundate the downstream slopes of the Ash Pond are not present.

Based on this assessment, the requirements in §257.73(d)(1)(vii) are not applicable to the Ash Pond, as inundation of the downstream slopes is not expected to occur.

4 Initial Safety Factor Assessment

40 CFR §257.73(e)(1)
The owner or operator must conduct initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified in (e)(1)(i) through (iv) of this section for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.

A geotechnical investigation program and stability analyses were performed by AECOM in 2015 to evaluate the design, performance, and condition of the earthen dikes of the Ash Pond. The exploration consisted of 14 auger borings, installation of 4 piezometers to monitor groundwater levels, 22 Cone Penetration Test (CPT) soundings with shear wave velocity measurements and pore pressure dissipation testing, and laboratory program including strength, consolidation, and index testing. Data collected from the 2015 AECOM investigation, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents were utilized to perform the safety factor assessment and geotechnical analyses.

In general, the subsurface conditions at the Ash Pond consist of a soft to very stiff compacted ash and clay dike, overlying stiff alluvial clay, overlying soft to medium stuff alluvial clay, which in turn overlies shale bedrock. The phreatic surface is typically located above the embankment/foundation interface beneath the crest of the dike, and at the embankment/foundation interface near the toe of the dike.

Ten (10) cross sections (A through J) were analyzed using GeoStudio SLOPE/W limit equilibrium slope stability analysis software to evaluate stability of the perimeter dike system and foundations. Slip surface search routines in SLOPE/W relied on circular slip surfaces using the entry and exit point-based method to define the initial critical slip surface. The slip surface was then optimized to find a critical, non-circular slip surface, and factors of safety were calculated using the Spencer method. This methodology was selected as it evaluates a wide range of slip surface geometries through the dike system and foundation, and the Spencer method satisfies both moment and force equilibrium. The cross section locations were based on the critical slope orientation, height, and subsurface conditions. The cross sections were evaluated for each of the loading conditions stipulated in §257.73(e)(1).

The results of the initial safety factor assessment are summarized in the following sub-sections. A detailed presentation of the analyses performed, including development of site stratigraphy, strength parameters, stability analysis methodology, and figures showing the location of cross-sections and investigation locations can be found in **Appendix B**.

4.1 Factor of Safety: Maximum Storage Pool Loading (§257.73(e)(1)(i))

The calculated static factor of safety under long-term, maximum storage pool loading condition must equal or exceed 1.50.

This calculation models the dike stability under static, long-term conditions, under the normal storage water level (El. 449.5 feet and 447.2 feet for the Process Water Pond and the Clarification Pond, respectively) within the impoundments, which corresponds to the normal water level in each sub-basin, based on the configuration of the outfall structures. Drained (effective stress) shear strength parameters were used for all materials, and phreatic conditions were estimated based on available piezometer and boring data. The calculated minimum factors of safety are identified in **Table 1.**

Table 1 – Summary of Factors of Safety – Maximum Storage Pool Loading Condition

Cross Section	Calculated Factor of Safety (§257.73(e)(1)(i) Minimum = 1.50)
A	2.02
B	1.59
C	1.83
D	1.79
E	1.54*
F	2.31
G	2.12
H	2.08
I	2.26
J	2.08

*Indicates critical cross section (i.e., lowest calculated factor of safety out of the 10 cross sections analyzed)

The calculated factors of safety exceed 1.50 for all cross sections analyzed, which meets the requirements in §257.73(e)(1)(i).

4.2 Factor of Safety: Maximum Surcharge Pool Loading (§257.73(e)(1)(ii))

The calculated static factor of safety under maximum surcharge pool loading condition must equal or exceed 1.40.

This calculation models the dike stability under short-term, surcharge pool conditions. The pool level for analysis was modeled at El. 457.8 feet in the Process Water Pond and El. 457.4 feet in the Clarification Pond, which is equal to the PMF flood pools in each sub-basin (See **Section 5.1**). Drained (effective stress) shear strength parameters were used for all materials, as the embankment is relatively wide, and the increase in pool level is not expected to result in the development of undrained conditions in the downstream slopes of the embankment, which is where the critical slip surface from the Maximum Surcharge Pool case is located. Pore pressures in the embankment were assumed to be similar to the Maximum Surcharge Pool loading condition; however, the pool level in the Ash Pond was increased to model additional loading from the surcharge pool. The calculated factors of safety are identified in **Table 2**.

Table 2 – Summary of Factors of Safety – Maximum Surcharge Pool Loading Condition

Cross Section	Calculated Factor of Safety (§257.73(e)(1)(ii) Minimum = 1.40)
A	2.02
B	1.59
C	1.82
D	1.79
E	1.54*
F	2.31
G	2.12
H	2.08
I	2.26
J	2.00

*Indicates critical cross section (i.e., lowest calculated factor of safety out of the 10 cross sections analyzed)

The calculated factors of safety exceed 1.40 for all cross sections analyzed, which meets the requirements in §257.73(e)(1)(ii).

4.3 Factor of Safety: Seismic (§257.73(e)(1)(iii))

The calculated seismic factor of safety must equal or exceed 1.00.

This calculation models the dike stability under short-term, seismic loading conditions during the design 2,500-year return period seismic event. Seismic loading is modeled as a horizontal force acting outward on the dike and foundation. This analysis is intended to model conditions during earthquake shaking. Therefore, peak undrained (total stress) shear strength parameters were used for all embankment and foundation materials. The pool elevation and phreatic conditions were assumed to be the same as the Maximum Storage Pool case (**Section 4.1**), and correspond to normal operating conditions at the Ash Pond. The calculated factors of safety are identified in **Table 3**.

Table 3 – Summary of Factor of Safety – Seismic Loading Condition

Cross Section	Calculated Factor of Safety (§257.73(e)(1)(iii) Minimum = 1.00)
A	1.37
B	1.28
C	1.09
D	1.18
E	1.11
F	1.08*
G	1.13
H	1.08*
I	1.30
J	2.08

*Indicates critical cross section (i.e., lowest calculated factor of safety out of the 10 cross sections analyzed)

The calculated factors of safety exceed 1.00 for all cross sections analyzed, which meets the requirements in §257.73(e)(1)(iii).

4.4 Factor of Safety: Soils Susceptible to Liquefaction (§257.73(e)(1)(iv))

For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

The 2015 AECOM field investigation did not identify any soil layers susceptible to liquefaction within either the embankments or the foundations at the Ash Pond. Therefore, the §257.73(e)(1)(iv) requirements are not applicable to the Ash Pond at the Edwards Power Station, and a liquefaction factor of safety analysis was not performed.

5 Initial Inflow Design Flood Control System Plan

40 CFR §257.82

(a) The owner or operator of an existing … CCR surface impoundment … must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.

> *(1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.*
>
> *(2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.*
>
> *(3) The inflow design flood is:*
>
> > *(i) For a high hazard potential CCR surface impoundment, …, the probable maximum flood;*
> >
> > *(ii) For a significant hazard potential CCR surface impoundment, …, the 1,000-year flood;*
> >
> > *(iii) For a low hazard potential CCR surface impoundment, …, the 100-year flood; or*
> >
> > *(iv) For an incised CCR surface impoundment, the 25-year flood.*

(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.

Analyses completed for the initial inflow design flood control system plan of the Ash Pond are described in the following subsections. Data and analysis results in the following subsection are based on spillway design information shown on design drawings, construction information, topographic surveys, information about operational and maintenance procedures provided by IPRG and field measurements collected by AECOM. The analysis approach and results of the hydrologic and hydraulic analyses are presented in the following subsections. A detailed presentation of the analyses performed can be found in **Appendix C**.

The Ash Pond has a high hazard potential; therefore, the inflow design flood (IDF) is the PMF.

5.1 Initial Inflow Design Flood Control Systems (§257.82(a))

An initial inflow design flood control system plan, supported by a hydraulic and hydrologic analysis, was developed for the Ash Pond by evaluating the effects of a 24-hour duration design storm for the PMF using a hydraulic HydroCAD (Version 10) computer model and a starting water surface elevation of 449.5 feet in the Process Water Pond and 447.2 feet in the Clarification Pond, based on the configuration of the outfall structures for each sub-basin as reported in the 2011 Kleinfelder site assessment report. The computer model evaluated the Ash Pond's ability to collect and control the PMF under existing operational and maintenance procedures. Rainfall data for the PMF, which corresponds to the Probable Maximum Precipitation (PMP) rainfall event, was obtained from the National Weather Service Hydrometeorological Report No. 51 (HMR 51) for the 10-square mile all-season Probable Maximum Precipitation. The HMR 51 24-hour PMP rainfall depth is 32.8 inches.

The HydroCAD model results for the Ash Pond indicate that the CCR unit has sufficient storage capacity and spillway structures to adequately manage (1) flow into the CCR unit during and following the peak discharge of the PMF and (2) flow from the CCR unit to collect and control the peak discharge resulting from the PMF. The peak water surface elevation is 457.8 feet in the Process Water Pond and 457.4 feet in the Clarification Pond during the PMF, and the minimum crest elevation of the Ash Pond dike is 458.8 feet in the Process Water Pond and 459.6 feet in the Fly Ash Pond and Clarification Pond. Therefore, overtopping is not expected.

Based on this evaluation, the Ash Pond meets the requirements in §257.82(a), and the hydrologic and hydraulic analysis is presented in **Appendix C**.

5.2 Discharge from the CCR Unit (§257.82(b))

40 CFR §257.82(b) provides that the discharge from the CCR unit must be handled in accordance with the surface water requirements under 40 CFR §257.3-3, which states the following:

> *(a) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.*
>
> *(b) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.*
>
> *(c) A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.*
>
> *(d) Definitions of the terms Discharge of dredged material, Point source, Pollutant, Waters of the United States, and Wetlands can be found in the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., and implementing regulations, specifically 33 CFR part 323 (42 FR 37122, July 19, 1977).*

The handling of discharge was evaluated by reviewing design drawings, operational and maintenance procedures, conditions observed in the field by AECOM, and the inflow design flood control system plan developed per §257.82(a).

Based on this evaluation, outflow from the Ash Pond is ultimately routed through a NPDES-permitted discharge into the Illinois River. Hydraulic and hydrologic analyses performed as part of the initial inflow design flood control system plan found that the Ash Pond adequately manages outflow during the PMF, as overtopping of the Ash Pond embankments is not expected.

Therefore, discharge of pollutants in violation of the NPDES permit is not expected as all discharge is routed and controlled through the existing spillway system and NPDES-permitted outfall during both normal and IDF conditions. Based on this evaluation, the Ash Pond meets the requirements in §257.82(b).

6 Conclusions

The Ash Pond at the Edwards Power Station was evaluated relative to the USEPA CCR Rule requirements for initial structural stability assessments (§257.73(d)), initial safety factor assessments (§257.73(e)), and initial inflow design flood control system plan (§257.82). Based on the evaluations presented herein, the referenced requirements are satisfied for safety factor assessments and hydrologic and hydraulic analyses. The requirements for structural stability (§257.73(d)) are also satisfied, except for §257.73(d)(1)(vi).

At this time, the structural integrity of the hydraulic structures passing through the dike of the Ash Pond (§257.73(d)(1)(vi)) cannot be certified because the sewer force main and the primary spillway pipes have not been fully visually inspected using CCTV equipment. In accordance with §257.73(d)(2), AECOM recommends performing a CCTV inspection of the sewer force main and the primary spillway pipes as soon as feasible and updating this assessment once the inspection has been performed.

7 References

AECOM (2016). *Hydrologic and Hydraulic Summary Report, Edwards Power Station, Ash Pond.* Bartonville, Illinois.

AECOM (2016). *Geotechnical Report, Edwards Power Station, Ash Pond.* Bartonville, Illinois.

Federal Emergency Management Agency (FEMA). (1983). *Flood Hazard Boundary Map, Peoria County, Illinois, Unincorporated Area, Panel 175 of 200*. Community-Panel Number 170533 0175 B.

Illinois Geospatial Data Clearing House (2015). *LiDAR Data for Peoria County, Illinois*. Accessed December, 2015.

Kleinfelder (2011). *Coal Ash Impoundment Site Assessment Final Report.* E.D. Edwards Power Generating Station, Ameren Energy Generating Company, Bartonville, Illinois. May 10, 2011.

Maurer-Stutz (2015). *Topographical and Bathymetric Survey, Edwards Ash Pon*d. Performed in June and July 2015.

National Weather Service. *Hydrometeorological Report No. 51.*

U.S. Environmental Protection Agency [USEPA]. (2015). *Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments.* 40 CFR Part 257, Subpart D. 80 Fed. Reg. 21468 April 17, 2015.

8 Appendices

A. Pipe Inspection Report

B. Geotechnical Report

C. Hydrologic and Hydraulic Report

Appendix A. Pipe Inspection Report

Tel:
Fax:
E-mail:

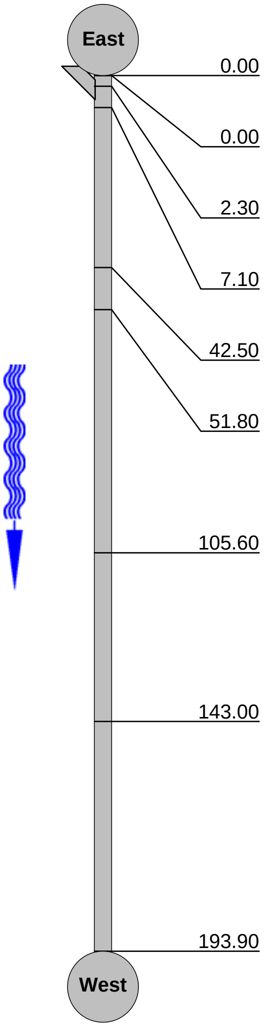
Inspection Report

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
9/22/2016			**Mike Bennett**		**1**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-313-17480				**No Pre-Cleaning**	

Street123	**7800 S. Cilco Ln**	Use of Sewer		Upstream MH	**East**
City	**Bartonville, IL**	Drainage Area		Dowstream MH	**West**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**193.90 ft**	Section Length	**193.90 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.		Lining Method	

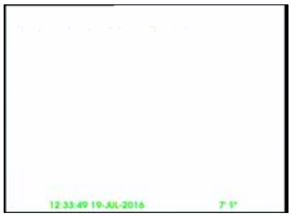
Add. Information :



1:480	Position	Observation
	0.00	Cleanout Mainline
	0.00	Water Level, 5 %of cross sectional area
	2.30	Tap Factory Made, at 03 o'clock, -, within 8 inches of joint: YES, 4"
	7.10	Water Level, 40 %of cross sectional area
	42.50	Water Level, 5 %of cross sectional area
	51.80	Water Level, 40 %of cross sectional area
	105.60	Water Level, 5 %of cross sectional area
	143.00	Water Level, 40 %of cross sectional area
	193.90	General Observation

0 FT

2.3 FT



7.1 FT

42.5 FT

51.8 FT

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Tel:
Fax:
E-mail:

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln**			**1**

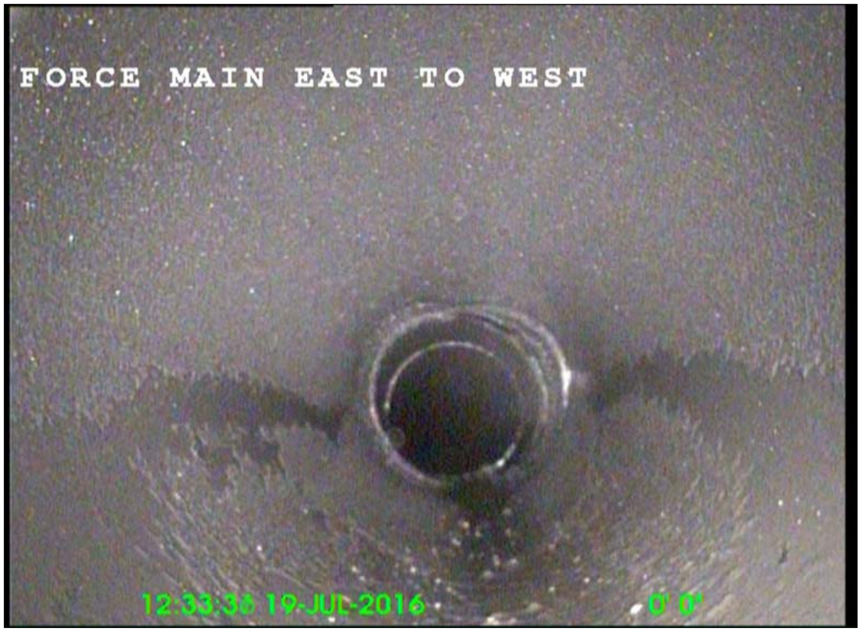


Photo: 1_1_1_A.jpg
0FT, Cleanout Mainline

Photo: 1_1_4_A.jpg
2.3FT, Tap Factory Made, at 03 o'clock, -, within 8 inches of joint: YES, 4"

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln**			**1**

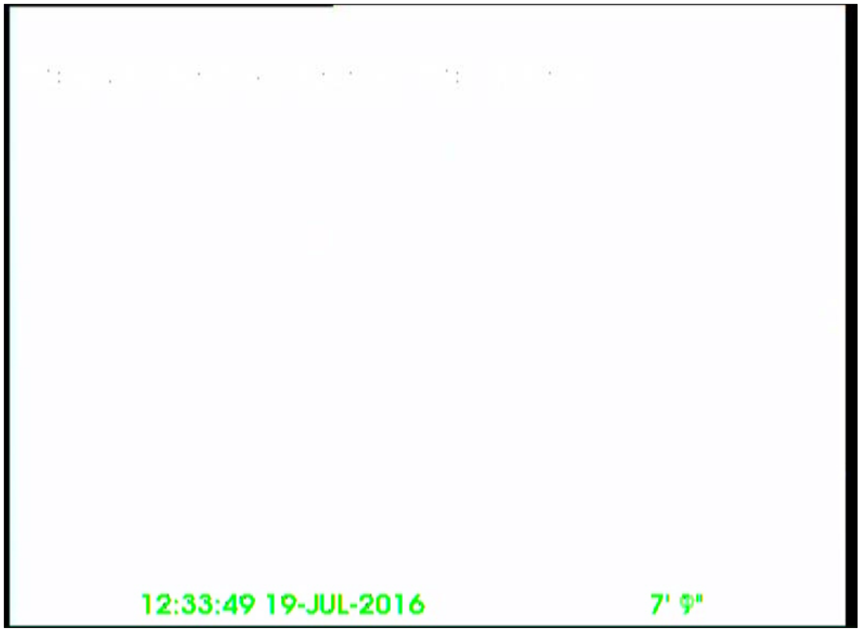


Photo: 1_1_5_A.jpg
7.1FT, Water Level, 40 %of cross sectional area

Photo: 1_1_6_A.jpg
42.5FT, Water Level, 5 %of cross sectional area

Tel:
Fax:
E-mail:

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln**			**1**

Photo: 1_1_7_A.jpg
51.8FT, Water Level, 40 %of cross sectional area

Photo: 1_1_8_A.jpg
105.6FT, Water Level, 5 %of cross sectional area

Tel:
Fax:
E-mail:

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln**			**1**

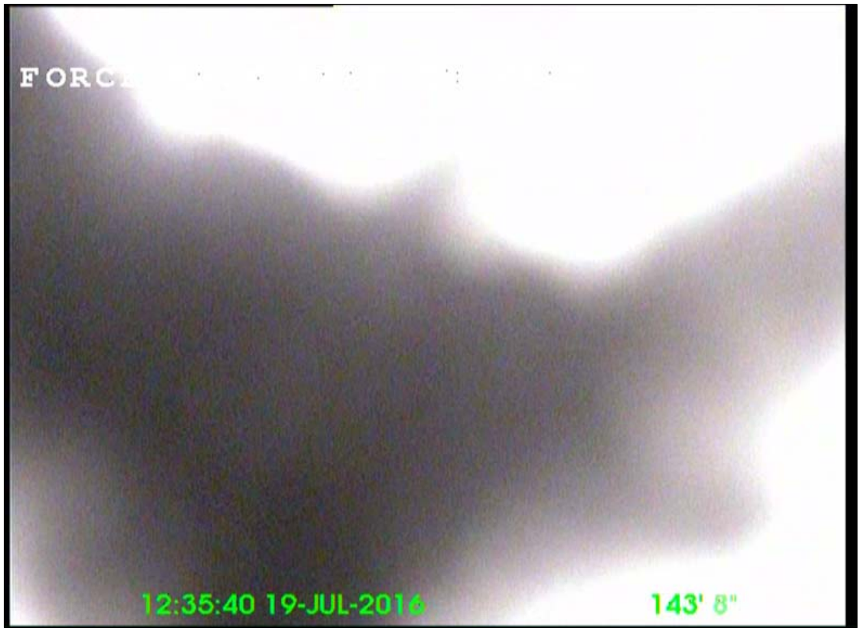


Photo: 1_1_9_A.jpg
143FT, Water Level, 40 %of cross sectional area

Photo: 1_1_10_A.jpg
193.9FT, General Observation

Tel:
Fax:
E-mail:

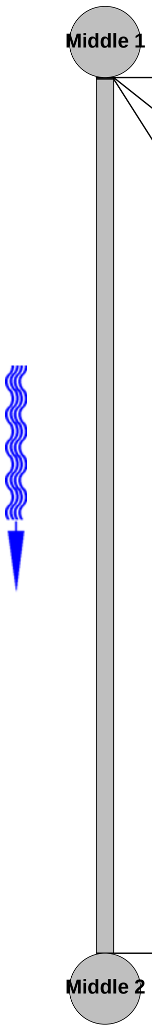
Inspection Report

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
9/22/2016			**Mike Bennett**		**2**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-313-17480				**No Pre-Cleaning**	

Street123	**7800 S. Cilco Ln.**	Use of Sewer		Upstream MH	**Middle 1**
City	**Bartonville, IL**	Drainage Area		Dowstream MH	**Middle 2**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**193.80 ft**	Section Length	**193.80 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.		Lining Method	

Add. Information :



1:480	Position	Observation
	0.00	Cleanout Mainline
	0.00	Water Level, 5 %of cross sectional area
	0.30	Water Level, 40 %of cross sectional area
	193.80	General Observation

0 FT

0.3 FT

193.8 FT

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln.**			**2**

Photo: 3_3_11_A.jpg
0FT, Cleanout Mainline

Photo: 3_3_13_A.jpg
0.3FT, Water Level, 40 %of cross sectional area

Tel:
Fax:
E-mail:

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln.**			**2**

Photo: 3_3_14_A.jpg
193.8FT, General Observation

Tel:
Fax:
E-mail:

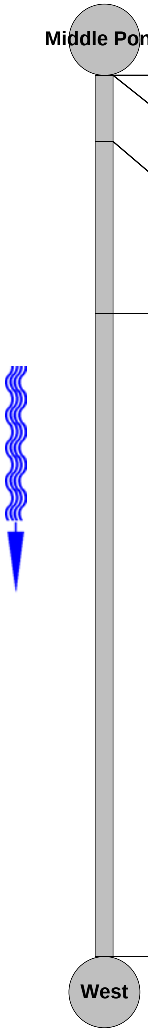
Inspection Report

Date	P/O. No.	Weather	Surveyor's Name	Pipe Segment Reference	Section No.
9/22/2016			**Mike Bennett**		**3**
Certificate No.	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning	Sewer Category
U-313-17480				**No Pre-Cleaning**	

Street123	**7800 S. Cilco Ln.**	Use of Sewer		Upstream MH	**Middle Pond**
City	**Bartonville, IL**	Drainage Area		Dowstream MH	**West**
Loc. details		Flow Control		Dir. of Survey	**Downstream**
Location Code		Length surveyed	**195.10 ft**	Section Length	**195.10 ft**

Purpose of Survey		Joint Length	
Year Laid		Dia./Height	**6 inch**
Year Rehabilitated		Material	**Polyethylene**
Tape / Media No.		Lining Method	

Add. Information :



1:480 Position	Observation
0.00	Cleanout Mainline
0.00	Water Level, 40 %of cross sectional area
14.60	Water Level, 10 %of cross sectional area
52.70	Water Level, 40 %of cross sectional area
195.10	General Observation

0 FT

14.6 FT

52.7 FT

195.1 FT

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	**0000**	**0**	**0**	**0**	**0**	**0**	**0**

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln.**			**3**

Photo: 4_4_15_A.jpg
0FT, Cleanout Mainline

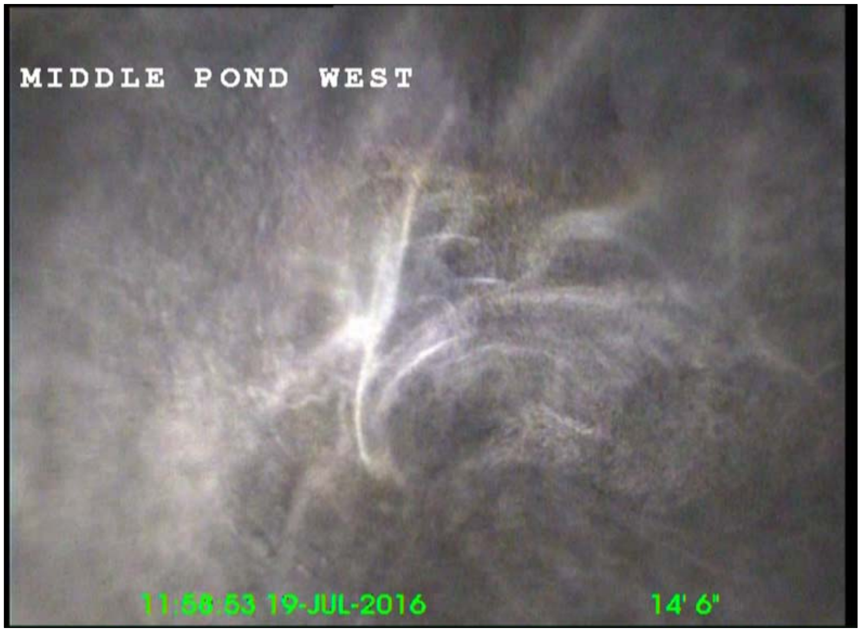


Photo: 4_4_17_A.jpg
14.6FT, Water Level, 10 %of cross sectional area

Tel:
Fax:
E-mail:

Inspection photos

City :	Street :	Date :	Pipe Segment Reference :	Section No :
Bartonville, IL	**7800 S. Cilco Ln.**			**3**

Photo: 4_4_18_A.jpg
52.7FT, Water Level, 40 %of cross sectional area

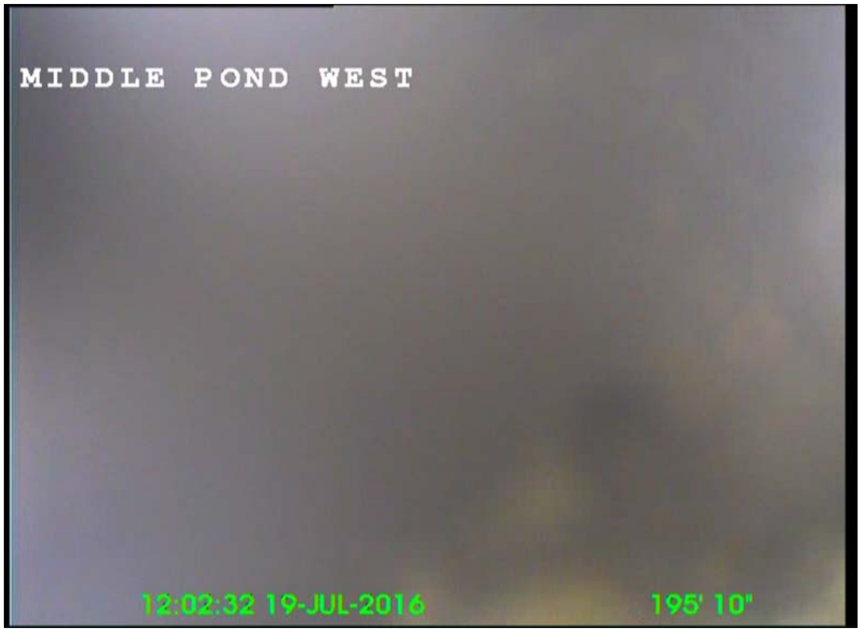


Photo: 4_4_19_A.jpg
195.1FT, General Observation

Appendix B. Geotechnical Report

AECOM

AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110-1337
www.aecom.com

314.429.0100 tel
314.429.0462 fax

October 7, 2016

Mr. Matt Ballance, PE
Senior Project Engineer
Dynegy Inc.
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

RE: Geotechnical Report
Edwards Power Station
Ash Pond

Dear Mr. Ballance:

AECOM is pleased to provide this Geotechnical Report for the Illinois Power Resource Generating, LLC (IPRG) Ash Pond Coal Combustion Residuals (CCR) unit at the Edwards Power Station located in Bartonville, Illinois. This Geotechnical Report has been prepared to document the analysis performed to check that the facility meets the geotechnical slope stability requirements including Factors of Safety required by 40 CFR § 257.73.

AECOM looks forward to providing continued support to Illinois Power Resource Generating, LLC and working together on this important program. Please do not hesitate to call Ron Hager at 314-429-0100 (office) / 440-591-7868 (mobile), if you have any questions or comments on this Geotechnical Report.

Sincerely,

AECOM

Ronald H. Hager

Jeremy Thomas, PE
Site Manager
jeremy.thomas@aecom.com

Ronald Hager
Program Manager
ronald.hager@aecom.com

cc: Mark Rokoff, PE – AECOM

Attachments:

A. Figures
B. Boring Logs
C. Piezometer Logs
D. CPT Data Report
E. Laboratory Test Data
F. Material Characterization Calculations
G. Slope Stability Analysis
H. Liquefaction Analysis

1. INTRODUCTION

1.1. *Purpose of This Report*

This report presents the results of the geotechnical analyses prepared by AECOM for the Illinois Power Resources Generating, LLC (IPRG[1]) Coal Combustion Residuals (CCR) Ash Pond at the Edwards Power Station, located in Bartonville, Illinois (see **Figure 1, Attachment A** for Location Map). The purpose of the geotechnical investigation and analyses performed is to evaluate the design, performance, and condition of the impoundment and associated structures using the data collected from surface and subsurface investigations, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents provided to AECOM by IPRG. This information was then used to evaluate the design and operation of the surface impoundment against the regulatory standards set in 40 CFR § 257.73.

The geotechnical field exploration was conducted between August 19 and November 5, 2015. The field program consisted of conventional mud rotary borings, Standard Penetration Testing (SPT), Cone Penetration testing (CPT), and piezometer installation. Laboratory testing was conducted on the materials obtained through various sampling techniques to assist in characterization of the subsurface conditions, especially with respect to defining material parameters in stability analyses. Stability analyses were performed by AECOM to evaluate the potential for slope instabilities, in accordance with the Environmental Protection Agency (EPA) regulation 40 CFR § 257.73(d) and (e).

A summary of the geotechnical field program, laboratory testing program, and stability evaluations are presented herein. Detailed interpretations, calculations, and presentation of analysis results are provided in the Attachments to this report.

1.2. *Description of Impoundment*

There is one CCR unit at the Edwards Power Station: the Ash Pond. The Ash Pond is approximately 95 acres in size and is contained by a perimeter embankment that forms the exterior of the impoundment on all but the northeast side of the Ash Pond. The northeast side is bordered by the Edwards Station building grounds and switch yard which are at approximately the same elevation as the top of the pond embankment.

The original Ash Pond embankment is composed primarily of low plasticity compacted clays. An engineered raise of the embankment, constructed of ash placed on the crest and outboard side of the existing embankment, was completed in 2004 to facilitate the addition of a rail loop at the crest of the embankment. Additionally, this raise project also included constructing a new crushed stone embankment through and within the southern end of the Ash Pond, isolating a portion of the Ash Pond that was filled with ash and is vegetated. The original embankment still forms the perimeter of the Ash Pond at the southern end of this filled and vegetated area.

---

[1] Although the Ash Pond is owned by IPRG, Dynegy Administrative Services Company (Dynegy) contracted AECOM to develop this geotechnical report on behalf of IPRG. Therefore, “Dynegy” is referenced in materials attached to this geotechnical report.

Embankment heights range from approximately 0 feet (east and northeastern side of the embankment) to 29 feet (south and western side of the embankment), relative to the outboard toe. The typical crest elevation is approximately elevation 460 to 461 feet (all elevations in this report are listed in the NAVD88 datum, unless otherwise stated), based on the 2015 Maurer-Stutz survey for the site. Based on 2015 Illinois state LiDAR data, embankment outboard slopes range from approximately 2.5H:1V (horizontal to vertical) at the southern end of Ash Pond to 3.4H:1V at the western side of Ash Pond. Embankment crest widths range from approximately 15 feet to 42 feet, with narrower crest widths along the northern portion of the embankment and wider crest widths along the south, east, and west sides of the CCR unit.

Site location and site vicinity maps are included **Attachment A**, **Figure 1**.

2. SUMMARY OF FIELD INVESTIGATIONS

A subsurface exploration program was undertaken at the Ash Pond, including 14 soil borings, installation of 4 standpipe piezometers, and 22 cone penetration test (CPT) soundings with shear wave velocity (Vs) measurements and pore pressure dissipation (PPD) testing. The borings were drilled by AECOM's subcontractor Strata Earth Services, LLC of Palatine, IL, under the full-time supervision of AECOM geotechnical personnel. Strata Earth Services used both an All-Terrain Vehicle-mounted Diedrich D-120 drill rig and a truck-mounted Mobile B-57 drill rig, in conjunction with 3¼-inch inner diameter hollow stem augers and mud rotary methods to drill the borings. CPT soundings were performed by AECOM's subcontractor ConeTec, Inc., again with full-time oversight by AECOM personnel.

Boring depths varied from 37 to 66.5 feet below ground surface (bgs) and CPT depths varied from approximately 15 to 56 feet bgs. Boring and CPT sounding locations are depicted in **Figure 2** and piezometer locations are depicted in **Figure 3**. Logs of the borings are presented in **Attachment B**. Logs of the CPT soundings are presented in **Attachment D**, and piezometer logs are presented in **Attachment C**. Approximate locations of borings and CPTs are listed in **Table 1**.

Representative soil samples were collected from each of the borings for classification and/or testing. The SPT soil samples were obtained with a split-spoon sampler, in accordance with ASTM D 1586. Undisturbed samples of fly ash and fine-grained soils were obtained using 3-inch outside diameter steel (Shelby) tubes, either conventionally pushed in accordance with ASTM D 1587 or by utilizing a piston sampler in accordance with ASTM D 6519 (in ash and very soft soils). Results of the laboratory testing are presented in **Attachment E**.

Table 1
Boring and CPT Exploration Location[1] Data

Exploration ID	Easting (ft NAD83)	Northing (ft NAD83)	Elevation (ft NAVD88)
Auger Borings			
EDW-B001	2435307.9	1431922.3	461.0
EDW-B002	2435311.8	1431230.1	454.9
EDW-B003	2435399.3	1430502.0	460.0
EDW-B003A	2435404.3	1430502.0	460.0
EDW-B004	2435844.2	1430395.2	460.5
EDW-B005	2436105.4	1428429.4	459.0
EDW-B006	2436239.1	1429340.9	436.0
EDW-B008	2435578.9	1428207.8	438.8
EDW-B009	2435438.4	1428498.4	460.1
EDW-B010	2434755.0	1431482.0	459.0
EDW-B011	2435211.9	1429262.2	456.4
EDW-B012	2434793.9	1429514.9	459.0
EDW-B013	2436189.5	1428284.1	457.0
EDW-B014	2434647.2	1430898.4	457.7
EDW-B015	2436104.4	1428611.5	460.0
EDW-B015A	2436099.4	1428606.5	460.0
CPT Soundings			
EDW-C001	2435307.9	1431922.3	461.0
EDW-C003	2435533.2	1431377.1	461.9
EDW-C005	2435844.2	1430395.2	460.5
EDW-C006	2435902.5	1429921.9	462.0
EDW-C007	2436127.3	1429449.6	458.1
EDW-C008	2436239.1	1429340.9	436.0
EDW-C009	2436104.4	1428611.5	460.0
EDW-C010	2436245.5	1428211.6	437.8
EDW-C011	2436189.5	1428284.1	457.0
EDW-C012	2436105.4	1428429.4	459.0
EDW-C013	2435634.1	1428281.0	457.9
EDW-C014	2435578.9	1428207.8	438.8
EDW-C015	2435438.4	1428498.4	460.1
EDW-C015A	2435501.3	1428444.5	460.1
EDW-C016	2435383.1	1428461.7	436.9
EDW-C017	2434793.9	1429514.9	459.0
EDW-C019	2434931.7	1429697.8	457.0
EDW-C021	2434538.8	1430424.2	460.0
EDW-C022	2434647.2	1430898.4	457.7
EDW-C023	2434755.0	1431482.0	459.0
EDW-C025	2435311.8	1431230.1	454.9
EDW-C026	2435399.3	1430502.0	460.0
EDW-C026B	2435404.2	1430505.4	460.0
EDW-C027	2435211.9	1429262.2	456.4

---

[1] Locations above were not surveyed. Locations were approximated based on handheld GPS measurements taken during the investigation. Elevations are based on site topographic LiDAR survey from Illinois Geospatial Data Clearinghouse for Peoria County downloaded in December of 2015. The expected accuracy of these measurements is expected to be approximately ±5 feet horizontal and ±1 foot vertical.

3. SUMMARY OF SITE-SPECIFIC SUBSURFACE CONDITIONS

3.1. Site Stratigraphy

New Embankment Fill Materials: The perimeter embankment dike of the Ash Pond was constructed in two stages, with an original embankment, and a later raise constructed on top of and on the outboard slope of the existing embankment. This raise brought the embankment crest from an original elevation around 455 feet to the current elevation around 460 to 461 feet. This newer embankment fill material is comprised of fly ash from the plant (as beneficial use material), classified as lean silt (United Soil Classification of ML) to poorly graded silty sand with gravel (SP). The consistency of the new embankment fill, as measured by uncorrected SPT N-values, ranged from soft to very stiff, but generally had a stiff to very stiff consistency and appeared to be well-compacted.

Old Embankment Fill Materials: The original perimeter embankment of the Ash Pond is largely comprised of clay fill with trace sand and shell fragments, classified as lean clay (CL). The consistency of the old embankment fill, as measured by uncorrected SPT N-values, ranged from soft to stiff, but generally had a stiff consistency and appeared to be well-compacted. It was noted that the old embankment fill generally had a higher measured shear strength above approximately elevation 450 ft, so this material was split into two materials within the slope stability analytical models.

Impounded Ash Materials: Ash materials were encountered in the borings drilled within the Ash Pond. The material was classified as a silt (ML - fly ash) with some sand and clay and trace gravel. The measured consistency of the ash ranged from very loose to very dense, though generally, the consistency of ash was loose to very loose and was saturated below the pool level in the Ash Pond.

Native Alluvial Clay Crust: The Ash Pond is underlain by native clay of alluvial origin. This material was typically classified as lean clay (CL), with occasional zones of interbedded fat clay (CH). Much of the clay has a liquid limit near 50, denoting borderline fat/lean clay. The uppermost approximate 5 feet of this native alluvial clay measured significantly higher in strength, signifying a desiccated crust layer near the original ground surface. The consistency of this clay was generally stiff.

Native Alluvial Clay: As noted above, the Ash Pond is underlain by native clay of alluvial origin, typically classified as lean clay (CL) with occasional zones of interbedded fat clay (CH). Much of the clay has a liquid limit near 50 moderate to high plasticity. Beneath the upper crust material, the clay exhibited significantly less shear strength, and was normally consolidated to slightly overconsolidated, with shear strengths increasing with depth. The clay consistency varied from soft to medium stiff near the top of the stratum, generally increasing with depth to a consistency of medium stiff to stiff near the level of the bedrock. To capture this strength increase within the stability models, this material was divided into three layers.

Shale Bedrock: Shale bedrock was encountered below the native alluvial soils in the deeper borings. The shale was found to be slightly weathered to weathered near the upper contact, and became hard with depth. The shale was cored in two locations to verify classification, but no further testing was completed on this material.

Other Materials: Other materials were encountered in relatively small quantities at the site, appearing at only one or two exploration locations, and were not considered part of the site-wide stratigraphy. These materials include old and recent fill (similar in properties to the old and new embankment fill materials), historic ash material (similar in properties to the more recent ash fill), and crushed stone embankment fill in the rail loop embankment that constructed the isolated filled and vegetated area in the southern end of the Ash Pond. The crushed stone embankment fill was observed to be medium dense, fine to coarse, crushed stone gravel with sand, classified as poorly graded gravel (GP). A clean crushed stone toe drain material was also noted on available historical design drawings, but was not encountered in the borings performed for this investigation.

Specific information used to assess and develop the design site stratigraphy can be found in **Attachment B** – Boring Logs, **Attachment D** – CPT Data Report, and **Attachment E** – Lab Test Data.

3.2. Phreatic Conditions

AECOM evaluated piezometer data from five measurement events (10/28/15, 11/24/15, 12/17/15, 1/14/16, and 2/11/16), interpreted pore pressure data from CPT soundings, and measured phreatic water in boreholes immediately after drilling. Piezometer data were judged to be the most representative of in-situ, steady state conditions. Data from CPT PPD tests in ash were judged to be representative of steady state phreatic conditions, but PPD tests within and outboard of the embankment were not consistently representative. Water was encountered in 6 of the 14 borings during drilling, observations which were unlikely to be representative of steady state conditions due to the time required for water levels to equilibrate in the relatively low-permeability embankment and foundation soils.

A total of four open standpipe piezometers were installed at the Ash Pond. All of the piezometers were installed through the perimeter embankment. Two of the piezometers (EDW-P002 and EDW-P004) were installed with the screened elevation within sluiced as in the Ash Pond. The remaining two piezometers (EDW-P001 and EDW-P003) were installed with the screen elevations located within the foundation soils. Piezometer locations and measurements are summarized in **Table 2**.

Table 2
Piezometer Location and Phreatic Level Data

Piezometer No.	**Impoundment Embankment**	**Northing (ft NAD83)[1]**	**Easting (ft NAD83)**	**Ground Surface Elevation (ft NAVD88)**	**Location**	**Piezometer Type[2]**	**Total Depth[3] (feet)**	**Phreatic Elevation (ft NAVD88)**				
								10/28/2015[4]	**11/24/2015**	**12/17/2015**	**1/14/2016**	**2/11/2016**
EDW-P001	North	2440516.6	1426796.5	461	Crest	OSP	36.5	-	436.7	438.9	441.8	438.3
EDW-P002	Northwest	2440043.6	1427380.9	459	Crest	OSP	29.0	449.7	449.8	450.2	451.0	450.4
EDW-P003	West	2438062.1	1427345.5	459.6	Crest	OSP	49.6	437.3	438.7	439.1	439.6	439.8
EDW-P004	Southeast	2437206.1	1426013.0	455.6	Crest	OSP	30.2	-	442.8	442.9	445.2	442.8

Notes:

1. Locations above were not surveyed. Locations are approximated based on handheld GPS measurements taken during investigation. Elevations are based on site topographic LiDAR survey from Illinois Geospatial Data Clearinghouse for Peoria County downloaded in December of 2015. The expected accuracy of these measurements is expected to be approximately ±5 feet horizontal and ±1 foot vertical.

2.OSP = open standpipe piezometer.

3. Total Depth = Approx. bottom of screen for standpipe piezometers.

4. Readings on 10/28/2015 at EDW-P001 and EDW-P004 were before piezometers were developed, and are not presented.

4. SUMMARY OF LABORATORY TESTING

4.1. Summary of Laboratory Testing Scope

Soil samples collected from the subsurface exploration were sealed at the site and were then transported to the lab of AECOM's laboratory testing subcontractors; Terracon of Vernon Hills, Illinois, where an AECOM geotechnical engineer reviewed the samples and selected samples for laboratory testing. The laboratory testing program performed for the Ash Pond was intended to obtain information on index and shear strength properties of the subsurface material at the site. The laboratory testing program for characterization of the materials at the Ash Pond is summarized in **Table 3**.

Table 3
Summary of Laboratory Testing Program for the Ash Pond

ASTM Designation	Test Type	Number of Tests							
		Total	Ash	New Embankment Fill	Old Embankment Fill	Other Fill Materials	Native Clay Crust	Native Clay	Bedrock
D2216	Moisture Content	181	47	15	21	19	5	56	18
D4318	Atterberg Limits	26	4	1	5	1	1	14	-
T311[1], D1140, D422	Gradation / Hydrometer	10	7	3	-	-	-	-	-
D854	Specific Gravity	9	5	-	-	-	4	-	-
D5084	Hydraulic Conductivity	3	2	-	-	-	-	1	-
D2435	Consolidation	2	-	-	-	-	-	2	-
D 2166	Unconfined Compression	5	-	-	-	-	-	5	-
D4767	Consolidated Undrained Triaxial (CIU)	5	-	-	3	-	-	2	-
D6528	Direct Shear (DS)	8	2	-	-	-	1	5	-
G57, G51	Corrosion Suite	5	4	-	-	-	-	1	-

[1] American Association of State Highway and Transportation Officials (AASHTO) test designation

4.2. Summary of Laboratory Testing Results

A summary of laboratory test results for the impounded ash, new embankment fill, old embankment fill, native clay crust, and native clay at the Ash Pond are presented in **Tables 4, 5, 6, 7** and **8**, respectively. A summary of laboratory tests results for other fill materials and shale bedrock are presented in **Tables 9** and **10**. Laboratory test data is included in **Attachment E**. Graphical displays of the shear strength characterization for the stratigraphic materials are included in the Material Characterization Calculation Package in **Attachment F**.

Table 4

Summary of Laboratory Test Results – Impounded Ash

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	Direct Shear		Hydraulic Conductivity (cm/sec)	Corrosion Suite (ANS Point Rating)
														c' (psf)	phi' (deg)		
EDW-B002	S-1	0.0'-1.5'	SM	38.4	4.50+												
EDW-B002	S-2	2.5'-4.0'	ML	62.4	3.50												
EDW-B002	S-3	5.0'-7.0'	MH	66.6						65	36	29					
EDW-B002	S-4	7.5'-10.0'		79.0		0.0	7.4	73.1	19.5								
EDW-B002	S-5	10.0'-12.0'		76.9						17	27	NP		112	29.8	9.19E-05	
EDW-B002	S-6	15.0'-16.5'		52.5													14.5
EDW-B002	S-7	20.0'-21.5'		67.8													
EDW-B002	S-8	25.0'-27.0'		63.9									2.471				
EDW-B003	S-1	0.0'-1.5'		44.4									2.469				
EDW-B003	S-10	35.0'-36.5'		51.9													
EDW-B003	S-2	2.5'-4.0'		27.3	2.00												
EDW-B003	S-3	5.0'-6.5'	OL	37.2	1.00												
EDW-B003	S-4	7.5'-9.5'		55.5													
EDW-B003	S-5	10.0'-11.5'		50.6		2.3	19.8	56.3	21.6								
EDW-B003	S-6	15.0'-16.5'		29.7									2.772				
EDW-B003	S-7	20.0'-21.5'		42.1													
EDW-B003	S-8	25.0'-27.0'		54.9													
EDW-B003	S-9	30.0'-32.0'		71.7		0.0	20.6	66.4	13.0					82.8	26.9	6.79E-05	
EDW-B004	S-1	0.0'-1.5'		18.9	4.50+												
EDW-B004	S-2	2.5'-3.5'		28.5	4.00												
EDW-B004	S-2A	3.5'-4.0'	CL	20.1	3.25												
EDW-B004	S-3	5.0'-6.5'	CL	21.6	1.75												3.0
EDW-B004	S-4	7.5'-9.0'	CL	23.4	4.00	0.0	9.3	43.3	47.4	37	16	21					
EDW-B004	S-5	10.0'-11.5'	CL	21.5	2.25												
EDW-B005	S-1	0.0'-1.5'	SC	45.8	4.50												
EDW-B005	S-2	2.5'-4.0'	ML	26.0													
EDW-B005	S-3	5.0'-6.5'	MH	50.9	3.25					61	54	7					
EDW-B005	S-4	8.5'-10.0'	ML	37.4	4.50+												
EDW-B005	S-5	10.0'-11.5'	SC	44.3													
EDW-B011	S-1	0.0'-1.5'		27.7	4.50+												
EDW-B011	S-10	35.0'-37.0'		93.9													
EDW-B011	S-2	2.5'-4.0'		16.3	4.50+												
EDW-B011	S-3	5.0'-6.5'		29.4	4.50+												
EDW-B011	S-4	7.5'-9.0'		45.3	3.00												
EDW-B011	S-5	9.0'-11.0'		70.0		15.5	21.3	46.0	17.2								
EDW-B011	S-6	15.0'-17.0'		63.2													14.5
EDW-B011	S-7	19.5'-21.5'		84.9		0.2	16.7	58.0	25.1								
EDW-B011	S-8	25.0'-27.0'		74.7									2.691				
EDW-B011	S-9	30.0'-32.0'		73.7													
EDW-B014	S-1	0.0'-1.5'		28.2	4.00												
EDW-B014	S-2	2.5'-3.5'	CL-ML	40.8	1.50												
EDW-B014	S-2A	3.5'-4.0'	CL-ML	50.0													
EDW-B014	S-4	7.0'-8.5'	SM	60.2		0.0	35.1	45.4	19.5								
EDW-B014	S-6	15.0'-17.0'		78.7	3.50												
EDW-B014	S-7	20.0'-22.5'		86.5	1.50								2.524				15.0
EDW-B014	S-8	25.0'-26.7'		73.1													
EDW-B014	S-9	30.0'-31.5'	CL	48.7													

Table 5
Summary of Laboratory Test Results – New Embankment Fill

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	Liquid Limit	Plastic Limit	Plasticity Index
EDW-B005	S-6	15.0'-16.5'	ML	41.4								
EDW-B005	S-7	20.0'-21.5'		51.1	1.75	3.1	21.3	51.7	23.9			
EDW-B005	S-8	25.0'-26.0'	ML	55.3								
EDW-B010	S-1 BOTTOM	0.0'-0.5'	CL	17.4	4.50+							
EDW-B010	S-1 TOP	0.0'-0.5'	SP	7.2								
EDW-B010	S-1A	0.5'-1.5'		27.9								
EDW-B010	S-2	2.5'-3.0'		20.9								
EDW-B010	S-2A	3.0'-4.0'		30.7	4.50							
EDW-B010	S-3	5.0'-6.5'	SP	14.8		12.6	54.8	26.0	6.6			
EDW-B010	S-4	7.5'-9.0'	CL	22.0	3.75							
EDW-B012	S-1	0.0'-1.5'	ML	23.0								
EDW-B012	S-2	2.5'-4.0'		23.8	4.50+					28	26	2
EDW-B012	S-3	5.0'-6.5'		26.5		0.0	9.6	73.7	16.7			
EDW-B012	S-4	7.5'-9.0'		26.5	4.50							
EDW-B012	S-5	10.0'-11.0'	CL	24.7	3.75							

Table 6
Summary of Laboratory Test Results – Old Embankment Fill

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)	Liquid Limit	Plastic Limit	Plasticity Index	Consolidated Undrained Triaxial			
									c (psf)	phi (deg)	c' (psf)	phi' (deg)
EDW-B008	S-1	0.0'-1.5'	CL	13.2	4.50+							
EDW-B008	S-2	2.5'-4.0'	CL	19.5	3.75	42	22	20				
EDW-B008	S-3	5.0'-6.5'	CL	42.3	2.00							
EDW-B008	S-4	7.5'-9.0'	CL	22.8	2.00							
EDW-B010	S-5	10.0'-11.5'	CL	24.0	2.00							
EDW-B010	S-6	12.5'-14.0'	CL	28.0	1.25							
EDW-B010	S-7	15.0'-17.0'	CL	30.5		48	18	30	420	11.1	199.6	24.8
EDW-B010	S-8	20.0'-21.5'	CL	32.9	0.75							
EDW-B010	S-9	25.0'-26.5'	CL	21.4	0.50							
EDW-B012	S-5A	11.0'-11.5'	CL	24.9	2.00							
EDW-B012	S-6	12.5'-14.0'	CL	22.0	3.50							
EDW-B012	S-7	15.0'-16.5'	CL	24.3	3.25	48	19	29	426	14.6	496	23.5
EDW-B012	S-8	20.0'-22.0'	CL	23.8								
EDW-B012	S-9	25.0'-26.5'	CL	23.2	1.25							
EDW-B013	S-2	2.5'-4.0'	CL	17.4	4.50+							
EDW-B013	S-3	6.0'-8.0'	CL	24.3		49	21	28	418	15.2	115.2	29.7
EDW-B013	S-4	8.0'-9.5'	CL	24.3	3.00							
EDW-B013	S-5	10.0'-11.5'	CL	25.4	2.25							
EDW-B013	S-6	15.0'-16.5'	CL	25.5	1.50	41	17	24				
EDW-B013	S-7	20.0'-21.5'	CL	23.5	1.75							
EDW-B013	S-8	25.0'-26.5'	CL	27.7								

Table 7
Summary of Laboratory Test Results – Native Clay Crust

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	Direct Shear	
										c' (psf)	phi' (deg)
EDW-B006	S-1	0.0'-1.5'	CL	26.4	2.25						
EDW-B006	S-2	2.5'-5.0'	CL	30.1	1.25						
EDW-B012	S-10	30.0'-31.5'	CL	24.8	1.50						
EDW-B013	S-9	30.0'-31.5'	CL	20.2	0.50						
EDW-B015	S-10	31.0'-33.0'	CL	20.2		24	13	11		193.4	27.6

Table 8
Summary of Laboratory Test Results – Native Clay

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	Unconfined Compression	Consolidated Undrained Triaxial				Direct Shear		Hydraulic Conductivity (cm/sec)	Corrosion Suite (ANS Point Rating)	Consolidation, Pc (psf)
										c (psf)	c (psf)	phi (deg)	c' (psf)	phi' (deg)	c' (psf)	phi' (deg)			
EDW-B002	S-10	35.0'-37.0'	CL	31.6		36	18	18		273.46			273.46						
EDW-B002	S-11	40.0'-41.5'	CL	42.9	1.00				2.592										
EDW-B002	S-12	45.0'-46.5'	CL	57.7	0.75														
EDW-B002	S-9	30.0'-30.5'	CL	126.1	<.25														
EDW-B002	S-9A	30.5'-31.5'	CL	31.1	0.50														
EDW-B003	S-10A	36.5'-37.0'	CL	43.0	2.25														
EDW-B003	S-11	40.0'-41.5'	CL	31.6	1.25														
EDW-B003	S-12	45.0'-47.0'	CH	46.0		51	17	34		632.48									2200
EDW-B003	S-13	50.0'-51.5'	CL	55.4	0.50														
EDW-B004	S-11	36.0'-38.0'	CL	20.1		35	17	18		615.04							7.20E-07		
EDW-B004	S-12	40.0'-41.5'	CL	30.0	1.25														
EDW-B004	S-13	45.0'-46.0'	CL	39.5	1.00														
EDW-B004	S-13A	46.0'-46.5'	CL	35.1															
EDW-B004	S-14	50.0'-51.5'	CL	65.2	1.75				2.617										
EDW-B004	S-15	55.0'-56.5'	CL	33.4	1.25														
EDW-B004	S-15A	56.0'-56.5'	ML	13.2															
EDW-B005	S-11	41.0'-43.0'	CH	44.8		57	22	35							262	27.2			
EDW-B005	S-12	45.0'-46.5'	CL	88.7	1.00				2.521									10.0	
EDW-B006	S-10	30.0'-31.0'	CL	43.4	0.50														
EDW-B006	S-10A	31.0'-31.5'	CL	19.6															
EDW-B006	S-3	5.0'-6.5'	CL	24.8	2.25	48	19	29											
EDW-B006	S-4	7.5'-10.0'	CL	26.0	2.50														
EDW-B006	S-5	10.0'-11.5'	CL	34.2	1.25														
EDW-B006	S-6	13.0'-15.0'	CH	31.1		62	20	42							316	23.7			
EDW-B006	S-7	15.0'-16.5'	CL	40.8	1.00														
EDW-B006	S-8	20.0'-21.5'	CL	43.4	0.75														
EDW-B006	S-9	26.0'-28.0'	OH	76.0		72	37	35			666	8.5	396	28.5					
EDW-B008	S-10	35.0'-36.5'	CL	56.9	0.25														
EDW-B008	S-5	11.0'-13.0'	CH	33.6		52	19	33		354									1860
EDW-B008	S-6	15.0'-16.5'	CL	64.6	0.50														
EDW-B008	S-7	20.0'-21.5'	CL	44.4	0.50														
EDW-B008	S-8	24.0'-26.5'	CH	68.9		67	31	36							848	27.3			
EDW-B008	S-9	30.0'-31.5'	CL	71.4	0.50														
EDW-B010	S-10	30.0'-32.0'	CL	30.0		40	15	25							31.8	24.1			
EDW-B010	S-11	35.0'-36.5'	CL	28.2	1.50														
EDW-B011	S-13	40.0'-41.5'	CL	47.9	1.00														
EDW-B011	S-14	45.0'-46.5'	CH	63.3	0.50	63	21	42											
EDW-B011	S-15	50.0'-51.5'	CL	62.5	0.50														
EDW-B011	S-16	55.0'-56.5'	CL	52.9	0.75														
EDW-B012	S-11	35.0'-36.5'	CL	28.3	1.50														
EDW-B012	S-12	40.0'-41.5'	CL	32.2	1.00														
EDW-B012	S-13	45.0'-46.5'	CL	50.2	1.25														
EDW-B012	S-14	47.0'-49.0'	CH	50.8		54	20	34							31.2	26			
EDW-B012	S-15	49.0'-50.5'	CL	67.4	1.00														
EDW-B012	S-16	55.0'-55.5'	CL	50.5	1.75														
EDW-B013	S-10	32.0'-34.0'	CL	33.3		42	23	19			450	11.8	116.6	26.4					
EDW-B013	S-11	34.0'-35.5'	CL	58.0	0.50														
EDW-B013	S-12	40.0'-41.5'	CL	54.5	1.75														
EDW-B013	S-13	45.0'-46.5'	CL	66.2	1.25														
EDW-B014	S-10	35.0'-36.7'	CL	31.6	0.75														
EDW-B014	S-11	40.0'-40.5'	CL	27.3	4.00				2.719										
EDW-B015	S-11	35.0'-36.5'	CL	33.8	1.50														
EDW-B015	S-12	37.0'-39.0'	CH	41.0		66	23	43		1072.18									
EDW-B015	S-13	39.0'-40.5'	CL	36.2	0.50														
EDW-B015	S-14	45.0'-46.5'	CL	49.4	1.00														
EDW-B015	S-15	50.0'-51.0'	CL	30.9	1.50														

Table 9
Summary of Laboratory Test Results – Other Fill Materials

Boring Number	Sample Number	Depth	Material Unit	USCS Classification	Water Content %	Qp (tsf)	Liquid Limit	Plastic Limit	Plasticity Index
EDW-B005	S-10	35.0'-36.5'	Historic Ash Fill	CL	37.3	1.00			
EDW-B005	S-8A	26.0'-27.0'	Historic Ash Fill	OL	47.6		44	29	15
EDW-B005	S-9	29.0'-31.0'	Historic Ash Fill		69.3				
EDW-B013	S-1	0.0'-1.5'	Historic Ash Fill	CL	13.6	4.50+			
EDW-B004	S-10	30.0'-31.5'	Historic Fill	CL	19.7	3.75			
EDW-B004	S-6	12.5'-14.0'	Historic Fill	CL	25.4	1.25			
EDW-B004	S-7	15.0'-16.5'	Historic Fill	CL	25.8	2.50			
EDW-B004	S-8	20.0'-21.5'	Historic Fill	CL	31.3	1.00			
EDW-B004	S-9	25.0'-26.0'	Historic Fill	CL	23.0	1.25			
EDW-B004	S-9A	26.0'-26.5'	Historic Fill	SC	19.5	0.75			
EDW-B015	S-1	0.0'-1.5'	Rock Embankment Fill	ML	54.7				
EDW-B015	S-2	2.5'-4.0'	Rock Embankment Fill	SP	4.5				
EDW-B015	S-3	5.0'-6.5'	Rock Embankment Fill	SP	5.4				
EDW-B015	S-4	7.5'-9.0'	Rock Embankment Fill	SP	7.2				
EDW-B015	S-5	10.0'-11.5'	Rock Embankment Fill	SP	6.5				
EDW-B015	S-6	13.0'-14.25'	Rock Embankment Fill	GP	3.6				
EDW-B015	S-7	15.0'-16.5'	Rock Embankment Fill	GP	8.2				
EDW-B015	S-8	20.0'-21.5'	Rock Embankment Fill	GP	7.8				
EDW-B015	S-9	25.0'-26.5'	Rock Embankment Fill	GP	8.1				

Table 10
Summary of Laboratory Test Results – Shale Bedrock

Boring Number	Sample Number	Depth	USCS Classification	Water Content %	Qp (tsf)
EDW-B002	S-13	50.0'-50.25'	ML	11.1	4.50+
EDW-B003	S-14	55.0'-55.5'	ML	23.3	3.50
EDW-B003	S-14A	55.5'-55.92'	ML	9.8	
EDW-B003	S-15	60.0'-60.25'	ML	7.1	
EDW-B004	S-16	60.0'-60.25'		8.8	
EDW-B005	S-13	50.0'-51.0'	CL-ML	15.9	4.50+
EDW-B005	S-14	51.0'-51.5'		12.8	
EDW-B006	S-11	35.0'-35.42'	ML	14.2	3.50
EDW-B008	S-11	40.0'-40.33'	ML	12.6	3.00
EDW-B010	S-12	40.0'-41.0'	SM	17.0	
EDW-B010	S-13	45.0'-45.25'	CL-ML	16.4	4.50
EDW-B011	S-17	60.0'-60.25'		9.1	
EDW-B012	S-16A	55.5'-56.5'	CL-ML	15.3	4.50
EDW-B012	S-17	60.0'-60.21'	CL-ML	17.9	1.50
EDW-B014	S-11A	40.5'-41.0'	ML	19.6	4.50+
EDW-B014	S-11B	41.0'-41.5'		10.2	
EDW-B014	S-12	45.0'-45.5'	ML	14.5	4.50
EDW-B015	S-16	55.0'-55.5'	ML	11.0	4.25

5. SLOPE STABILITY ANALYSES

Slope stability analyses were performed for varying loading conditions at selected representative embankment cross-sections, as described in the following sub-sections. Development of cross-sections for analysis, soil material properties, and seismic analyses related to the slope stability analysis are also discussed in the following sub-sections.

5.1. Cross-Sections for Analysis

Ten cross sections were identified as representative cross sections for the evaluation of the Ash Pond perimeter embankment slope stability. Cross-sections were selected at various locations around the perimeter embankments based on critical slope orientation, height, and subsurface conditions. The location of each analysis section and the relevant CPT soundings and test borings that were used to develop subsurface stratigraphy are listed in **Table 11** and shown on **Figure 3** (**Attachment A**):

Table 11
Cross Section Locations for Slope Stability Analyses

Cross-Section	Approximate Station	Location (Crest/Toe)	Boring/CPT Number
A	15+00	CREST	EDW-B001, EDW-C001
		TOE	-
B	21+00	CREST	EDW-B010, EDW-C023
		TOE	-
C	31+00	CREST	EDW-C021
		TOE	-
D	40+00	CREST	EDW-B012, EDW-C017
		TOE	-
E	51+00	CREST	EDW-B009, EDW-C015
		TOE	EDW-C016
F	54+00	CREST	EDW-C013
		TOE	EDW-B008, EDW-C014
G	58+00	CREST	EDW-B005, EDW-B013, EDW-C011, EDW-C012
		TOE	EDW-C010
H	60+00	CREST	EDW-B015, EDW-C009
		TOE	-
I	67+00	CREST	EDW-C007
		TOE	EDW-B006, EDW-C008
J	87+00	CREST	EDW-C003
		TOE	-

The surface geometry for each analysis cross-section was determined based on the LiDAR ground surface topographic contours obtained from the Illinois Geospatial Data Clearinghouse (IGDC, 2015), shown on **Figure 3 (Attachment A)**. Additionally, design drawings from “Proposed 150 Car Loop Track For Edwards Power Plant Bartonville, Illinois” by Design Nine, Inc. (2003) were used to supplement the subsurface investigation in developing the subsurface embankment geometry. The phreatic surfaces for each analysis section were estimated based on the normal pool elevations of 447.2 and 449.5 feet for the Clarification Pond and Cooling Pond, respectively, based on the

AECOM hydraulics and hydrology report (AECOM, 2016), and phreatic readings in the piezometers, CPT soundings and borings. The development of the analysis cross-sections is further discussed in **Attachment G**.

5.2. Stability Analysis Conditions Considered

Consistent with the criteria provided in the USEPA CCR Rule § 257.73(e), the stability of the ash pond embankment was evaluated for the following three load cases:

Static, Steady-State, Normal Pool Condition*:* This case models the embankment under static, long-term conditions, at normal water levels within the impoundment. Drained (effective stress) shear strength parameters were used for all materials, and phreatic conditions were estimated based on available piezometer and CPT data. The normal storage pool elevation within the Process Water[2] and Clarification Ponds were modeled at 449.5 ft and 447.2 ft, respectively, based on AECOM's *Hydrologic and Hydraulic Summary Report* for the Ash Pond (AECOM, 2016). ***Target Factor of Safety of 1.50.***

Static, Maximum Surcharge Pool Condition: This case models the conditions under short-term surcharge pool conditions; water surface elevations of 457.8 ft and 457.4 ft for the Process Water and Clarification Ponds, respectively, based on AECOM's *Hydrologic and Hydraulic Summary Report* for the Ash Pond (AECOM, 2016). Drained (effective stress) shear strength parameters were used for all materials, as the critical surface in the normal pool case was found to be in the downstream slope of the embankment. Due to the relatively large width of the embankment, the increase in pool level does not add driving force to this slip surface and is therefore unlikely to initiate total stress mechanisms of failure. It was assumed that the temporary surcharge load was not of a sufficient duration to significantly alter the phreatic surface (i.e. saturation line within the embankment); although the phreatic surface was increased in the raised fill part of the embankment, where more permeable materials are present. Therefore, the phreatic surface was modeled equivalent in the clay embankment fill and foundation to the steady state case in all cases except cross-section J. In this cross-section, horizontal phreatic surfaces at the elevations noted above were assumed as the section is located several hundred feet from the free water pool in the Cooling Pond. ***Target Factor of Safety of 1.40.***

Seismic Slope Stability Analysis: These analyses incorporate a horizontal seismic coefficient k_h selected to be representative of expected loading during the design earthquake event (i.e., a "pseudostatic" analysis). The analyses utilized peak undrained strengths for all materials. The pool levels and phreatic surface corresponding to the steady state pool from the static analyses were utilized. ***Target Factor of Safety of 1.00***.

Post-Liquefaction Slope Stability Analyses: Soils susceptible to liquefaction were not identified in the embankment or foundation soils at the Ash Pond. Therefore, post-liquefaction conditions were not evaluated.

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[2] The Process Water Pond was historically referred to as the Cooling Pond, and may be called the Cooling Pond in the attachments to this report.

5.3. *Material Properties*

Material properties for slope stability analyses were developed using both laboratory testing data (index and strength testing) and strength correlations from CPT and SPT data. The material characterization and development of strength parameters is described further in **Attachment F**.

Unit weights for the materials were evaluated using laboratory test results from relatively undisturbed samples. New embankment fill was conservatively assigned unit weights consistent with the observed material type based on previous experience with similar materials.

Shear strengths for the native alluvial clays and the old embankment fill were evaluated for the normal operating (steady-state) loading condition using results from the consolidated undrained triaxial (CIU) and direct shear (DS) tests, as well as correlations with SPT data. Shear strengths for the native clay crust and the fly ash material for the steady-state loading condition were evaluated using results from DS tests, as well as correlations with SPT data. In general, when assigning lab tests, direct shear tests were assigned for deeper samples and CIU tests were assigned to shallower samples to match the assumed orientation of the slope stability slip surface. For the new embankment fill and the crushed stone (rail loop embankment) materials, where undisturbed Shelby tube samples were not obtained, unit weights and shear strengths were based on published correlations for SPT and CPT data, and previous experience with similar materials.

For the pseudo-static analyses, undrained shear strengths for the old embankment fill and native alluvial clays were developed using CIU and unconfined compression (UC) tests, published correlations for SPT and CPT data, as well as previous experience with similar materials.

The material properties developed for use in slope stability analysis are listed in **Table 12**.

Table 12
Material Properties for Slope Stability Analyses

Material	Total Unit Weight Above and Below Water Table (pcf)	Effective (Drained) Shear Strength Parameters		Total (Undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
New Embankment	115	200	30	2500	0
Old Embankment 1	125	200	28	2500	0
Old Embankment 2	125	100	29	1250	0
Native Clay Crust	120	200	27.5	1250	0
Native Clay 1	117	100	26	650	0
Native Clay 2	105	200	26	700	0
Native Clay 3	105	200	26	900	0
Impounded Ash	105	100	27	600	0
Historic Ash	105	100	26	750	0
Historic Fill	125	200	28	1000	0
Recent Fill	115	200	30	1250	0
GP (Very Dense)	135	0	36	0	36
New Embankment (Crushed Stone - Sandy Gravel)	120	0	32	0	32
Bedrock - Shale	140	1000	36	1000	36

5.4. Methodology of Analyses

Limit equilibrium stability analyses were completed using the two-dimensional SLOPE/W 2012 (v. 8.15.4.11512 by GeoStudio) computer program. Factors of safety were calculated with Spencer's method using circular search routines with optimization to develop non-circular sliding surfaces through lower-strength layers which may represent a lower factor of safety than circular sliding surfaces. Slip surfaces which intersected the embankment crest and could result in a release of CCR materials were analyzed. Pore pressures were assigned as hydrostatic pressures under the phreatic surface.

A brief summary of the analyses is presented in the following sections. A more detailed discussion is provided in **Attachment G**.

5.4.1. Static Analysis Conditions

Static stability was evaluated for steady-state conditions using both the normal pool elevation and the maximum flood surcharge pool elevation. The normal pool elevation of 449.5 feet and surcharge pool elevation of 457.8 ft was used for the northern portion of the site (Cross-Sections A, B, and J). A normal pool elevation of 447.2 feet and surcharge pool elevation of 457.4 ft was used for the southern portion of the site (Cross-Sections C, D, E, F, G, H, and I). All elevations were taken from the 2016 AECOM *Hydrologic and Hydraulic Summary Report* for the Ash Pond (AECOM, 2016).

5.4.2. Earthquake Analysis Conditions

Earthquake ground motions at the site were developed using simplified procedures, as described in the following sub-sections.

5.4.3. Determination of Ground Motion Parameters

Seismic ground motions were estimated using the United States Geological Survey (USGS) 2008 Interactive Deaggregation tool (http:earthquake.usgs.gov/hazards/apps/). This application generates acceleration values, including peak ground acceleration (PGA) for top of rock, and mean and modal moment magnitudes based on user entered values of location, exceedance probability, and spectral period. Results are computed based on the 2008 National Seismic Hazard Mapping Project (NSHMP) Probabilistic Seismic Hazard Analysis (PSHA) Maps.

For the Edwards Power Station, the calculated PGA for an event with a probability of exceedance of 2% in 50 years (approximately a 2,500 year average return period) was 0.067g at the top of hard rock. To estimate the free-field, ground surface horizontal acceleration, the site was classified according to the site classes defined in International Building Code (IBC, 2003) and amplified using the site amplification factors found in National Earthquake Hazards Reduction Program (NEHRP, 2009). The site class was determined based on the weighted average of the shear wave velocity of the upper 100 feet of the stratigraphic profile and found to be Site Class D (600 ≤ Vs ≤ 1,200 ft/sec). This corresponds to a NEHRP amplification factor of 1.6, resulting in a ground surface acceleration of 0.107g. The Peak Transverse Acceleration at the dike crest was estimated using the ground surface acceleration and the procedure proposed by Idriss (2015), resulting in a peak crest acceleration of 0.32g. Details of the estimation of ground motion parameters are included in **Attachment G**.

5.4.4. Seismic Coefficient

The horizontal acceleration (k_h) calculated for use in the pseudostatic slope stability analysis was based on the simplified procedure developed by Makdisi and Seed (1978). For the estimated peak crest acceleration value of 0.32g and the full-height critical slip surfaces that were identified in the analyses (presented in **Attachment G**), a seismic coefficient of 0.109g was estimated for k_h in the pseudostatic analysis.

5.4.5. Liquefaction Triggering Analysis

Liquefaction is used to describe the contraction of coarse-grained (i.e. cohesionless) sand and gravel soils under cyclic loading imposed by earthquake shaking. The result is a reduction in the effective confining stress within the soil and an associated loss of strength (Idriss and Boulanger 2008). Liquefaction only occurs in saturated soils. Liquefaction susceptibility also largely depends on compositional characteristics such as particle size, shape, and gradation; however, laboratory and field observations also indicate that plasticity characteristics influence liquefaction susceptibility (Kramer 1996). Idriss and Boulanger (2008) suggested that soils with a plasticity index (PI) greater than about 7 are not susceptible to liquefaction.

AECOM's field exploration did not encounter cohesionless soils in the embankment or foundation of the Ash Pond. Only cohesive soils were encountered by AECOM, and out of the 52 Atterberg limit tests performed, all but one sample had a PI of above 7. This means that the soils encountered in AECOM's field exploration are not susceptible to liquefaction. Consequently, a formal liquefaction analysis was determined to be unnecessary as the embankment and foundation soils at the site are not susceptible to liquefaction based on their composition and observed index properties. Due to the generally medium stiff to stiff nature of the embankment and foundation clays, and the relatively low seismicity at the site, the embankment and foundation soils are also unlikely to be susceptible to cyclic softening.

6. RESULTS

6.1. Results of Static Stability Analyses

The results of the limit equilibrium slope stability analyses for the static load cases are summarized in **Table 13**. The Slope/W output figures showing the critical slip surfaces and details of the analyses are included in **Attachment G.1**.

Table 13
Summary of Minimum Slope Stability Factors of Safety for Static Load Cases

Load Case	Program Criteria	Section									
		A	B	C	D	E	F	G	H	I	J
Steady State (Normal Pool)	FS≥1.50	2.02	1.59	1.83	1.79	1.54	2.31	2.12	2.08	2.26	2.08
Surcharge Pool (Flood Pool)	FS≥1.40	2.02	1.59	1.82	1.79	1.54	2.31	2.12	2.08	2.26	2.00

6.2. *Results of Earthquake Stability Analyses*

6.2.2. *Seismic Stability Analysis*

The results of the slope stability analyses for the seismic load cases are summarized in **Table 14**. The Slope/W output figures showing the critical slip surfaces and details of the analyses are included in **Attachment G.1**.

Table 14

Summary of Minimum Slope Stability Factors of Safety for Earthquake Load Cases

Load Case	Program Criteria	Section									
		A	B	C	D	E	F	G	H	I	J
Seismic (Pseudostatic)	FS ≥ 1.00	1.37	1.28	1.09	1.18	1.11	1.08	1.13	1.08	1.30	2.08

7. CONCLUSIONS

The calculated factors of safety from the limit equilibrium slope stability analysis satisfy the USEPA CCR Rule § 257.73(e) requirements for each loading condition at all of the analysis sections that represent the embankments of Ash Pond at the Edwards Power Station. Load cases analyzed for this study included static (steady-state) normal pool, maximum flood surcharge pool and seismic (pseudo-static).

8. LIMITATIONS

Background information, design basis, and other data have been furnished to AECOM by IPRG. AECOM has used this data in preparing this report. AECOM has relied on this information as furnished, and is not responsible for the accuracy of this information.

Borings have been spaced as closely as economically feasible, but variations in soil properties between borings, that may become evident at a later date, are possible. The conclusions developed in this report are based on the assumption that the subsurface soil, rock, and phreatic conditions do not deviate appreciably from those encountered in the site-specific exploratory borings. If any variations or undesirable conditions are encountered in any future exploration, we should be notified so that additional analyses can be made, if necessary.

The conclusions presented in this report are intended only for the purpose, site location, and project indicated. The recommendations presented in this report should not be used for other projects or purposes. Conclusions or recommendations made from these data by others are their responsibility. The conclusions and recommendations are based on AECOM's understanding of current plant operations, maintenance, stormwater handling, and ash handling procedures at the station, as provided by IPRG. Changes in any of these operations or procedures may invalidate the findings in this report until AECOM has had the opportunity to review the changes, and revise the report if necessary.

This geotechnical investigation was performed in accordance with the standard of care commonly used as state-of-practice in our profession. Specifically, our services have been performed in accordance with accepted principles and practices of the geological and geotechnical engineering profession. The conclusions presented in this report are professional opinions based on the indicated project criteria and data available at the time this report was prepared. Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

9. REFERENCES

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Attachment A. Figures

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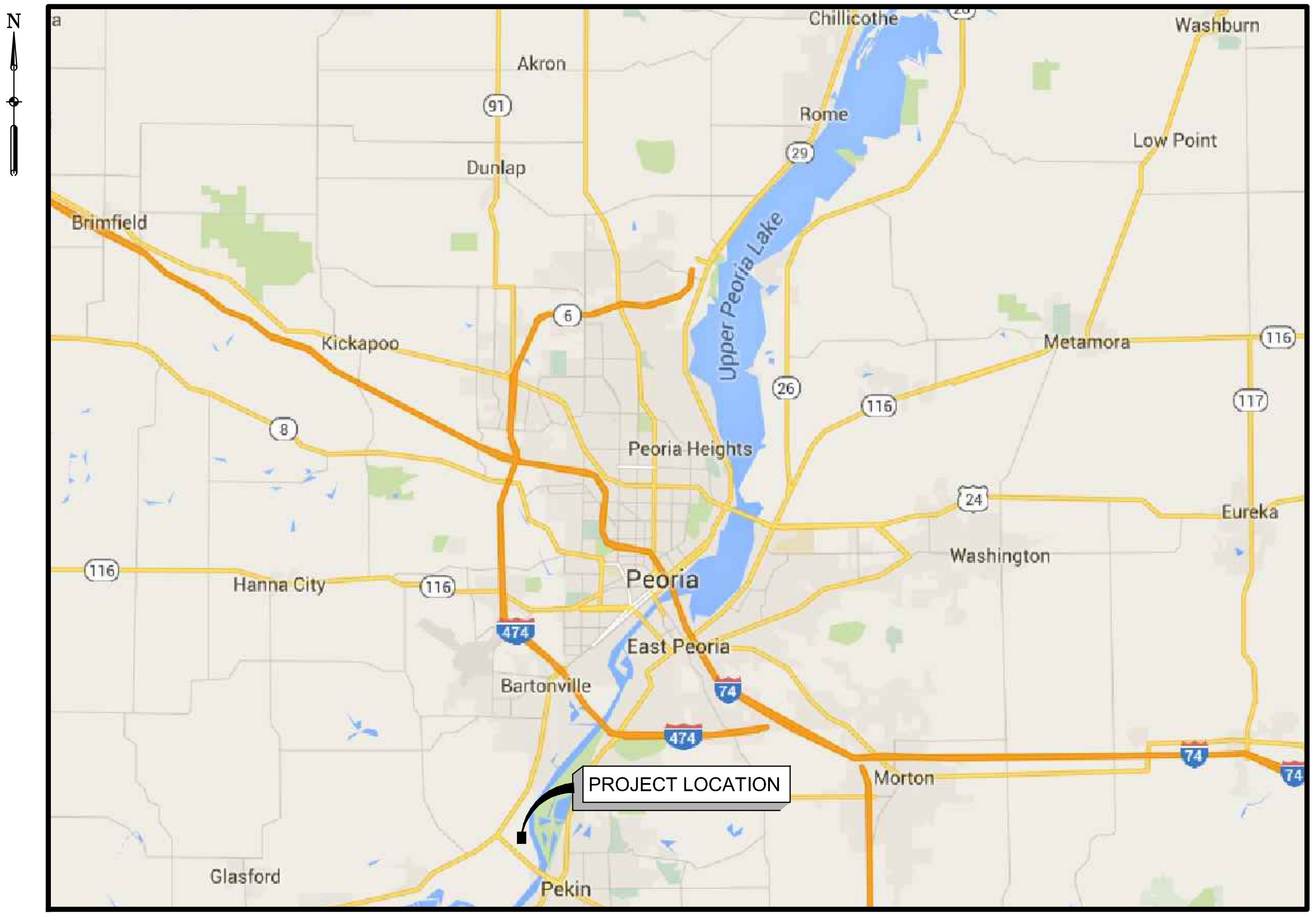

LOCATION MAP

NOT TO SCALE

VICINITY MAP

NOT TO SCALE

AERIAL FROM GOOGLE EARTH PRO
MAP FROM GOOGLE

AECOM
558 N Main Street
Oshkosh, Wisconsin
920 235-0270 (phone)
920 235-0321 (fax)

DYNEGY
Dynegy Inc.
1500 East Port Plaza Drive
Collinsville, IL 62234

CCR RULE ASSESSMENT OF PLANTS

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

GEOTECHNICAL REPORT
ASH POND

ISSUED FOR BIDDING ______ DATE BY

ISSUED FOR CONSTRUCTION ______ DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
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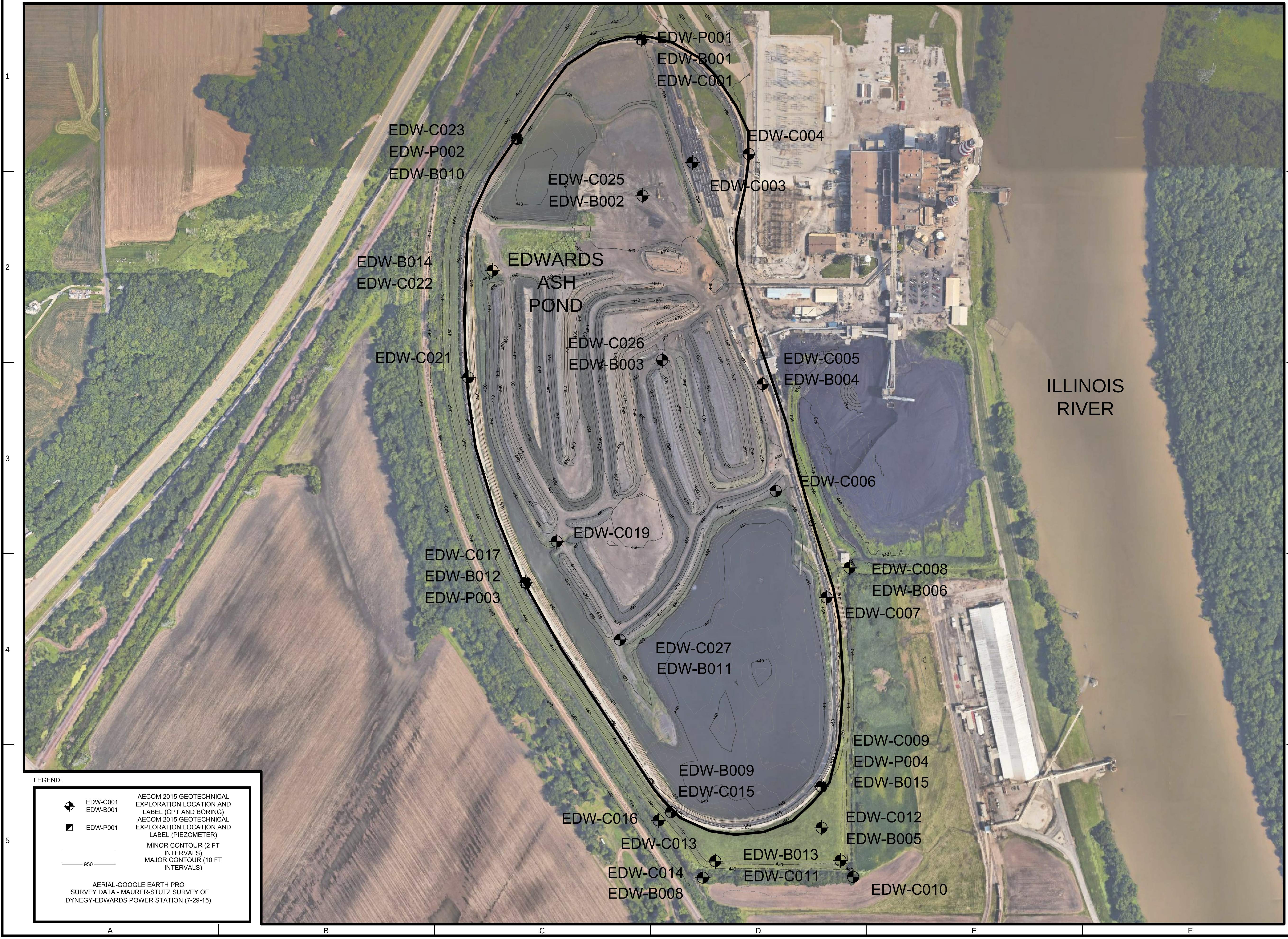
DRAWN BY:	TPB
DESIGNED BY:	_
CHECKED BY:	_
DATE CREATED:	2/17/2016
PLOT DATE:	2/17/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

LOCATION MAP AND
SITE VICINITY MAP

Figure 1



LEGEND:

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◪	EDW-P001	AECOM 2015 GEOTECHNICAL EXPLORATION LOCATION AND LABEL (PIEZOMETER)
———		MINOR CONTOUR (2 FT INTERVALS)
—— 950 ——		MAJOR CONTOUR (10 FT INTERVALS)

AERIAL-GOOGLE EARTH PRO
SURVEY DATA - MAURER-STUTZ SURVEY OF
DYNEGY-EDWARDS POWER STATION (7-29-15)

AECOM
558 N Main Street
Oshkosh, Wisconsin
920 235-0270 (phone)
920 235-0321 (fax)

DYNEGY
Dynegy Inc.
1500 East Port Plaza Drive
Collinsville, IL 62234

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

0 300 600
SCALE IN FEET

ISSUED FOR BIDDING ______ DATE BY

ISSUED FOR CONSTRUCTION ______ DATE BY

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PLOT DATE:	2/17/2016
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OVERALL GEOTECHNICAL SITE PLAN

Figure 2

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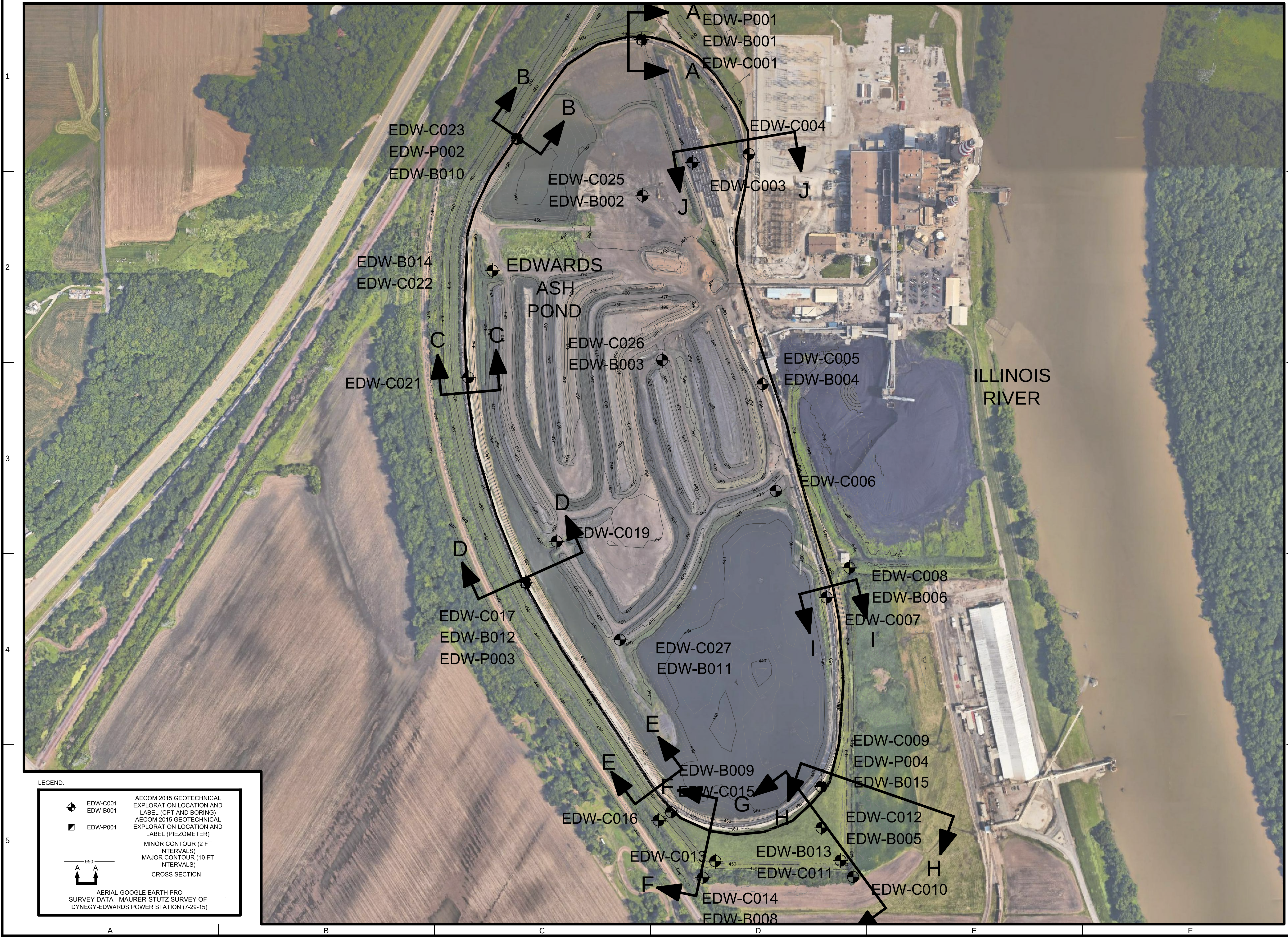

LEGEND:

⊕	EDW-C001 EDW-B001	AECOM 2015 GEOTECHNICAL EXPLORATION LOCATION AND LABEL (CPT AND BORING)
◪	EDW-P001	AECOM 2015 GEOTECHNICAL EXPLORATION LOCATION AND LABEL (PIEZOMETER)
──		MINOR CONTOUR (2 FT INTERVALS)
── 950 ──		MAJOR CONTOUR (10 FT INTERVALS)
A A		CROSS SECTION

AERIAL-GOOGLE EARTH PRO
SURVEY DATA - MAURER-STUTZ SURVEY OF
DYNEGY-EDWARDS POWER STATION (7-29-15)

AECOM
558 N Main Street
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DYNEGY
Dynegy Inc.
1500 East Port Plaza Drive
Collinsville, IL 62234

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

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ISSUED FOR CONSTRUCTION ________ DATE BY

REVISIONS

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PLOT DATE:	2/17/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

ASH POND
GEOTECHNICAL
SITE PLAN

Figure 3

AECOM DRAWING PATH: K:\Projects\60427894-Dynegy\900-WORKING DOCS-CAD\902-SHEETS\30% Design Sheets_Edwards\EDW 2-2 ASH POND GEOTECHNICAL SITE PLAN.dwg

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Attachment B. Boring Logs

Project: EDWARDS POWER STATION

Project Location: BARTONVILLE, ILLINOIS

Project Number: 60440202

Key to Soil Boring Logs

Sheet 1 of 1

	Graphic Symbol	Description	USCS Classification
SAND AND GRAVEL	⁙	SAND poorly graded	SP
	▒	SAND well graded	SW
	▥	Silty SAND	SM
	▨	Clayey SAND	SC
	●	GRAVEL poorly graded	GP
LOW PLASTIC SILTS AND CLAYS	▥	Inorganic low plastic SILT	ML
	▨	Inorganic low plastic CLAY	CL
	▥▨	Inorganic low plastic SILTY-CLAY	CL-ML
HIGH PLASTIC SILT AND CLAYS	▨	Inorganic high plastic CLAY	CH
	▨	Sandy Inorganic high plastic CLAY	CH
	▨	Inorganic elastic SILT	MH
SURFACE MATERIALS	■	Asphalt, Pavement	
	⁙	Topsoil	
	▩	Gravel Limestone	
	∫	Fly Ash	
	∫	Bottom Ash	
	∫	Fill	

TERMS DESCRIBING DENSITY OR CONSISTENCY

Coarse grained soils (major portion retained on No. 200 sieve) include gravels and sands. Density is based on the Standard Penetration Test (SPT).

Density	SPT blows per foot
Very loose	0 - 5
Loose	5 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	Greater than 50

Fine grained soils (major portion passing No. 200 sieve) include clays and silts. Consistency is rated according to shearing strength, as indicated by uncorrected SPT blows per foot.

Descriptive Term	SPT blows per foot	Estimated undrained shear strength (ksf)	Hand Test
Very soft	0-2	< 0.25	Extrudes between fingers
Soft	2-4	0.25-0.5	Molded by slight pressure
Medium stiff	4-8	0.5-1.0	Molded by strong pressure
Stiff	8-15	1.0-2.0	Indented by thumb
Very stiff	15-30	2.0-4.0	Indented by thumbnail
Hard	> 30	> 4.0	Difficult to indent

LEGEND AND NOMENCLATURE

⧄	Standard penetration split spoon test sample
▥	Undisturbed shelby tube sample
PP qu	Pocket penetrometer unconfined compressive strength
NMC	Natural Moisture Content, %
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non-plastic
∇	Depth Groundwater enters at time of drilling.
▼	Groundwater Level at some specified time after drilling
Su	Undrained Shear Strength
TXUU	Triaxial Unconsolidated Undrained
DTW	Depth to water
N/A	Not Applicable

SAMPLING RESISTANCE

P	Sample pushed by hydraulic rig action.
3 6 9	Numbers indicate blows per 6 in. of sampler penetration. Standard penetration test sampler, (2-in O.D.) and oversize penetration sample (3-in O.D.) are driven by a 140 lb hammer falling freely 30-in
50/2	Number of blows (50) used to drive a penetration sampler a certain number of inches (2)
WOH	Weight of hammer
WOR	Weight of rods

ABBREVIATIONS USED UNDER "REMARKS"

HSA	Hollow Stem Auger	No.	Number
ATD	At Time of Drilling	CIU	Isotropically Consolidated Undrained
AD	After Drilling	ST	Shelby Tube
ID	Inside Diameter	SS	Split Spoon
OD	Outside Diameter		
RQD	Rock Quality Designation		
-#200	(% Pass #200 Sieve)		
Sa (%)	Sieve Analysis (% Passing #200)		

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AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B001

Sheet 1 of 2

Date(s) Drilled	11/05/2015 to 11/05/2015	Logged By	Robert Weseljak	Checked By	NDS
Drilling Method	Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	51.0 ft
Drill Rig Type	Mobile B-57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	461.0 ft
Borehole Backfill	Portland Cement and Bentonite	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
461.0	0.0		SS-1	2 6 8	61		Stiff, dry, gray mottled with brown, lean CLAY (CL).					3.0			
458.5	2.5		SS-2	3 4 5	94		Stiff, moist, brown mottled with gray and black, lean CLAY (CL), trace shell fragments.					3.0			
	5		SS-3	3 3 3	75		Becomes medium stiff.					1.0			
			ST-4	200 psi	100										*Pushed shelby tube from 7.0 to 9.0 feet*
451.0	10.0		SS-5	3 3 6	83		Stiff, moist, grayish black, lean CLAY (CL), trace organics.					1.0 1.5			
	15		SS-6	1 3 5	78							1.25			
441.0	20.0		SS-7	1 6 7	100		Stiff, moist, very dark gray to grayish black with some brown, lean CLAY (CL).					1.5 2.5			
436.0	25.0		SS-8	WOH WOH 2	100		Very soft, wet, brown mottled with gray, sandy lean CLAY (CL).					1.0 0.5			
431.0	30.0														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B001

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION Elevation (feet)	MATERIAL DESCRIPTION	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30		ST-9	150 psi	100			Soft, wet, gray, silty lean CLAY (CL-ML).						1.25			*Pushed shelby tube from 30.0 to 32.0 feet*
	35		SS-10	2 2 4	100		426.0	Loose, wet, gray, silty SAND (SM), trace wood fragments.	35.0					0.5			
							425.2	Medium stiff, moist, gray, lean CLAY (CL).	35.8					1.0			
	40		SS-11	50/3"	100		421.0	CLAYSTONE: Brown and gray, weathered, hard.	40.0								
	45		SS-12	50/2"													
			Run 1	16.7	36.7		415.0	SILTSTONE: Thin to medium bedding, fresh, argillaceous.	46.0									*Run 1 - Start 13:46, End 14:00*
							410.0	End of Boring at 51 ft	51.0								*Boring backfilled with Portland Cement and bentonite*

Elevation (feet)	Depth (feet)
	30
430	
	35
425	
	40
420	
	45
415	
	50
410	
	55
405	
	60
400	
	65

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B002

Sheet 1 of 2

Date(s) Drilled	**09/03/2015 to 09/03/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**52.5 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**454.9 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**7.5 ft on 9/3/2015**		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	0		SS-1	7 6 8	89		454.9 / 0.0 Medium dense, moist, dark brown, FLY ASH [Fill].	38.4							
			SS-1	3 2 2	100		452.4 / 2.5 Loose, moist, dark gray, FLY ASH [Fill].	62.4							
450	5		ST-3	150 psi	62.5			66.6		65	29				*Pushed shelby tube from 5.0 to 7.0 feet*
			SS-4	WOR	100		447.4 / ∇ 7.5 Very loose, wet, black, FLY ASH [Fill].	79.0							
445	10		ST-5		55			76.9	90.8 94.3 91.2	17	NP				*10.0 feet switch to mud rotary* *Pushed shelby tube from 10.0 to 12.0 feet*
							Becomes dark gray.								
							Hard layer at tip of tube.								
440	15		SS-6	1 2 3	100		Becomes loose.	52.5							
435	20		SS-7	12 17 2	37		434.9 / 20.0 Medium dense, wet, dark gray, FLY ASH [Fill], with cementous layers.	67.8							
430	25		SS-8	1 WOH WOH	100		429.9 / 25.0 Very loose, wet, dark gray, FLY ASH [Fill].	63.9							
425	30														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B002

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30						With clay.								
424.4	30.5	SS	SS-9	WOR WOH WOH	100		Very soft, wet, brown, lean CLAY (CL), with sand.	126.1 31.1				0.5			
419.9	35.0	ST	ST-10	100 psi	100		Very soft, gray, lean CLAY (CL), with sand, trace shells.	31.6		36	18	0.25			
	40	SS	SS-11	WOH WOH WOH	100			42.9				0.75			
	45	SS	SS-12	WOH WOH 2	100		Grades with trace organics.	57.7				0.25			
407.9	47.0						SHALE: Light gray, silt sized.								
	50	SS	SS-13	50/3"	100			11.1							
402.4	52.5						End of Boring at 52.5 ft								*Boring backfilled with bentonite and cement fluid*

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B003

Sheet 1 of 2

Date(s) Drilled	09/03/2015 to 09/03/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	60.5 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	460.0 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	7 ft on 9/3/2015		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
460	0		SS-1	7 7 7	83		460.0 / 0.0 Medium dense, moist, dark gray, FLY ASH [Fill].	44.4							
			SS-2	3 2 2	100		Becomes loose.	27.3							
455	5		SS-3	1 WOH 2			455.0 / 5.0 Very soft, moist, lean CLAY (CL) with ash, sand, and organics. ∇	37.2							
			ST-4	<100 psi	100		452.5 / 7.5 Ash, dark gray [Fill].	55.5							*Pushed shelby tube from 7.5 to 9.5 feet*
450	10		SS-5	WOR WOR WOR	67			50.6							*10.0 feet: Switch to mud rotary*
							447.0 / 13.0 Very dense, dark gray, moist, fine to coarse ASH with sand and gravel, slightly cemented [Fill].								*13.0 feet: Hard drilling*
445	15		SS-6	26 37 29	100			29.7							
							Becomes very loose, dark gray, fine.								
440	20		SS-7	1 1 1	100			42.1							
435	25		ST-8	100 psi	100		Grades with sand.	54.9							*Pushed shelby tube from 25.0 to 27.0 feet*
430	30														

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Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B003

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type Number	 Sampling Resist. OR Core RQD (%)	 Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
430	30	ST-9	100 psi	100		Varved FLY ASH [Fill].	71.7	91.2 92.9 92.0						*Pushed shelby tube from 30.0 to 32.0 feet*
425	35	SS-10	WOR WOR WOR	100			51.9 43.0							
423.5	36.5					Very soft, moist, brown to gray, silty CLAY (CL), trace sand, shells, and organics.								
420	40	SS-11	WOH WOH WOR	100			31.6				.75			
415.0	45.0	ST-12	100 psi	100		Soft, moist, dark gray, fat CLAY (CH) with sand.	46.0				1.0			*Pushed shelby tube from 45.0 to 47.0 feet*
410.0	50.0	SS-13	1 2 3	100		Medium stiff, moist, brownish to greenish, gray, lean CLAY (CL), with sand.	55.4				1.0			
406.0	54.0					SHALE, gray, weathered, silt sized.								
405	55	SS-14	11 50/5"	100			23.3 9.8							
400	60	SS-15	50/3"	100			7.1							
399.5	60.5					End of Boring at 60.5 ft								*Boring backfilled with bentonite and cement fluid*
395	65													

Project: Edwards Power Station

Project Location: **Bartonville, Illinois**

Project Number: **60440202**

Log of Boring EDW-B003A

Sheet 1 of 1

Date(s) Drilled	**09/03/2015 to 09/03/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**9.5 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**460.0 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
Boring Location	**5' East of EDW-B003 (ft NAD83)**	Groundwater Level(s)	**7 ft on 9/3/2015**		

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
460	0					Elevation (feet) 460.0 / Depth (feet) 0.0 Offset boring to attempt shelby tube at 7.5 feet								
455	5													
						▽								
		ST-1		0										*Pushed shelby tube from 7.5 to 9.5 feet*
						450.5 / 9.5 End of Boring at 9.5 ft								*Boring backfilled with bentonite and cement fluid*
450	10													
445	15													
440	20													
435	25													
430	30													

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B004

Sheet 1 of 2

Date(s) Drilled	09/11/2015 to 09/11/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	60.3 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	460.5 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
460.5	0.0														
460.0	0.5						6" stone at surface [Fill].								
			SS-1	16 12 15	83		Medium dense, moist, dark gray, ASH [Fill].	18.9							
			SS-2	3 2 2	100			28.5 20.1							
457.0	3.5						Becomes dark gray to dark brown, trace silty clay, sand and gravel [Fill].								
455	5		SS-3	2 2 4	77							1.25			
			SS-4	2 3 4	100			21.6				2.0			
450	10		SS-5	2 2 2	67			21.5				2.0			*10.0 feet: Switch to mud rotary*
448.0	12.5						Soft, wet, brown mottled, silty CLAY (CL), trace sand and gravel.								
			SS-6	2 2 2	100			25.4				1.25			
445	15		SS-7	2 3 3	77			25.8				1.25			
440	20		SS-8	WOH 2 3	89		Grades brown, with sand.	31.3				.75			
435	25		SS-9	2 2 3	89			23.0 19.5							
434.5	26.0						Medium stiff, wet, brown, clayey SAND (SC).								
434.0	26.5						Medium stiff, wet, dark gray to gray, silty CLAY (CL), trace sand.								
430.5	30.0														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B004

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	SAMPLES Number	SAMPLES Sampling Resist. OR Core RQD (%)	SAMPLES Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
430	30	▨	SS-10	2 7 6	89	▨	Stiff, gray, wet, lean CLAY (CL), with sand, and organics.	19.7				4.0			
425.5	35.0					▨	Stiff, wet, gray mottled, lean CLAY (CL) with sand.								
		▤	ST-11		100			20.1				1.25			*Pushed shelby tube from 36.0 to 38.0 feet*
420.5	40.0	▨	SS-12	2 3 3	89	▨	Stiff, wet, brown mottled, lean CLAY (CL), trace sand.	30.0				1.75			
415.5	45.0	▨	SS-13	2 3 5	83	▨	Medium stiff, wet, dark gray, lean CLAY (CL).	39.5 35.1				1.25			
410.5	50.0	▨	SS-14	2 2 3	100	▨	Medium, stiff, wet, gray, lean CLAY (CL) with sand, trace shells and organics.	65.2				1.25			
	55	▨	SS-15	3 8 23				33.4 13.2							
404.5	56.0					▤	SHALE: Light gray, weathered.								*56.5 to 60.0 feet: Solid drilling*
400.5	60.0	▨	SS-16	50/3"	100		End of Boring at 60.3 ft	8.8							*Boring backfilled with bentonite and cement fluid*

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Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B005

Sheet 1 of 2

Date(s) Drilled	**09/10/2015 to 09/10/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**53.0 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**459.0 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**8 ft on 9/10/2015**		

Elevation (feet)	Depth (feet)	SAMPLES Type Number	SAMPLES Sampling Resist. OR Core RQD (%)	SAMPLES Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	0	SS-1	4 4 5	95		459.0 / 0.0 Medium, stiff, moist, brown, clayey SAND (SC), trace gravel, topsoil, roots and fill.	45.8				2.0			
455		SS-2	9 15 11	100		456.5 / 2.5 Medium dense, moist, brown, sandy SILT (ML) with gravel.	26.0							
	5	SS-3	2 2 2	100		454.0 / 5.0 Loose, moist, brown, sandy elastic SILT (MH) with clay.	50.9				1.8			
450		SS-4		100		451.0 / ▽ 8.0 Loose, wet, brown, sandy SILT (ML) with gravel.	37.4							
	10	SS-5	1 2 5	100		449.0 / 10.0 Medium stiff, wet, light brown and gray, clayey SAND (SC) with gravel.	44.3							*10.0 feet: Switch to mud rotary*
445	15	SS-6	2 8 10	100		444.0 / 15.0 Very stiff, wet, brown, sand SILT (ML) with gravel.	41.4							
440	20	SS-7	1 1 1	100		439.0 / 20.0 Soft, wet, brown, gravelly CLAY (CL), trace sand.	51.1							
435	25	SS-8	2"	100			55.3 47.6							
430		SS-9		100		432.5 / 26.5 Very loose, wet, dark brown ASH [Fill].	69.3							
	30													

Project: Edwards Power Station

Project Location: **Bartonville, Illinois**

Project Number: **60440202**

Log of Boring EDW-B005

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30		SS-9		100			69.3							
424.0	35.0		SS-10	WOR WOH WOH	67		Very loose, wet, black, ASH, with organic clay [Fill].	37.3							
421.0	38.0						Soft, wet, gray, fat CLAY (CH), trace sand, shells, and organics.								
			ST-11	150 psi	100			44.8		57	35				*Pushed shelby tube from 41.0 to 43.0 feet*
414.0	45.0		SS-12	WOH 2 2	100		Soft, wet, dark gray and greenish gray, lean CLAY (CL), with sand, organics and shale.	88.7							
409.5	49.5		SS-13	11 18 44	89		SHALE: light gray, weathered.	15.9 12.8							
406.0	53.0						End of Boring at 53 ft								*Boring backfilled with bentonite and cement fluid*

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B006

Sheet 1 of 2

Date(s) Drilled	09/08/2015 to 09/08/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	37.0 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	436.0 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
436.0	0.0	SS-1	3 4 6	94		Stiff, moist, dark brown, lean CLAY (CL) with sand and glass.	26.4				3.0			
433.5	2.5	SS-2	3 3 3	67		Medium stiff, brown to dark brown lean CLAY (CL), trace sand.	30.1				1.25			
431.0	5.0	SS-3	2 3 4	100		Medium stiff, moist, gray and mottled brown, lean CLAY (CL), trace sand.	24.8		48	29	2.0			
		SS-4	3 4 4	100			26.0				1.5			
	10	SS-5	1 2 1	100		Becomes soft.	34.2				1.0			*10.0 feet: Switch to mud rotary*
														Pushed shelby tube from 12.0 to 14.0 feet
423.0	13.0	ST-6		100		Soft, moist, gray fat CLAY (CH) with sand and shells.	31.1		62	42	1.25			
421.0	15.0	SS-7	1 1 1	100		Soft, moist, brownish gray, lean CLAY (CL).	40.8				1.0			
	20	SS-8	WOH WOH 1	100		Becomes very soft, brown and gray, with sand.	43.4				0.75			
410.0	26.0	ST-9		100		Very soft, moist, dark gray, organic SILT (OH).	76.0		72	35	0.75			*Pushed shelby tube from 26.0 to 28.0 feet*
406.0	30.0													

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:09 PM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B006

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Elevation (feet)	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30	▨	SS-10		89	▨	Very soft, moist, gray lean CLAY (CL) with sand, pockets of organics.	405.0	31.0	43.4				0.75			
405						▨	Very soft, moist, grayish brown, lean CLAY (CL) with sand, silt, and organics.	403.0	33.0	19.6							
	35	▨	SS-11		84	☰	SHALE: light gray, weathered.	399.0	37.0	14.2							
400							End of Boring at 37 ft										*Boring backfilled with bentonite and cement fluid*
395	40																
390	45																
385	50																
380	55																
375	60																
	65																

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B008

Sheet 1 of 2

Date(s) Drilled	**09/13/2015 to 09/13/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**42.5 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**438.8 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**ft on**		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
438.8	0.0	▨	SS-1	3 4 4	100	▨	Stiff, moist, brown, lean CLAY (CL) with sand and gravel, trace roots.	13.2				4.0			
		▨	SS-2	3 4 6	100	▨		19.5		42	20	4.25			
		▨	SS-3	2 3 5	67	▨	Becomes medium stiff.	42.3				2.0			
431.3	7.5	▨	SS-4	1 3 2	89	▨	Medium stiff, moist, gray and mottled brown, lean CLAY (CL), trace sand.	22.8				2.5			
	10					▨									*10.0 feet: Switch to mud rotary*
427.8	11.0	▤	ST-5	150 psi	85	▩	Medium stiff, moist, brown and gray fat CLAY (CH), trace sand.	33.6		52	33	0.75			
423.8	15.0	▨	SS-6	WOH 1 1	100	▨	Soft, moist, dark brown, lean CLAY (CL), trace shells.	64.6				0.75			
		▨	SS-7	WOH WOH WOH	100	▨	Becomes very soft.	44.4				0.75			
414.8	24.0	▤	ST-8	150 psi		▩	Very soft, moist, dark gray, fat CLAY (CL), trace organics.	68.9		67	36	1.0			
408.8	30.0														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B008

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30	▨	SS-9	WOH WOH WOH	100	▨	Very soft, moist, gray and brownish gray, lean CLAY (CL), trace sand.	71.4				0.5			
405						▨									
	35	▨	SS-10	WOH WOH WOH	100	▨	Trace wood, organics, and shells.	56.9				0.75			
400						▨	399.8 – – – 39.0								
						▤	SHALE: Light gray, slightly weathered.								
	40	▨	SS-11	66/4"	100	▤		12.6							*40.0 to 42.5 feet: Solid drilling*
						▤	396.3 ——— 42.5								
							End of Boring at 42.5 ft								*Boring backfilled with bentonite and cement fluid*
395															
	45														
390															
	50														
385															
	55														
380															
	60														
375															
	65														

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:15 PM

AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B009

Sheet 1 of 3

Date(s) Drilled	11/05/2015 to 11/05/2015	Logged By	Robert Weseljak	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	66.5 ft
Drill Rig Type	Mobile B-57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	460.1 ft
Borehole Backfill	Portland Cement and Bentonite	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION Elevation (feet)	MATERIAL DESCRIPTION	MATERIAL DESCRIPTION Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
460	0					460.1		0.0								
		SS-1	11 13 15	100		459.6	Medium dense, moist, brown silty SAND (SM).	0.5					1.0 1.25			
						457.6	Very stiff, moist, gray and brown, sandy SILT (ML).	2.5								
		SS-2	2 1 1	67		455.6	Soft, dry, gray and brown sandy SILT (ML)	4.5					0.25			
455	5					454.6	Concrete from 4.5 to 5.5 [Fill].	5.5								
		SS-3	5 2 5	11		452.6	Light brown, well graded GRAVEL (GW).	7.5								*5.5 feet: Limestone cobbles*
		SS-4	5 4 4	89		451.6	Stiff, dry, brownish gray, silty SAND with GRAVEL (SM).	8.5					1.0			
450	10					449.1	Medium dense, moist, black, sandy SILT (ML).	11.0								
		ST-5	250 psi	75		445.1	Medium stiff, moist, brownish gray, lean CLAY (CL).	15.0					1.5			*Pushed shelby tube from 11.0 to 13.0 feet* *Trace gravel in top of tube*
445	15	SS-6	1 5 5	89		440.1	Medium dense, moist, brown mottled with reddish brown, lean CLAY (CL).	20.0					2.0			
440	20	SS-7	WOH 2 4	94		435.1	Very soft to medium dense, moist to wet, gray, lean CLAY (CL) with shell and wood fragments.	25.0					1.0			
435	25	SS-8	WOH WOH 3	100			Very soft to soft, wet, gray, lean CLAY (CL) with shell fragments.						0.5 1.0			
	30															

AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B009

Sheet 2 of 3

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Elevation (feet)	MATERIAL DESCRIPTION	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
430	30		SS-9	WOH 7 7	100	429.6	Stiff, dry, black, lean CLAY (CL), low plasticity.	30.5					1.0 1.25			
425	35		ST-10	125 psi	100		Becomes gray.						1.0			*Pushed shelby tube from 35.0 to 37.0 feet*
420	40		SS-11	WOH WOH 4	100	420.1	Soft, moist to wet, gray, lean CLAY (CL) with shell fragments, low to medium plasticity.	40.0					0.5			
415	45		SS-12	WOH 1 4	100								1.0			
410	50		SS-13	WOH WOH WOH	100	410.1	Very soft, wet, gray, SILT (ML) with shell fragments, low plasticity.	50.0					1.0			
405	55		SS-14	WOH WOH 17	100								3.0			
						404.1	Medium dense, wet, gray, fine to coarse clayey GRAVEL (GC), trace fine to coarse sand, reddish brown gravel.	56.0								
400	60		SS-15	50/3"	17	400.1	CLAYSTONE: Gray.	60.0								
			Run 1	0	0											*61.5 feet: Run 1 - Start 7:57, End 8:10*
	65															

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:20 PM

Elevation (feet)	Depth (feet)	SAMPLES				Graphic Symbol	MATERIAL DESCRIPTION			Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
		Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)		Elevation (feet)		Depth (feet)								
395		▌	Run 1	0	0	▤	393.6	End of Boring at 66.5 ft	66.5								
390	70																
385	75																
380	80																
375	85																
370	90																
365	95																
	100																

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B010

Sheet 1 of 2

Date(s) Drilled	09/04/2015 to 09/04/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	45.3 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	459.0 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	0		SS-1	10 6 10	56		459.0 / 0.0 458.5 Medium dense, moist, brown, SAND (SP) with gravel and clay. 0.5 Medium dense, moist, dark gray, fine to coarse ASH [Fill].	7.2 17.4 27.9							
			SS-2	9 8 8	83			20.9 30.7							
455	5		SS-3	3 6 4	100			14.8							
							451.5 / 7.5 Stiff, moist, brown lean CLAY (CL), trace sand and gravel.								
			SS-4	3 3 6	78			22.0							
450	10						449.0 / 10.0 Medium stiff, moist, brown and mottled gray, lean CLAY (CL), trace sand.								
			SS-5	2 3 4	78			24.0							
			SS-6	2 2 3	78			28.0							*12.0 feet: Switch to mud rotary*
445	15		ST-7	250 psi	83			30.5		48	30				*Pushed shelby tube from 15.0 to 17.0 feet*
440							440.0 / 19.0 Soft, wet, gray, lean CLAY (CL), trace sand and shells.								
	20		SS-8	1 1 1	83			32.9							
435	25		SS-6	WOH WOH 3	89			21.4							
430	30														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B010

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	MATERIAL DESCRIPTION	Elevation (feet)	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30	ST-10		72				30.0	117.6 118.9 118.6	40	25				*Pushed shelby tube from 30.0 to 32.0 feet*
425	35	SS-11	1 2 3	94	Becomes medium stiff.			28.2							
420	40	SS-12	6 7 50/3.5"	83	Medium dense, wet, brown, fine to coarse silty SAND (SP) with gravel.	419.0	40.0	17.0							
					SHALE: Light gray, weathered.	418.0	41.0								*41.0 to 43.0 feet: Hard drilling*
415	45	SS-13	50/3"	35	End of Boring at 45.25 ft	413.8	45.3	16.4							*Boring backfilled with bentonite and cement fluid*
410	50														
405	55														
400	60														
395	65														

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:29 PM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B011

Sheet 1 of 2

Date(s) Drilled	09/12/2015 to 09/12/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	62.0 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	456.4 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	7.5 ft on 9/12/2015		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) 456.4; Depth (feet) 0.0)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	0	▨	SS-1	9 12 12	89		Medium dense, moist, dark gray, ASH [Fill].	27.7							
455															
		▨	SS-2	8 9 14	100			16.3							
	5	▨	SS-3	6 9 9	94			29.4							
450							∇								
		▨	SS-4	2 1 1	100		Becomes loose, wet.	45.3							
	10	▨	SS-5		84			70.0							*10.0 feet: Switch to mud rotary*
445															
	15	▨	SS-6	WOR WOR WOR WOR	100		Becomes very loose.	63.2							
440															
	20	▨	SS-7		56			84.9							
435															
	25	▨	SS-8	WOR WOR WOR WOR	89			74.7							
430															
	30														

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION Elevation (feet) / Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
425	30		SS-9	WOR WOR WOR WOR	100			73.7							
420	35		SS-10	WOR WOR WOR WOR	84			93.9							
416.4 415	40		SS-11	WOH 1 2	100		416.4 — 40.0 Soft, wet, gray, silty CLAY (CL), trace sand, shells, and organics.	47.9							
411.4 410	45		SS-12	WOR WOR WOH	94		411.4 — 45.0 Very soft, wet, gray, fat CLAY (CH), trace sand, shells, and wood.	63.3		63	42				
406.4 405	50		SS-13	WOR WOR WOH	89		406.4 — 50.0 Very soft, wet, dark gray and grayish brown, lean CLAY (CL).	62.5							
400	55		SS-14	WOR WOR WOH	100		Grades gray.	52.9							
398.4	58.0						398.4 — 58.0 SHALE: Light gray, soft.								*58.0 to 62.0 feet: Solid drilling*
395	60		SS-15	50/3"	100			9.1							
394.4	62.0						394.4 — 62.0 End of Boring at 62 ft								*Boring backfilled with bentonite and cement fluid*
	65														

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:35 PM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B012

Sheet 1 of 2

Date(s) Drilled	09/09/2015 to 09/09/2015	Logged By	Norm Seiler	Checked By	NDS
Drilling Method	Power Auger/ Mud Rotary	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Borehole Depth	60.0 ft
Drill Rig Type	Diedrich D-120 Rubber Tired ATV	Drilling Contractor	Strata Earth Services	Surface Elevation	459.0 ft
Borehole Backfill	Bentonite and Cement Fluid	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Hammer Data	Automatic, 140 lbs, 30" drop
		Groundwater Level(s)	ft on		

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
459.0	0.0												
458.6	0.4				Limestone gravel [Fill].								
		SS-1	6 6 4	94	Stiff, moist, brown sandy SILT (ML), trace clay, gravel, and topsoil.	23.0							
456.5	2.5				Loose, moist, dark brown ASH [Fill].								
		SS-2	5 4 3	78		23.8		28	2				
455	5	SS-3	3 4 11	56		26.5							
450		SS-4	10 10 7	89		26.5							
	10	SS-5	2 3 4	89	With clay.	24.7 24.9							
448.0	11.0				Stiff, moist, brown to gray, silty CLAY (CL), trace sand, shells, and roots.								
445		SS-6	3 3 6	94		22.0							
	15	SS-7	2 3 4	61	Becomes medium stiff.	24.3		48	29				*15.0 feet: Switch to mud rotary*
440	20	ST-8	100 psi	75		23.8							*Pushed shelby tube from 20.0 to 22.0 feet*
435	25	SS-9	3 3 3	100		23.2							
430	30												

AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B012

Sheet 2 of 2

Depth (feet)	Type / Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Elevation (feet)	MATERIAL DESCRIPTION	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
30	SS-10	2 2 4	61				24.8							
35	SS-11	2 2 2	100		Becomes soft, trace sand.		28.3							
40	SS-12	WOH 2 2	100		Becomes soft, trace sand, shells, and organics.		32.2							
45	SS-13	1 2 3	100				50.2							
	ST-14		100	412.0	Medium stiff, moist, dark gray, fat CLAY (CH).	47.0	50.8	104.4 104.9 104.0	54	34				*Pushed shelby tube from 47.0 to 49.0 feet*
50	SS-15	3 2 4	100	410.0	Medium stiff, moist, gray and brownish gray, lean CLAY (CL), trace sand.	49.0	67.4							
55	SS-16	11 21 23	100	403.5	Gray broken rock, weathered.	55.5	50.5 15.3							
				402.0	Light gray rock, weathered.	57.0								
60	SS-17	50/2.5"	75	398.8	End of Boring at 60 ft	60.2	17.9							*Boring backfilled with bentonite and cement fluid*
65														

Elevation (feet): 425, 420, 415, 410, 405, 400, 395

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:41 PM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B013

Sheet 1 of 2

Date(s) Drilled	**09/11/2015 to 09/11/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**53.0 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**457.0 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**ft on**		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
457.0	0.0	▨	SS-1	4 4 7	44	▨	Medium stiff, moist, dark gray to brown, CLAY (CL) with ASH [Fill].	13.6							
454.5	2.5	▨	SS-2	1 3 4	83	▨	Medium stiff, moist, brown, silty CLAY (CL), trace sand, gravel, and roots.	17.4				2.0			
		▨	SS-3		46	▨		24.3 20.0		49	28				
449.0	8.0	▨	SS-4	3 4 6	72	▨	Stiff, moist, dark gray, silty CLAY (CL), trace sand.	24.3				2.0			
		▨	SS-5	2 4 7	83	▨		25.4				2.0			*10.0 feet: Switch to mud rotary*
						▨	Gray and mottled brown silty CLAY (CL), trace sand.								
		▨	SS-6	2 2 4	100	▨	Becomes medium stiff, gray and mottled brown.	25.5		41	29	1.0			
		▨	SS-7	2 3 3	67	▨		23.5				1.0			
		▨	SS-8	3 3 4	67	▨	Becomes gray, trace organics.	27.7				1.25			
427.0	30.0					▨									

Elevation scale: 455, 450, 445, 440, 435, 430

Depth scale: 0, 5, 10, 15, 20, 25, 30

AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B013

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30	SS	SS-9	1 2 2	94	Medium stiff, moist, brown mottled gray, sandy CLAY (CL), trace silt and shells.	20.2				1.5			
425.0	32.0	ST	ST-10		100	Medium stiff, moist, gray and brown lean CLAY (CL) with sand.	33.3		42	19	1.25			*Pushed shelby tube from 32.0 to 34.0 feet*
	35	SS	SS-11	2 2 2	89	Becomes dark gray, trace organics.	58.0				1.0			
	40	SS	SS-12	2 2 3	100		54.5				1.25			
	45	SS	SS-13	2 2 4	100	Grades with calcium carbonate seams and shells.	66.2				1.75			
						Gravel layer 47.5 feet to 49.0 feet								
404.0	53.0					End of Boring at 53 ft								*Boring backfilled with bentonite and cement fluid*

Project: Edwards Power Station

Project Location: **Bartonville, Illinois**

Project Number: **60440202**

Log of Boring EDW-B014

Sheet 1 of 2

Date(s) Drilled	**09/12/2015 to 09/12/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**45.5 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**457.7 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**5 ft on 9/12/2015**		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	0						457.7 / 0.0 Medium dense, moist, dark gray, ASH [Fill].								
		▨	SS-1	1 4 10	89			28.2							
455		▨	SS-2	7 2 1	100			40.8							
							Becomes wet, gray.								
	5						∇								
		▤	ST-3		35										*Pushed shelby tube from 5.0 to 7.0 feet*
450		▨	SS-4	1 1 1	100		Becomes light gray.	60.2							
	10	▨	SS-5		100		Becomes dark gray.	78.7							*10.0 feet: Switch to mud rotary* *Pushed shelby tube from 10.0 to 12.0 feet*
445															
	15	▤	ST-6	1/12" 1/12"	100		Becomes light gray.	86.5							
440															
	20	▨	SS-7	1/12" 1/12"	100			73.1							
435															
	25	▨	SS-8	WOR WOR WOR	100			48.7							
430															
	30						427.7 / 30.0								

AECOM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B014

Elevation (feet)	Depth (feet)	SAMPLES Type	SAMPLES Number	SAMPLES Sampling Resist. OR Core RQD (%)	SAMPLES Recovery (%)	Graphic Symbol	Elevation (feet)	MATERIAL DESCRIPTION	Depth (feet)	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
	30		SS-9	WOR WOR WOR	67			Very loose, wet, black to gray, ASH with clay [Fill].		31.6							
	35		SS-10	WOH 1 2	100		422.7	Soft, wet, gray, silty CLAY (CL), trace shells and wood.	35.0								
	40		SS-11	2 18 34	100		417.2	SHALE: Light gray, weathered.	40.5	27.3 19.6 10.2							
																	42.0 to 45.0 feet: Solid drilling
	45		SS-12	56	100					14.2							
							412.2	End of Boring at 45.5 ft	45.5								*Boring backfilled with bentonite and cement fluid*

Elevation (feet)	Depth (feet)
425	
420	35
415	40
	45
410	50
405	55
400	60
395	65

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B015

Sheet 1 of 2

Date(s) Drilled	**09/10/2015 to 09/10/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**57.0 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**460.0 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
		Groundwater Level(s)	**ft on**		

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
460	0						460.0 / 0.0								
							459.6 / 0.4 Brown gravel.								
			SS-1	5 4 1	72		Medium stiff, moist, gray to brown, sandy CLAY (CL), trace silt.	54.7							
							457.5 / 2.5								
			SS-2	5 9 13	50		Medium dense, moist, light brown to white, fine to coarse GRAVEL (GP) with sand, trace silt and limestone.	4.5							
455	5		SS-3	6 10 13	39			5.4							
			SS-4	6 9 7	39			7.2							
450	10		SS-5	4 5 6	39			6.5							*10.0 feet: Switch to mud rotary; borehole collapsed*
			SS-6	10 3 2	11			3.6							
445	15		SS-7	4 4 4	39		Some coarse limestone.	8.2							
440	20		SS-8	10 7 9	39			7.8							
															23.0 to 25.0 feet: Drove casing with hammer *23.0 to 29.0 feet: Hard drilling*
435	25		SS-9	7 4 11	33			8.1							
430	30														

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B015

Sheet 2 of 2

Elevation (feet)	Depth (feet)	SAMPLES: Type Number	SAMPLES: Sampling Resist. OR Core RQD (%)	SAMPLES: Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
430	30													
429.0	31.0	ST-10	300 psi	100		Medium stiff, wet, gray, sandy CLAY (CL), trace silt, shells, and organics.	20.2	122.2 121.0 119.8	24	11	2.5			*Pushed shelby tube from 31.0 to 33.0 feet*
425.0	35.0	SS-11	WOH 2 3	94		Medium stiff, wet, gray and dark gray lean CLAY (CL)	33.8				1.25			
423.0	37.0	ST-12	175 psi			Soft, wet, dark gray, fat CLAY (CH).	41.0		66	43	1.0			*Pushed shelby tube from 37.0 to 39.0 feet*
421.0	39.0	SS-13	WOH 2 2	100		Soft, wet, brown and gray, lean CLAY (CL).	36.2				1.0			
415	45	SS-14	WOH 2 2	83		Grades with sand.	49.4				1.0			
410	50	SS-15	3 5 14	22		Grades without sand.	30.9				0.5			
408.0	52.0					SHALE: Light gray, silt sized, weathered.								*52.0 feet: Solid drilling*
405	55	SS-16	71/6"	oK			11.0							
403.0	57.0					End of Boring at 57 ft								*Boring backfilled with bentonite and cement fluid*
400	60													
395	65													

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:22:58 PM

Project: Edwards Power Station

Project Location: Bartonville, Illinois

Project Number: 60440202

Log of Boring EDW-B015A

Sheet 1 of 1

Date(s) Drilled	**09/10/2015 to 09/10/2015**	Logged By	**Norm Seiler**	Checked By	**NDS**
Drilling Method	**Power Auger/ Mud Rotary**	Drill Bit Size/Type	**3 7/8" Tricone Roller Bit**	Borehole Depth	**30.0 ft**
Drill Rig Type	**Diedrich D-120 Rubber Tired ATV**	Drilling Contractor	**Strata Earth Services**	Surface Elevation	**460.0 ft**
Borehole Backfill	**Bentonite and Cement Fluid**	Sampling Method(s)	**Split Spoon/3" Thin Walled Tube**	Hammer Data	**Automatic, 140 lbs, 30" drop**
Boring Location	**5' SW of EDW-B015 (ft NAD83)**	Groundwater Level(s)	**ft on**		

Elevation (feet)	Depth (feet)	SAMPLES			Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU (ksf)	REMARKS
		Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)		Elevation (feet) / Depth (feet)								
460	0					460.0 / 0.0 Blank power auger to 30.0 feet to confirm 29.0 feet of gravel.								*Offset 5.0 feet west of EDW-B015*
455	5													*5.0 to 30.0 feet: No cuttings* *7.0 feet: Borehole collapsed; created a 14" diameter hole with no cuttings*
450	10													
445	15													
440	20													*20.0 feet: Groundwater encountered*
435	25													*Auger hole collapsed and auger removed. No clay on auger.*
430	30					430.0 / 30.0								

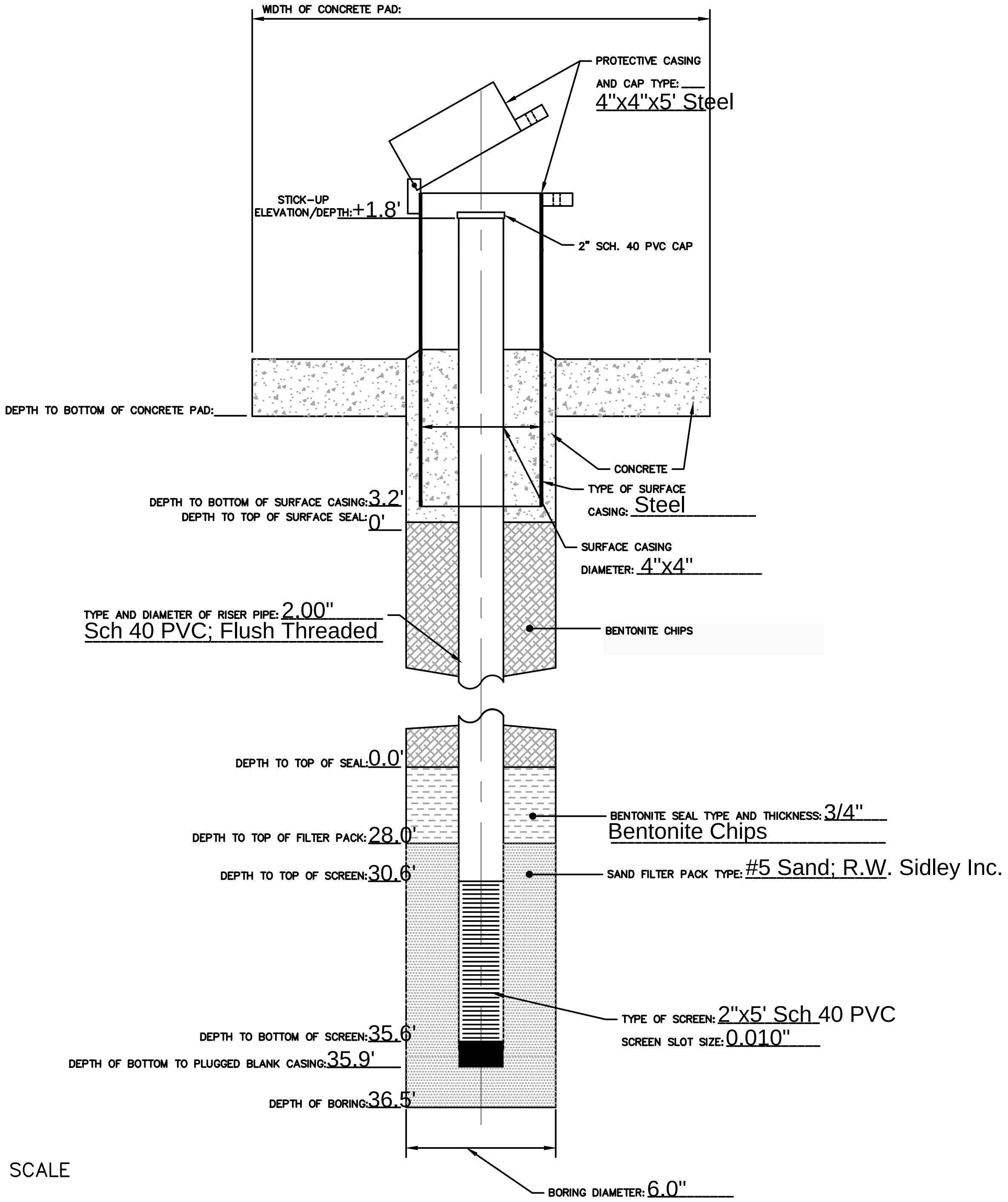
End of Boring at 30 ft

Report: GEO_SOIL; File K:\PROJECTS\60440202_DYNEGY CCR EDWARDS\400-TECHNICAL\BORING LOGS\60440202_DYNEGYEDWARDSBORINGLOGS.GPJ; 2/24/2016 7:23:03 PM

Attachment C. Piezometer Logs

Project: Dynegy Project Location: Bartonville, IL Project Number: 60440202	Log of Piezometer Sheet 1 of 1

Piezometer Location	EDW-P001	Date Installed	11/05/15	Time	5:30 P.M.
Installed By	Josh Kohn	Observed By	R. Weseljak	Total Depth	36.5'
Method of Installation	6" Mud Rotary	Drilling Contractor	Strata	Surface Elevation	461.0 (NAVD88)
Screened Interval	30.6-35.6'				
		Groundwater Level(s)	24.64' from top of casing		



WIDTH OF CONCRETE PAD:

PROTECTIVE CASING AND CAP TYPE: 4"x4"x5' Steel

STICK-UP ELEVATION/DEPTH: +1.8'

DEPTH TO BOTTOM OF CONCRETE PAD:

TYPE OF SURFACE CASING: Steel

DEPTH TO BOTTOM OF SURFACE CASING: 3.2'

DEPTH TO TOP OF SURFACE SEAL: 0'

SURFACE CASING DIAMETER: 4"x4"

TYPE AND DIAMETER OF RISER PIPE: 2.00" Sch 40 PVC; Flush Threaded

DEPTH TO TOP OF SEAL: 0.0'

BENTONITE SEAL TYPE AND THICKNESS: 3/4" Bentonite Chips

DEPTH TO TOP OF FILTER PACK: 28.0'

DEPTH TO TOP OF SCREEN: 30.6'

SAND FILTER PACK TYPE: #5 Sand; R.W. Sidley Inc.

TYPE OF SCREEN: 2"x5' Sch 40 PVC

SCREEN SLOT SIZE: 0.010"

DEPTH TO BOTTOM OF SCREEN: 35.6'

DEPTH OF BOTTOM TO PLUGGED BLANK CASING: 35.9'

DEPTH OF BORING: 36.5'

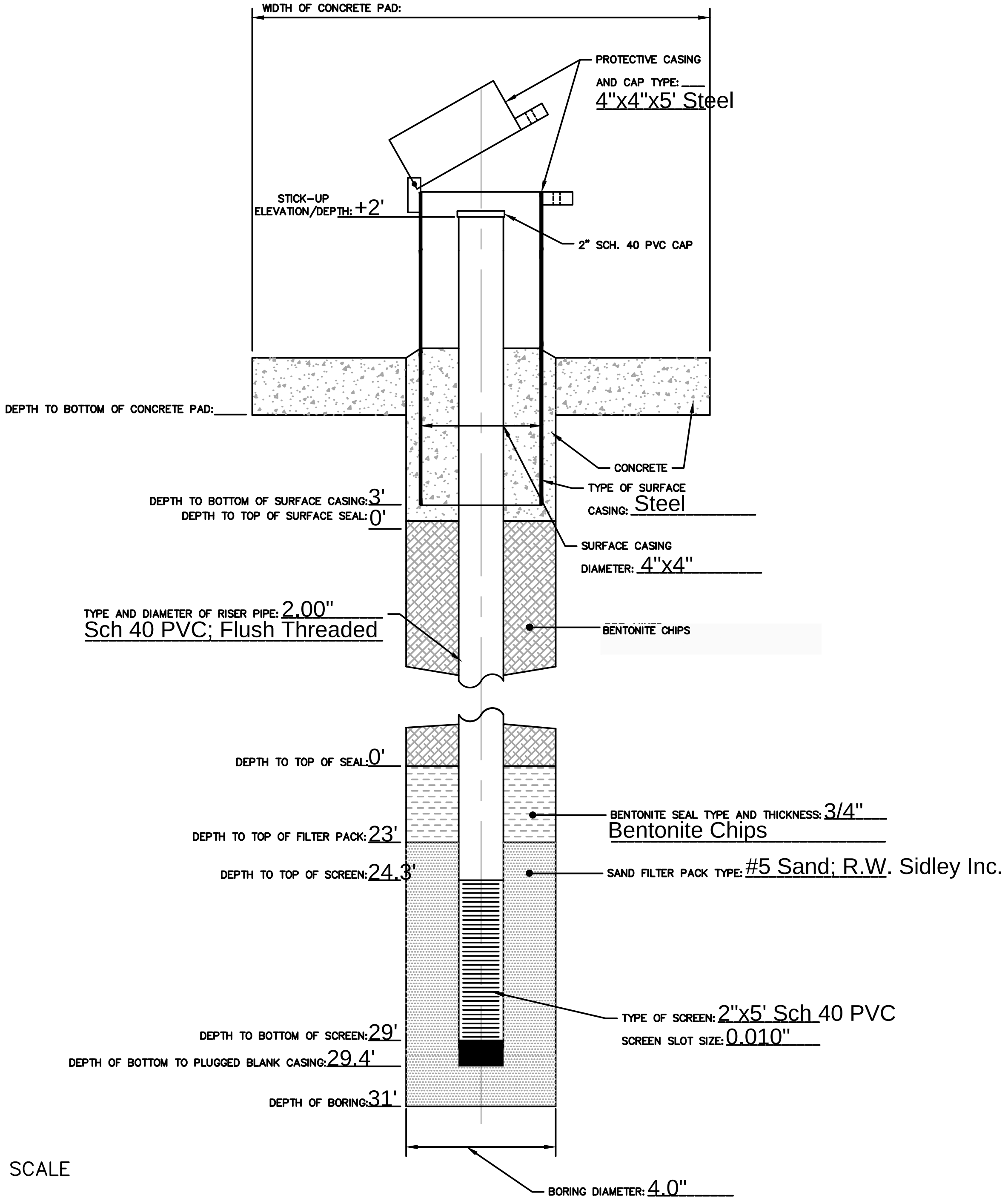
BORING DIAMETER: 6.0"

NOT TO SCALE

AECOM

Project: Dynegy	Log of Piezometer
Project Location: Bartonville, IL	
Project Number: 60440202	Sheet 1 of 1

Piezometer Location	EDW-P002	Date Installed	09/04/15	Time	11:00-12:00 P.M.
Installed By	Scott Komen	Observed By	N. Seiler	Total Depth	31'
Method of Installation	4" Power Auger	Drilling Contractor	Strata	Surface Elevation	459.0 (NAVD88)
Screened Interval	24-29'				
		Groundwater Level(s)	29' After Drilling		



WIDTH OF CONCRETE PAD:

PROTECTIVE CASING AND CAP TYPE: 4"x4"x5' Steel

STICK-UP ELEVATION/DEPTH: +2'

DEPTH TO BOTTOM OF CONCRETE PAD:

DEPTH TO BOTTOM OF SURFACE CASING: 3'

DEPTH TO TOP OF SURFACE SEAL: 0'

TYPE OF SURFACE CASING: Steel

SURFACE CASING DIAMETER: 4"x4"

TYPE AND DIAMETER OF RISER PIPE: 2.00" Sch 40 PVC; Flush Threaded

DEPTH TO TOP OF SEAL: 0'

BENTONITE SEAL TYPE AND THICKNESS: 3/4" Bentonite Chips

DEPTH TO TOP OF FILTER PACK: 23'

DEPTH TO TOP OF SCREEN: 24.3'

SAND FILTER PACK TYPE: #5 Sand; R.W. Sidley Inc.

TYPE OF SCREEN: 2"x5' Sch 40 PVC

SCREEN SLOT SIZE: 0.010"

DEPTH TO BOTTOM OF SCREEN: 29'

DEPTH OF BOTTOM TO PLUGGED BLANK CASING: 29.4'

DEPTH OF BORING: 31'

BORING DIAMETER: 4.0"

NOT TO SCALE

Project: Dynegy

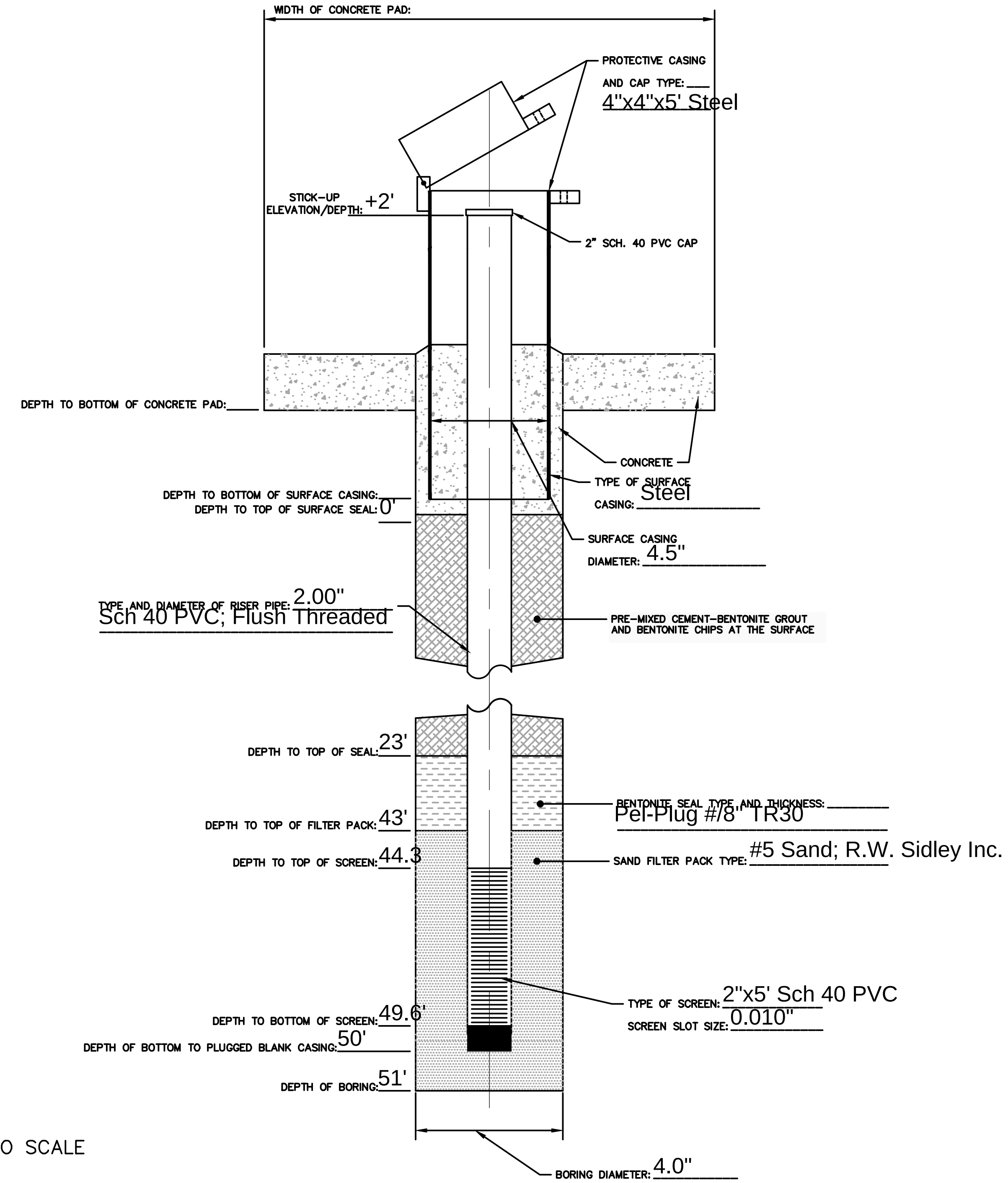
Project Location: Bartonville, IL

Project Number: 60440202

Log of Piezometer

Sheet 1 of 1

Piezometer Location	EDW-P003	Date Installed	09/04/15	Time	3:30-6:00 P.M.
Installed By	Scott Komen	Observed By	N. Seiler	Total Depth	51'
Method of Installation	3 7/8" Rock Bit	Drilling Contractor	Strata	Surface Elevation	459.6 (NAVD88)
Screened Interval	44.3-49.6'				



WIDTH OF CONCRETE PAD:

PROTECTIVE CASING AND CAP TYPE: 4"x4"x5' Steel

STICK-UP ELEVATION/DEPTH: +2'

2" SCH. 40 PVC CAP

DEPTH TO BOTTOM OF CONCRETE PAD:

CONCRETE

DEPTH TO BOTTOM OF SURFACE CASING:

DEPTH TO TOP OF SURFACE SEAL: 0'

TYPE OF SURFACE CASING: Steel

SURFACE CASING DIAMETER: 4.5"

TYPE AND DIAMETER OF RISER PIPE: 2.00" Sch 40 PVC; Flush Threaded

PRE-MIXED CEMENT-BENTONITE GROUT AND BENTONITE CHIPS AT THE SURFACE

DEPTH TO TOP OF SEAL: 23'

BENTONITE SEAL TYPE AND THICKNESS: Pel-Plug #/8" TR30

DEPTH TO TOP OF FILTER PACK: 43'

DEPTH TO TOP OF SCREEN: 44.3

SAND FILTER PACK TYPE: #5 Sand; R.W. Sidley Inc.

TYPE OF SCREEN: 2"x5' Sch 40 PVC

SCREEN SLOT SIZE: 0.010"

DEPTH TO BOTTOM OF SCREEN: 49.6'

DEPTH OF BOTTOM TO PLUGGED BLANK CASING: 50'

DEPTH OF BORING: 51'

BORING DIAMETER: 4.0"

NOT TO SCALE

Project: Dynegy

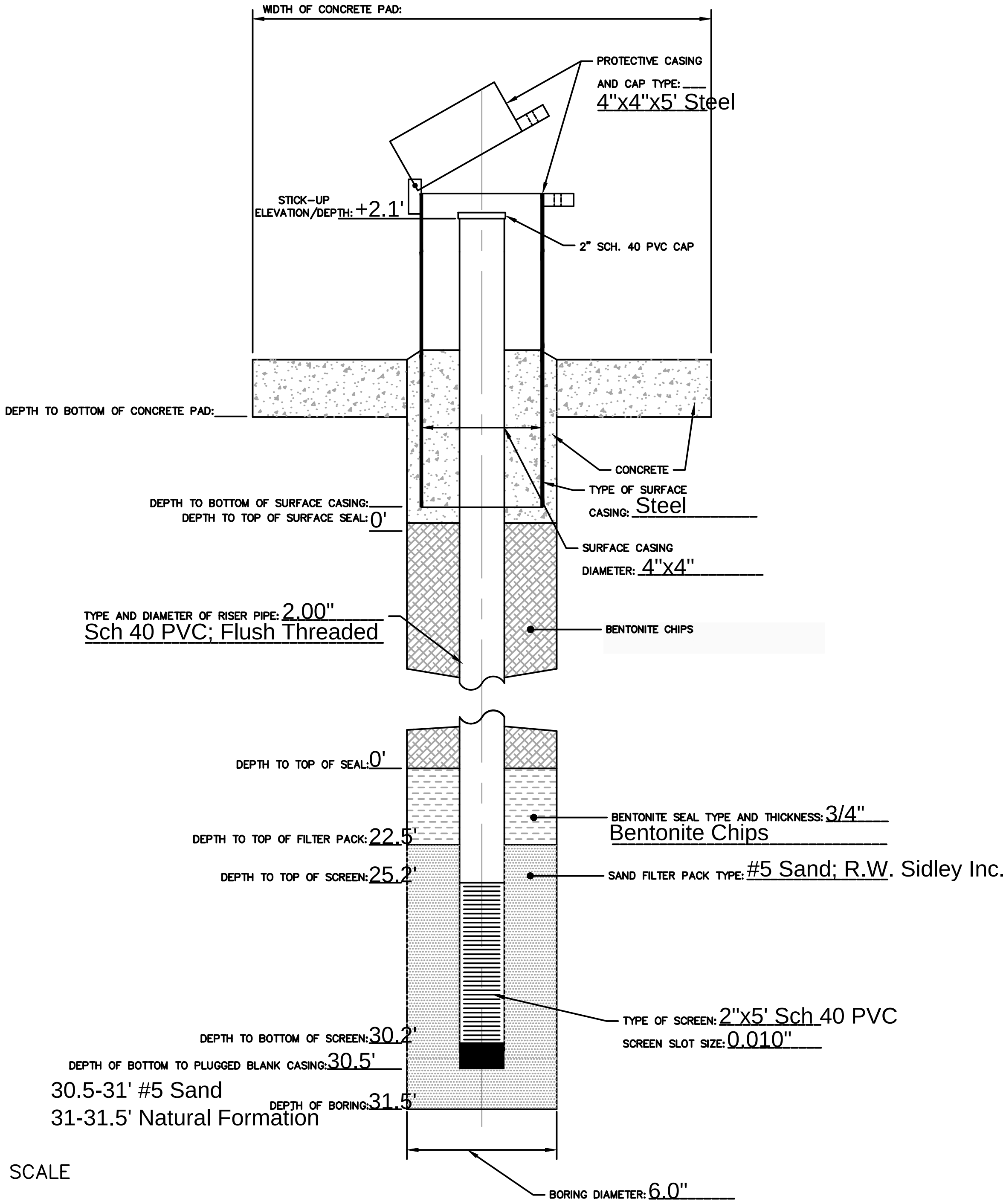
Project Location: Bartonville, IL

Project Number: 60440202

Log of Piezometer

Sheet 1 of 1

Piezometer Location	EDW-P004	Date Installed	11/04/15	Time	12:00
Installed By	Josh Kohn	Observed By	R. Weseljak	Total Depth	31.5'
Method of Installation	6" Mud Rotary	Drilling Contractor	Strata	Surface Elevation	455.6 (NAVD88)
Screened Interval	25.2-30.2'				
		Groundwater Level(s)	14.85 From Top of Casing		



PROTECTIVE CASING AND CAP TYPE: 4"x4"x5' Steel

STICK-UP ELEVATION/DEPTH: +2.1'

DEPTH TO BOTTOM OF SURFACE CASING:

DEPTH TO TOP OF SURFACE SEAL: 0'

TYPE OF SURFACE CASING: Steel

SURFACE CASING DIAMETER: 4"x4"

TYPE AND DIAMETER OF RISER PIPE: 2.00" Sch 40 PVC; Flush Threaded

DEPTH TO TOP OF SEAL: 0'

BENTONITE SEAL TYPE AND THICKNESS: 3/4" Bentonite Chips

DEPTH TO TOP OF FILTER PACK: 22.5'

DEPTH TO TOP OF SCREEN: 25.2'

SAND FILTER PACK TYPE: #5 Sand; R.W. Sidley Inc.

TYPE OF SCREEN: 2"x5' Sch 40 PVC

SCREEN SLOT SIZE: 0.010"

DEPTH TO BOTTOM OF SCREEN: 30.2'

DEPTH OF BOTTOM TO PLUGGED BLANK CASING: 30.5'

DEPTH OF BORING: 31.5'

30.5-31' #5 Sand

31-31.5' Natural Formation

BORING DIAMETER: 6.0"

NOT TO SCALE

Attachment D. CPT Data Report

PRESENTATION OF SITE INVESTIGATION RESULTS

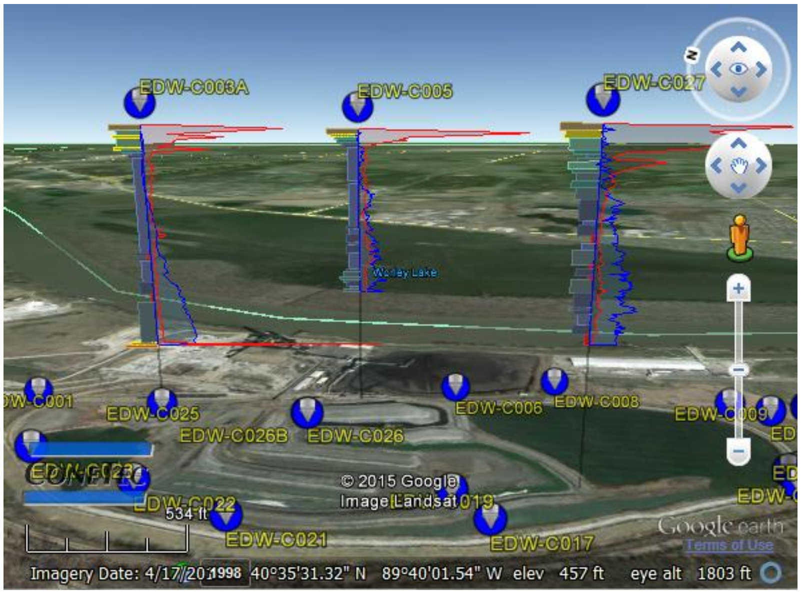
Edwards Power Station
Peoria, Illinois

Prepared for:

AECOM

ConeTec Job No: 15-53073

Project Start Date: 19-Aug-2015
Project End Date: 29-Aug-2015
Report Date: 31-Aug-2015



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Introduction

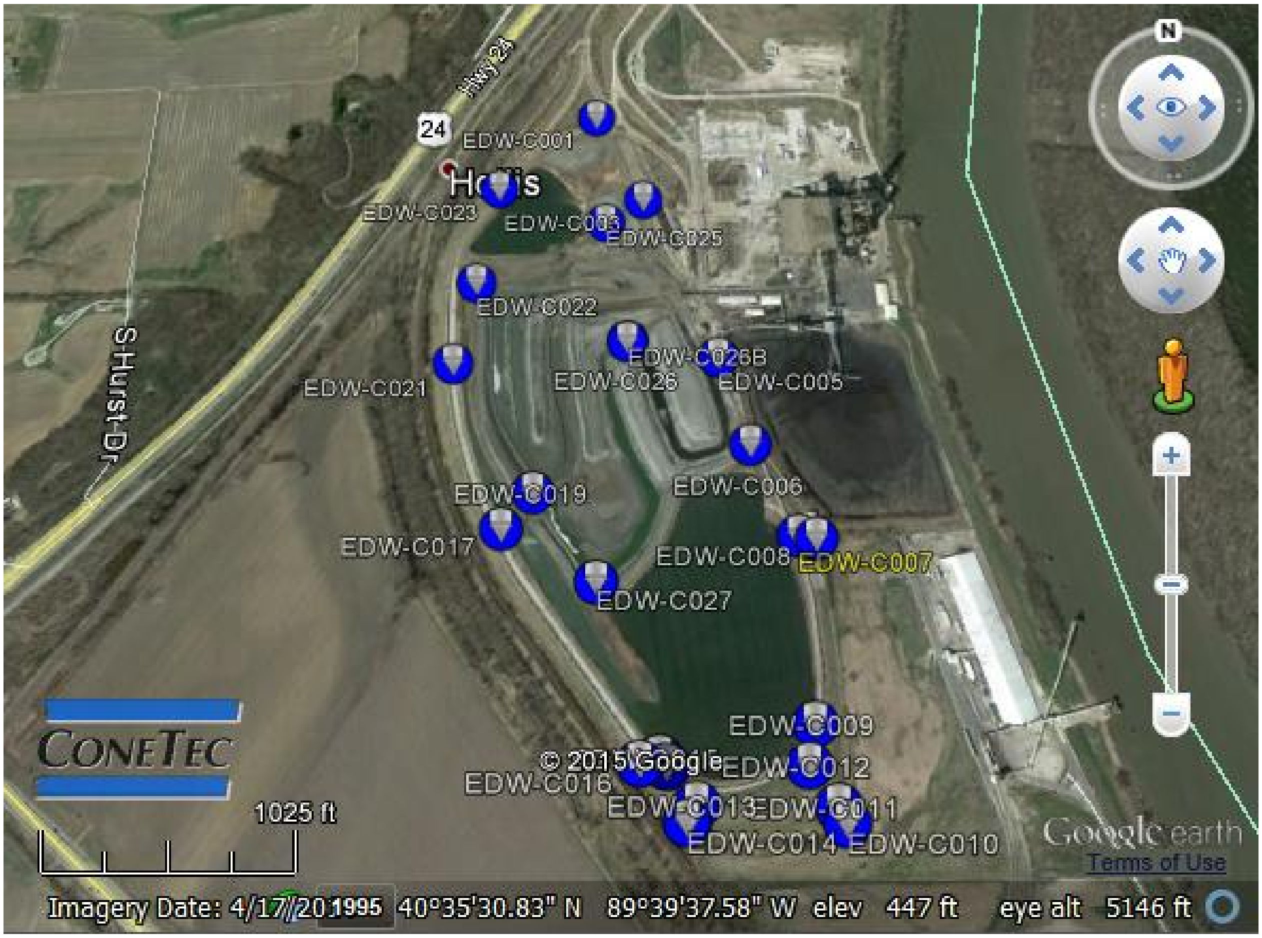
The enclosed report presents the results of a piezocone penetration testing (CPTu or CPT) and seismic piezocone penetration testing (SCPTu or SCPT) program carried out at the Edwards Power Station site located in Peoria, Illinois. The site investigation program was conducted by ConeTec Inc., under contract to AECOM of Chicago, Illinois.

A total of fourteen cone penetration tests and ten seismic cone penetration tests were completed at twenty two locations (There were two shallow refusals). The CPT and SCPT program was performed to evaluate the subsurface soil conditions. CPT and SCPT sounding locations were selected and numbered under the supervision of AECOM personnel (Mr. Daryle Harrison and Mr. Adam Grossman).

Project Information

Project	
Client	AECOM
Project	Edwards Power Station, Peoria, IL
ConeTec project number	15-53073

A map from Google earth including the CPT test locations is presented below.



Rig Description	Deployment System	Test Type
CPT Truck Rig	25 ton truck mounted (twin cylinders)	CPT and SCPT
CPT Track Rig	20 ton track mounted (twin cylinders)	CPT and SCPT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT and SCPT	GPS (Handheld)	32616 (WGS 84 / UTM North)

Cone Penetration Test (CPT)	
Depth reference	Ground surface at the time of the investigation.
Tip and sleeve data offset	0.1 meter. This has been accounted for in the CPT data files.
Pore pressure dissipation (PPD) tests	Fifty seven pore pressure dissipation tests were completed primarily to determine the phreatic surface.
Additional Comments	Shear wave velocity tests were conducted at five foot intervals at ten locations.

Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
335:T1500F15U500	335	15	225	1500	15	500
340:T1500F15U500	340	15	225	1500	15	500
374:T1500F15U500	374	15	225	1500	15	500

Limitations

This report has been prepared for the exclusive use of AECOM (Client) for the project titled "Edwards Power Station, Peoria, IL". The report's contents may not be relied upon by any other party without the express written permission of ConeTec, Inc. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

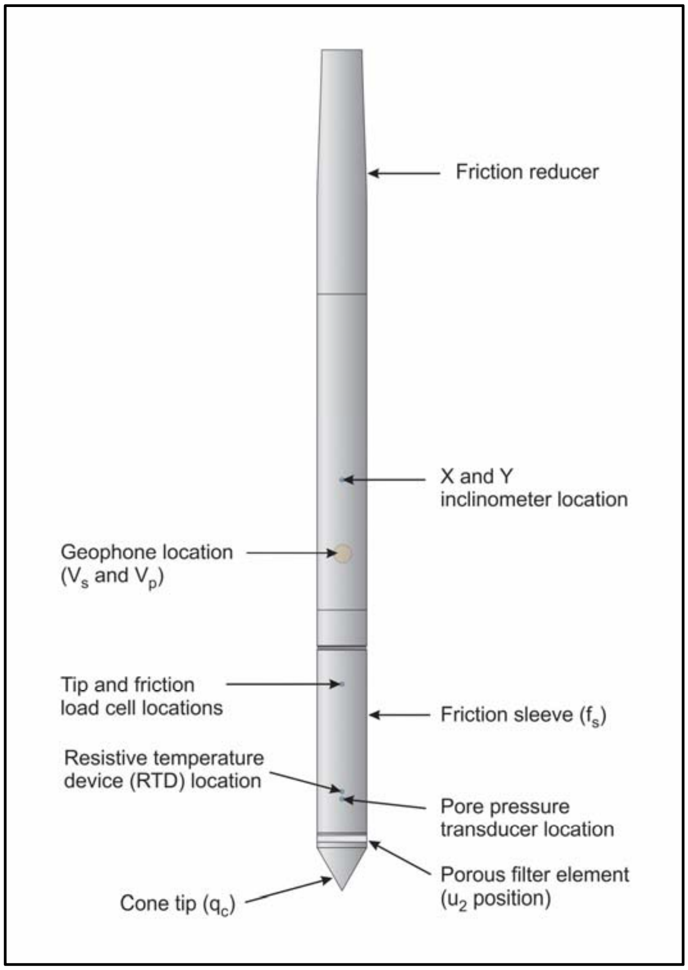


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording intervals are either 2.5 cm or 5.0 cm depending on project requirements; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerin or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil or glycerin under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al, 1986:

$$q_t = q_c + (1\text{-}a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (Rf) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is included in an appendix.

For additional information on CPTu interpretations, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

Mayne, P.W. and Peuchen, J., 2012, “Unit weight trends with cone resistance in soft to firm clays”, Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355.

Shear wave velocity testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave (Vp) velocity is also determined.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that triggers the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

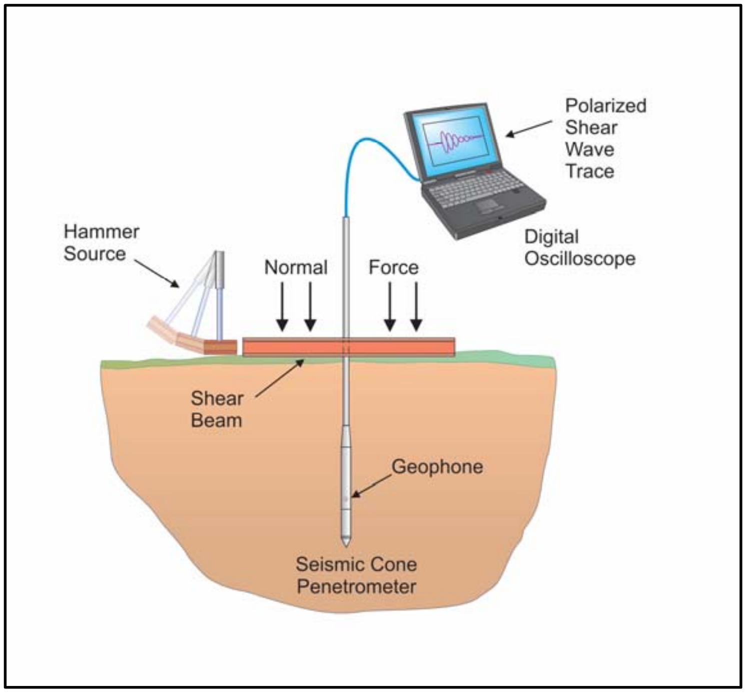


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Multiple wave traces are recorded for quality control purposes. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et.al. (1986).

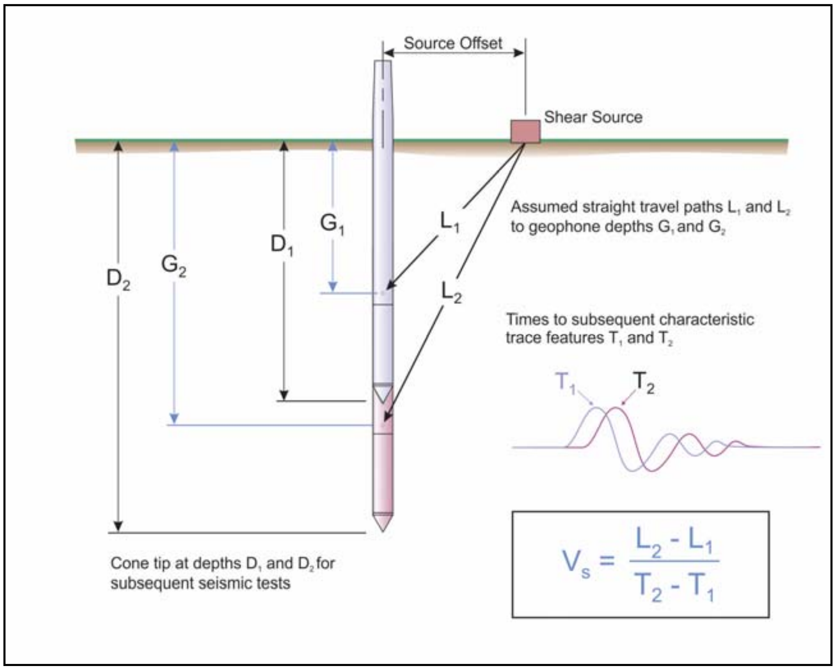


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

The average shear wave velocity to a depth of 100 feet (30 meters) ($\bar{v}_s$) has been calculated and provided for all applicable soundings using the following equation presented in ASCE, 2010.

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{v_{si}}}$$

where: $\bar{v}_s$ = average shear wave velocity ft/s (m/s)
d_i = the thickness of any layer between 0 and 100 ft (30 m)
v_{si} = the shear wave velocity in ft/s (m/s)
$\sum_{i=1}^{n} d_i$ = 100 ft (30 m)

Average shear wave velocity, $\bar{v}_s$ is also referenced to V_{s100} or V_{s30}.

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

American Society of Civil Engineers (ASCE), 2010, “Minimum Design Loads for Buildings and Other Structures”, Standard ASCE/SEI 7-10, American Society of Civil Engineers, ISBN 978-0-7844-1085-1, Reston, Virginia.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, “Seismic CPT to Measure In-Situ Shear Wave Velocity”, Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

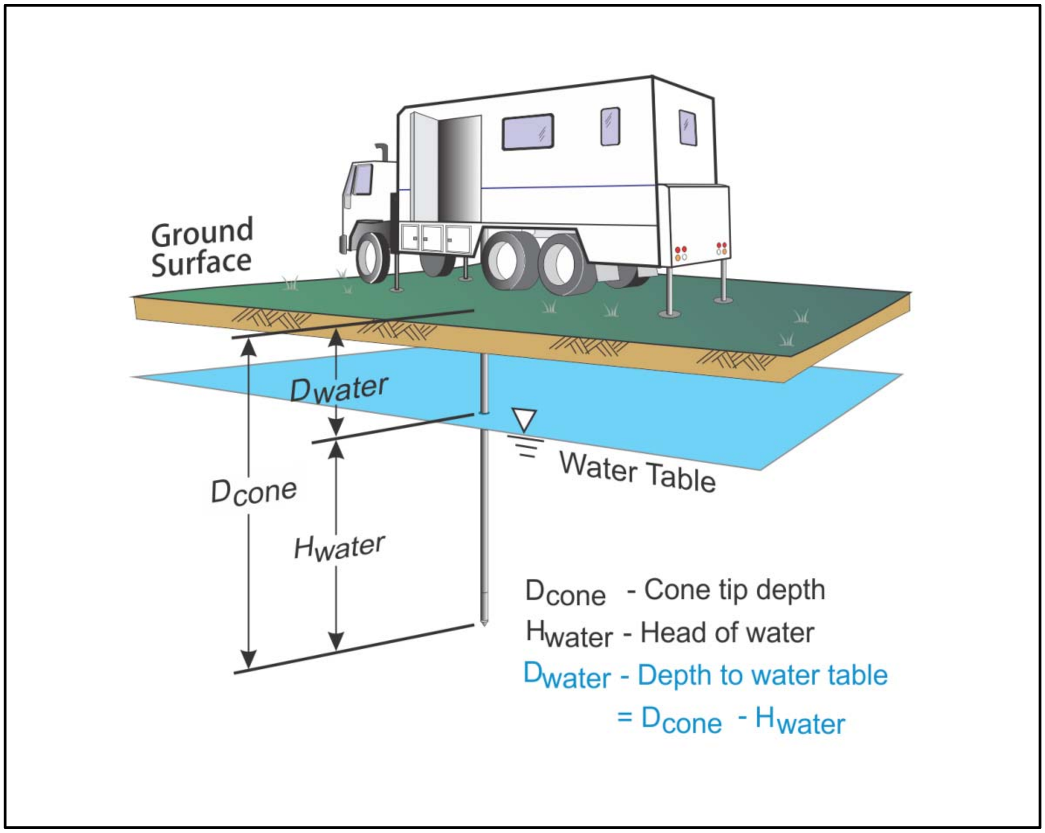
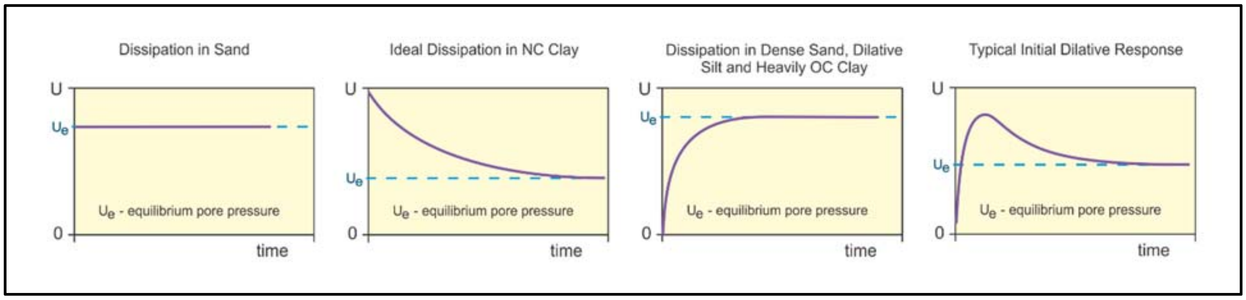


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.


Dissipation in Sand

Ideal Dissipation in NC Clay

Dissipation in Dense Sand, Dilative Silt and Heavily OC Clay

Typical Initial Dilative Response

Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve of Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T^* is the dimensionless time factor (Table Time Factor)

a is the radius of the cone

I_r is the rigidity index

t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby, 1991)

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby, 1991), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, “Monotonic and dilatory pore pressure decay during piezocone tests”, Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, “Analytical cavity expansion-critical state model cone dissipation in fine-grained soils”, Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, “The piezometer probe: a useful investigation tool”, Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, “Estimating coefficient of consolidation from piezocone tests”, Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, “An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils”, Canadian Geotechnical Journal, 36(2): 369-381.

Teh, C.I., and Houlsby, G.T., 1991, “An analytical study of the cone penetration test in clay”, Geotechnique, 41(1): 17-34.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Seismic Cone Penetration Test Plots
- Seismic Cone Penetration Test Tabular Results
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station, Peoria, IL
Start Date: 19-Aug-2015
End Date: 29-Aug-2015

CONE PENETRATION TEST SUMMARY

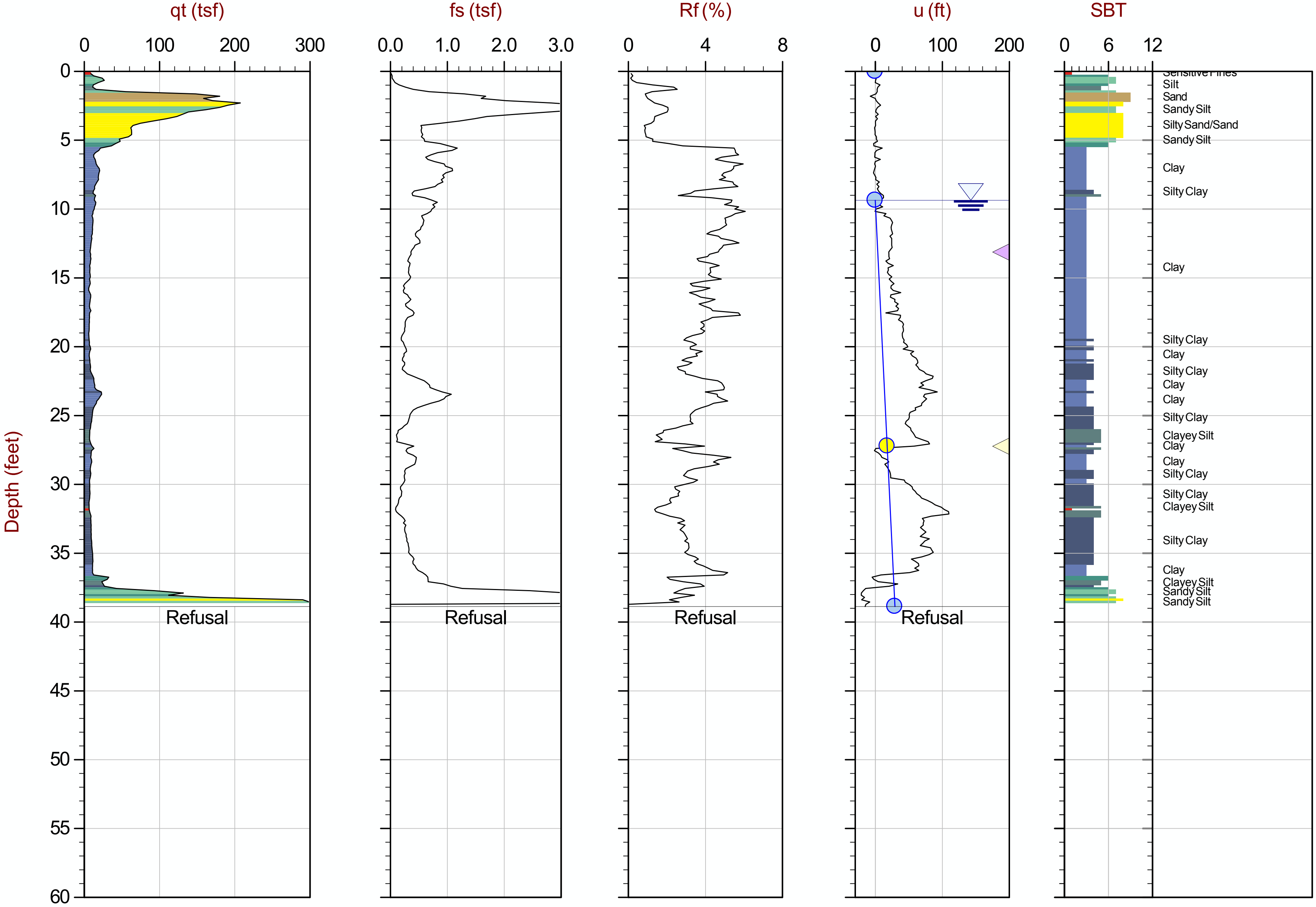
Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface^1 (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing^2 (m)	Easting (m)	Refer to Notation Number
EDW-C001	15-53073_SP01	19-Aug-2015	374:T1500F15U500	9.4	38.88	8	4497502	274312	
EDW-C003	15-53073_SP03	27-Aug-2015	340:T1500F15U500	9.0	54.63	8	4497325	274377	
EDW-C005	15-53073_CP05	26-Aug-2015	374:T1500F15U500	7.0	40.03		4497026	274468	3
EDW-C006	15-53073_CP06	25-Aug-2015	374:T1500F15U500	11.5	40.03		4496880	274500	
EDW-C007	15-53073_CP07	29-Aug-2015	340:T1500F15U500	8.9	54.79		4496737	274551	
EDW-C008	15-53073_CP08	27-Aug-2015	374:T1500F15U500	10.0	33.63		4496731	274576	3
EDW-C009	15-53073_CP09	28-Aug-2015	340:T1500F15U500	19.9	52.17		4496476	274538	
EDW-C010	15-53073_CP10	27-Aug-2015	374:T1500F15U500	2.2	30.02		4496351	274562	
EDW-C011	15-53073_CP11	28-Aug-2015	340:T1500F15U500	22.5	47.08		4496372	274553	
EDW-C012	15-53073_SP12	28-Aug-2015	340:T1500F15U500	23.3	50.20	10	4496424	274524	
EDW-C013	15-53073_SP13	28-Aug-2015	340:T1500F15U500	22.7	56.27	11	4496386	274376	
EDW-C014	15-53073_CP14	27-Aug-2015	374:T1500F15U500	4.9	38.22		4496366	274362	
EDW-C015	15-53073_SP15	19-Aug-2015	335:T1500F15U500		8.04	2	4496447	274334	4
EDW-C015A	15-53073_SP15A	19-Aug-2015	335:T1500F15U500	12.0	40.03	8	4496435	274342	3
EDW-C016	15-53073_CP16	28-Aug-2015	374:T1500F15U500	3.8	36.91		4496442	274308	
EDW-C017	15-53073_SP17	27-Aug-2015	340:T1500F15U500	24.2	55.94	12	4496775	274137	
EDW-C019	15-53073_CP19	27-Aug-2015	340:T1500F15U500	6.5	53.31		4496825	274184	
EDW-C021	15-53073_CP21	27-Aug-2015	340:T1500F15U500	13.0	49.38		4497046	274071	3
EDW-C022	15-53073_SP22	26-Aug-2015	374:T1500F15U500	6.7	20.01	4	4497185	274108	
EDW-C023	15-53073_CP23	27-Aug-2015	340:T1500F15U500	15.1	40.68		4497364	274147	
EDW-C025	15-53073_CP25	25-Aug-2015	374:T1500F15U500	6.0	20.01		4497285	274315	
EDW-C026	15-53073_SP26	26-Aug-2015	374:T1500F15U500	7.2	14.27	3	4497062	274334	
EDW-C026B	15-53073_SP26B	26-Aug-2015	374:T1500F15U500	6.8	14.60	2	4497064	274335	
EDW-C027	15-53073_CP27	25-Aug-2015	374:T1500F15U500	7.4	40.03		4496687	274266	
Totals	24 soundings				929.12	68			

1. Assumed phreatic surface depths were determined from the pore pressure data unless otherwise noted. Hydrostatic data were used for calculated parameters.
2. Coordinates are WGS 84 / UTM Zone 16 and were collected using a handheld GPS Receiver.
3. Assumed phreatic surface estimated from dynamic pore pressure response.
4. No phreatic surface detected

AECOM

Job No: 15-53073
Date: 08:19:15 13:46
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C001
Cone: 374:T1500F15U500



Max Depth: 11.850 m / 38.88 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497502m E: 274312m

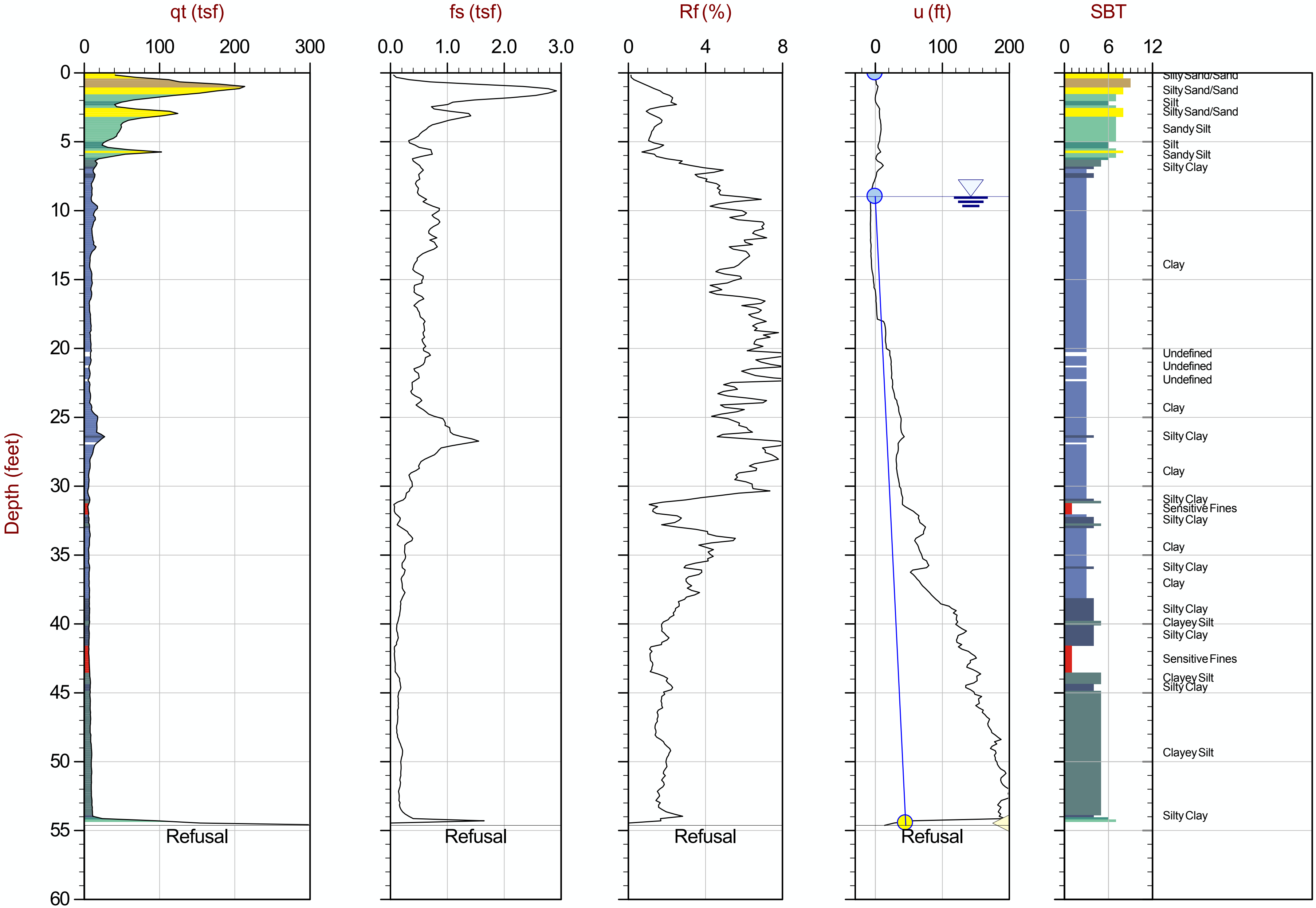
— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:27:15 15:22
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C003
Cone: 340:T1500F15U500



Max Depth: 16.650 m / 54.63 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497325m E: 274377m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

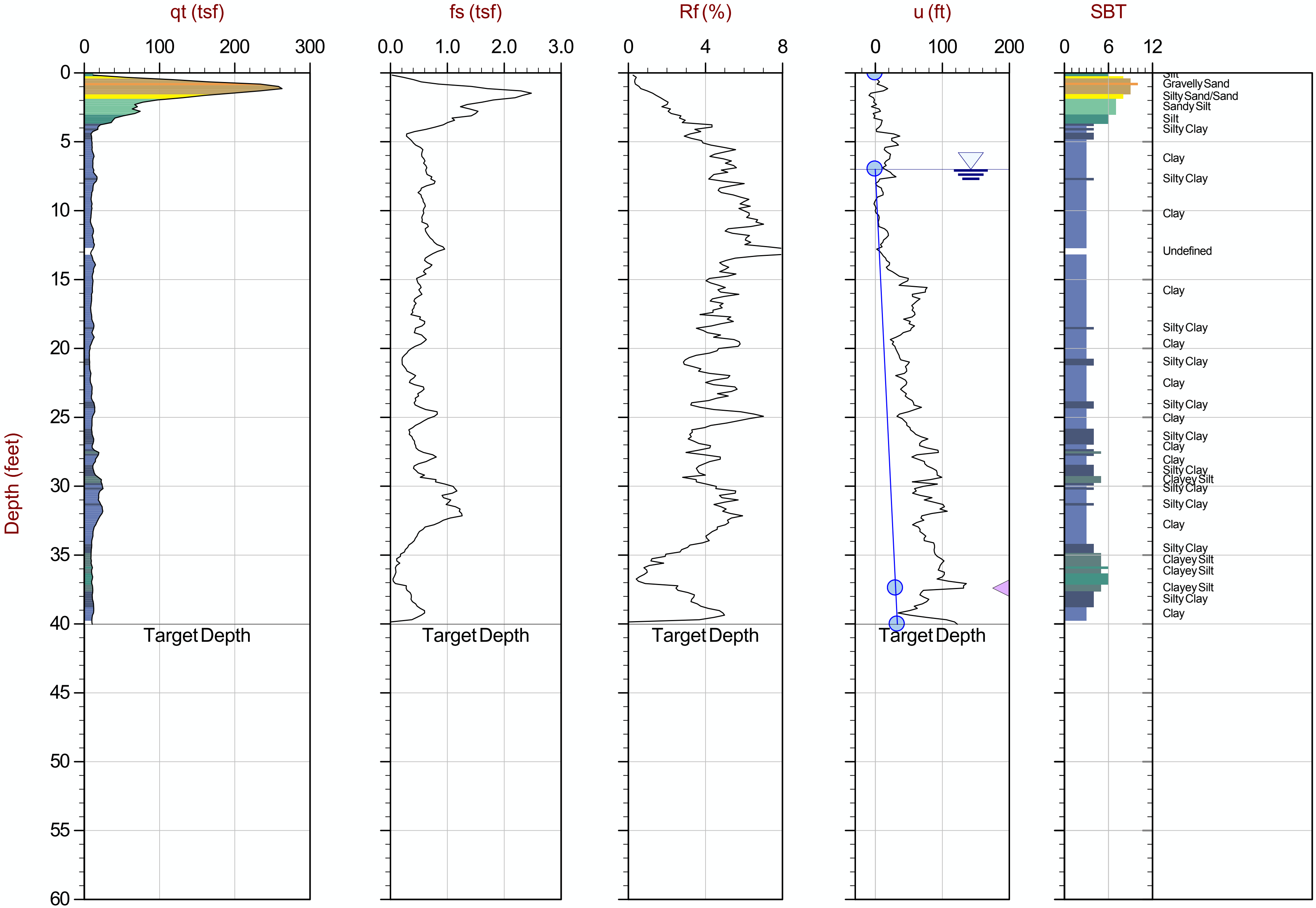
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 15:05
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C005
Cone: 374:T1500F15U500



Max Depth: 12.200 m / 40.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP05.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497026m E: 274468m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

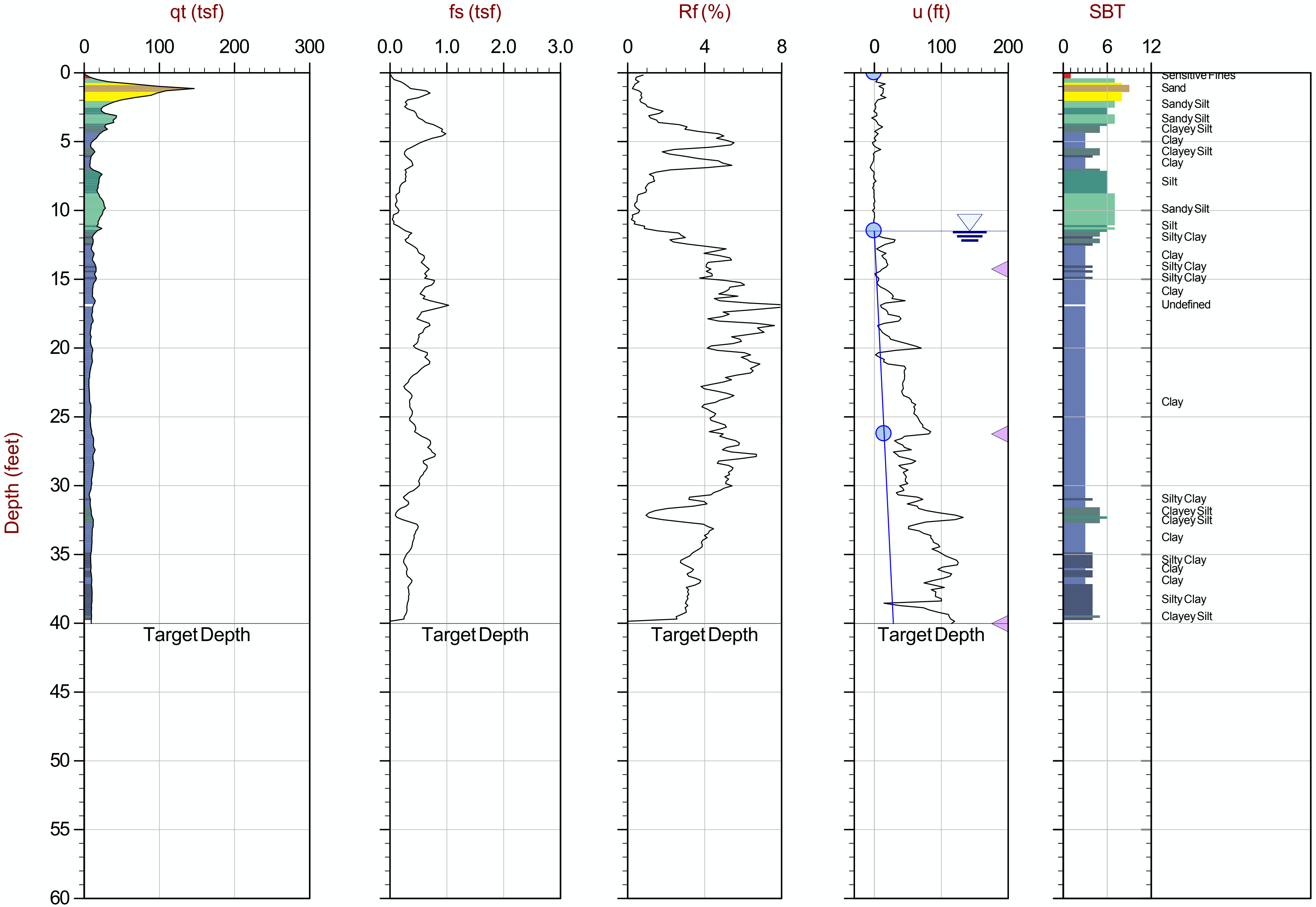
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:25:15 15:52
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C006
Cone: 374:T1500F15U500



Max Depth: 12.200 m / 40.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP06.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496880m E: 274500m

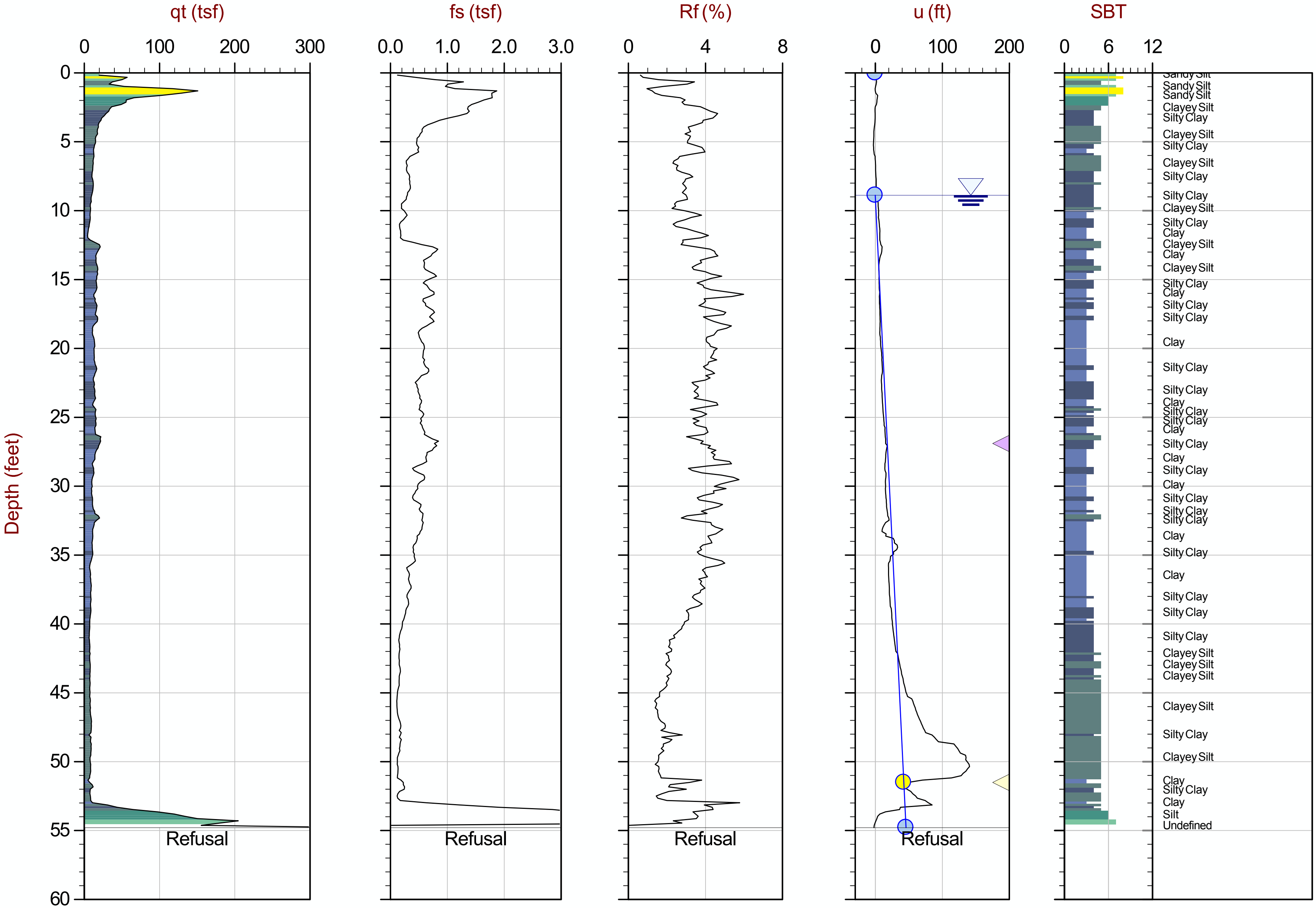
— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:29:15 09:19
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C007
Cone: 340:T1500F15U500



Max Depth: 16.700 m / 54.79 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP07.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496736m E: 274551m

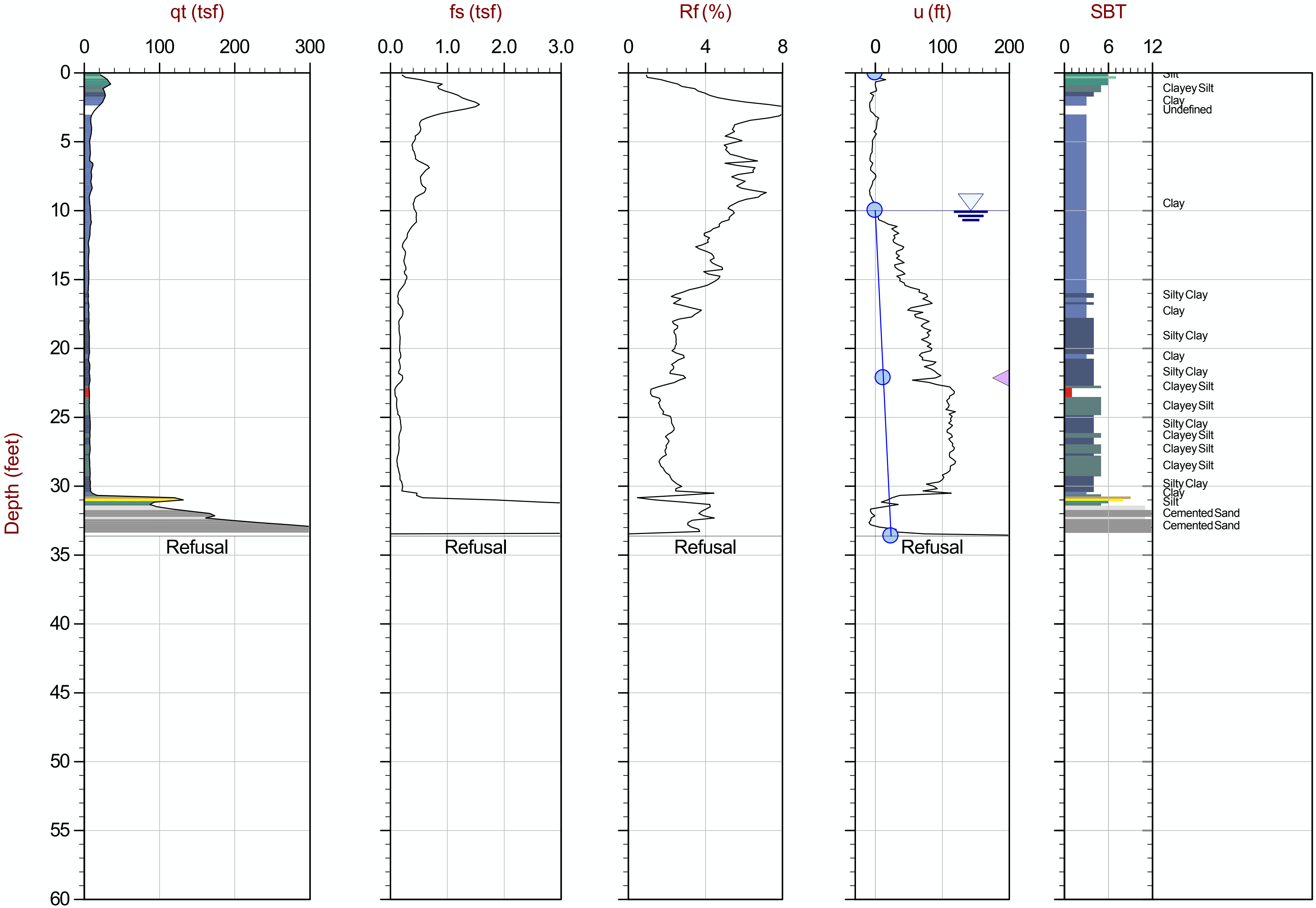
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:27:15 08:50
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C008
Cone: 374:T1500F15U500



Max Depth: 10.250 m / 33.63 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP08.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496731m E: 274576m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

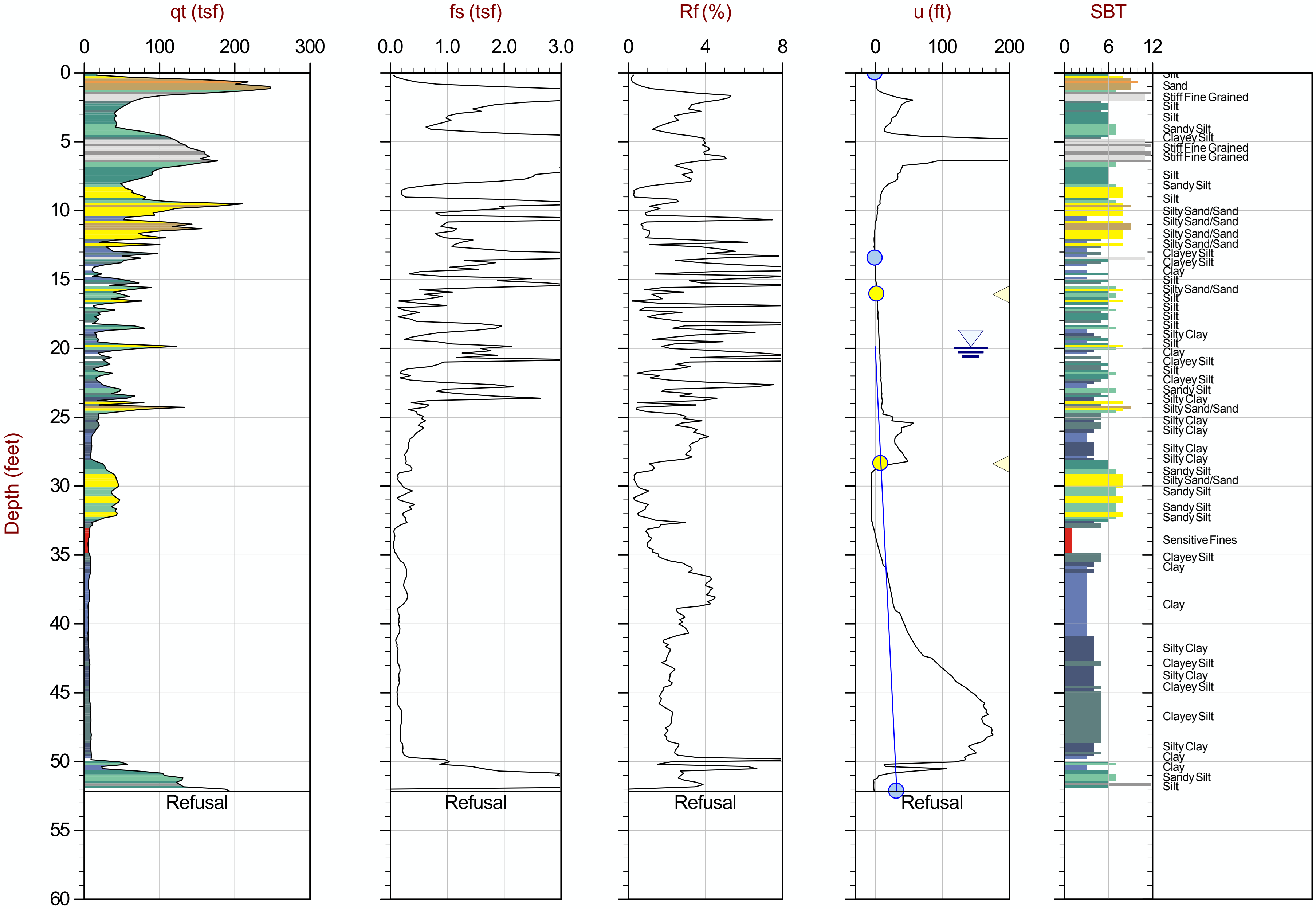
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:28:15 16:08
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C009
Cone: 340:T1500F15U500



Max Depth: 15.900 m / 52.16 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP09.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496476m E: 274538m

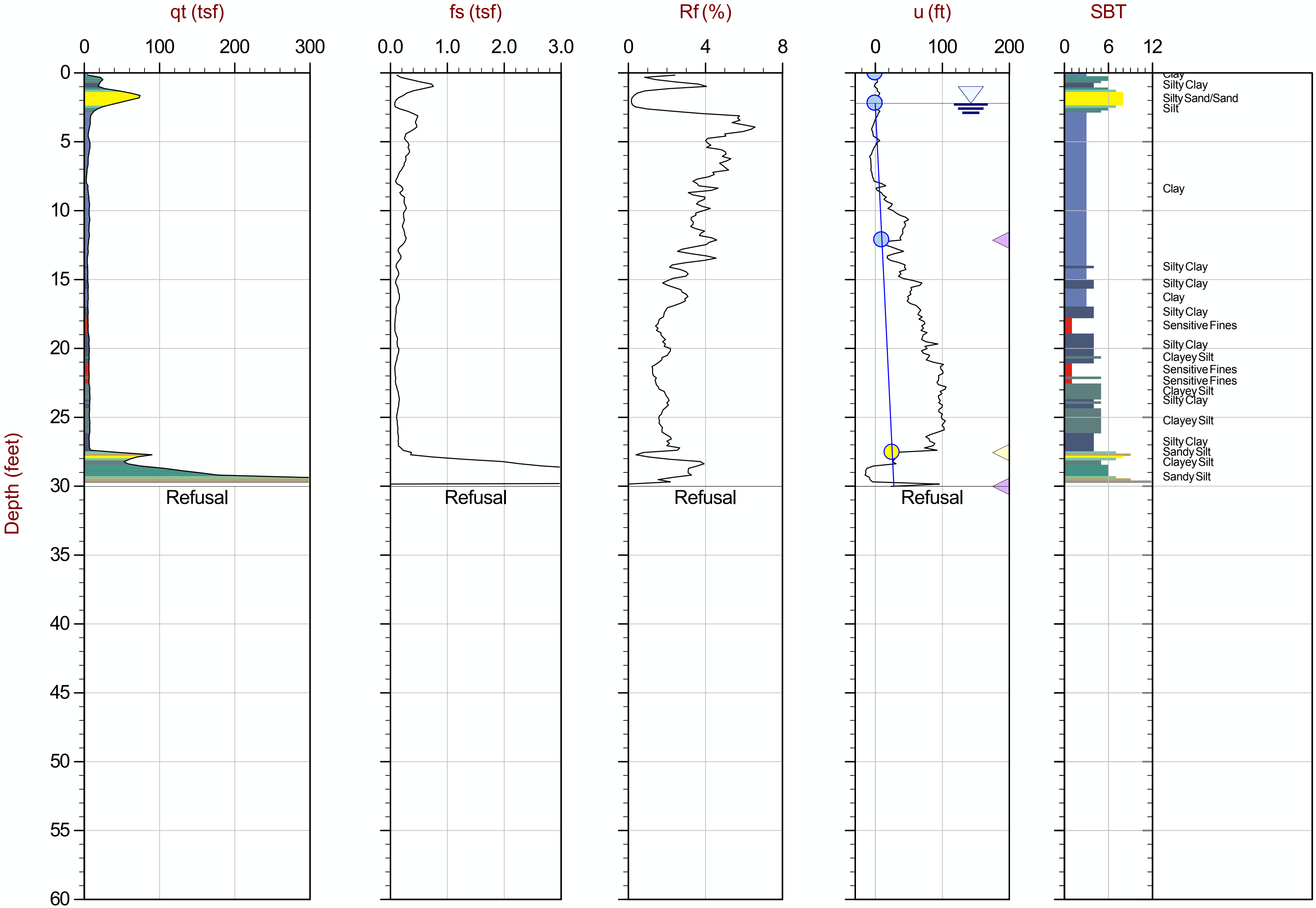
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:27:15 12:10
Site: Edwards Power Station, Peoria, IL
Sounding: EDW-C010
Cone: 374:T1500F15U500



Max Depth: 9.150 m / 30.02 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP10.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496351m E: 274562m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

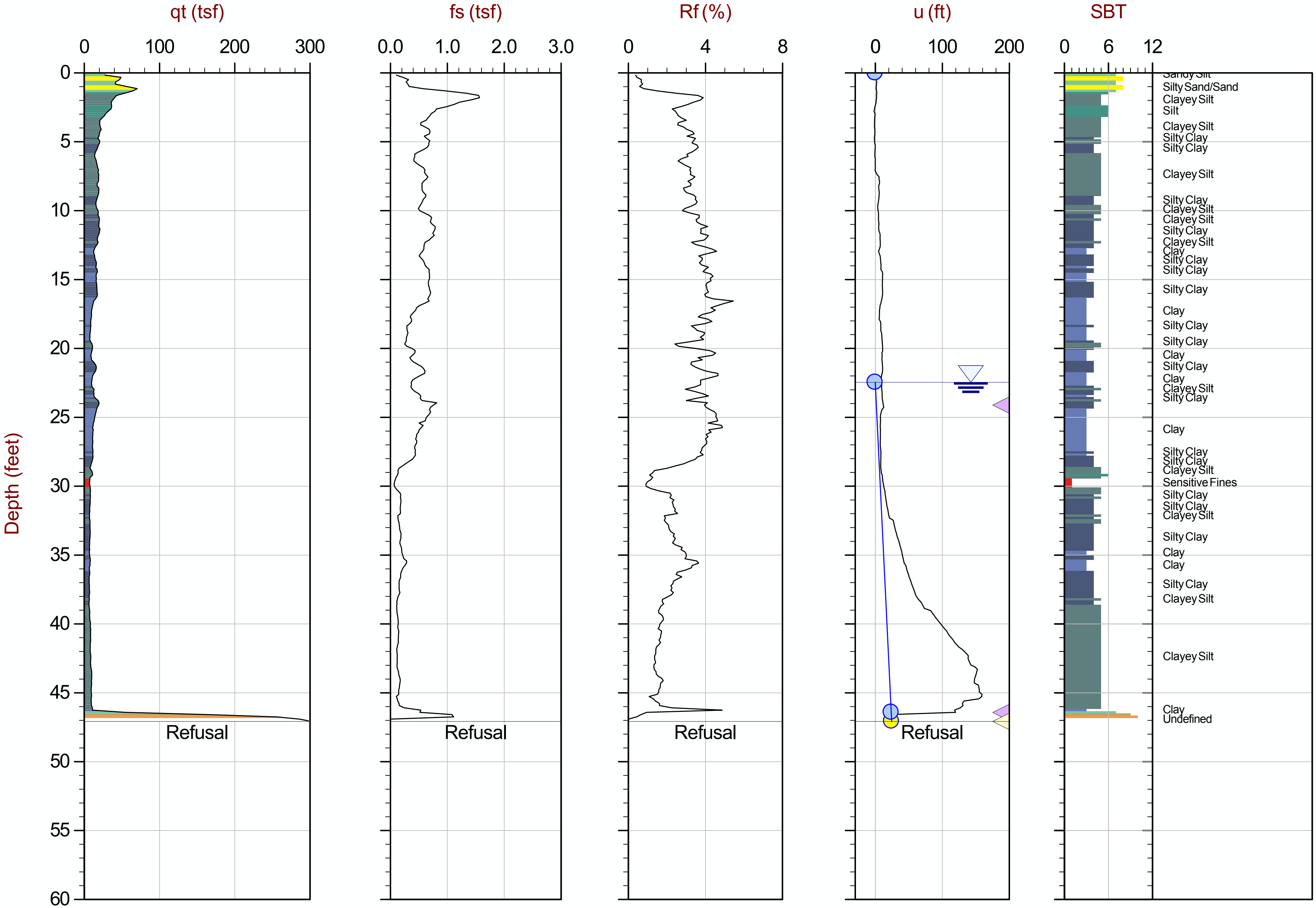
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:28:15 10:19
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C011
Cone: 340:T1500F15U500



Max Depth: 14.350 m / 47.08 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP11.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496372m E: 274553m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

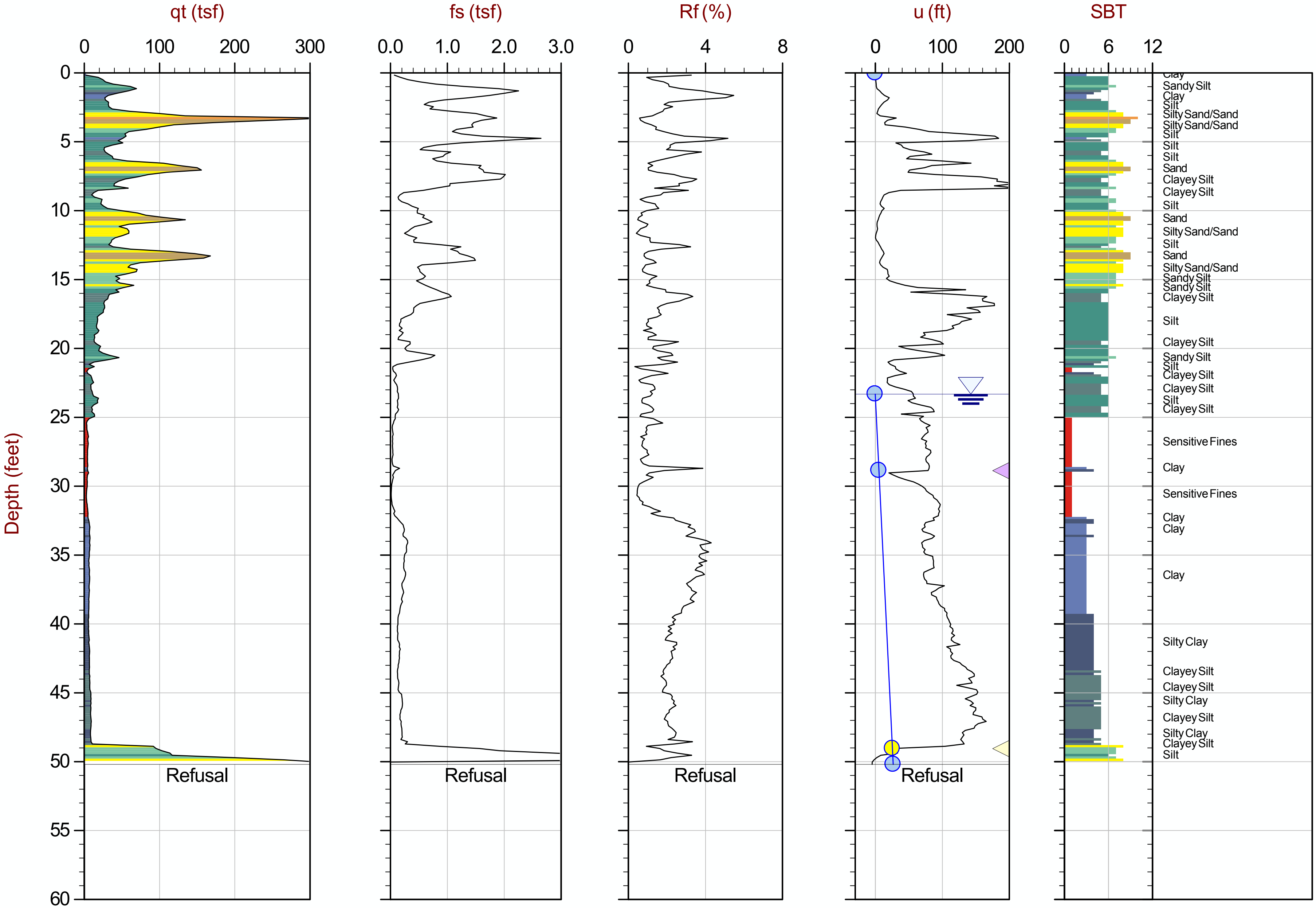
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:28:15 14:27
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C012
Cone: 340:T1500F15U500



Max Depth: 15.300 m / 50.20 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP12.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496424m E: 274524m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

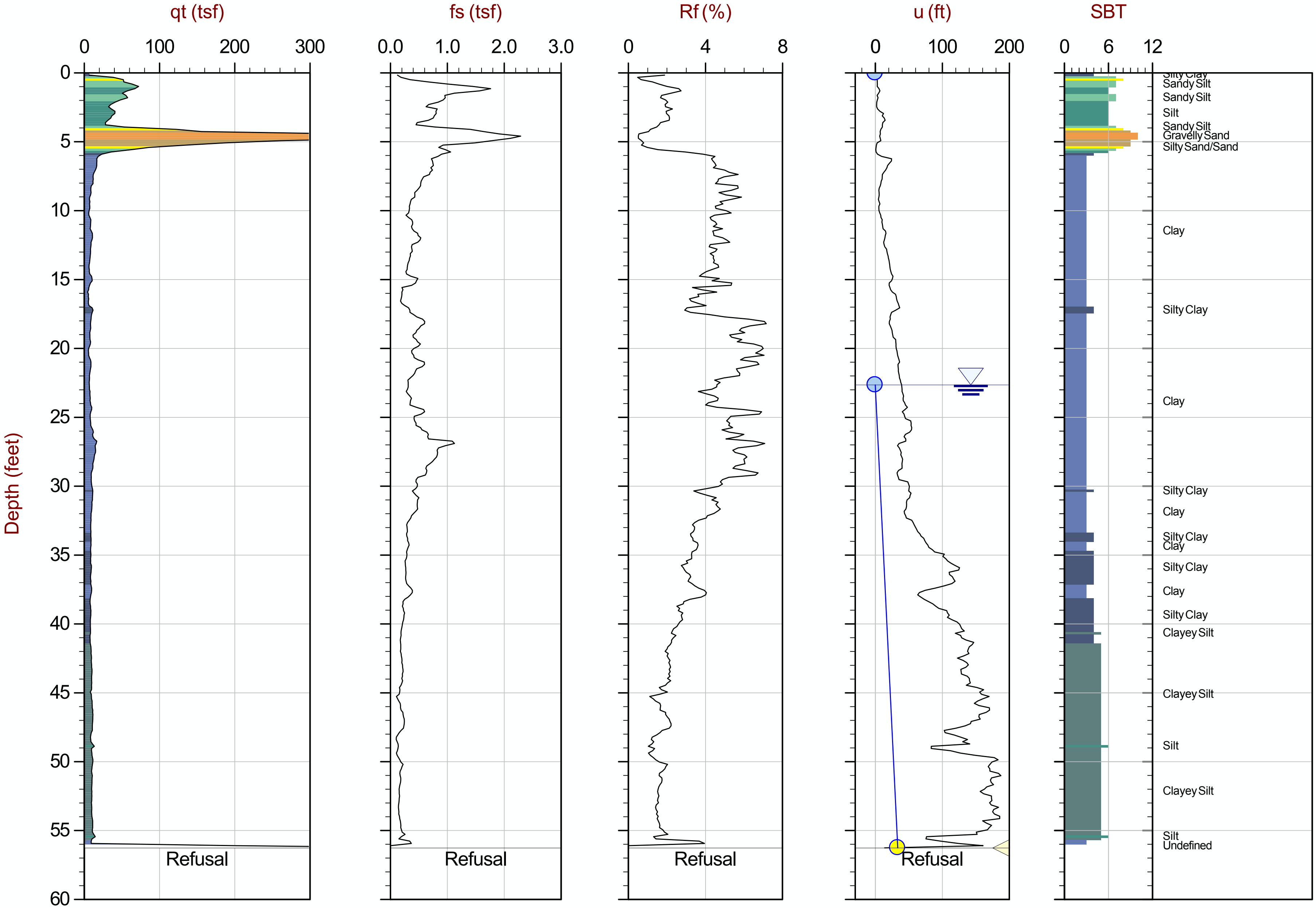
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:28:15 08:45
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C013
Cone: 340:T1500F15U500



Max Depth: 17.150 m / 56.27 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP13.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496386m E: 274376m

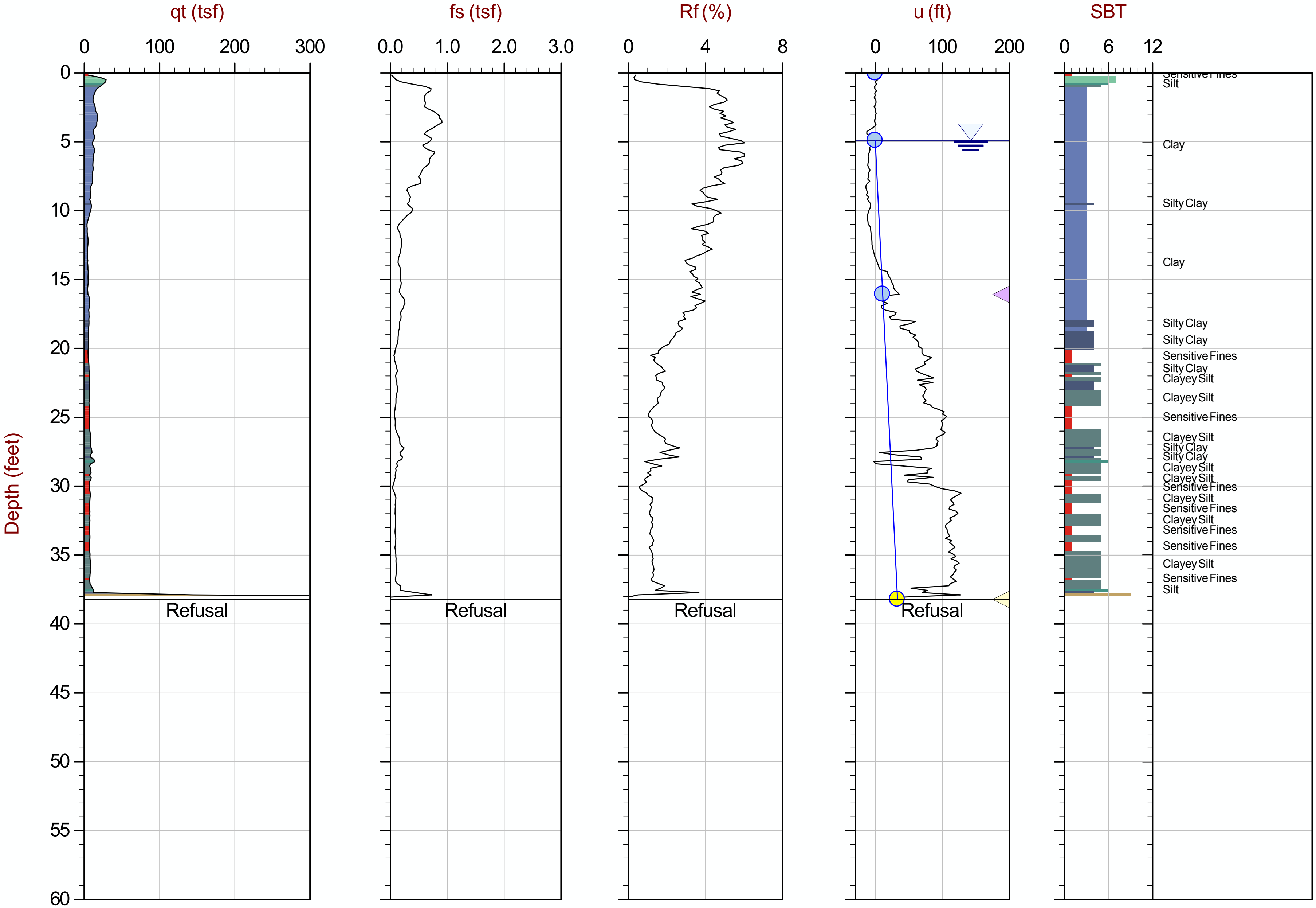
— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:27:15 14:29
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C014
Cone: 374:T1500F15U500



Max Depth: 11.650 m / 38.22 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP14.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496366m E: 274362m

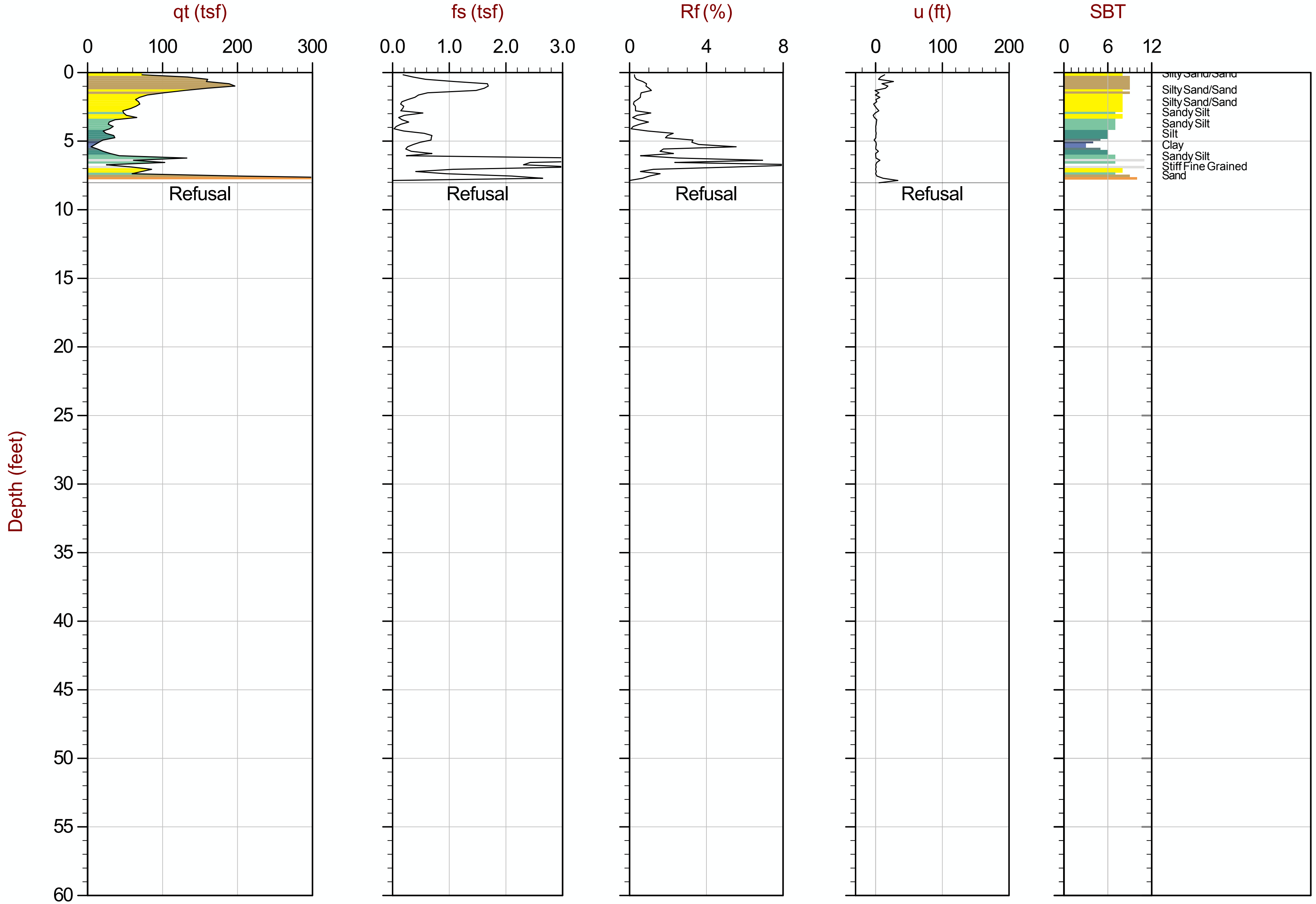
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:19:15 13:31
Site: Edwards Power Station

Sounding: EDW-C015
Cone: 335:T1500F15U500



Max Depth: 2.450 m / 8.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP15.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496447m E: 274334m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

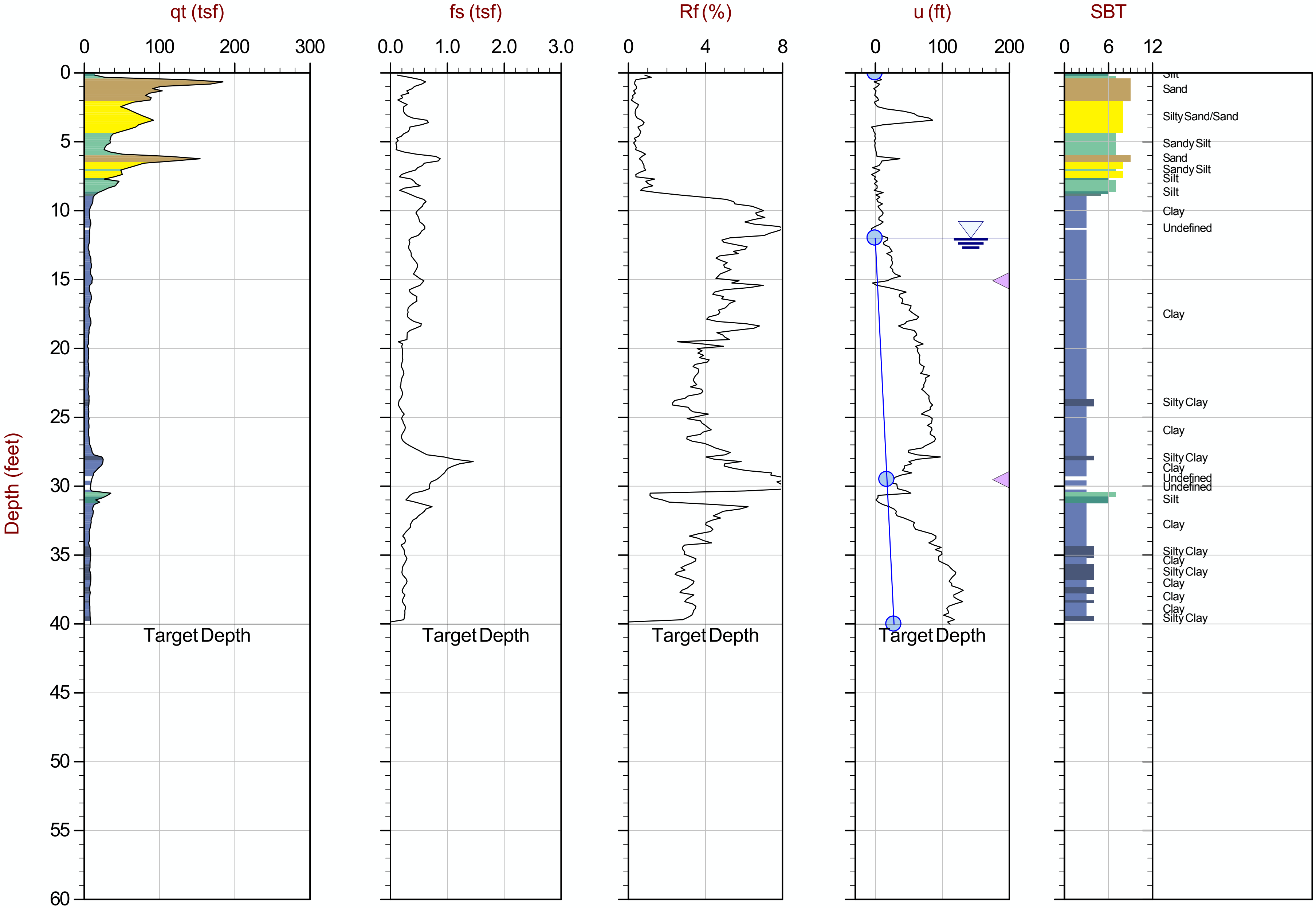
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:19:15 14:12
Site: Edwards Power Station

Sounding: EDW-C015A
Cone: 335:T1500F15U500



Max Depth: 12.200 m / 40.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP15A.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496435m E: 274342m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

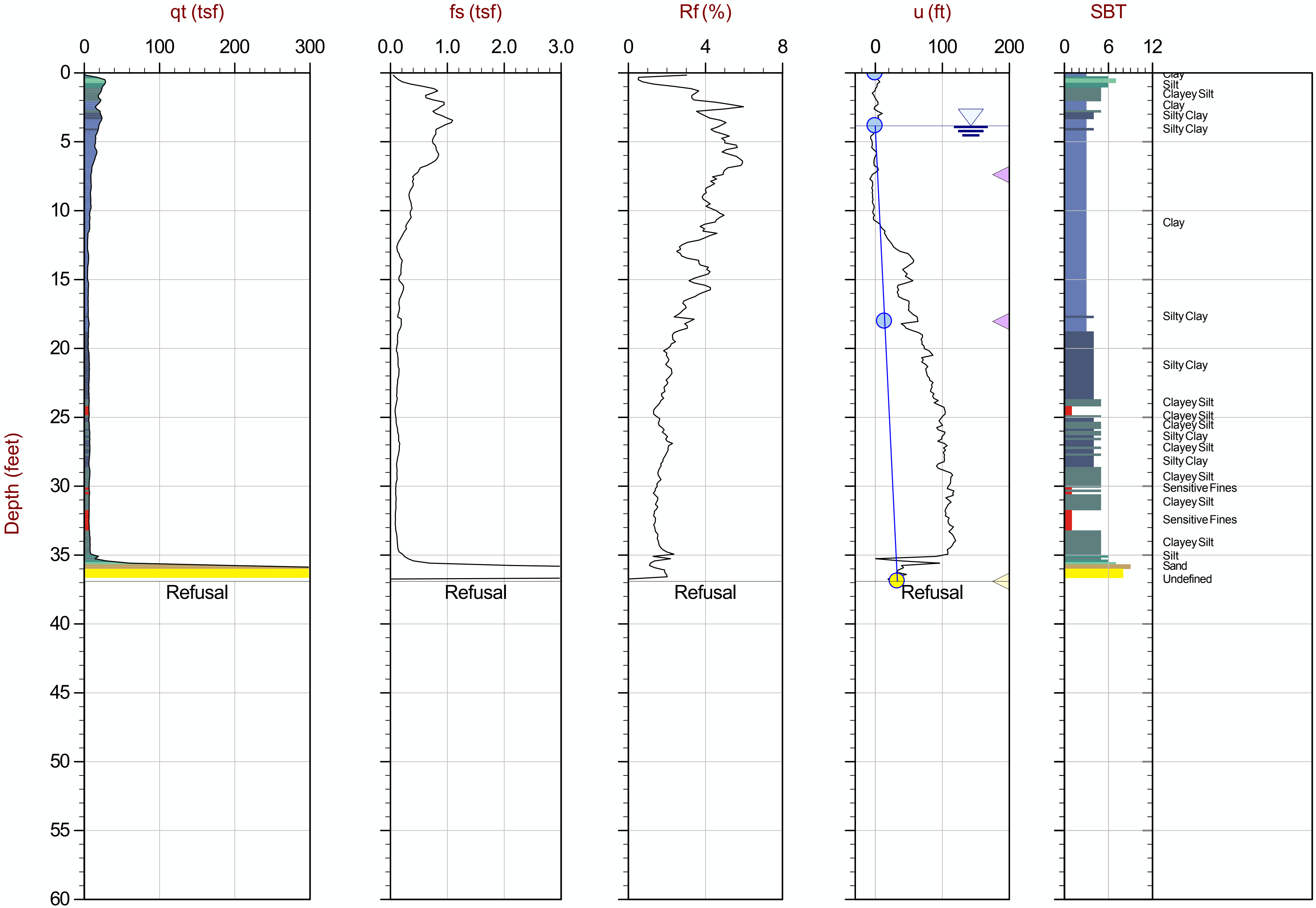
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:28:15 08:46
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C016
Cone: 374:T1500F15U500



Max Depth: 11.250 m / 36.91 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP16.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496442m E: 274308m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

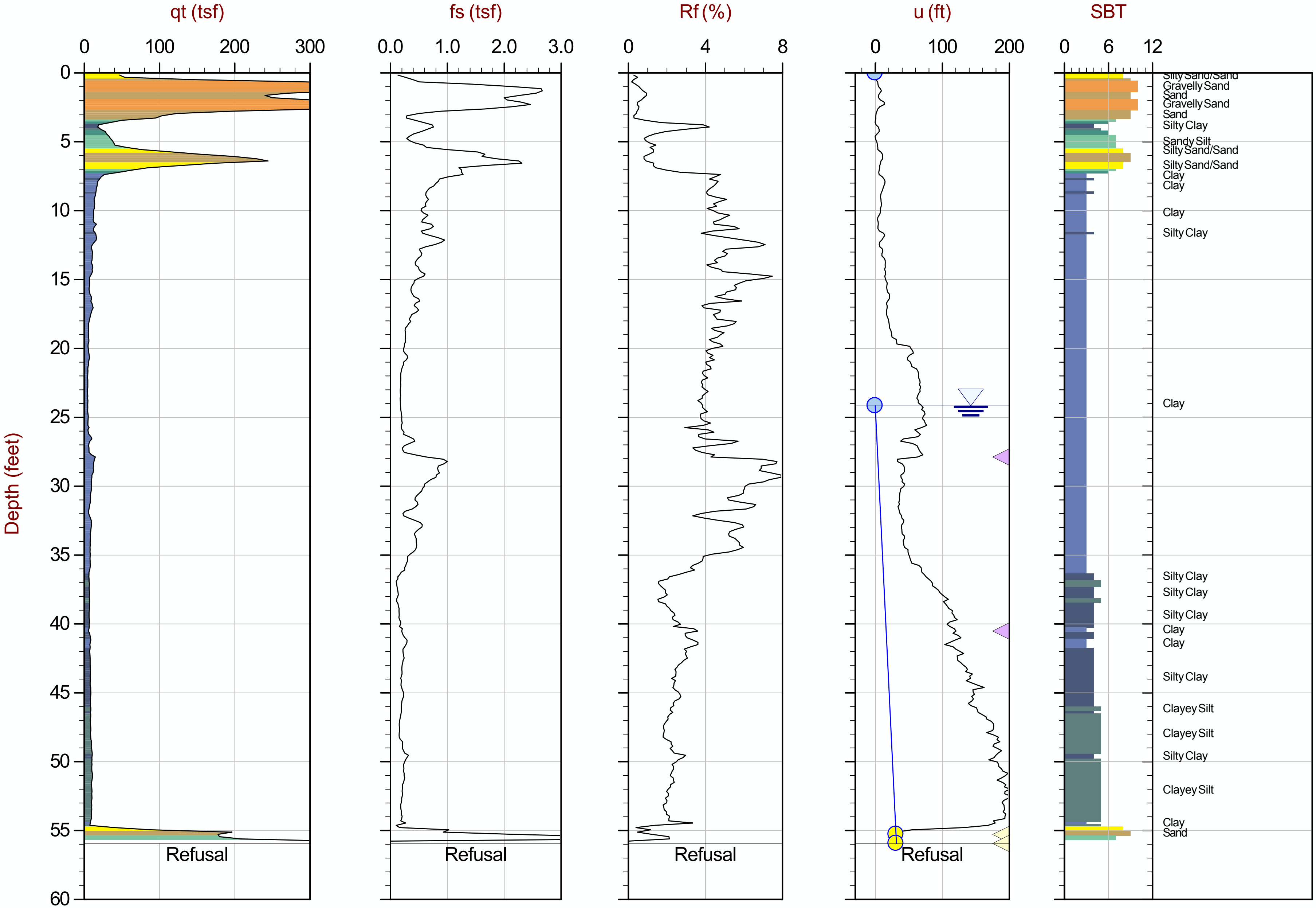
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:27:15 11:13
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: 340:T1500F15U500



Max Depth: 17.050 m / 55.94 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP17.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496775m E: 274137m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

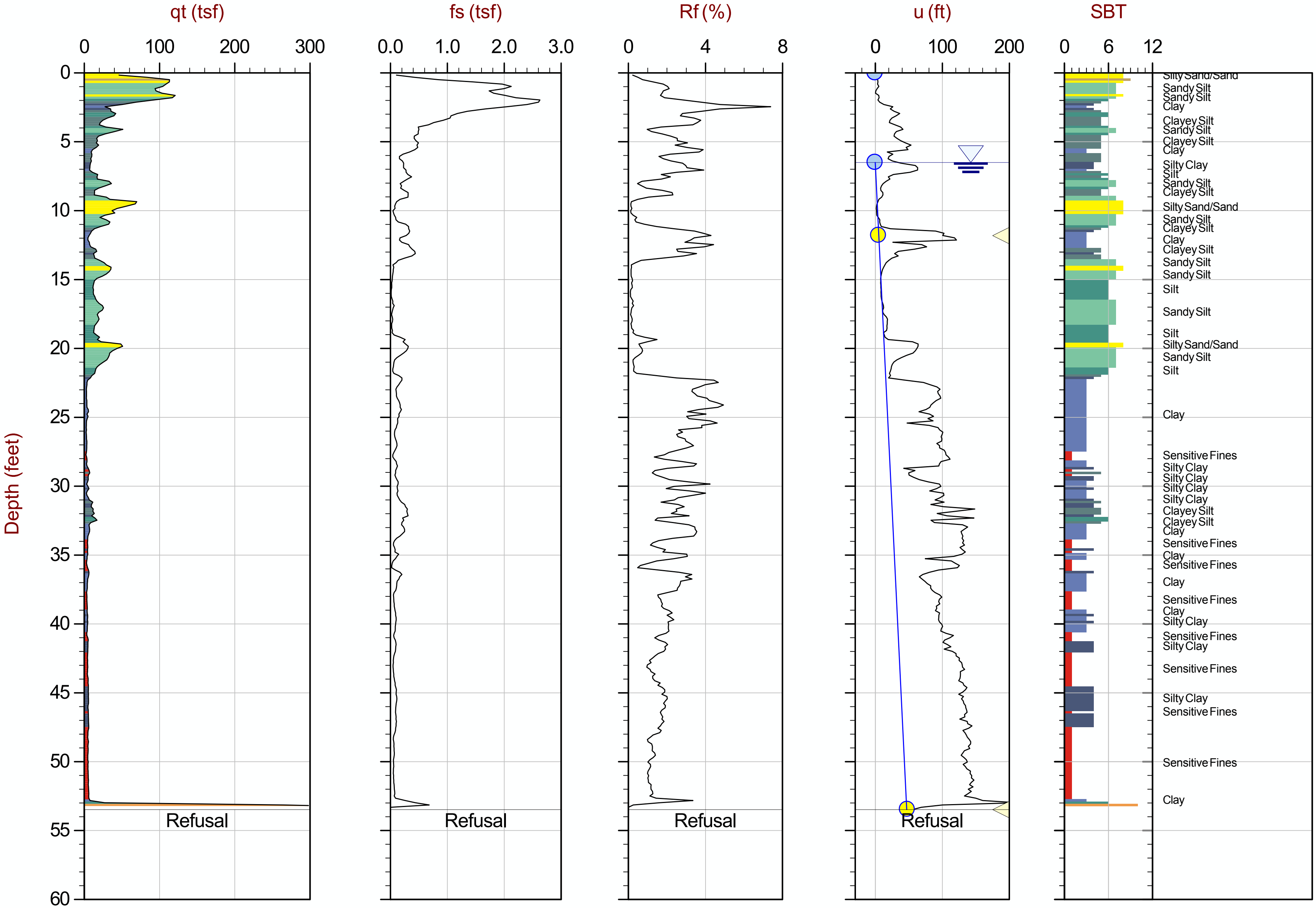
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

AECOM

Job No: 15-53073
Date: 08:27:15 15:23
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C019
Cone: 340:T1500F15U500



Max Depth: 16.300 m / 53.48 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP19.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496825m E: 274184m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

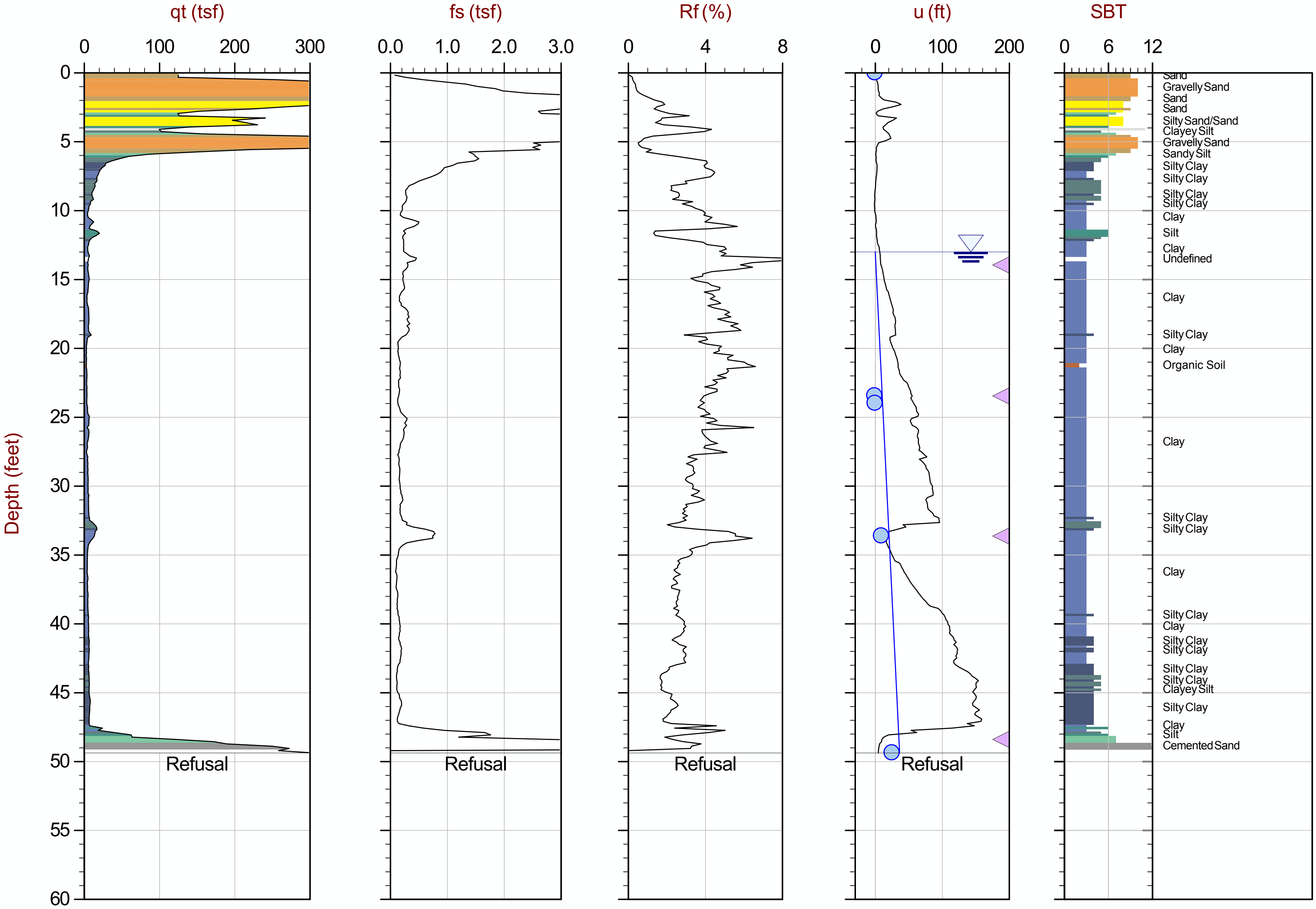
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:27:15 13:27
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C021
Cone: 340:T1500F15U500



Max Depth: 15.050 m / 49.38 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP21.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497046m E: 274071m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

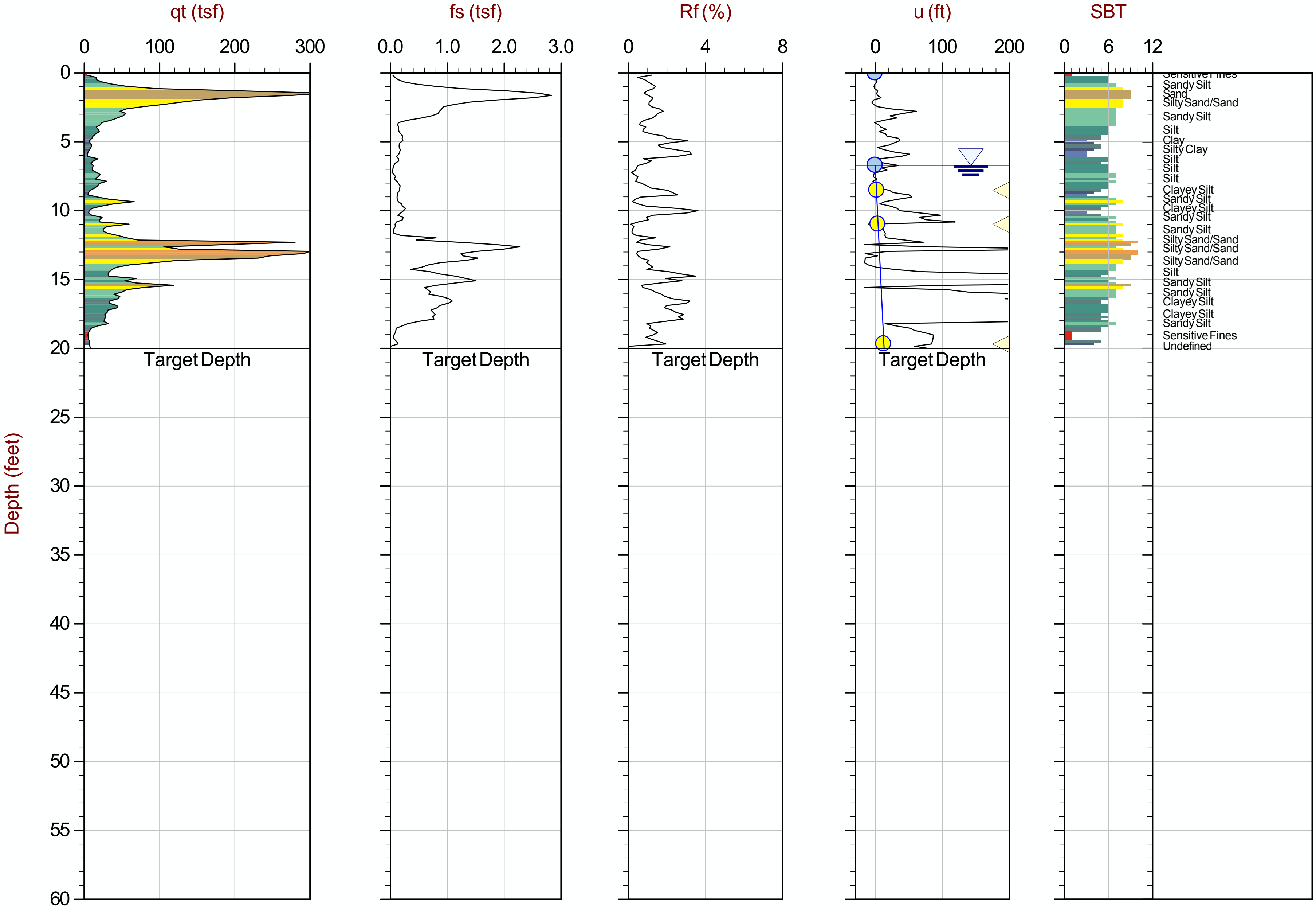
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 10:35
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C022
Cone: 374:T1500F15U500



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP22.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497185m E: 274108m

— Hydrostatic Line ○ Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

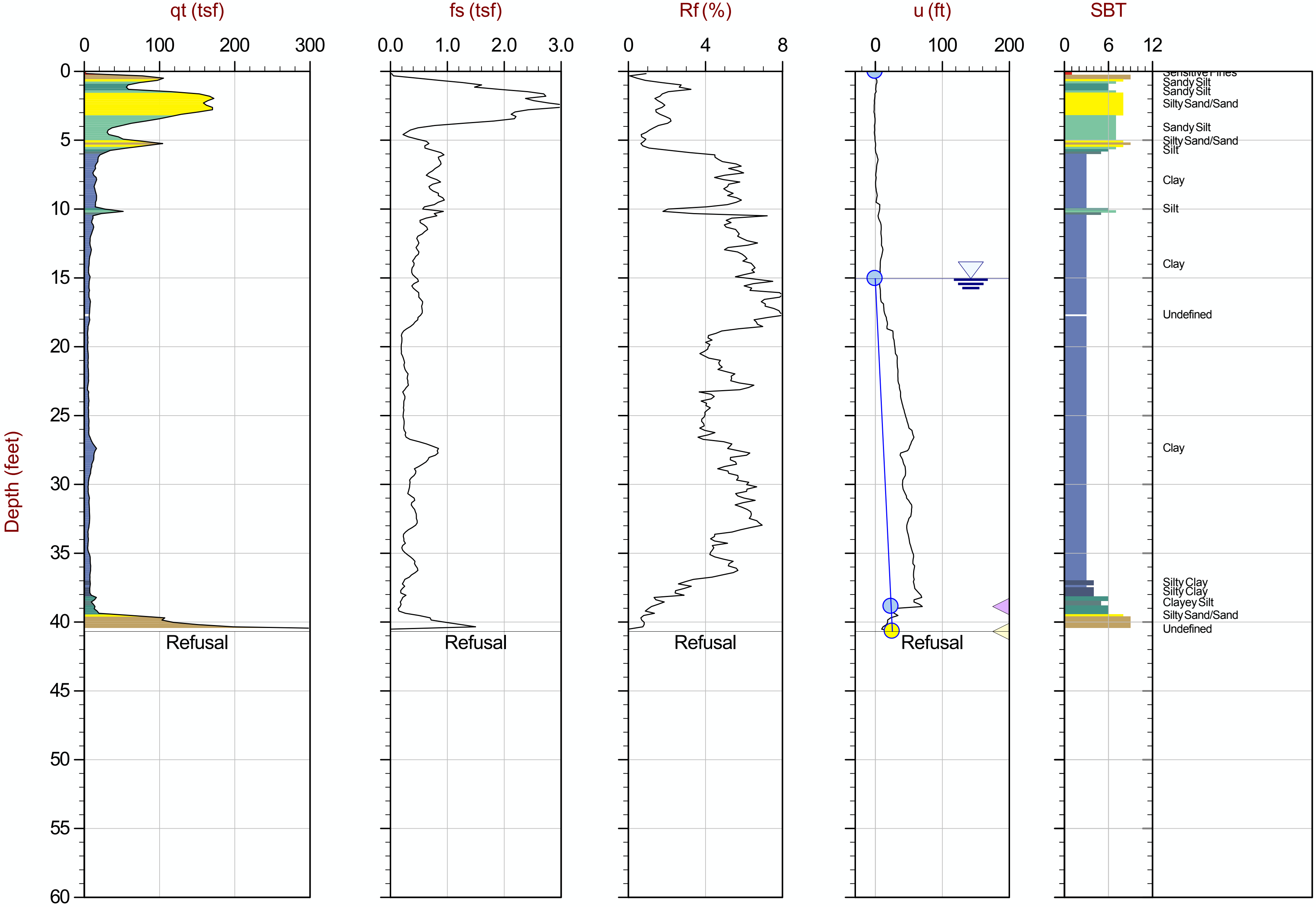
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:27:15 08:52
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C023
Cone: 340:T1500F15U500



Max Depth: 12.400 m / 40.68 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP23.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497364m E: 274147m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

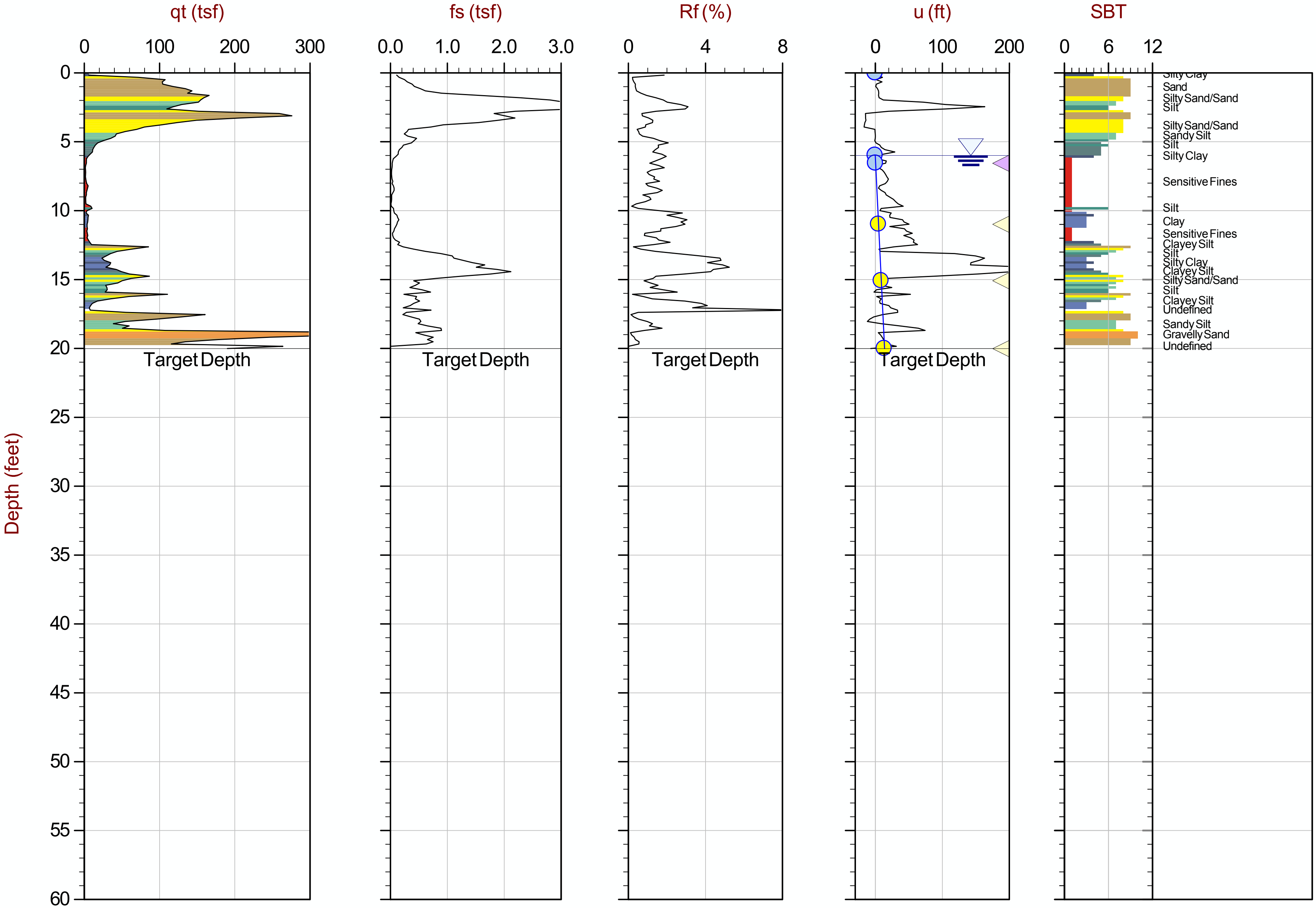
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:25:15 13:44
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C025
Cone: 374:T1500F15U500



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP25.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497285m E: 274315m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

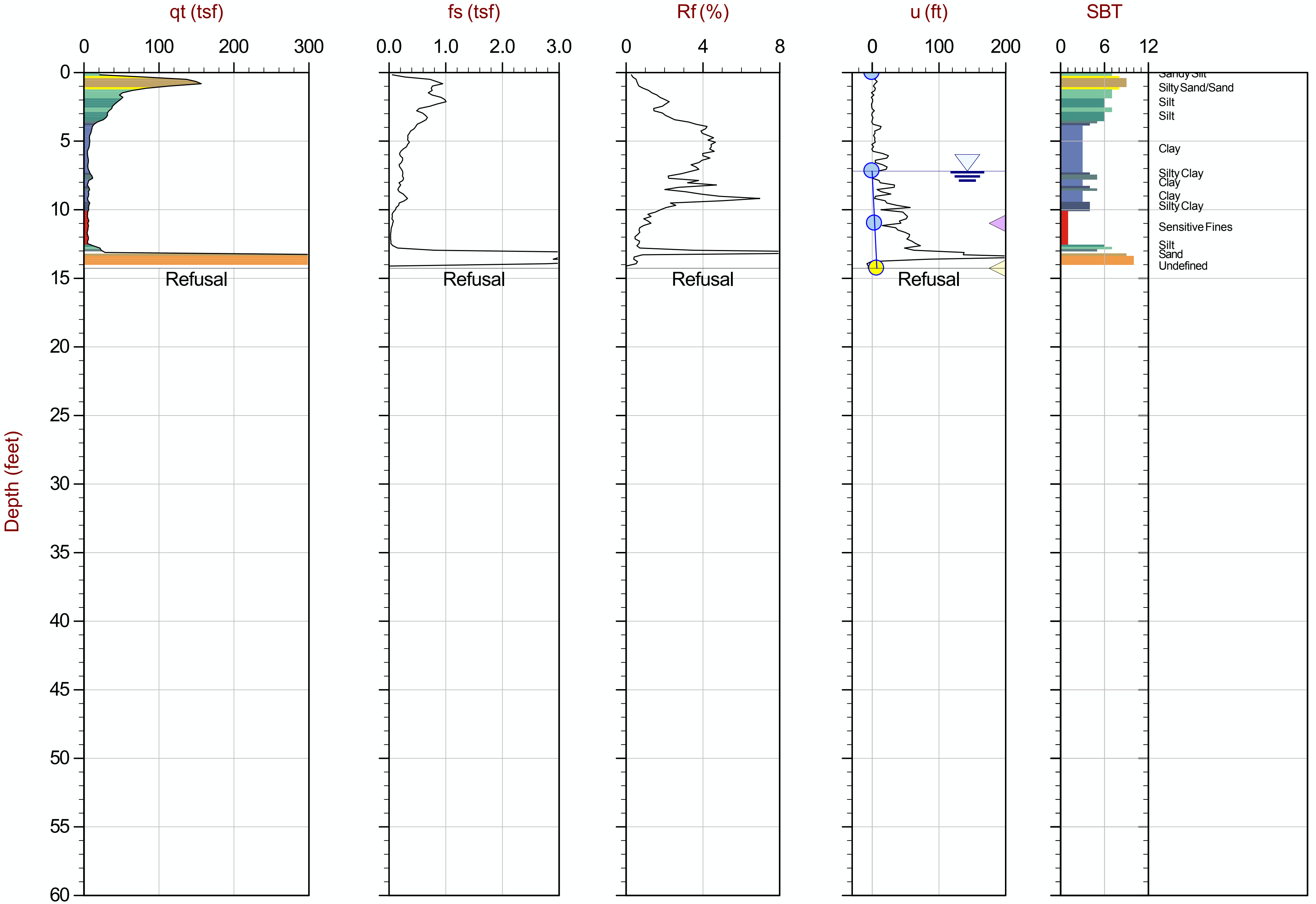
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 12:20
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026
Cone: 374:T1500F15U500



Max Depth: 4.350 m / 14.27 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP26.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497062m E: 274334m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

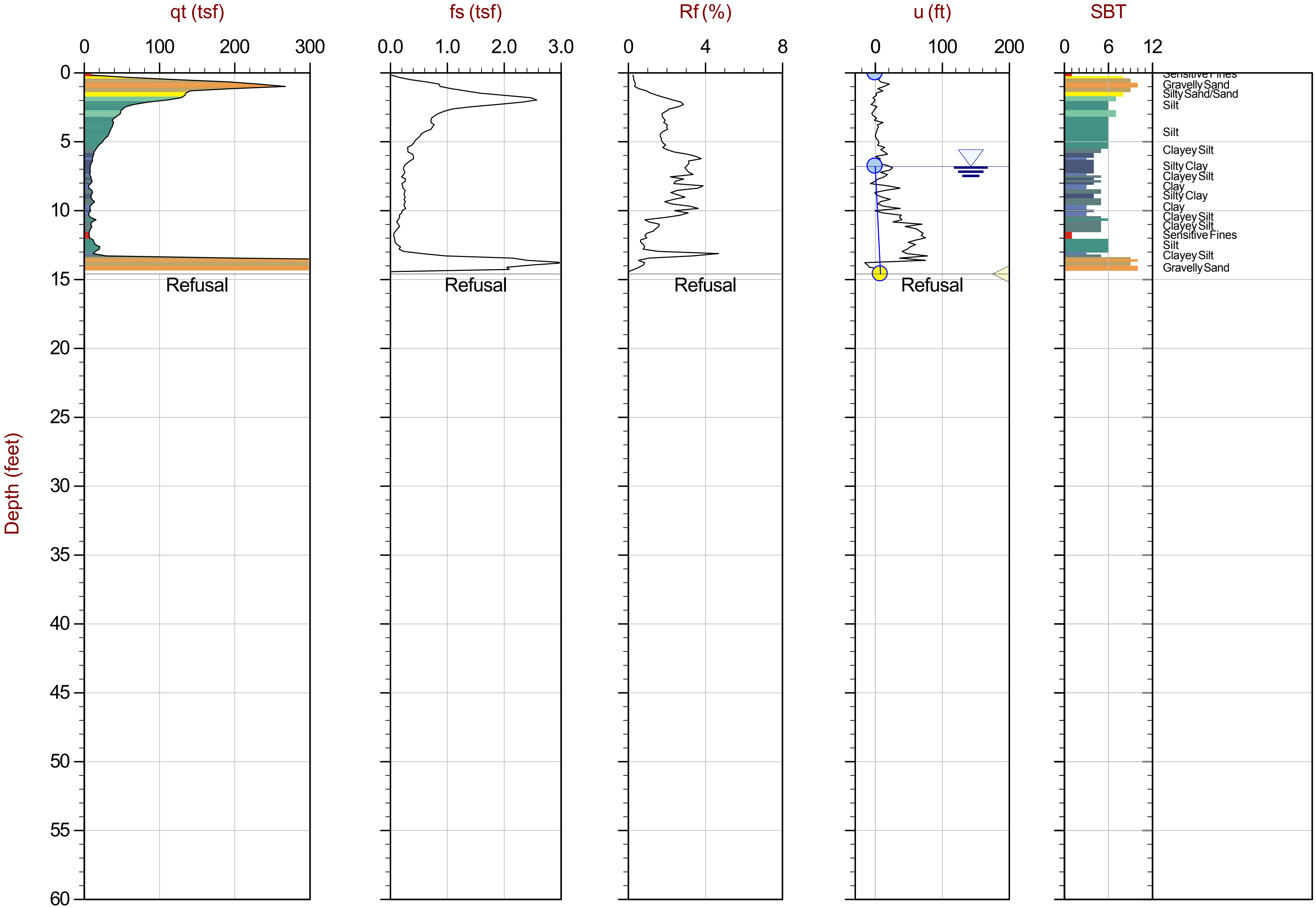
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 14:00
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026B
Cone: 374:T1500F15U500



Max Depth: 4.450 m / 14.60 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP26B.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497064m E: 274335m

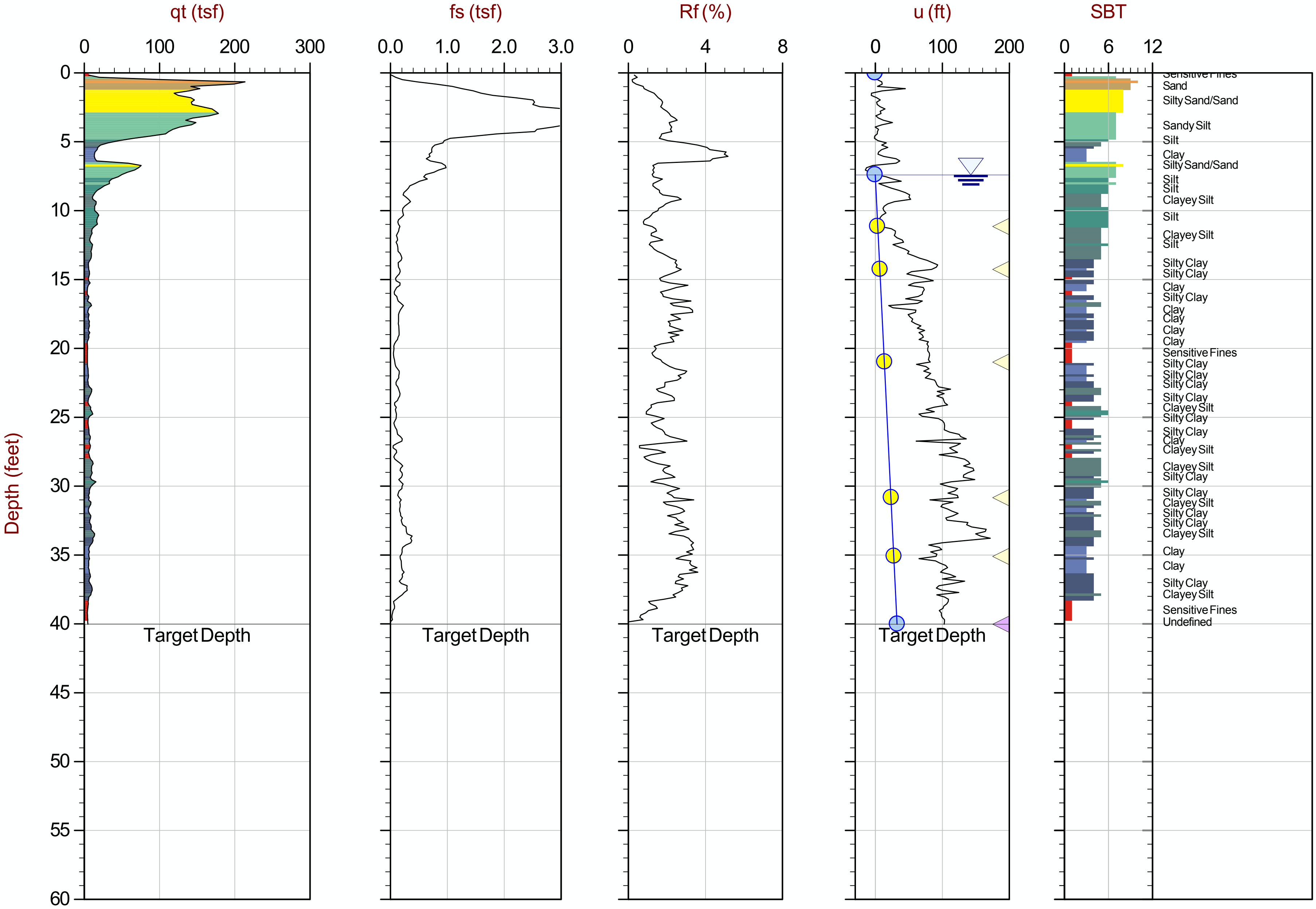
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:25:15 11:00
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374:T1500F15U500



Max Depth: 12.200 m / 40.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_CP27.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496687m E: 274266m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

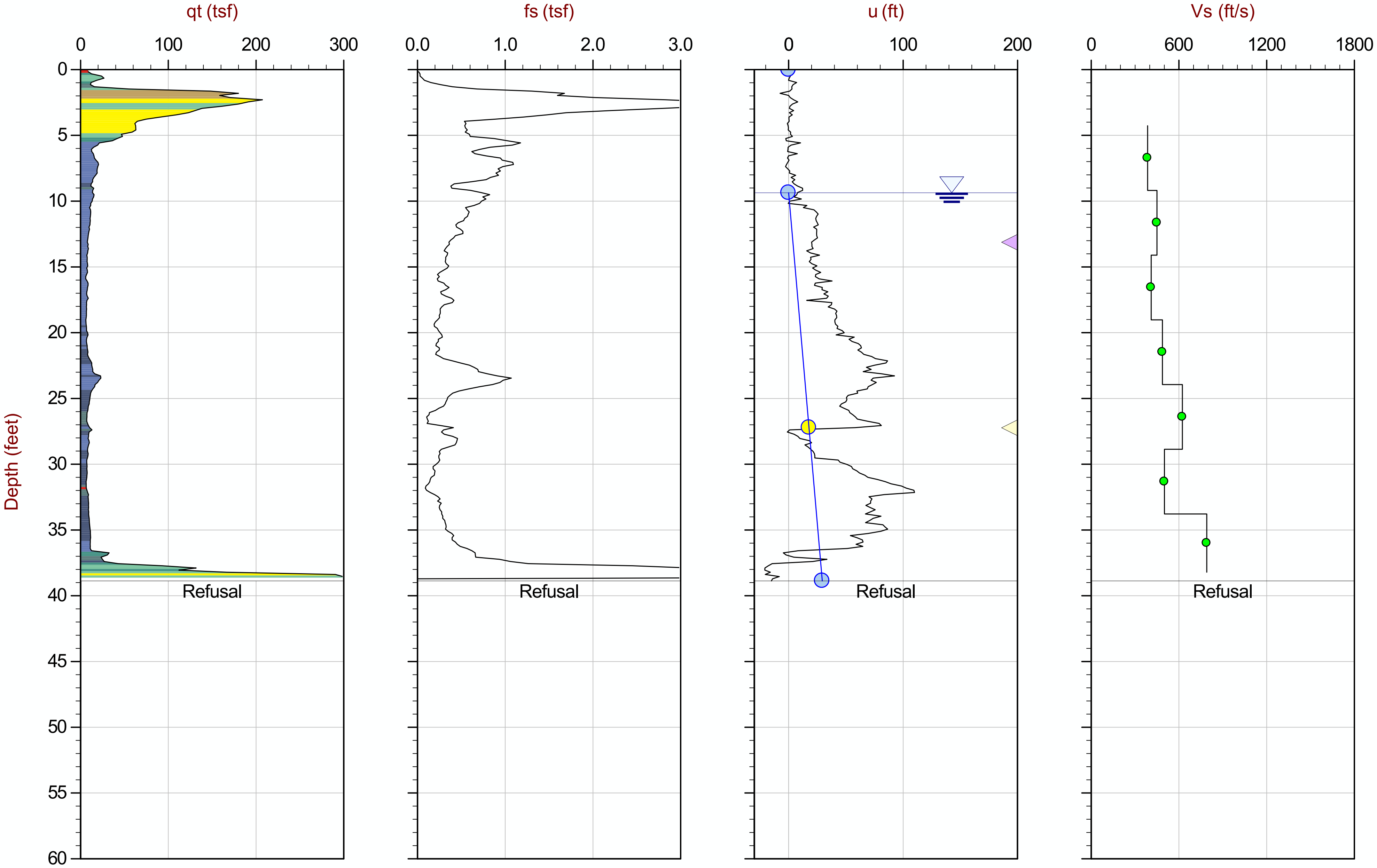
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

CONETEC **AECOM**

Job No: 15-53073
Date: 08:19:15 13:46
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C001
Cone: 374:T1500F15U500



Max Depth: 11.850 m / 38.88 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497502m E: 274312m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

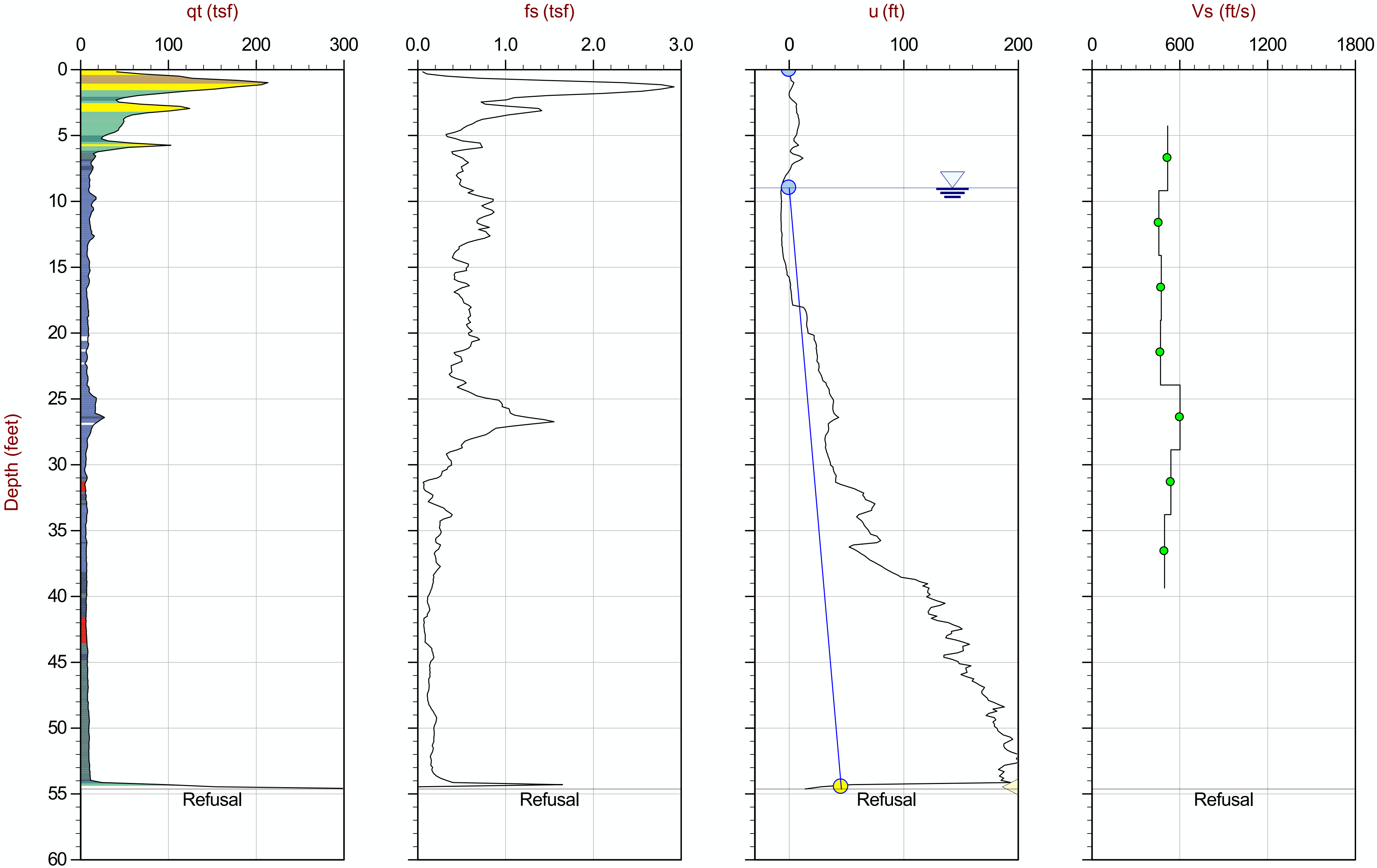
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:27:15 15:22
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C003
Cone: 340:T1500F15U500



Max Depth: 16.650 m / 54.63 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497325m E: 274377m

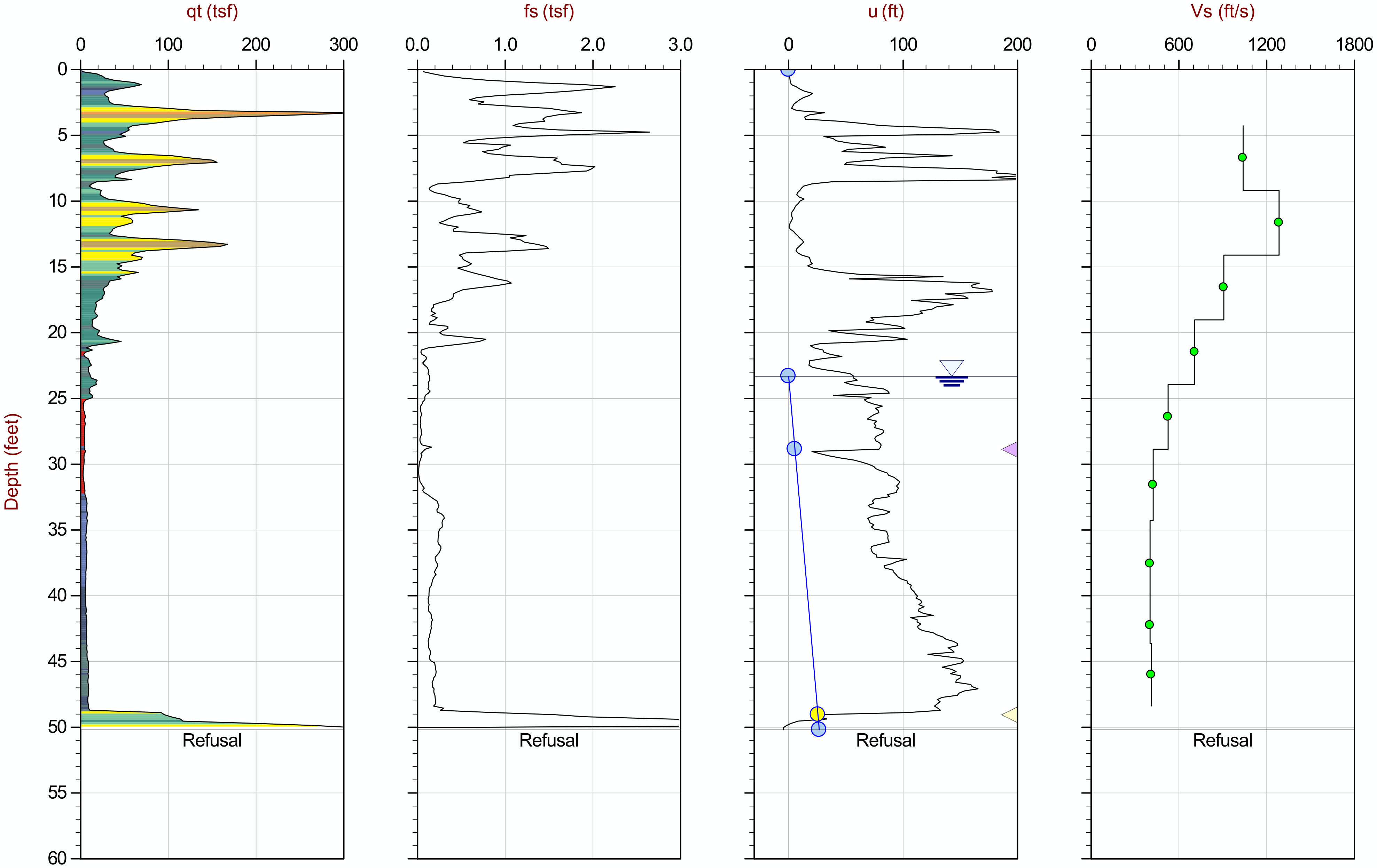
— Hydrostatic Line ○ Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec **AECOM**

Job No: 15-53073
Date: 08:28:15 14:27
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C012
Cone: 340:T1500F15U500



Max Depth: 15.300 m / 50.20 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP12.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496424m E: 274524m

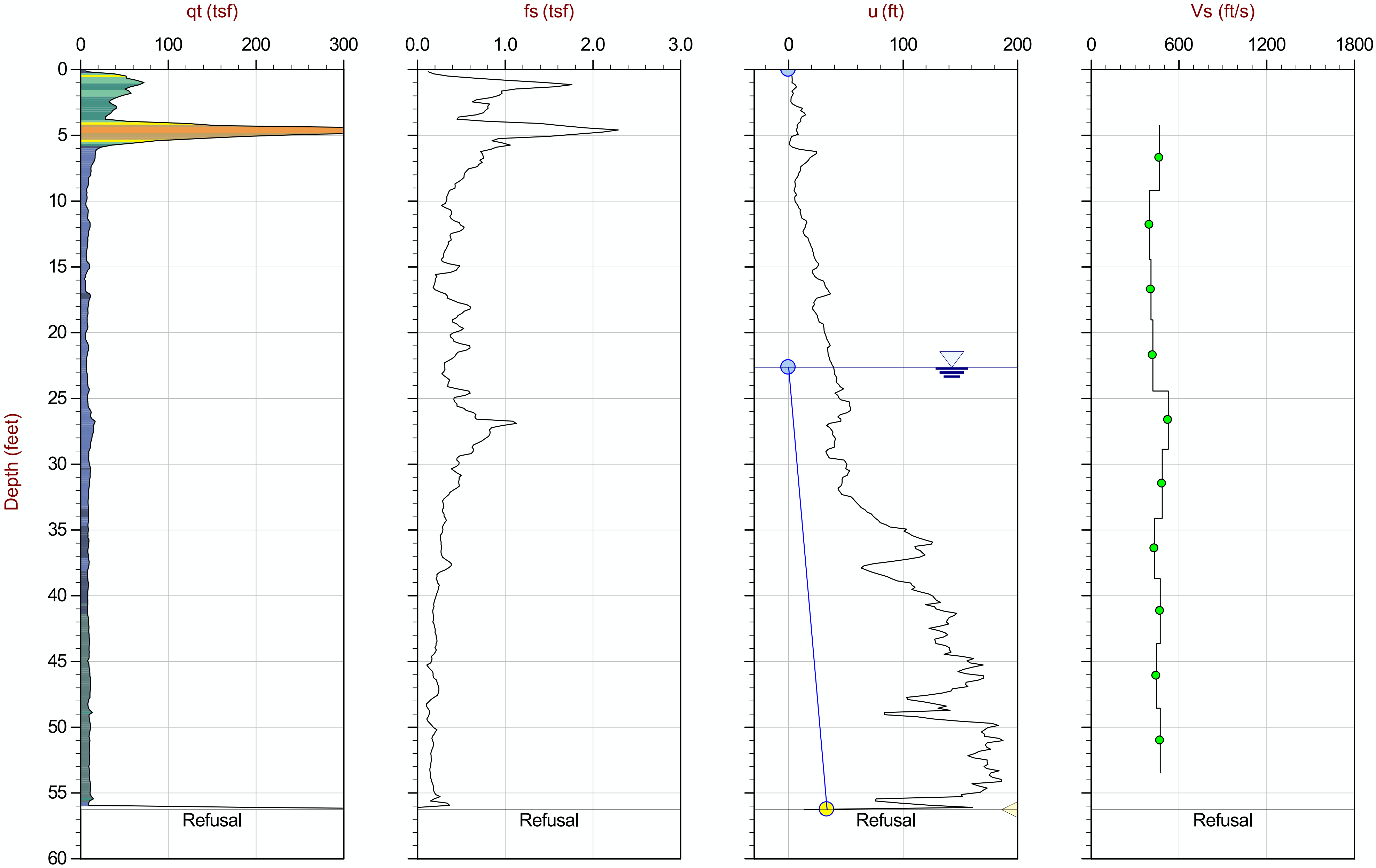
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:28:15 08:45
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C013
Cone: 340:T1500F15U500



Max Depth: 17.150 m / 56.27 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP13.COR

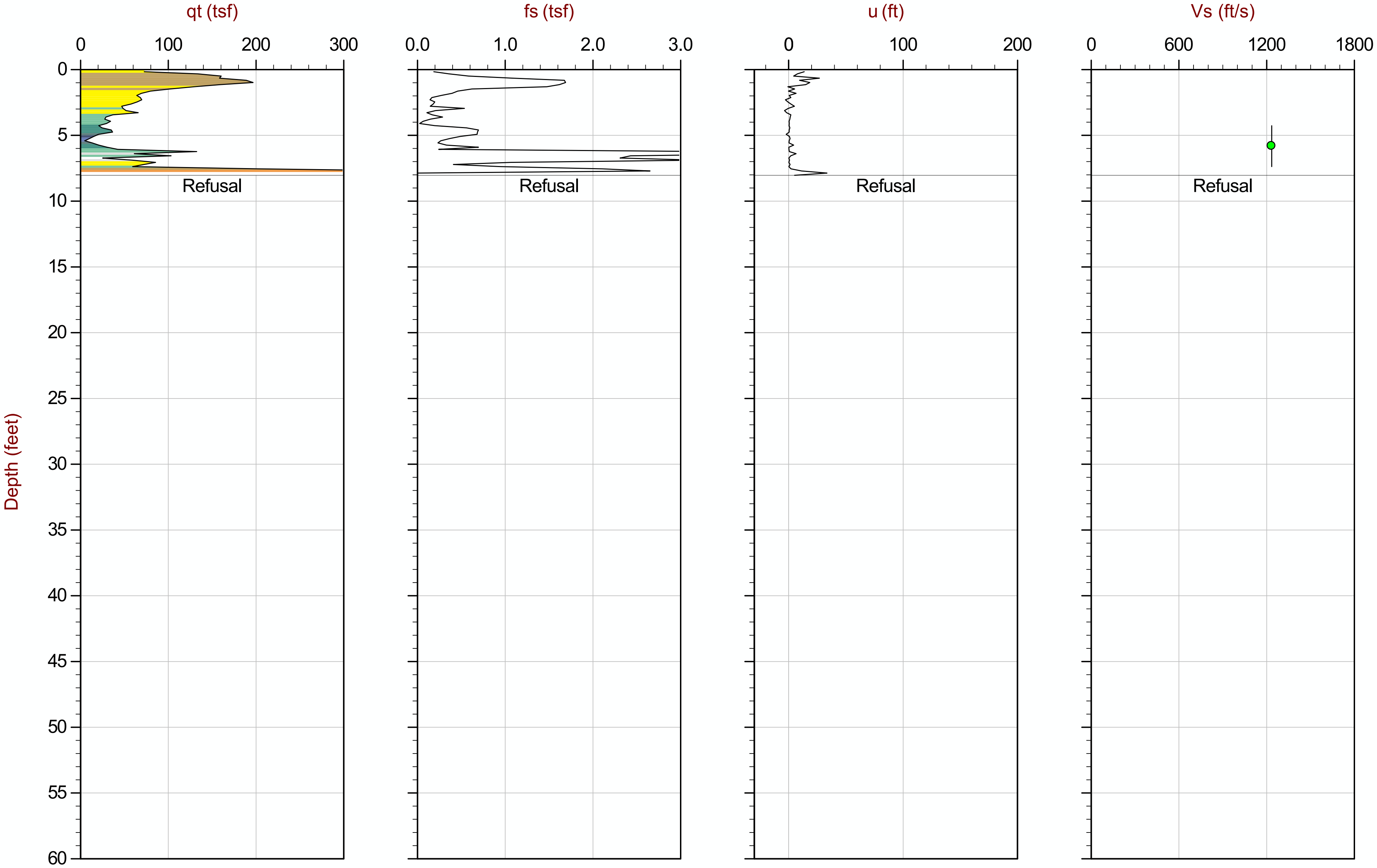
SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496386m E: 274376m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC **AECOM**

Job No: 15-53073
Date: 08:19:15 13:31
Site: Edwards Power Station
Sounding: EDW-C015
Cone: 335:T1500F15U500



Max Depth: 2.450 m / 8.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP15.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496447m E: 274334m

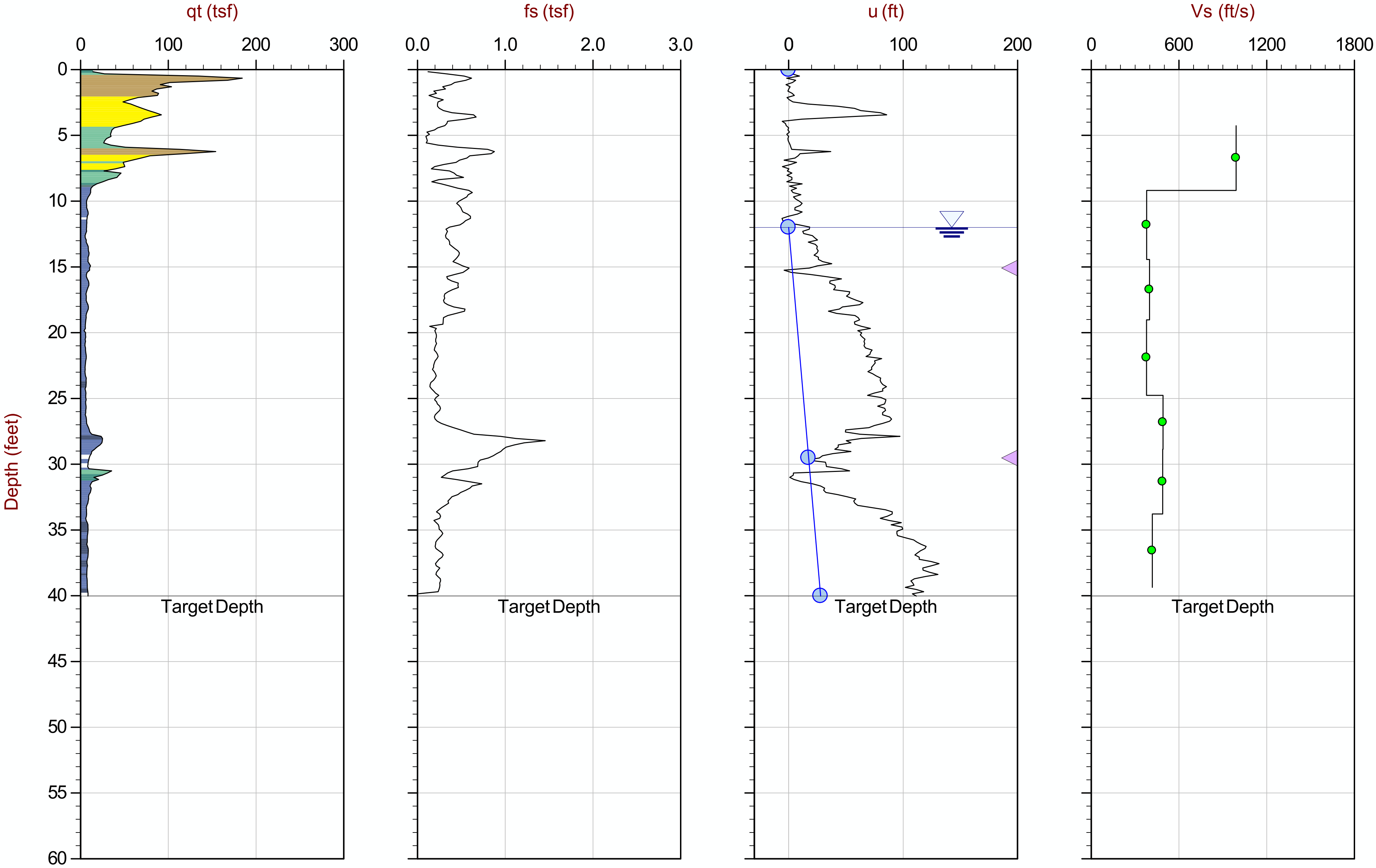
— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:19:15 14:12
Site: Edwards Power Station

Sounding: EDW-C015A
Cone: 335:T1500F15U500



Max Depth: 12.200 m / 40.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP15A.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496435m E: 274342m

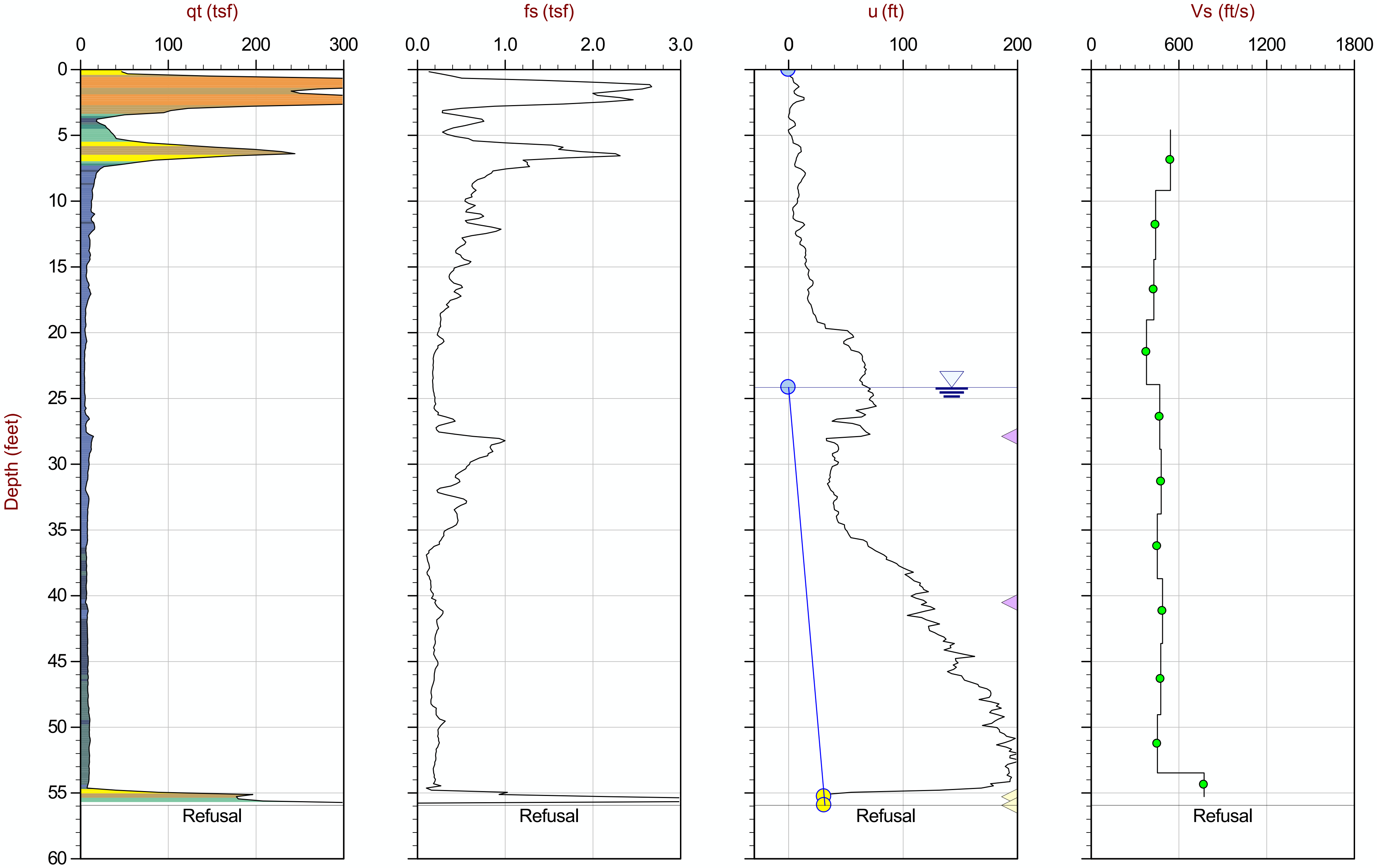
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:27:15 11:13
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: 340:T1500F15U500



Max Depth: 17.050 m / 55.94 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP17.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4496775m E: 274137m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◀ PPD, Ueq not achieved

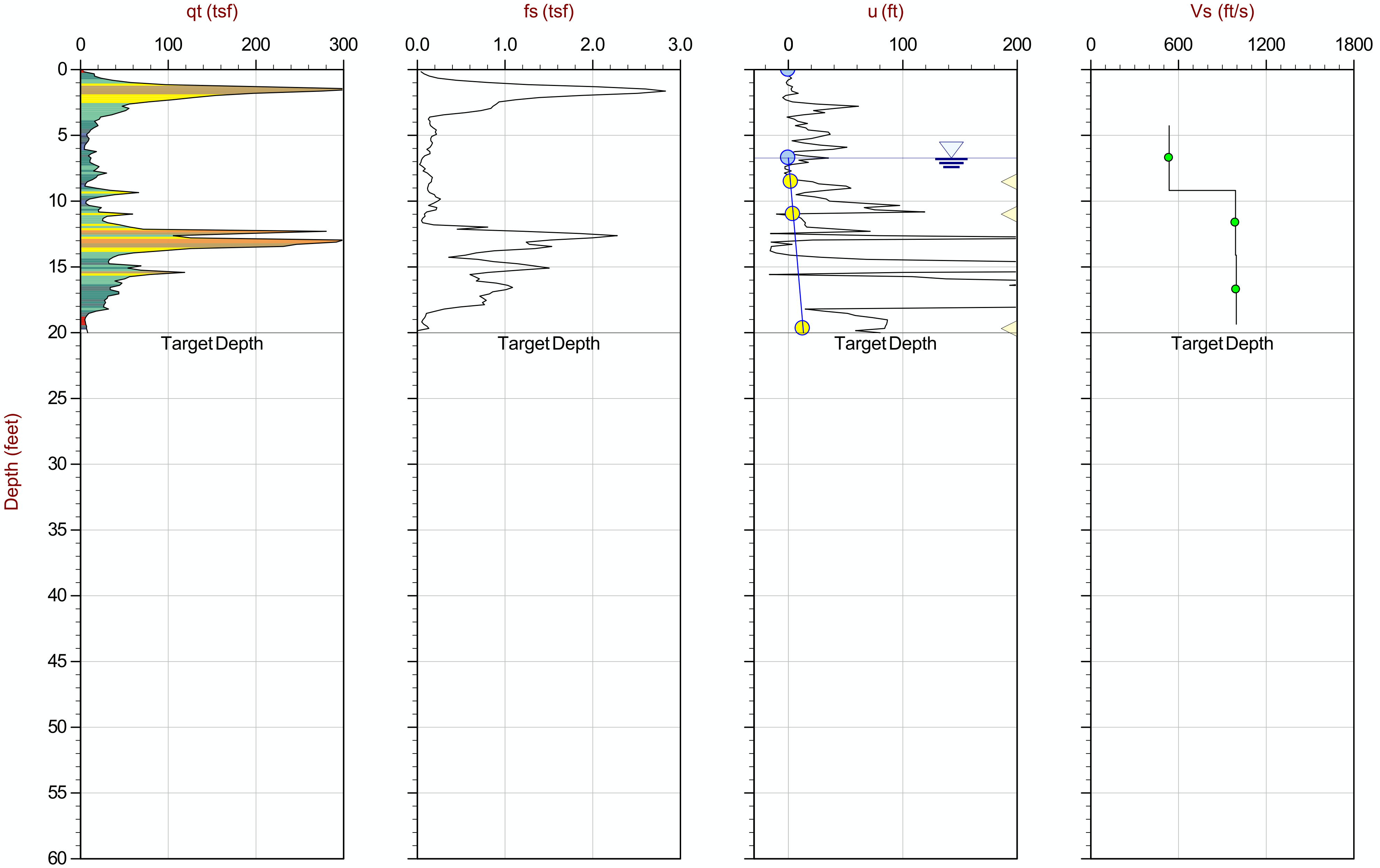
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 10:35
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C022
Cone: 374:T1500F15U500



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP22.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497185m E: 274108m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

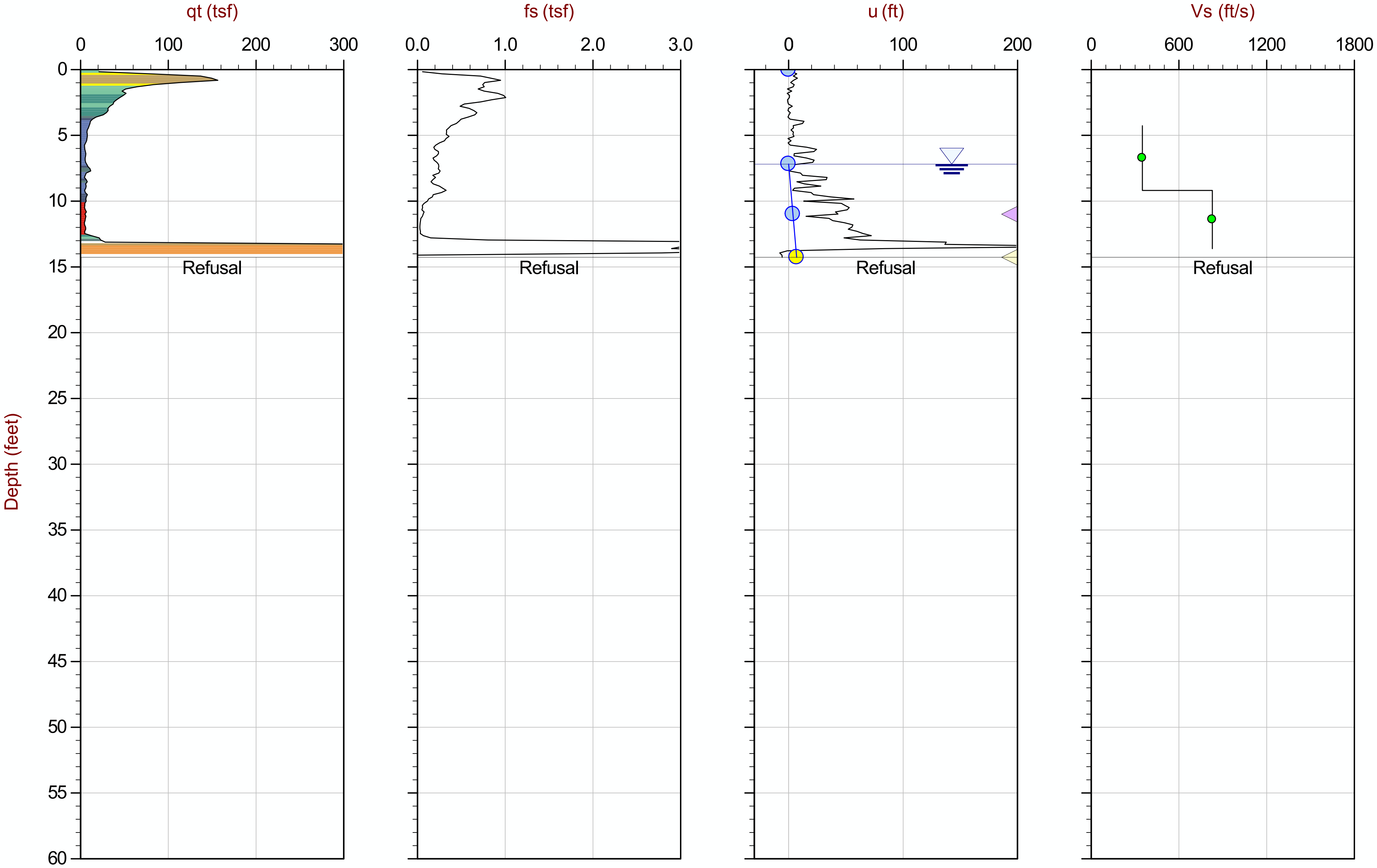
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53073
Date: 08:26:15 12:20
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026
Cone: 374:T1500F15U500



Max Depth: 4.350 m / 14.27 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP26.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497062m E: 274334m

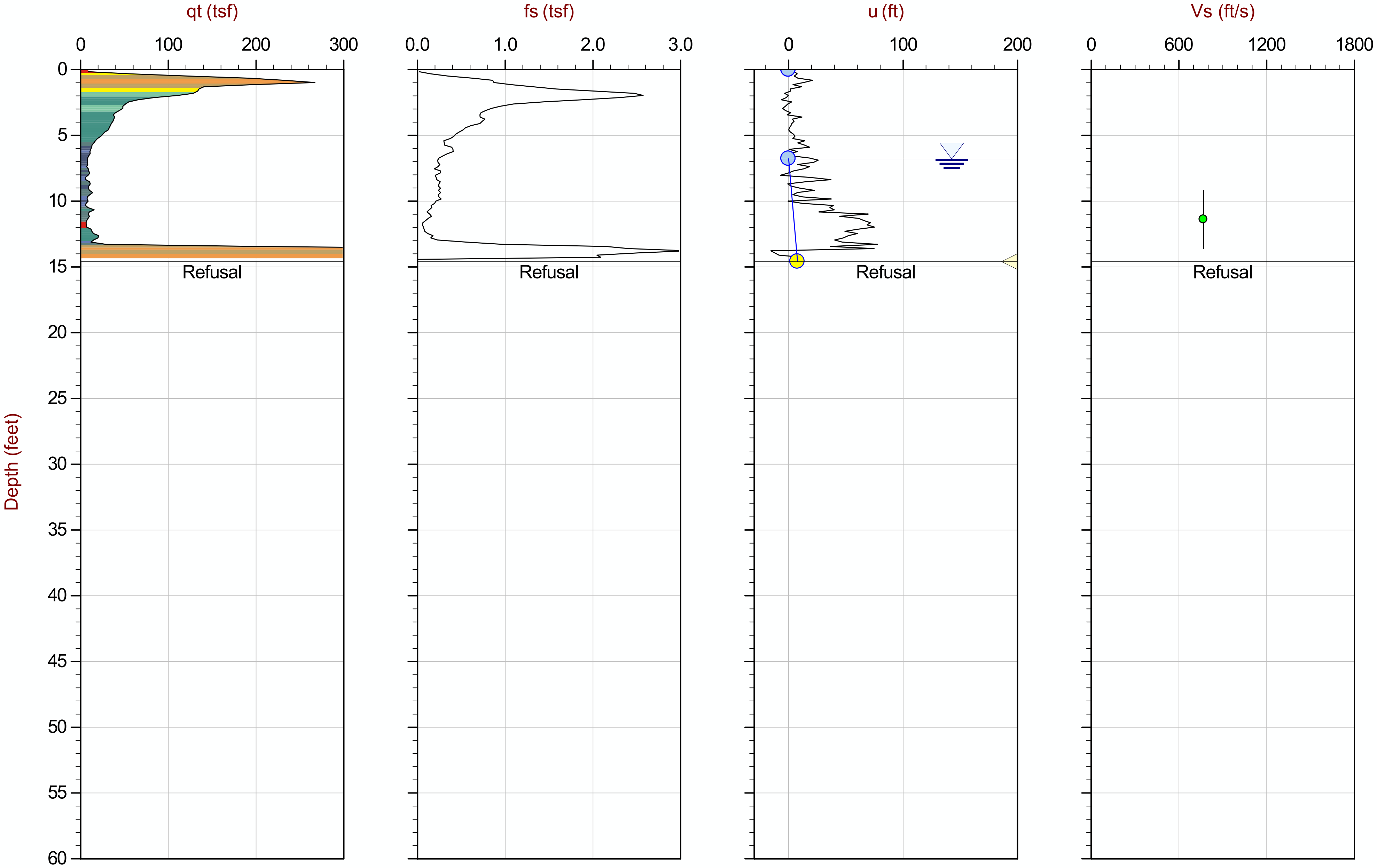
Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

AECOM

Job No: 15-53073
Date: 08:26:15 14:00
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026B
Cone: 374:T1500F15U500



Max Depth: 4.450 m / 14.60 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53073_SP26B.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4497064m E: 274335m

— Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results (Vs)

Job No:	15-53073
Client:	AECOM
Project:	Edwards Power Station
Sounding ID:	EDW-C001
Date:	19-Aug-2015

Seismic Source:	Beam
Source Offset (ft):	7.21
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	8.38			
9.84	9.19	11.68	3.30	8.55	386
14.76	14.11	15.84	4.17	9.25	450
19.69	19.03	20.35	4.51	10.98	410
24.61	23.95	25.01	4.66	9.57	487
29.53	28.87	29.76	4.75	7.61	624
34.45	33.79	34.55	4.80	9.57	501
38.88	38.22	38.90	4.34	5.49	791

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C003
Date: 25-Aug-2015

Seismic Source: Beam
Source Offset (ft): 1.97
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	4.70			
9.84	9.19	9.40	4.70	9.08	517
14.76	14.11	14.24	4.85	10.62	457
19.69	19.03	19.13	4.89	10.30	474
24.61	23.95	24.03	4.90	10.48	468
29.53	28.87	28.94	4.91	8.15	602
34.45	33.79	33.85	4.91	9.12	539
40.03	39.37	39.42	5.57	11.23	496

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C012
Date: 28-Aug-2015

Seismic Source: Beam
Source Offset (ft): 1.97
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	4.70			
9.84	9.19	9.40	4.70	4.52	1039
14.76	14.11	14.24	4.85	3.77	1285
19.69	19.03	19.13	4.89	5.39	907
24.61	23.95	24.03	4.90	6.92	708
29.53	28.87	28.94	4.91	9.33	526
34.94	34.28	34.34	5.40	12.74	424
41.50	40.85	40.89	6.55	16.28	403
44.29	43.64	43.68	2.79	6.92	403
49.05	48.39	48.43	4.75	11.55	411

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C013
Date: 28-Aug-2015

Seismic Source: Beam
Source Offset (ft): 1.97
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	4.70			
9.84	9.19	9.40	4.70	10.06	467
15.09	14.44	14.57	5.17	12.94	400
19.69	19.03	19.13	4.56	11.16	409
25.10	24.44	24.52	5.39	12.78	422
29.53	28.87	28.94	4.42	8.39	527
34.78	34.12	34.18	5.24	10.79	486
39.37	38.71	38.76	4.59	10.58	433
44.29	43.64	43.68	4.92	10.42	472
49.21	48.56	48.60	4.92	11.04	446
54.13	53.48	53.51	4.92	10.42	472

Job No:	15-53073
Client:	AECOM
Project:	Edwards Power Station
Sounding ID:	EDW-C015
Date:	19-Aug-2015

Seismic Source:	Beam
Source Offset (ft):	1.50
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	4.52			
8.04	7.38	7.53	3.01	2.44	1235

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C015A
Date: 19-Aug-2015

Seismic Source: Beam
Source Offset (ft): 1.50
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	4.52			
9.84	9.19	9.31	4.79	4.83	991
15.09	14.44	14.51	5.21	13.73	379
19.69	19.03	19.09	4.57	11.46	399
25.43	24.77	24.82	5.73	15.15	378
29.53	28.87	28.91	4.09	8.34	491
34.45	33.79	33.83	4.92	10.05	489
40.03	39.37	39.40	5.57	13.34	418

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C017
Date: 27-Aug-2015

Seismic Source: Beam
Source Offset (ft): 1.97
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.25	4.59	5.00			
9.84	9.19	9.40	4.40	8.11	542
15.09	14.44	14.57	5.17	11.73	441
19.69	19.03	19.13	4.56	10.62	429
24.61	23.95	24.03	4.90	12.96	378
29.53	28.87	28.94	4.91	10.47	469
34.45	33.79	33.85	4.91	10.26	479
39.37	38.71	38.76	4.91	10.87	452
44.29	43.64	43.68	4.92	10.08	488
49.70	49.05	49.09	5.41	11.37	476
54.13	53.48	53.51	4.43	9.77	453
55.94	55.28	55.32	1.80	2.33	772

Job No:	15-53073
Client:	AECOM
Project:	Edwards Power Station
Sounding ID:	EDW-C022
Date:	26-Aug-2015

Seismic Source:	Beam
Source Offset (ft):	7.21
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	8.38			
9.84	9.19	11.68	3.30	6.16	536
14.76	14.11	15.84	4.17	4.21	990
20.01	19.36	20.66	4.81	4.83	996

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C026
Date: 26-Aug-2015

Seismic Source: Beam
Source Offset (ft): 7.21
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.92	4.27	8.38			
9.84	9.19	11.68	3.30	9.43	350
14.27	13.62	15.41	3.73	4.50	829

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station
Sounding ID: EDW-C026B
Date: 26-Aug-2015

Seismic Source: Beam
Source Offset (ft): 7.21
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
9.84	9.19	11.68			
14.27	13.62	15.41	3.73	4.85	769

Pore Pressure Dissipation Summary and

Pore Pressure Dissipation Plots

CONETEC

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station, Peoria, IL
Start Date: 19-Aug-2015
End Date: 29-Aug-2015

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)
EDW-C001	15-53073_SP01	15	200	13.12						
EDW-C001	15-53073_SP01	15	9000	27.23	17.86	9.37		81	100	8.69
EDW-C003	15-53073_SP03	15	1020	54.46	45.49	8.98				
EDW-C005	15-53073_CP05	15	6000	37.40	30.40		7.00	3717	100	0.19
EDW-C006	15-53073_CP06	15	360	14.27						
EDW-C006	15-53073_CP06	15	7200	26.25	14.75		11.50	7114	100	0.10
EDW-C006	15-53073_CP06	15	1200	40.03						
EDW-C007	15-53073_CP07	15	600	26.90						
EDW-C007	15-53073_CP07	15	4000	51.51	42.62	8.89				
EDW-C008	15-53073_CP08	15	4800	22.15	12.15		10.00	2835	100	0.25
EDW-C008	15-53073_CP08	15	1800	33.63						
EDW-C009	15-53073_CP09	15	800	16.08	2.61	13.46				
EDW-C009	15-53073_CP09	15	600	28.38	8.49	19.89				
EDW-C010	15-53073_CP10	15	3000	12.14	9.93		2.21	1239	100	0.57
EDW-C010	15-53073_CP10	15	300	27.56	25.35	2.21				
EDW-C010	15-53073_CP10	15	600	30.02	0.00					
EDW-C011	15-53073_CP11	15	3800	24.11						
EDW-C011	15-53073_CP11	15	7500	46.42	23.96		22.47	1082	100	0.65
EDW-C011	15-53073_CP11	15	400	47.08	24.61	22.47				
EDW-C012	15-53073_SP12	15	1500	28.87	5.55		23.32	120	100	5.86
EDW-C012	15-53073_SP12	15	1000	49.05	25.73	23.32				
EDW-C013	15-53073_SP13	15	1205	56.27	33.61	22.65				
EDW-C014	15-53073_CP14	15	4000	16.08	11.16		4.91	2190	100	0.32
EDW-C014	15-53073_CP14	15	500	38.22	33.31	4.91				
EDW-C015A	15-53073_SP15A	15	2000	15.09						
EDW-C015A	15-53073_SP15A	15	10800	29.53	17.53		12.00	6095	100	0.12
EDW-C016	15-53073_CP16	15	900	7.38						
EDW-C016	15-53073_CP16	15	3600	18.04	14.20		3.85	1538	100	0.46
EDW-C016	15-53073_CP16	15	500	36.91	33.06	3.85				
EDW-C017	15-53073_SP17	15	500	27.89						
EDW-C017	15-53073_SP17	15	525	40.52						
EDW-C017	15-53073_SP17	15	600	55.28	31.11	24.17				
EDW-C017	15-53073_SP17	15	85	55.94	31.25	24.69				
EDW-C019	15-53073_CP19	15	600	11.81	5.31	6.51				
EDW-C019	15-53073_CP19	15	1500	53.48	48.16	5.31				
EDW-C021	15-53073_CP21	15	550	13.94						
EDW-C021	15-53073_CP21	15	8000	23.46	10.46		13.00	2190	100	0.32
EDW-C021	15-53073_CP21	15	12070	33.63	20.63		13.00	1449	100	0.48
EDW-C021	15-53073_CP21	15	1600	48.39						
EDW-C022	15-53073_SP22	15	300	8.53	2.39	6.14				
EDW-C022	15-53073_SP22	15	300	10.99	4.27	6.72				
EDW-C022	15-53073_SP22	15	1200	19.68	12.85	6.84				
EDW-C023	15-53073_CP23	15	4000	38.88	23.82		15.06	78	100	9.01
EDW-C023	15-53073_CP23	15	400	40.68	25.63	15.06				
EDW-C025	15-53073_CP25	15	1500	6.56	0.57		5.99	36	100	19.34

Job No: 15-53073
Client: AECOM
Project: Edwards Power Station, Peoria, IL
Start Date: 19-Aug-2015
End Date: 29-Aug-2015

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50}^{a} (s)	Assumed Rigidity Index (I_r)	c_h^{b} (cm^2/min)
EDW-C025	15-53073_CP25	15	500	10.99	5.00	5.99				
EDW-C025	15-53073_CP25	15	500	15.09	9.03	6.06				
EDW-C025	15-53073_CP25	15	500	20.01	13.58	6.44				
EDW-C026	15-53073_SP26	15	2700	10.99	3.80		7.19	31	100	22.51
EDW-C026	15-53073_SP26	15	1100	14.27	7.08	7.19				
EDW-C026B	15-53073_SP26B	15	800	14.60	7.81	6.79				
EDW-C027	15-53073_CP27	15	500	11.15	3.75	7.40				
EDW-C027	15-53073_CP27	15	300	14.27	7.50	6.77				
EDW-C027	15-53073_CP27	15	360	21.00	14.24	6.76				
EDW-C027	15-53073_CP27	15	500	30.84	24.17	6.67				
EDW-C027	15-53073_CP27	15	500	35.10	28.47	6.63				
EDW-C027	15-53073_CP27	15	1800	40.03	33.25		6.77	1185	100	0.59
Totals	54 dissipations		1879.3 min							

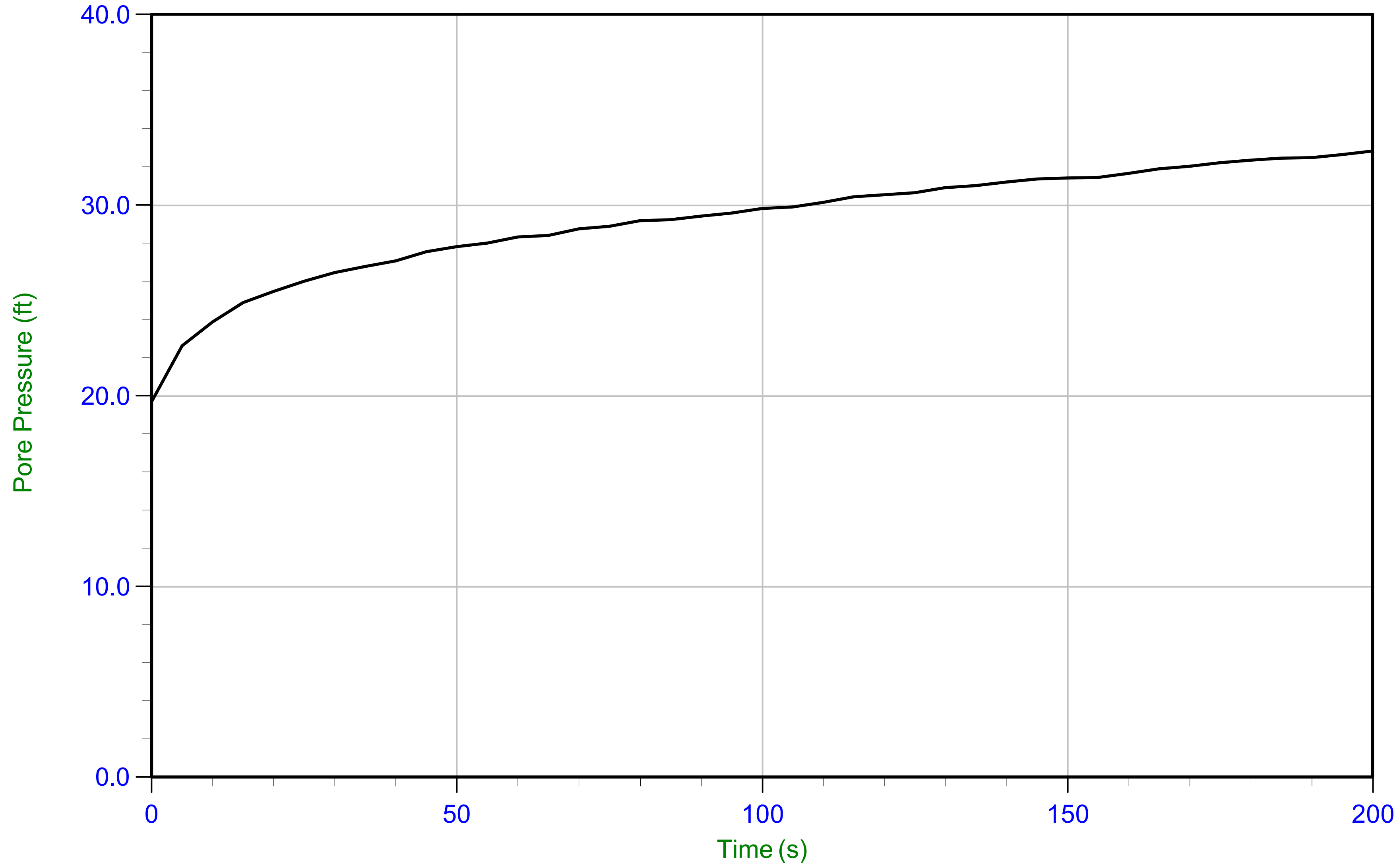
a. Time is relative to where umax occurred

b. Houlsby and Teh, 1991

AECOM

Job No: 15-53073
Date: 19-Aug-2015 13:46:01
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C001
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP01.PPD
Depth: 4.000 m / 13.123 ft
Duration: 200.0 s

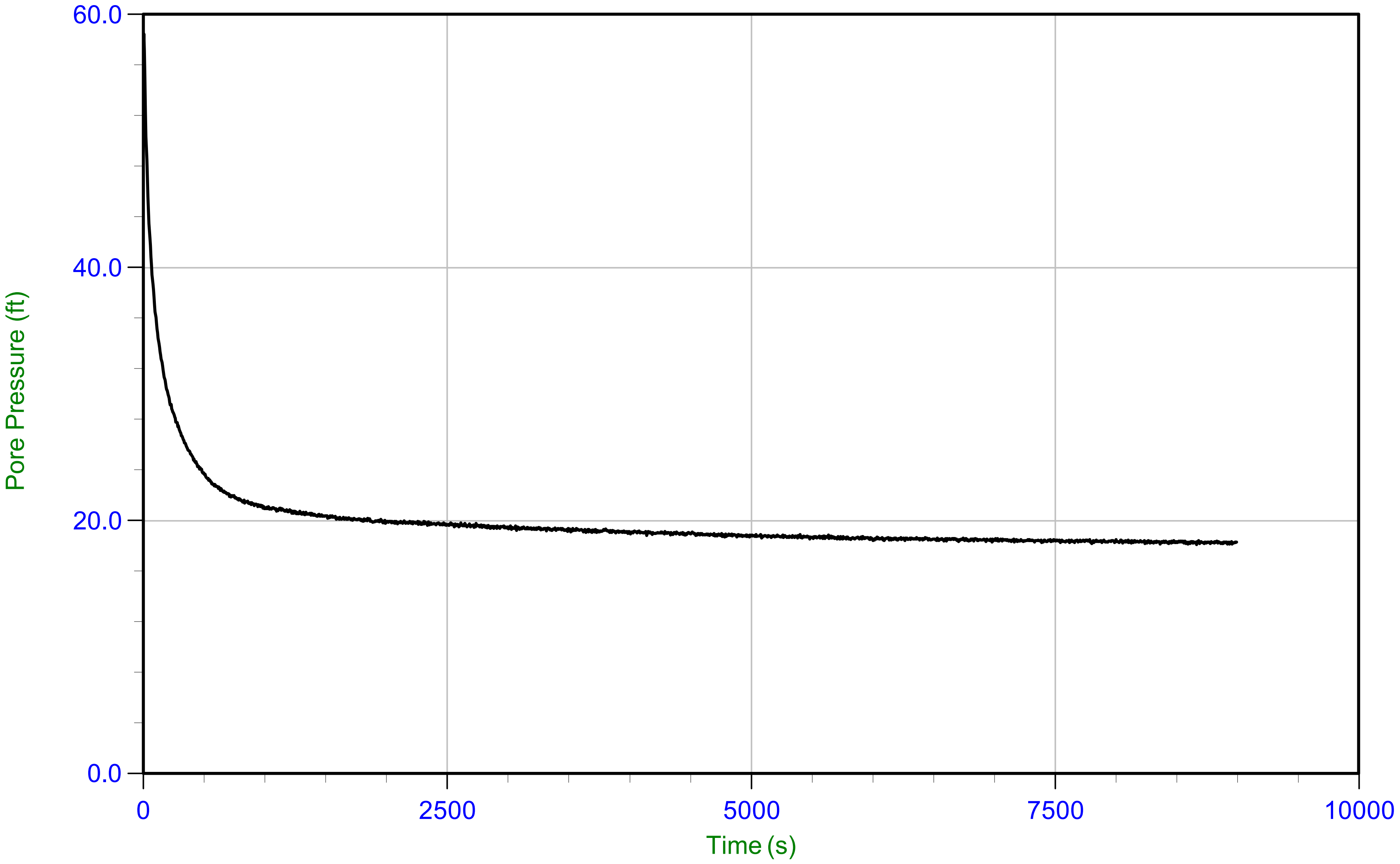
U Min: 19.7 ft
U Max: 32.8 ft

CONETEC

AECOM

Job No: 15-53073
Date: 19-Aug-2015 13:46:01
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C001
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP01.PPD
Depth: 8.300 m / 27.231 ft
Duration: 9000.0 s

U Min: 18.1 ft
U Max: 58.5 ft

WT: 2.855 m / 9.367 ft
Ueq: 17.9 ft
U(50): 38.16 ft

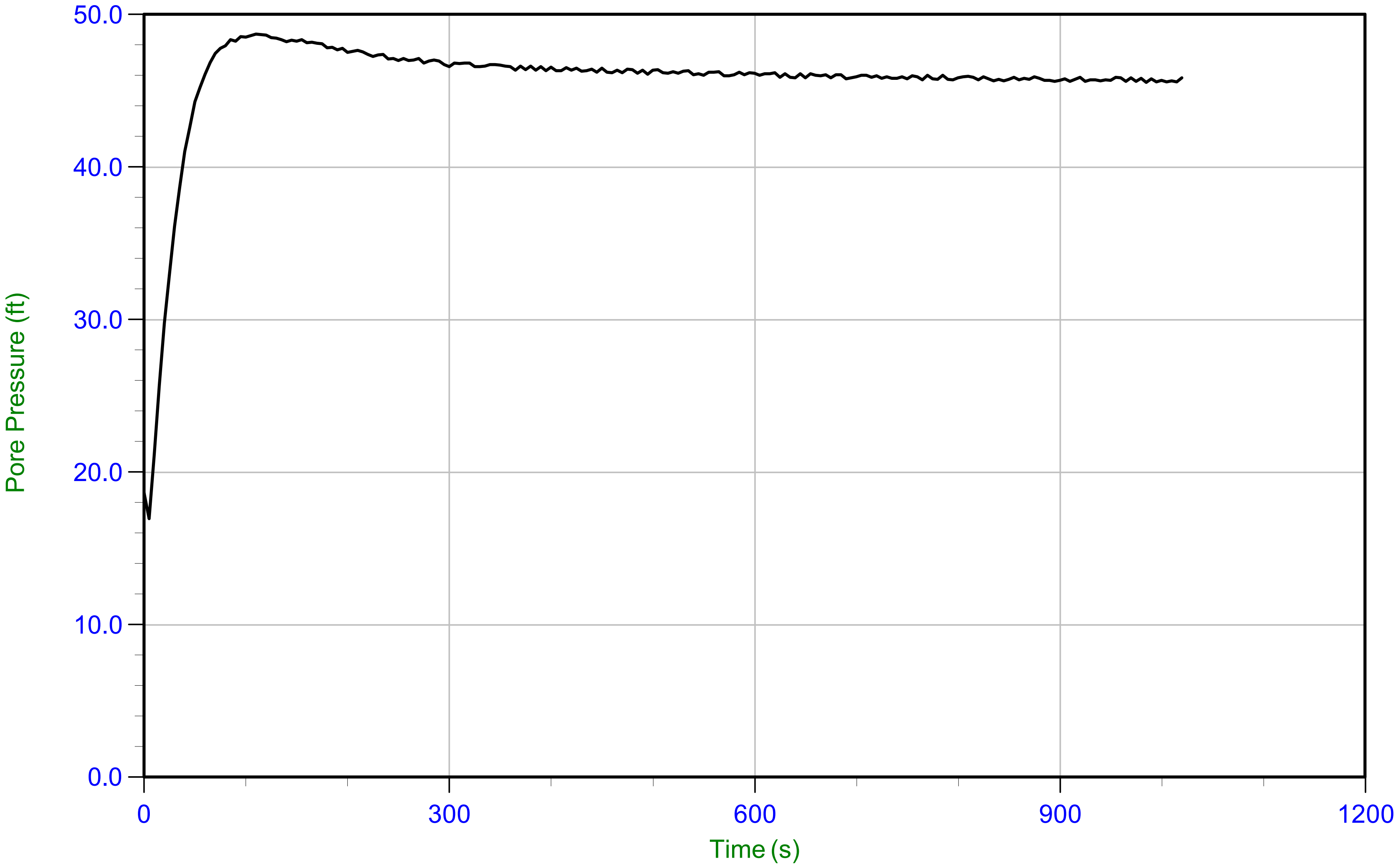
T(50): 80.8 s
Ir: 100
Ch: 8.7 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 14:27:54
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C003
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP03.PPD
Depth: 16.600 m / 54.461 ft
Duration: 1020.0 s

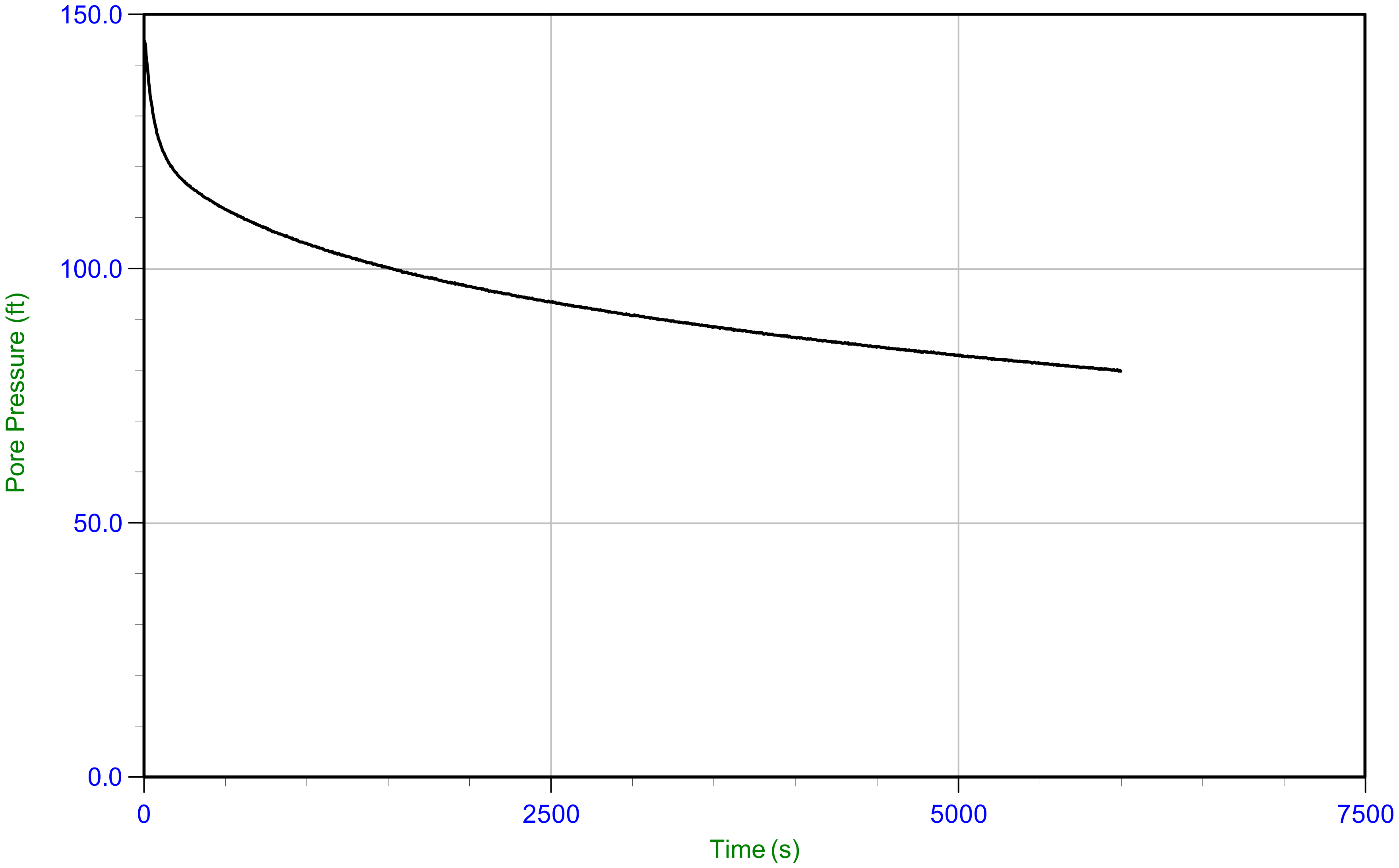
U Min: 16.9 ft
U Max: 48.7 ft

WT: 2.736 m / 8.976 ft
Ueq: 45.5 ft

AECOM

Job No: 15-53073
Date: 26-Aug-2015 15:05:24
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C005
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP05.PPD
Depth: 11.400 m / 37.401 ft
Duration: 6000.0 s

U Min: 79.9 ft
U Max: 144.8 ft

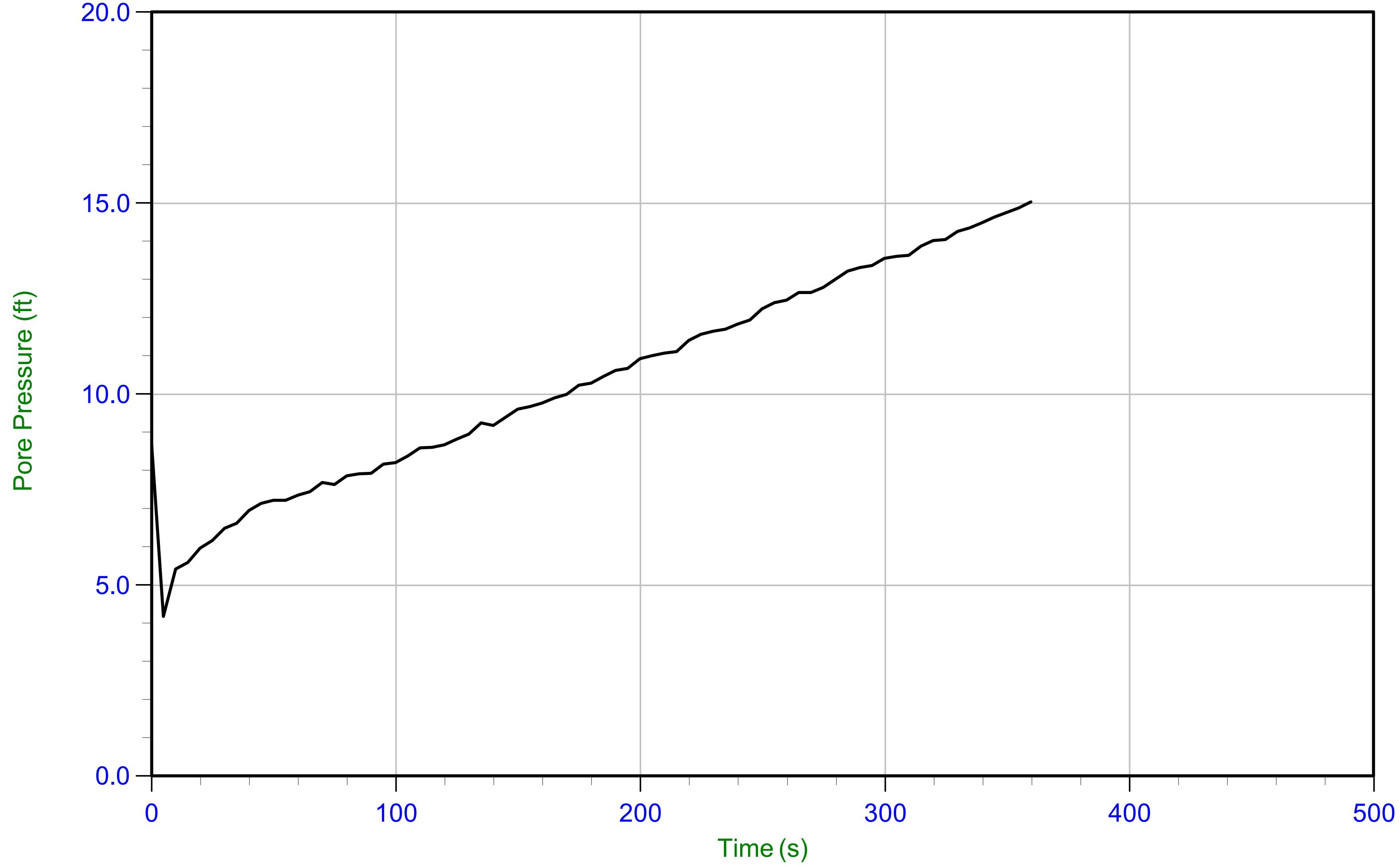
WT: 2.134 m / 7.001 ft
Ueq: 30.4 ft
U(50): 87.59 ft

T(50): 3717.5 s
Ir: 100
Ch: 0.2 sq cm/min

AECOM

Job No: 15-53073
Date: 25-Aug-2015 15:52:43
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C006
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP06.PPD
Depth: 4.350 m / 14.271 ft
Duration: 360.0 s

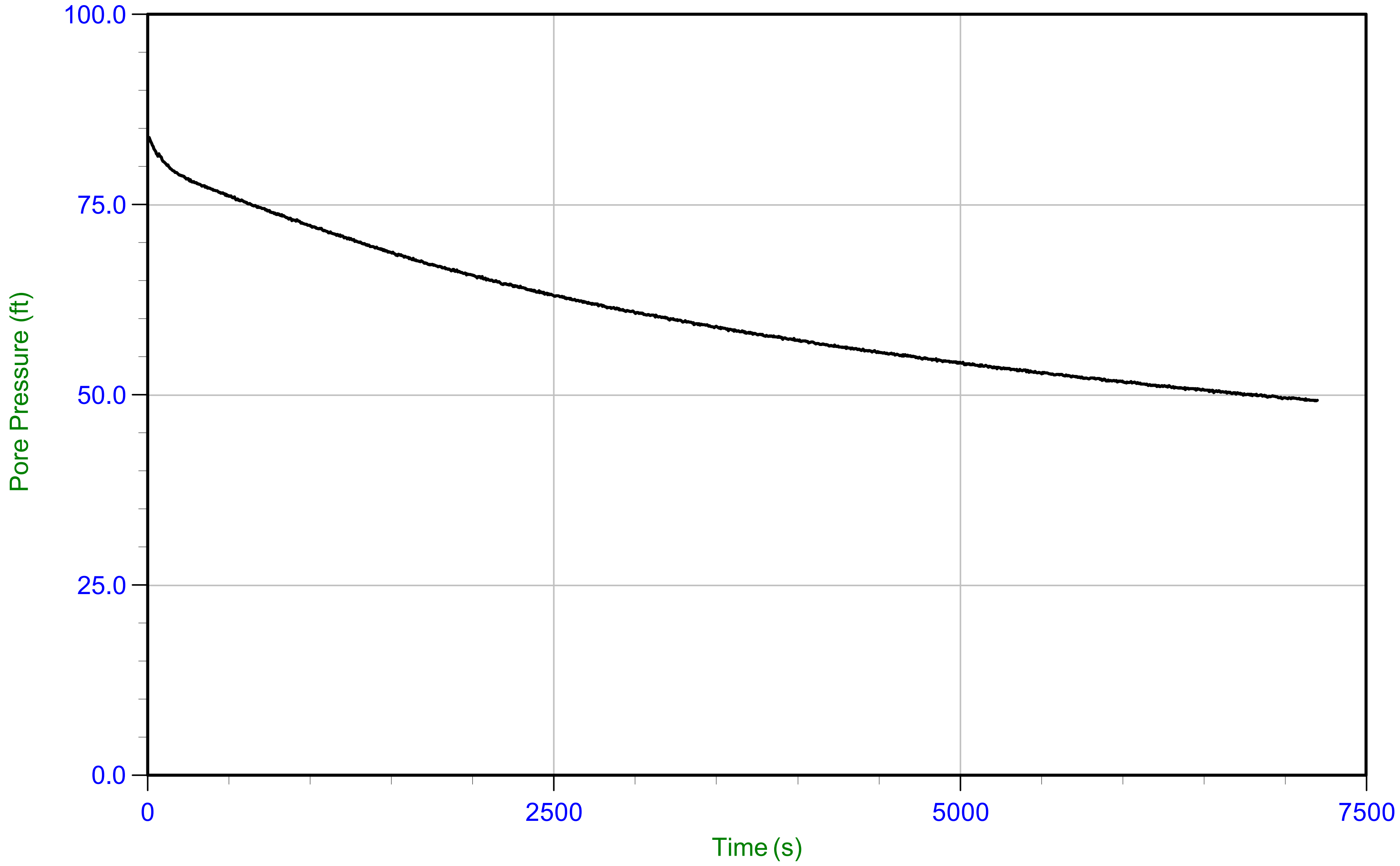
U Min: 4.2 ft
U Max: 15.0 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 15:52:43
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C006
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP06.PPD
Depth: 8.000 m / 26.246 ft
Duration: 7200.0 s

U Min: 49.2 ft
U Max: 83.8 ft

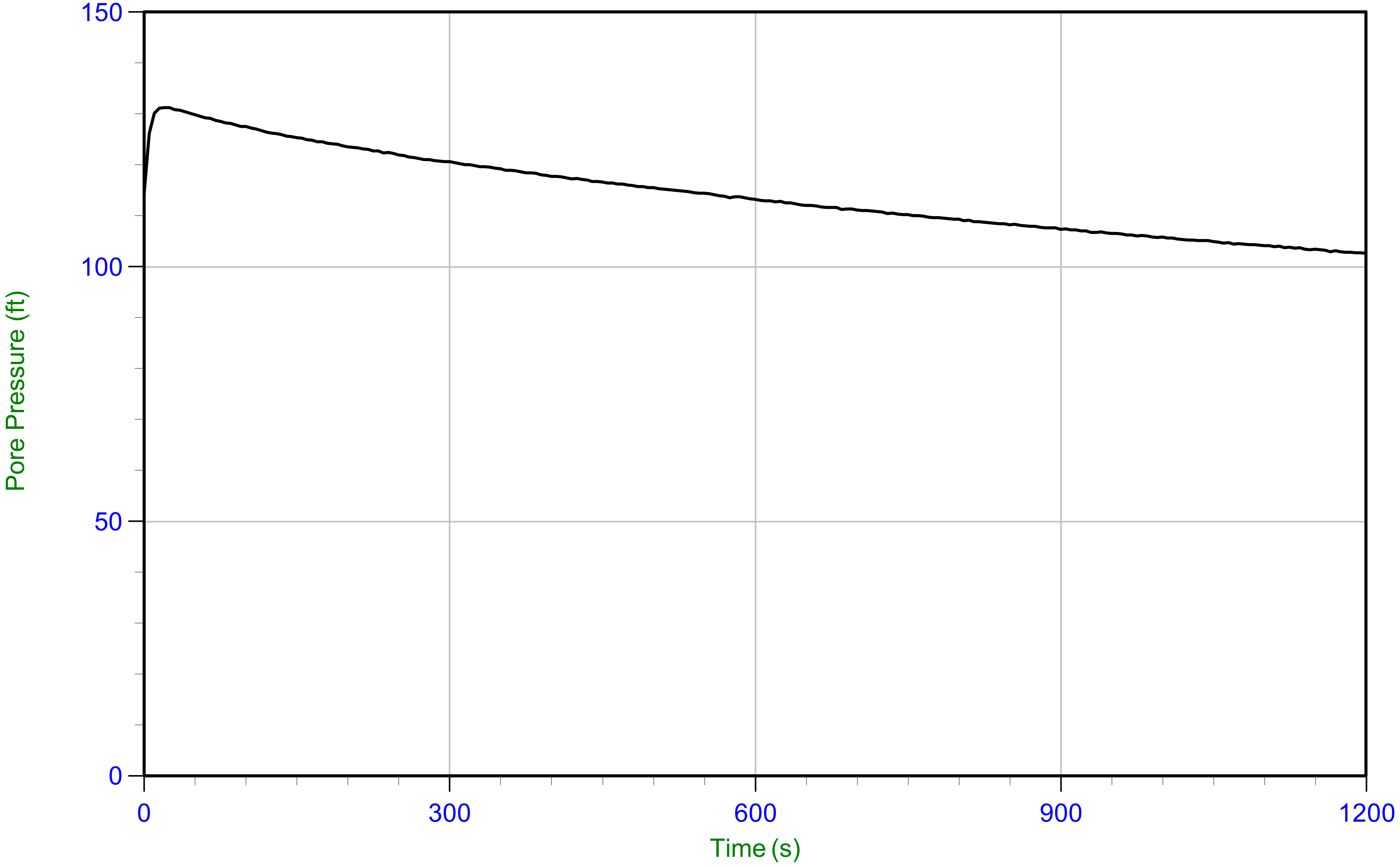
WT: 3.505 m / 11.499 ft
Ueq: 14.7 ft
U(50): 49.29 ft

T(50): 7113.9 s
Ir: 100
Ch: 0.1 sq cm/min

AECOM

Job No: 15-53073
Date: 25-Aug-2015 15:52:43
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C006
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP06.PPD
Depth: 12.200 m / 40.026 ft
Duration: 1200.0 s

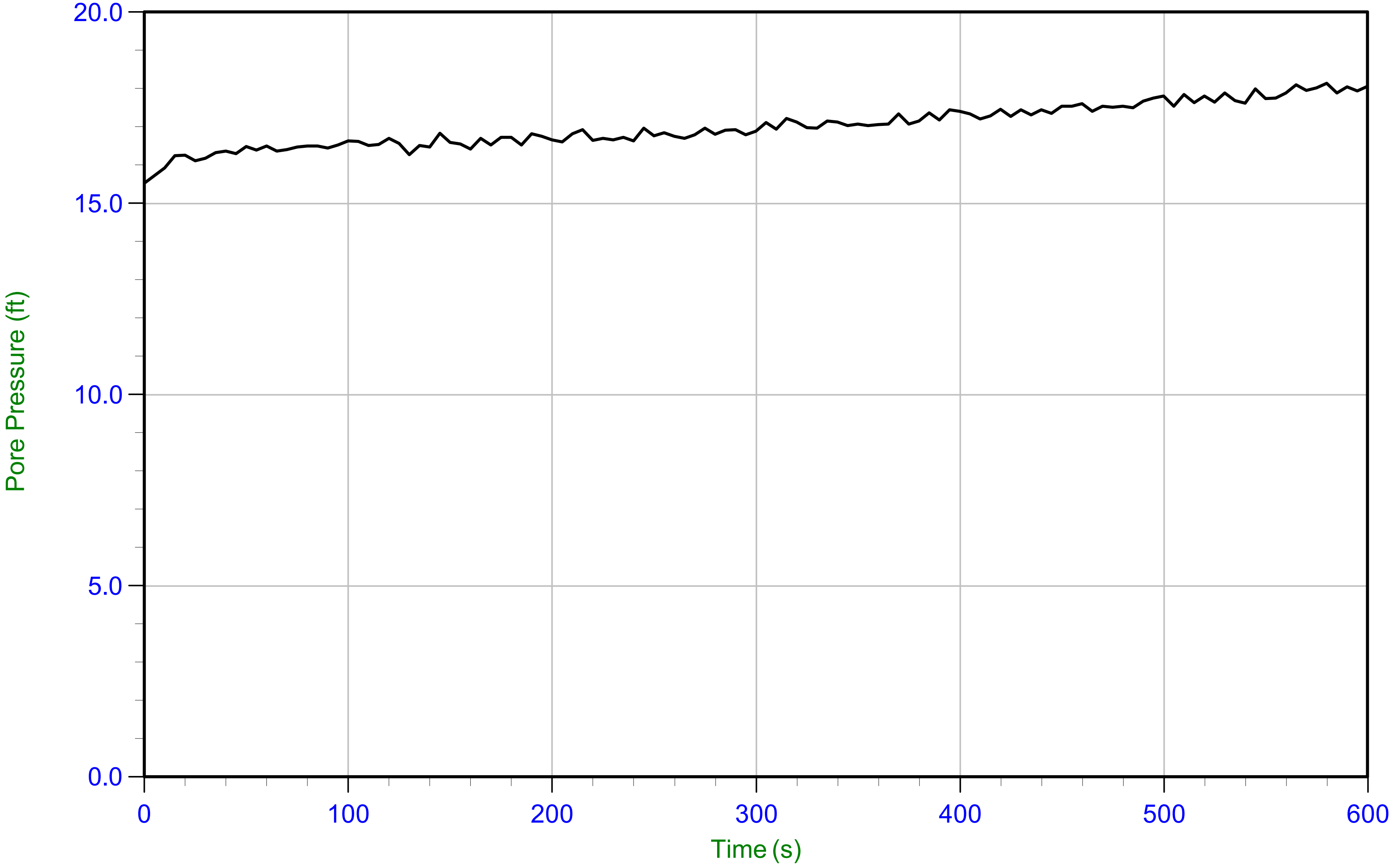
U Min: 102.7 ft
U Max: 131.3 ft

CONETEC

AECOM

Job No: 15-53073
Date: 29-Aug-2015 09:19:17
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C007
Cone: AD340
Cone Area: 15 sq cm

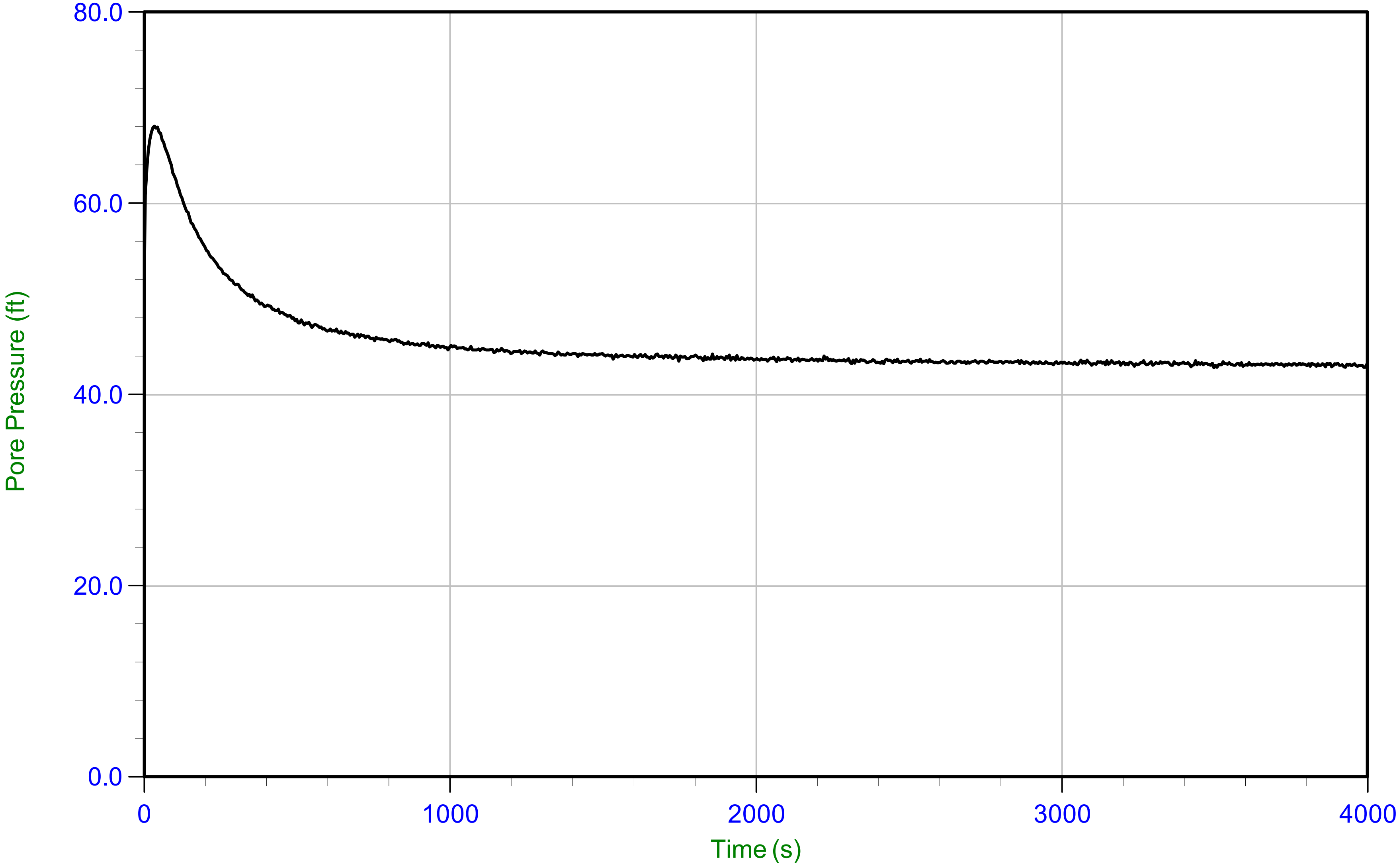


Trace Summary:

Filename: 15-53073_CP07.PPD
Depth: 8.200 m / 26.903 ft
Duration: 600.0 s

U Min: 15.5 ft
U Max: 18.1 ft

AECOM	Job No: 15-53073	Sounding: EDW-C007
	Date: 29-Aug-2015 09:19:17	Cone: AD340
	Site: Edwards Power Station, Peoria, Il	Cone Area: 15 sq cm



Trace Summary:

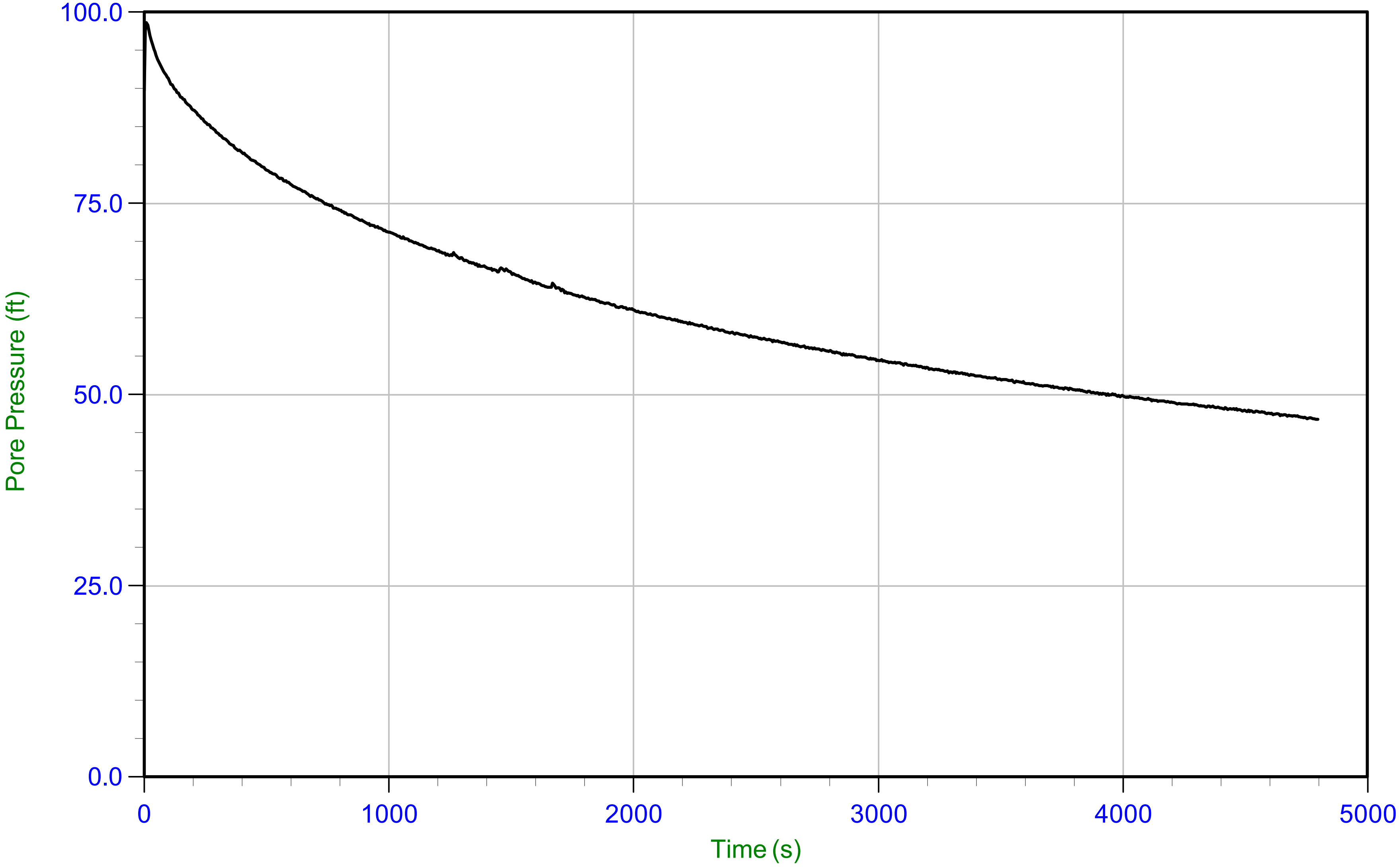
Filename: 15-53073_CP07.PPD	U Min: 42.8 ft	WT: 2.709 m / 8.888 ft	T(50): 166.2 s
Depth: 15.700 m / 51.509 ft	U Max: 68.1 ft	Ueq: 42.6 ft	Ir: 100
Duration: 4000.0 s		U(50): 55.34 ft	Ch: 4.2 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 08:50:17
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C008
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP08.PPD
Depth: 6.750 m / 22.145 ft
Duration: 4800.0 s

U Min: 46.8 ft
U Max: 98.7 ft

WT: 3.048 m / 10.000 ft
Ueq: 12.1 ft
U(50): 55.40 ft

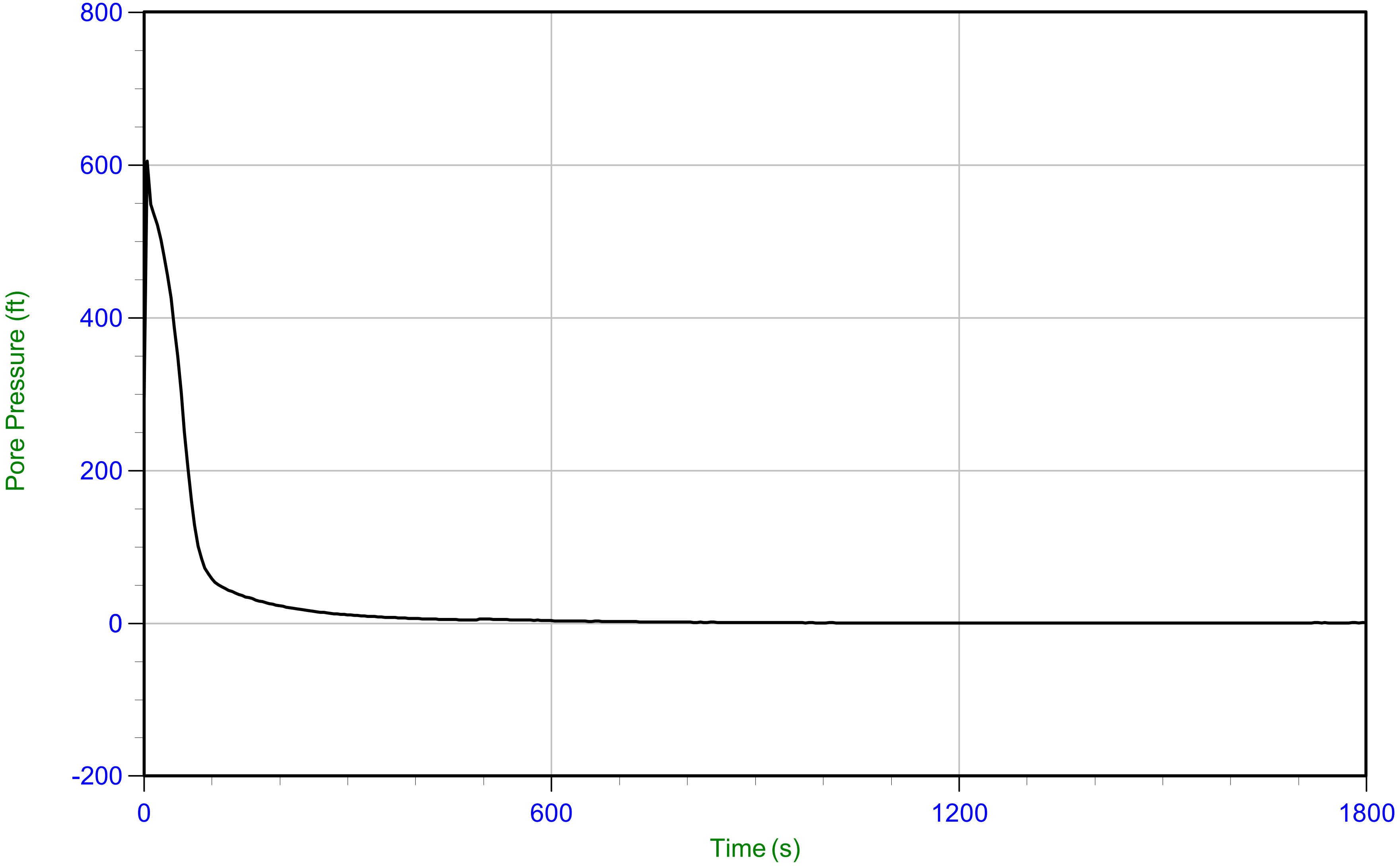
T(50): 2835.5 s
Ir: 100
Ch: 0.2 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 08:50:17
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C008
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP08.PPD
Depth: 10.250 m / 33.628 ft
Duration: 1800.0 s

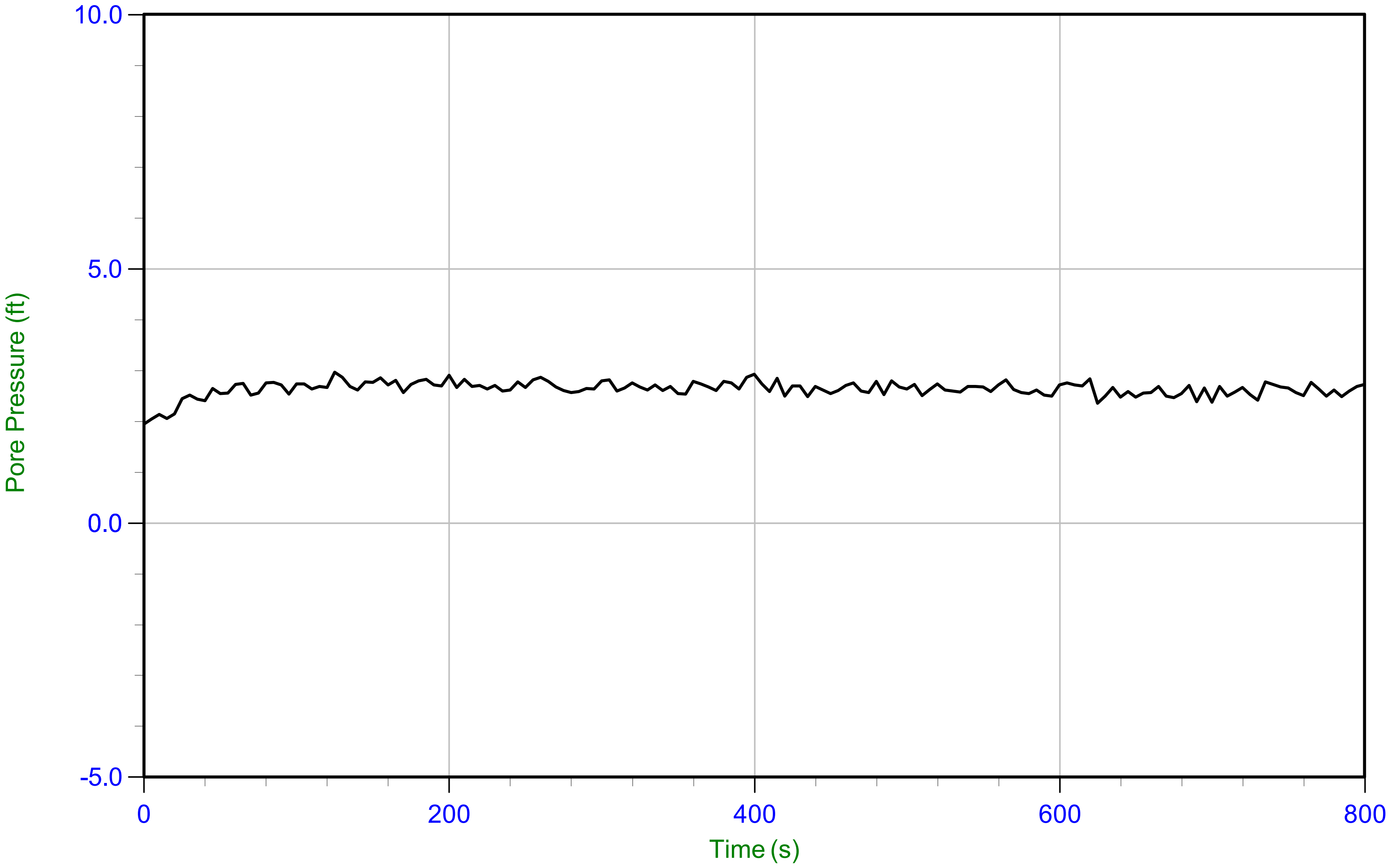
U Min: 0.1 ft
U Max: 605.2 ft

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 16:08:12
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C009
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP09.PPD
Depth: 4.900 m / 16.076 ft
Duration: 800.0 s

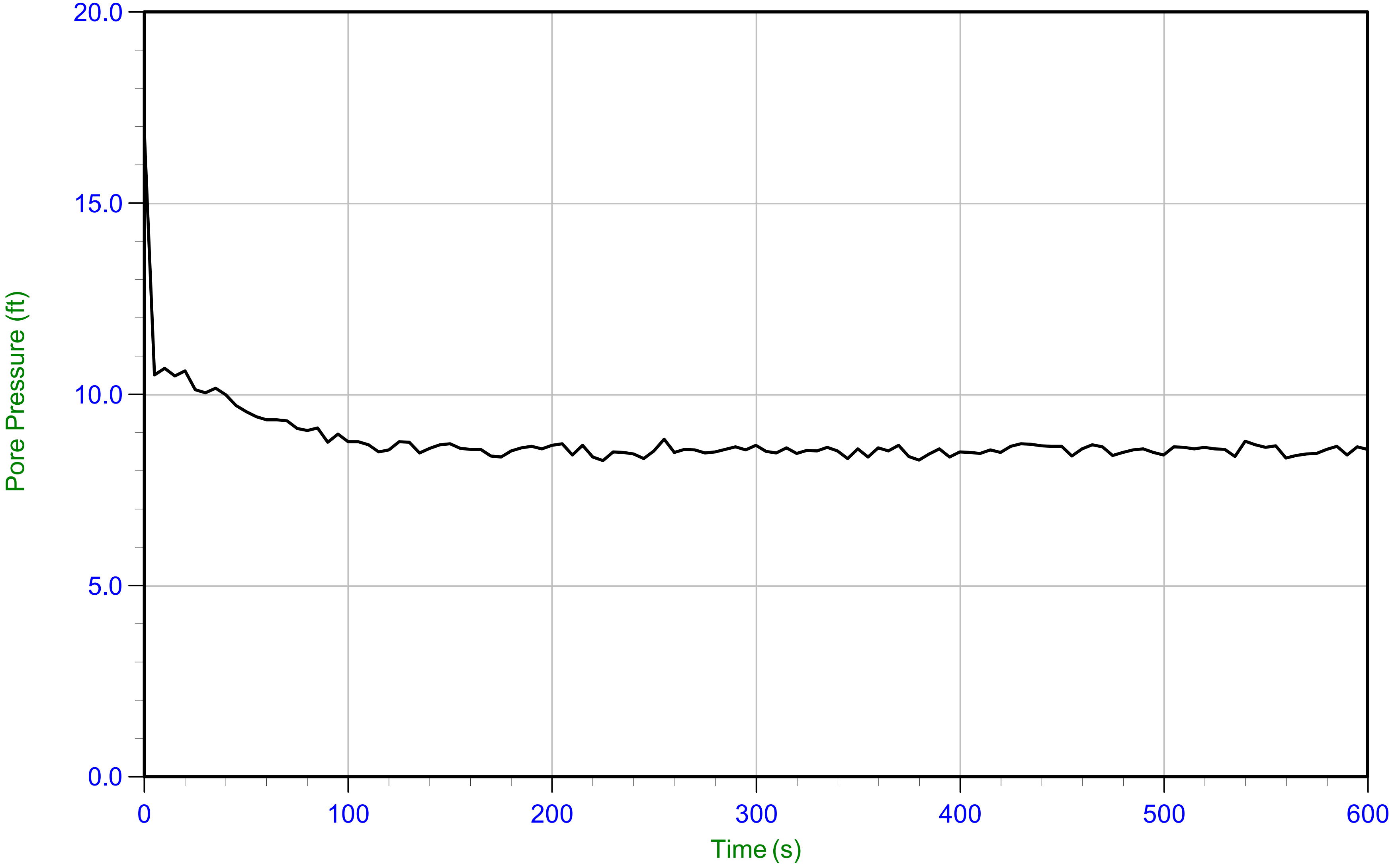
U Min: 1.9 ft
U Max: 3.0 ft

WT: 4.104 m / 13.464 ft
Ueq: 2.6 ft

AECOM

Job No: 15-53073
Date: 28-Aug-2015 16:08:12
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C009
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP09.PPD
Depth: 8.650 m / 28.379 ft
Duration: 600.0 s

U Min: 8.3 ft
U Max: 16.9 ft

WT: 6.062 m / 19.888 ft
Ueq: 8.5 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 12:10:38
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C010
Cone: 374
Cone Area: 15 sq cm

Trace Summary:

Filename: 15-53073_CP10.PPD
Depth: 3.700 m / 12.139 ft
Duration: 3000.0 s

U Min: 21.9 ft
U Max: 48.5 ft

WT: 0.674 m / 2.211 ft
Ueq: 9.9 ft
U(50): 29.22 ft

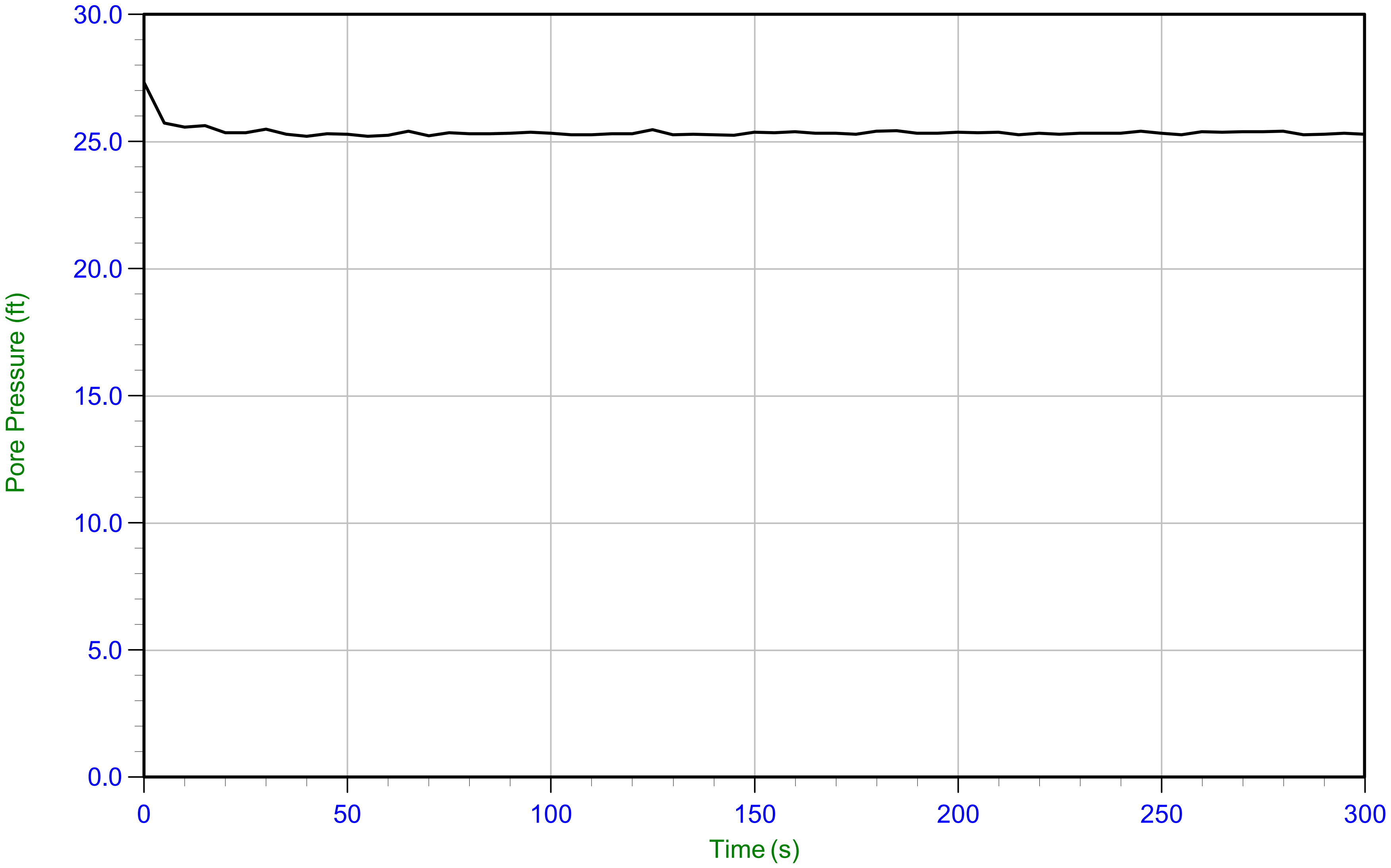
T(50): 1239.4 s
Ir: 100
Ch: 0.6 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 12:10:38
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C010
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP10.PPD
Depth: 8.400 m / 27.559 ft
Duration: 300.0 s

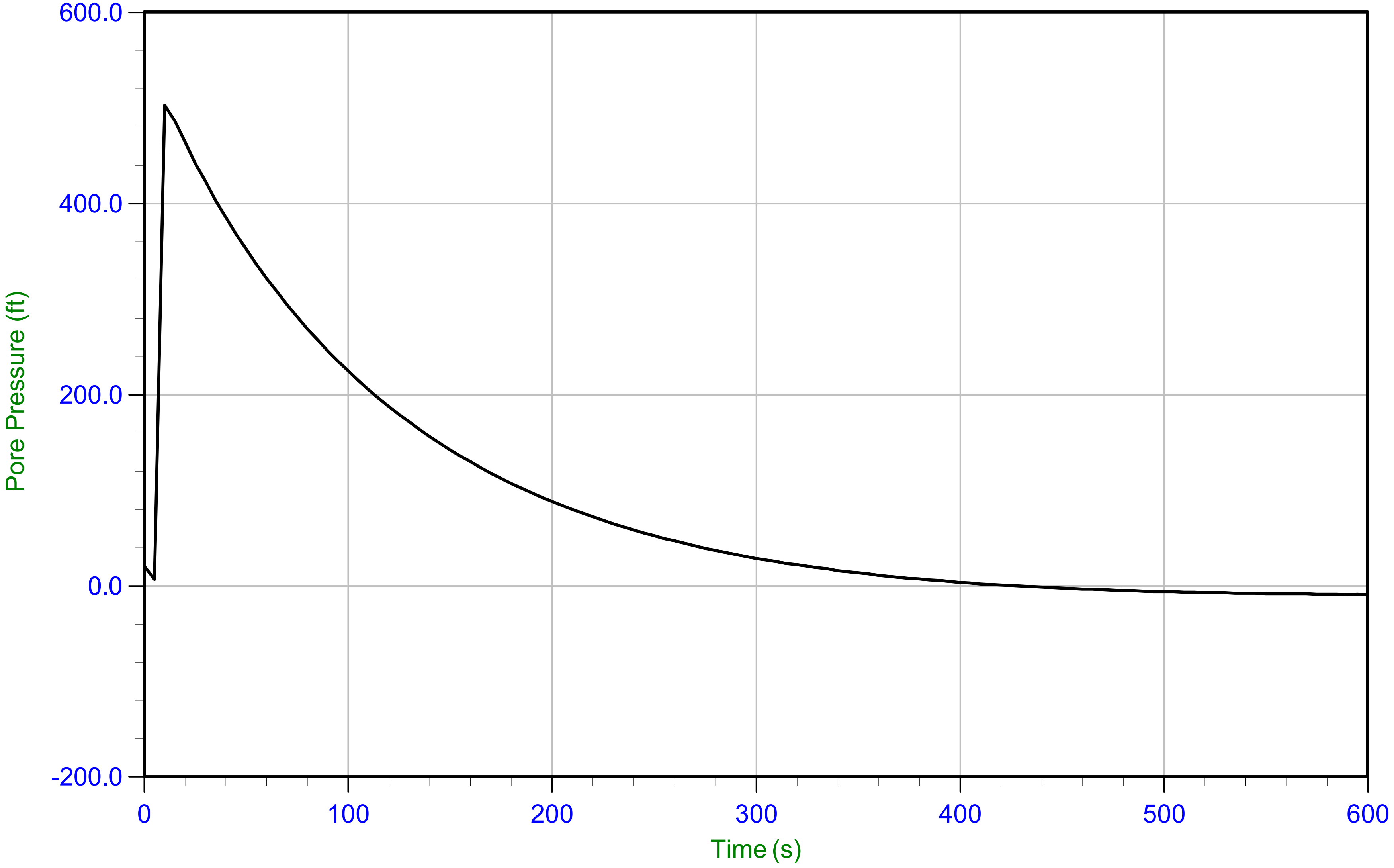
U Min: 25.2 ft
U Max: 27.3 ft

WT: 0.674 m / 2.211 ft
Ueq: 25.3 ft

AECOM

Job No: 15-53073
Date: 27-Aug-2015 12:10:38
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C010
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

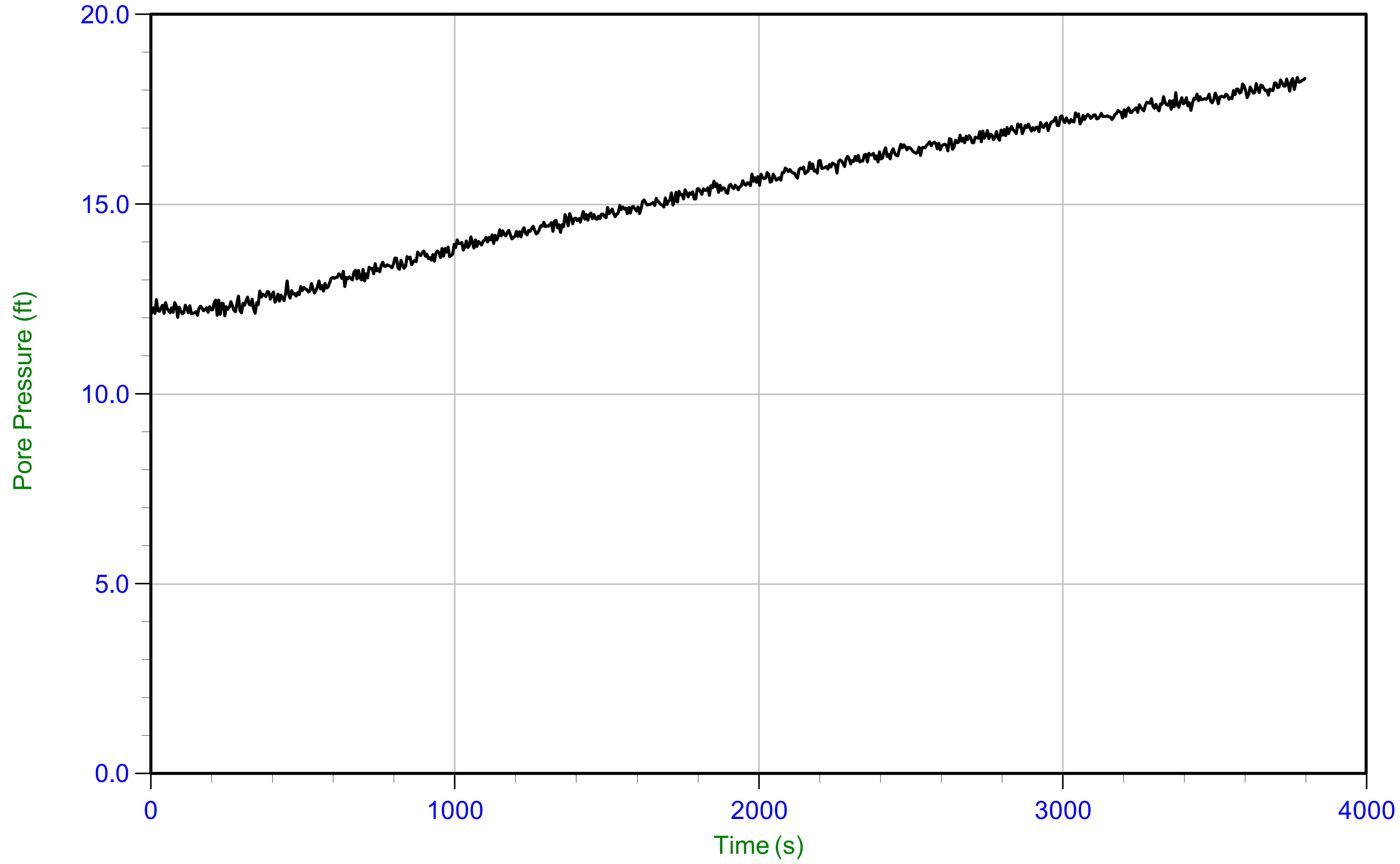
Filename: 15-53073_CP10.PPD	U Min: -9.2 ft	WT: 9.150 m / 30.019 ft	T(50): 77.5 s
Depth: 9.150 m / 30.019 ft	U Max: 502.6 ft	Ueq: 0.0 ft	Ir: 100
Duration: 600.0 s		U(50): 251.28 ft	Ch: 9.1 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 10:19:26
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C011
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP11.PPD
Depth: 7.350 m / 24.114 ft
Duration: 3800.0 s

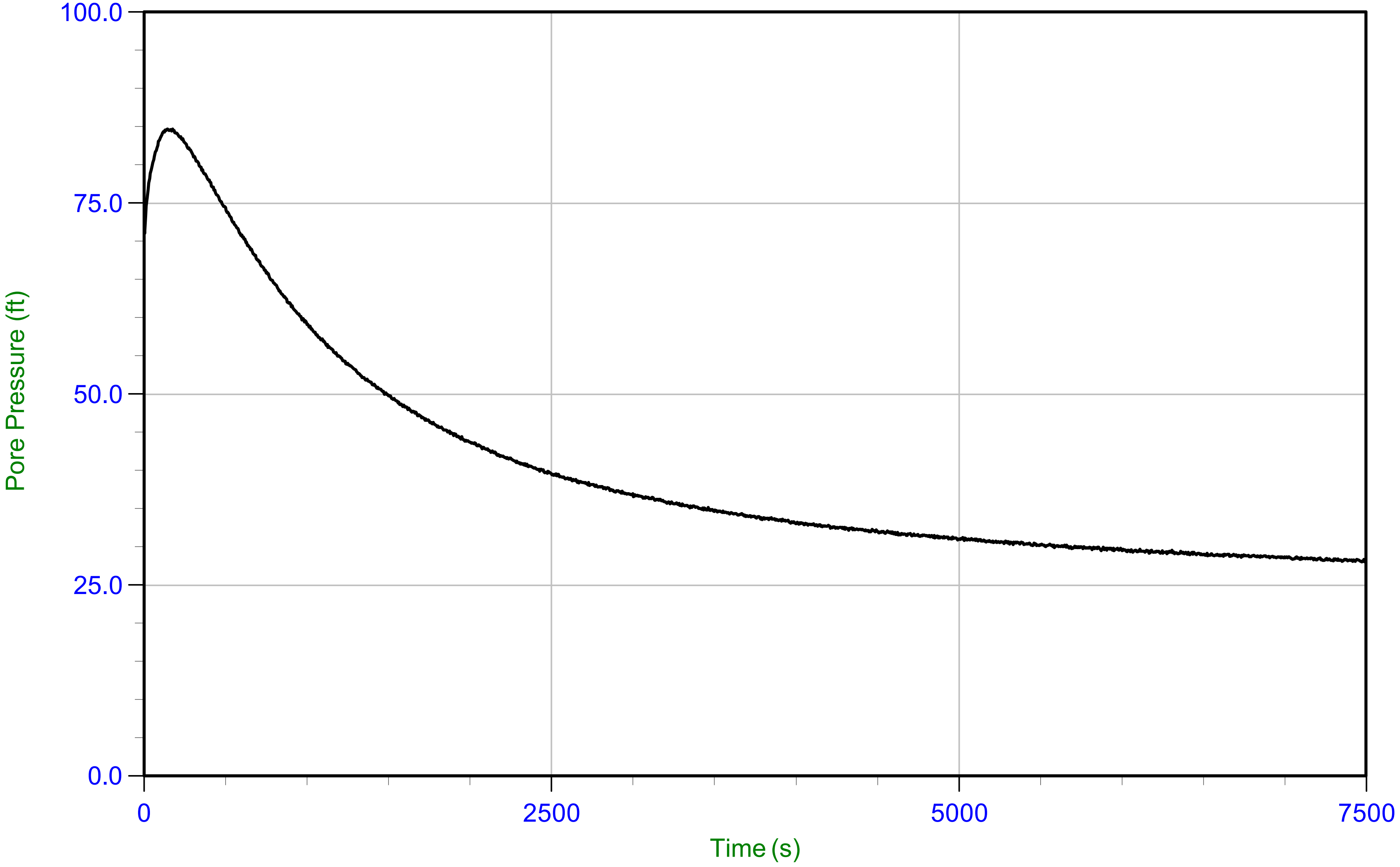
U Min: 12.0 ft
U Max: 18.3 ft

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 10:19:26
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C011
Cone: AD340
Cone Area: 15 sq cm



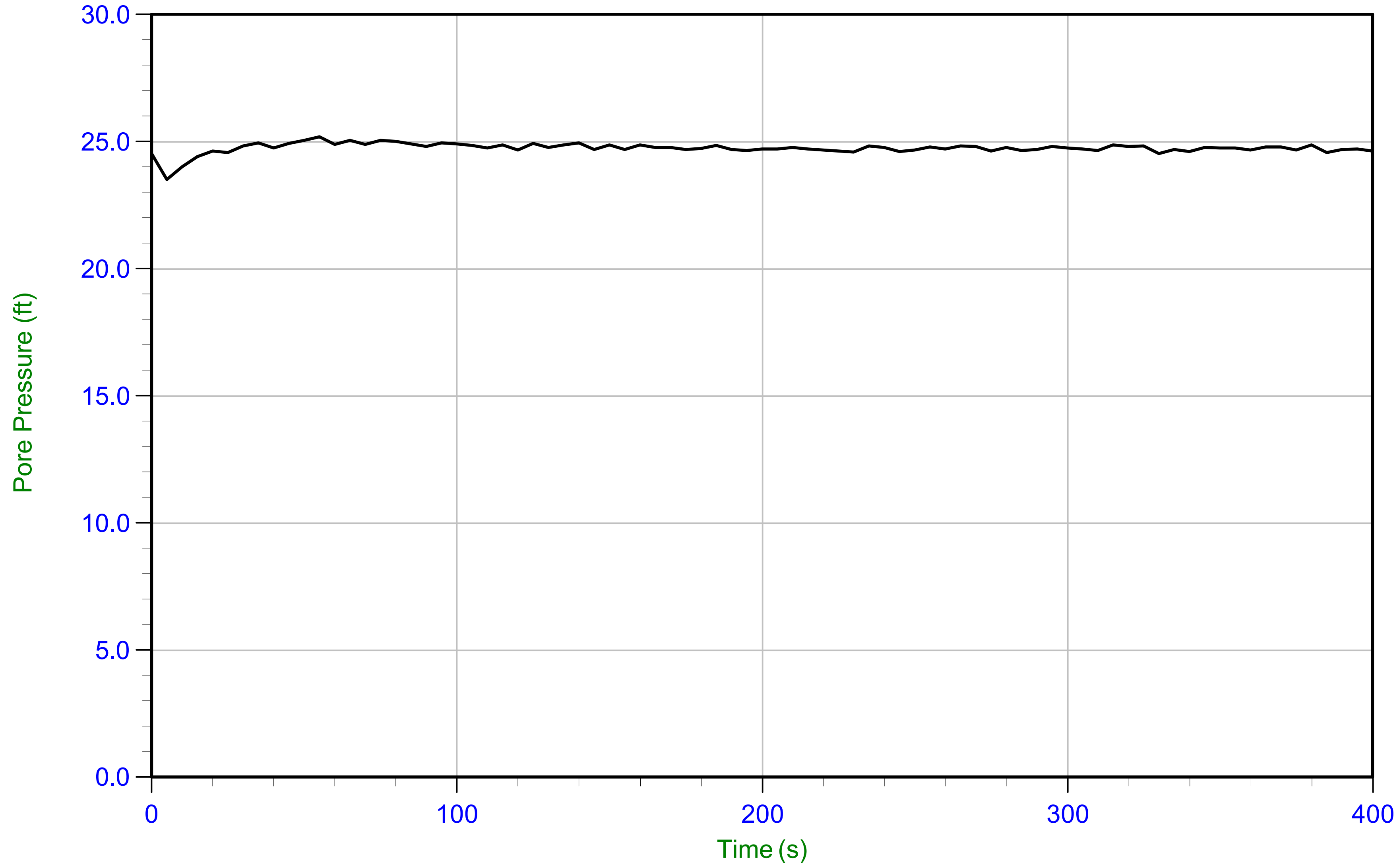
Trace Summary:	Filename: 15-53073_CP11.PPD	U Min: 28.0 ft	WT: 6.848 m / 22.467 ft	T(50): 1082.1 s
	Depth: 14.150 m / 46.423 ft	U Max: 84.7 ft	Ueq: 24.0 ft	Ir: 100
	Duration: 7500.0 s		U(50): 54.34 ft	Ch: 0.6 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 10:19:26
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C011
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP11.PPD
Depth: 14.350 m / 47.079 ft
Duration: 400.0 s

U Min: 23.5 ft
U Max: 25.2 ft

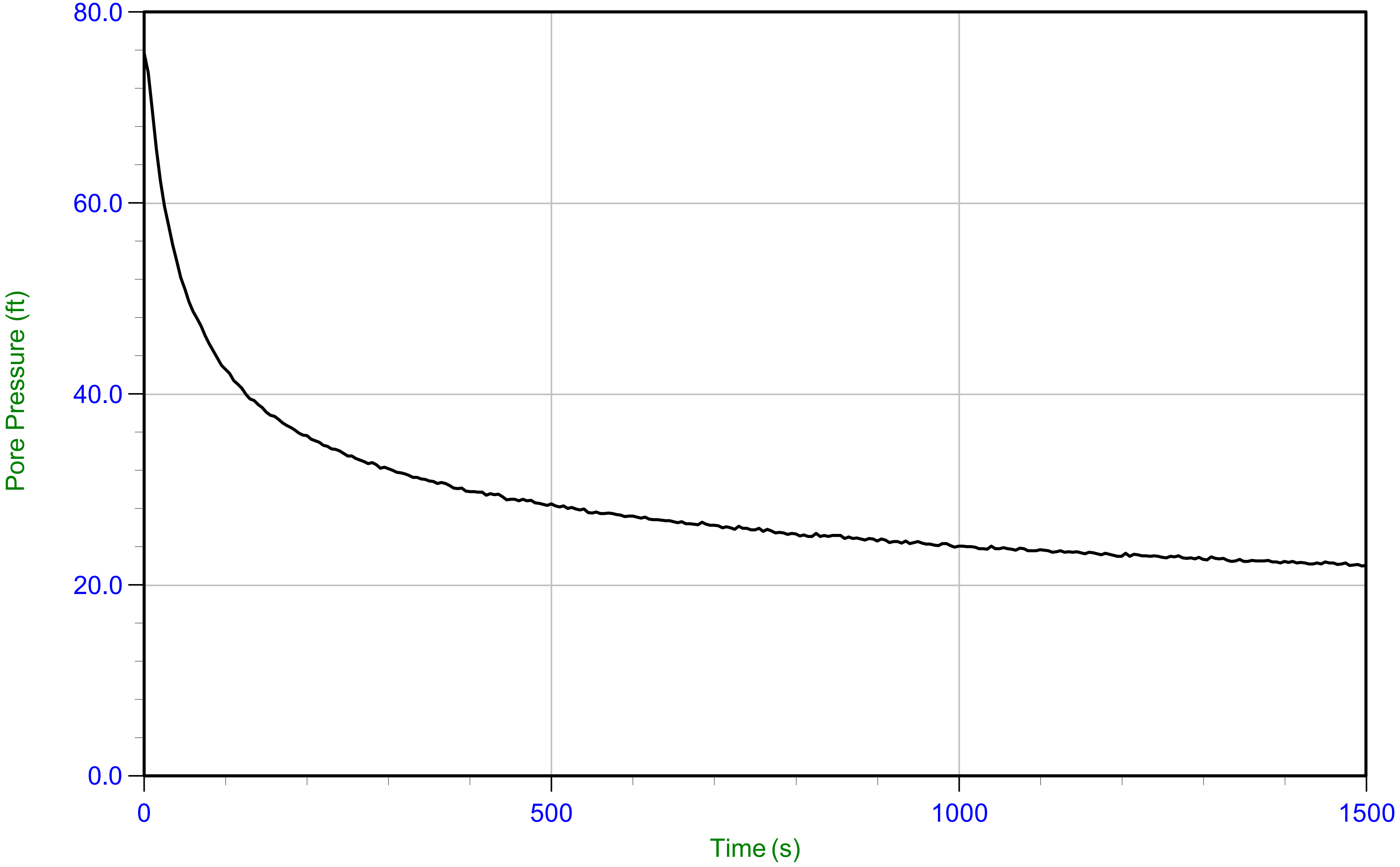
WT: 6.848 m / 22.467 ft
Ueq: 24.6 ft

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 14:27:24
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C012
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP12.PPD
Depth: 8.800 m / 28.871 ft
Duration: 1500.0 s

U Min: 22.0 ft
U Max: 75.7 ft

WT: 7.108 m / 23.320 ft
Ueq: 5.6 ft
U(50): 40.63 ft

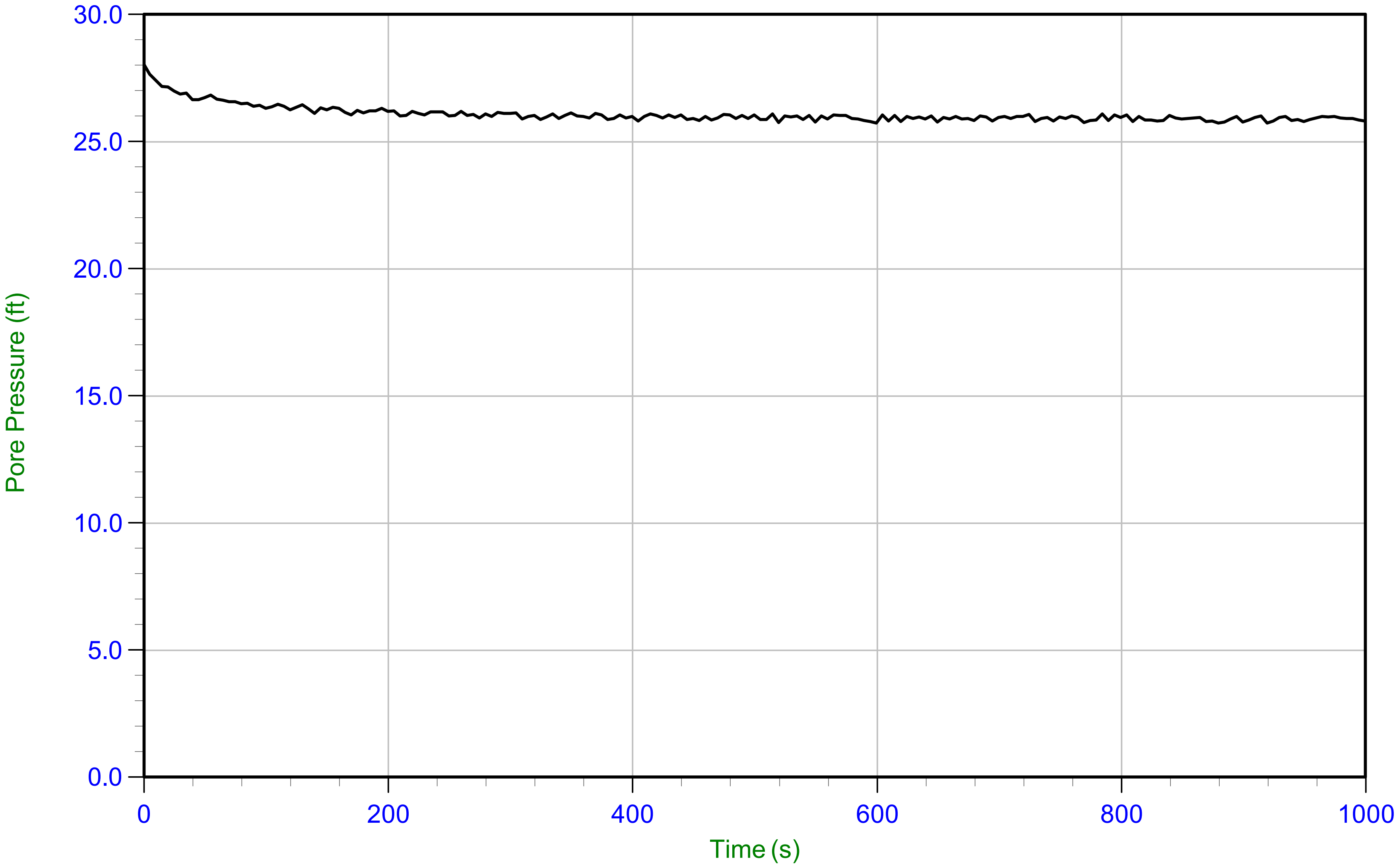
T(50): 119.8 s
Ir: 100
Ch: 5.9 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 14:27:24
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C012
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP12.PPD
Depth: 14.950 m / 49.048 ft
Duration: 1000.0 s

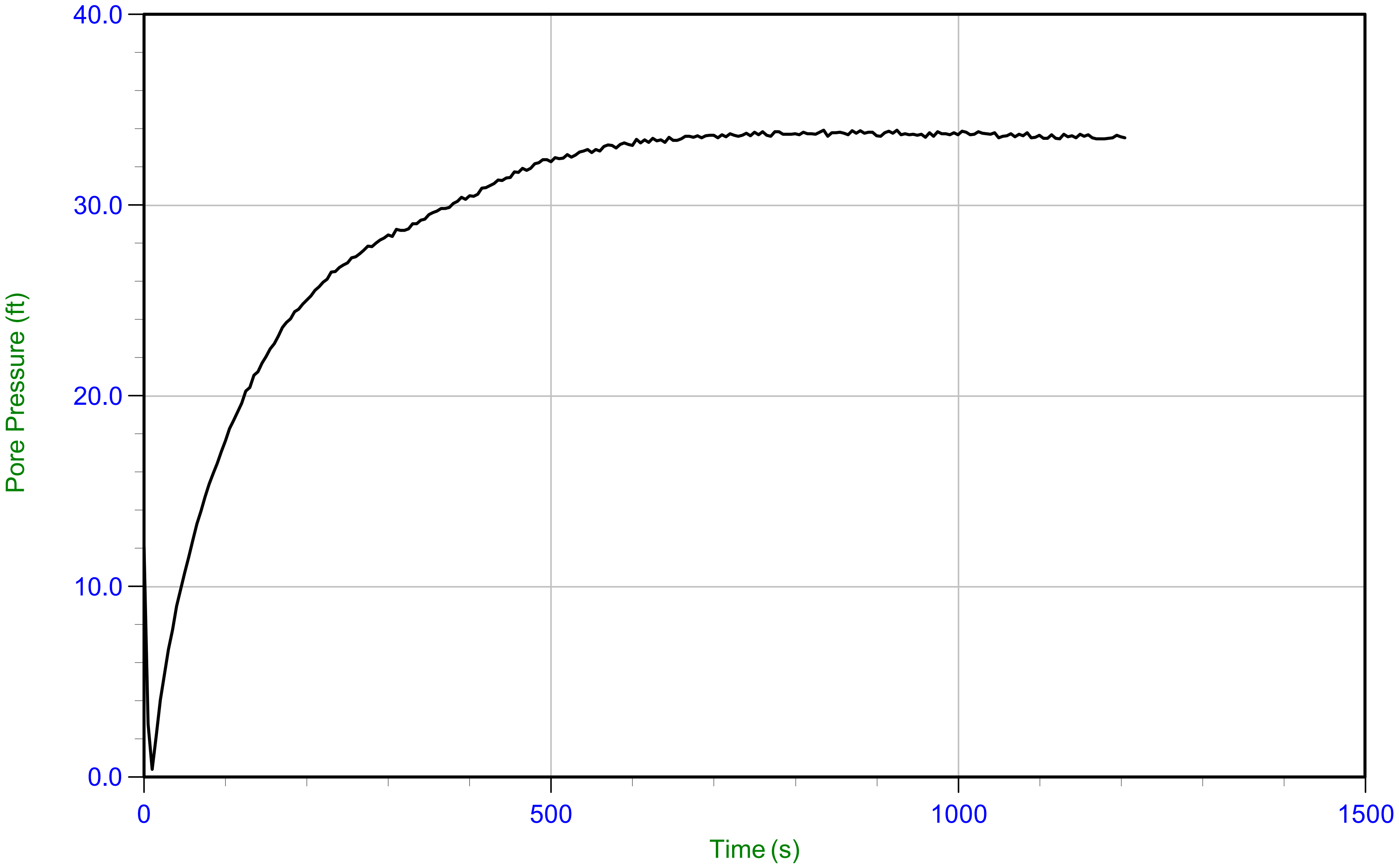
U Min: 25.7 ft
U Max: 28.0 ft

WT: 7.108 m / 23.320 ft
Ueq: 25.7 ft

AECOM

Job No: 15-53073
Date: 28-Aug-2015 08:45:02
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C013
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP13.PPD
Depth: 17.150 m / 56.266 ft
Duration: 1205.0 s

U Min: 0.4 ft
U Max: 33.9 ft

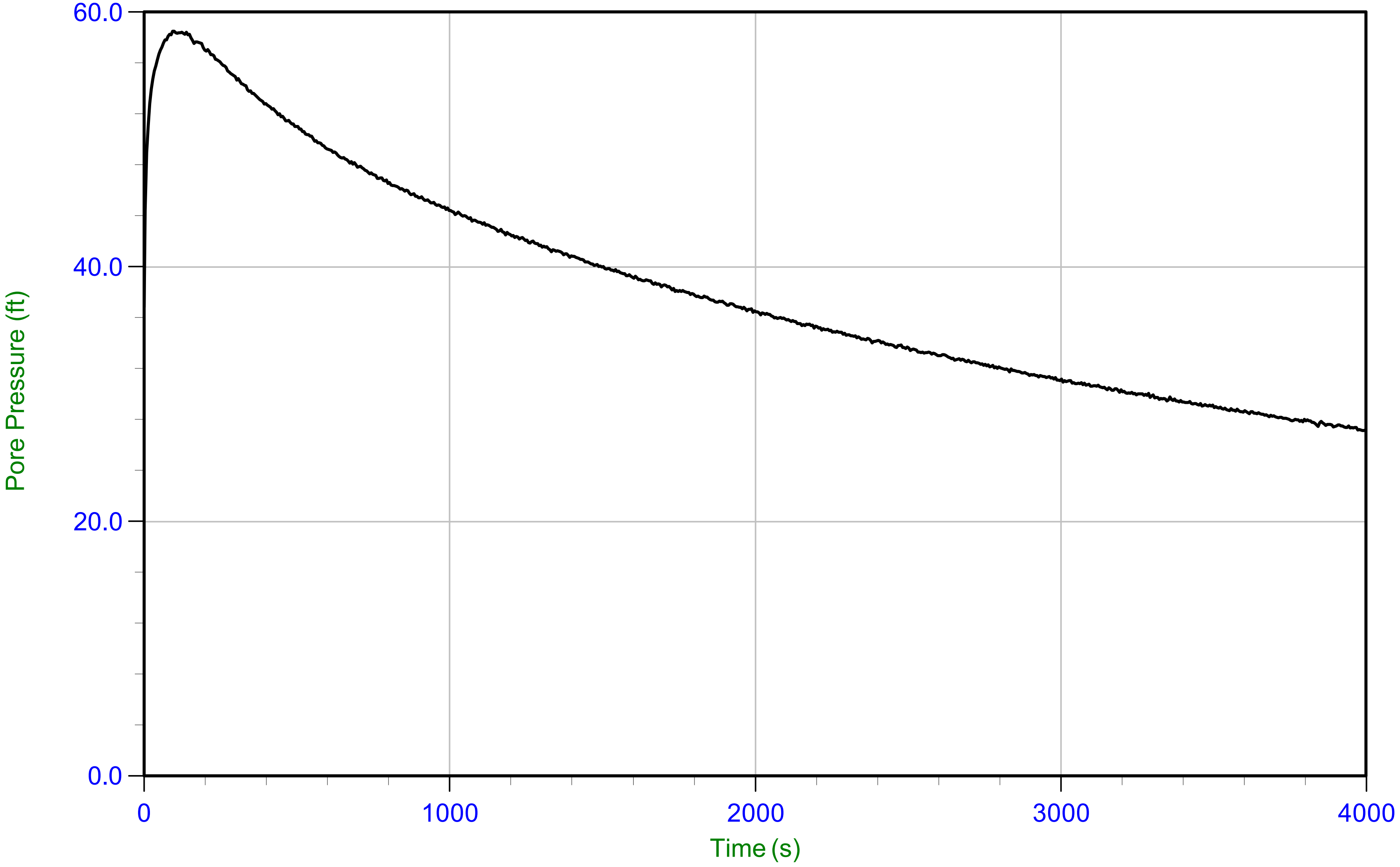
WT: 6.905 m / 22.654 ft
Ueq: 33.6 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 14:29:59
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C014
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP14.PPD
Depth: 4.900 m / 16.076 ft
Duration: 4000.0 s

U Min: 27.1 ft
U Max: 58.5 ft

WT: 1.498 m / 4.915 ft
Ueq: 11.2 ft
U(50): 34.84 ft

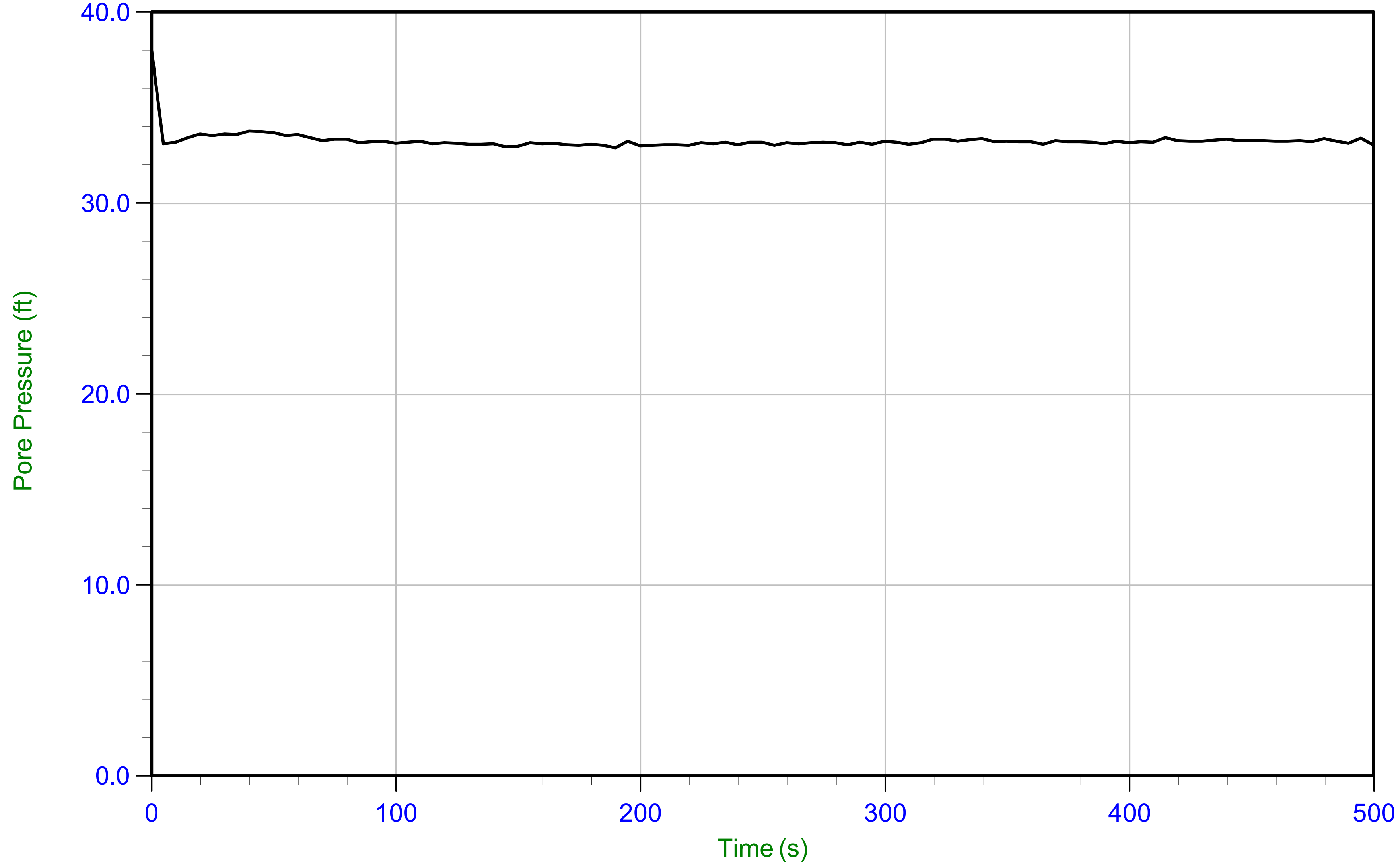
T(50): 2190.4 s
Ir: 100
Ch: 0.3 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 14:29:59
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C014
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP14.PPD
Depth: 11.650 m / 38.221 ft
Duration: 500.0 s

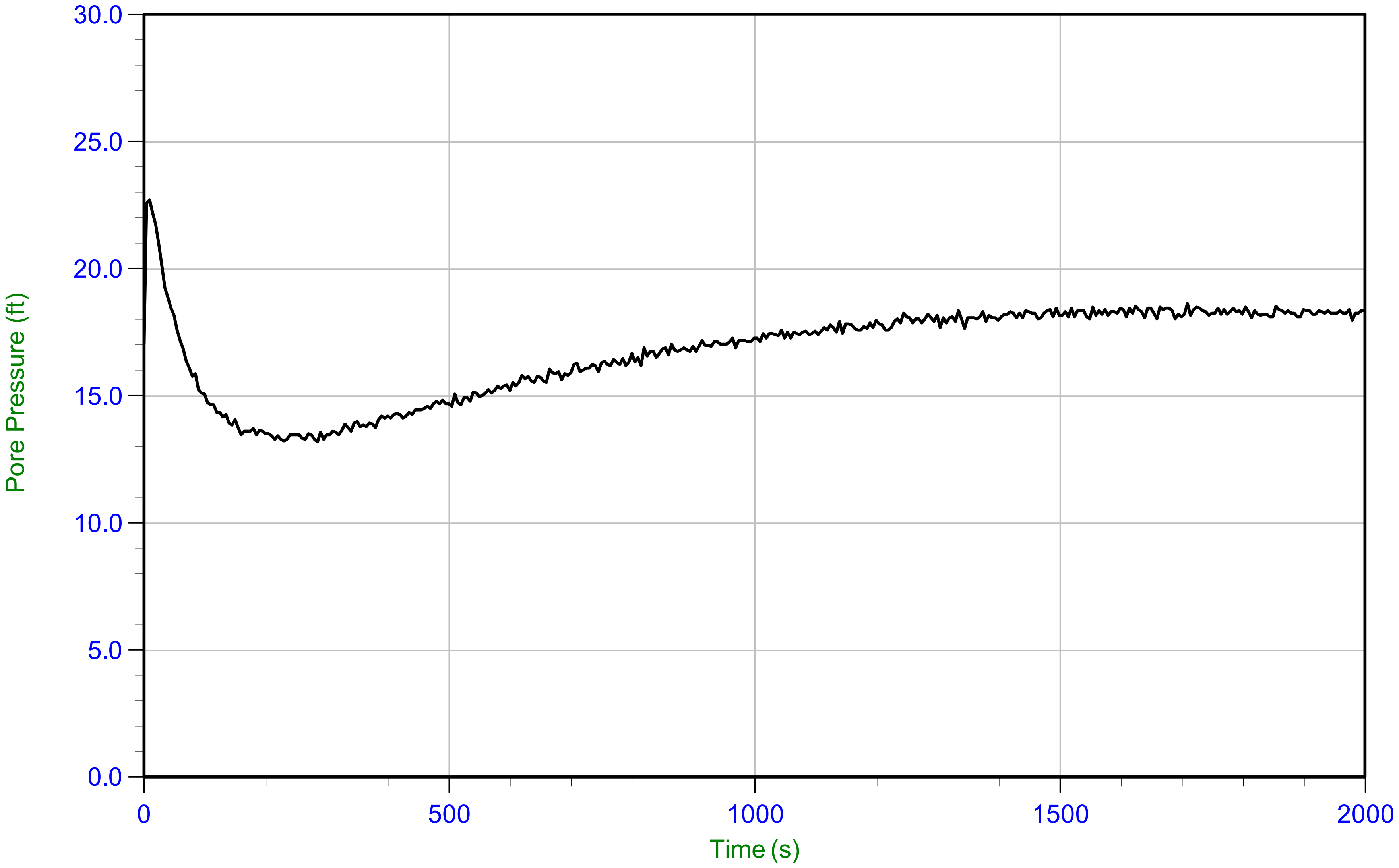
U Min: 32.9 ft
U Max: 38.0 ft

WT: 1.498 m / 4.915 ft
Ueq: 33.3 ft

AECOM

Job No: 15-53073
Date: 19-Aug-2015 14:12:51
Site: Edwards Power Station

Sounding: EDW-C015A
Cone: 335
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP15A.PPD
Depth: 4.600 m / 15.092 ft
Duration: 2000.0 s

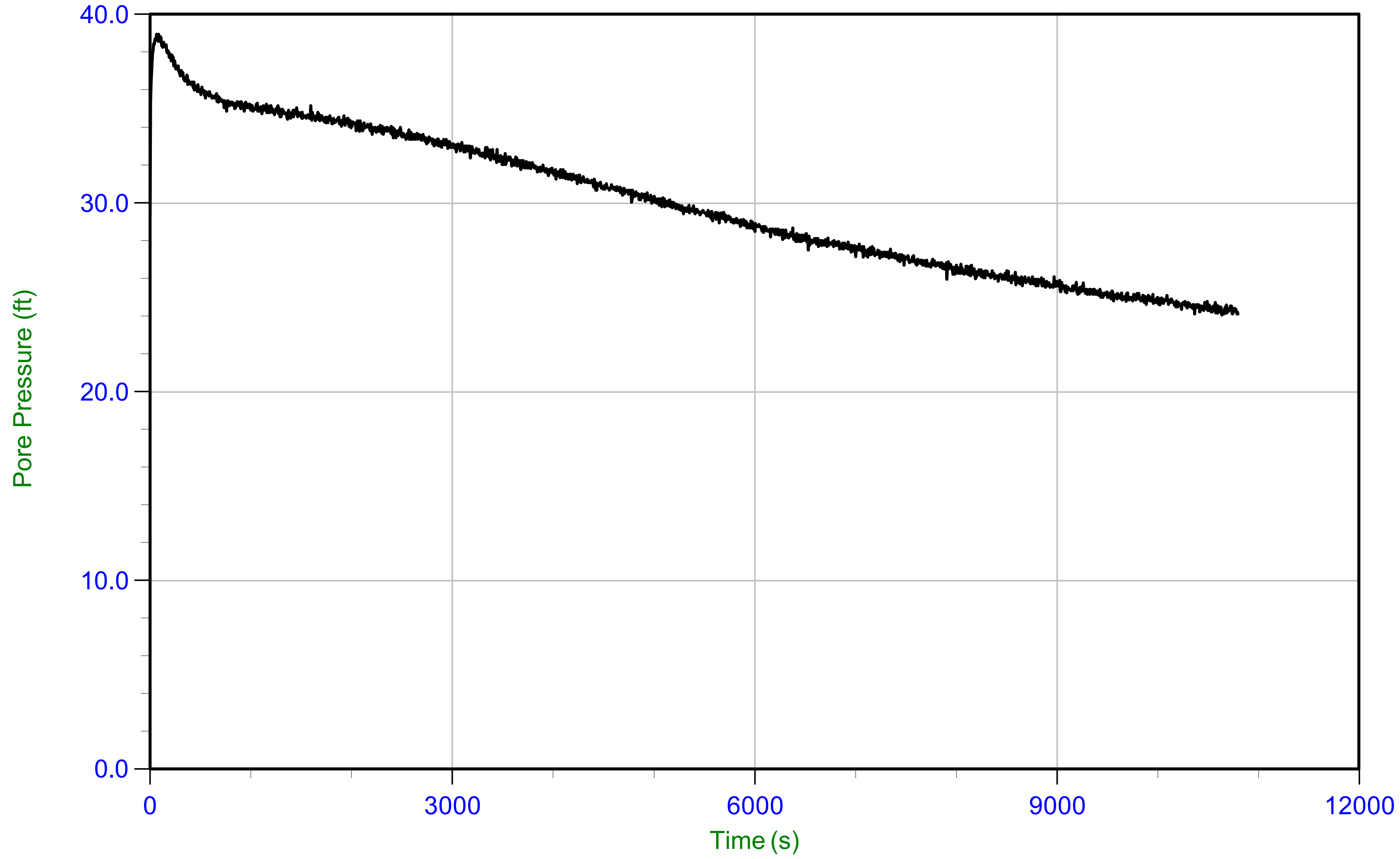
U Min: 13.2 ft
U Max: 22.7 ft

CONETEC

AECOM

Job No: 15-53073
Date: 19-Aug-2015 14:12:51
Site: Edwards Power Station

Sounding: EDW-C015A
Cone: 335
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP15A.PPD
Depth: 9.000 m / 29.527 ft
Duration: 10800.0 s

U Min: 24.1 ft
U Max: 39.0 ft

WT: 3.658 m / 12.001 ft
Ueq: 17.5 ft
U(50): 28.24 ft

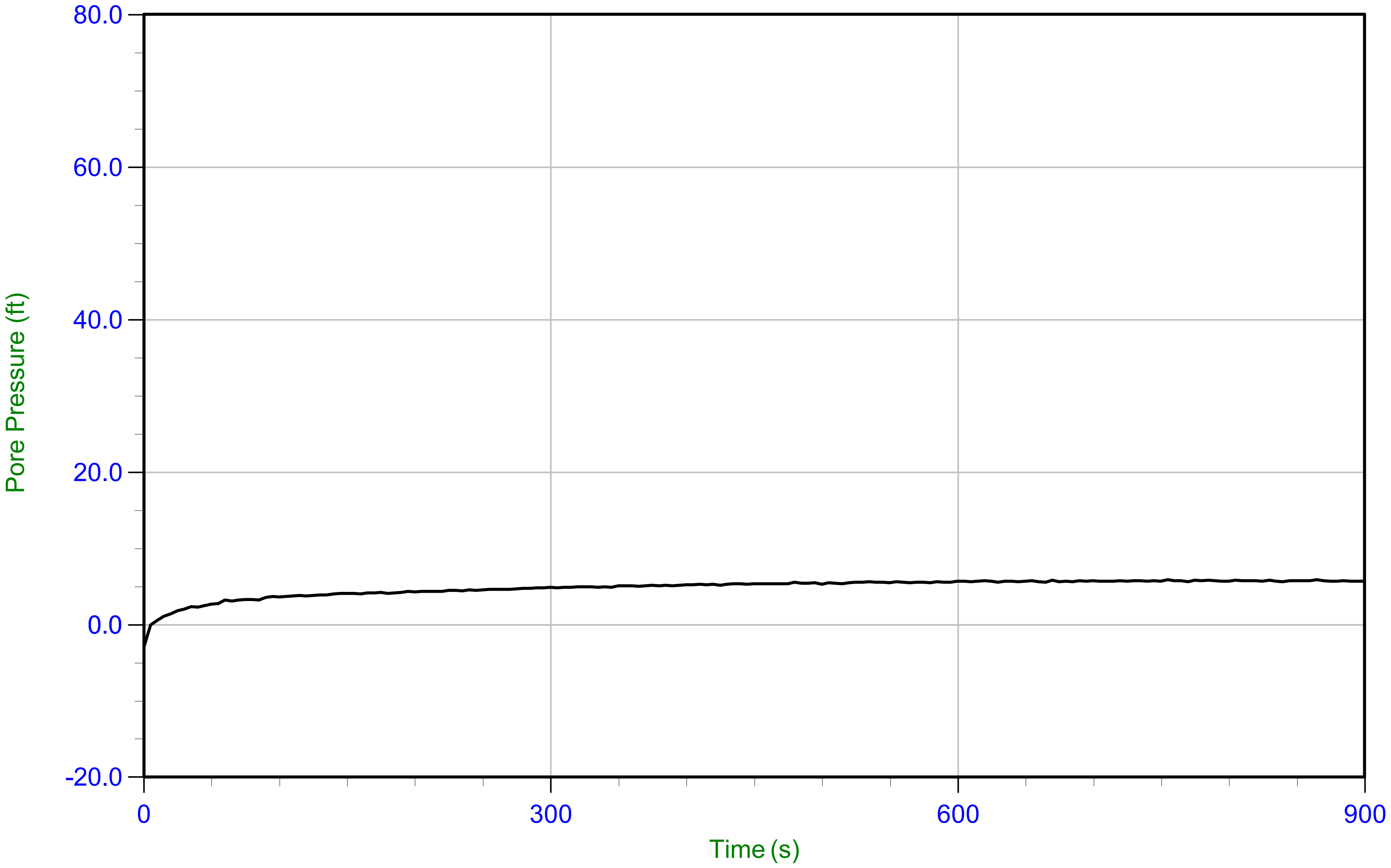
T(50): 6094.6 s
Ir: 100
Ch: 0.1 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 08:46:01
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C016
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP16.PPD
Depth: 2.250 m / 7.382 ft
Duration: 900.0 s

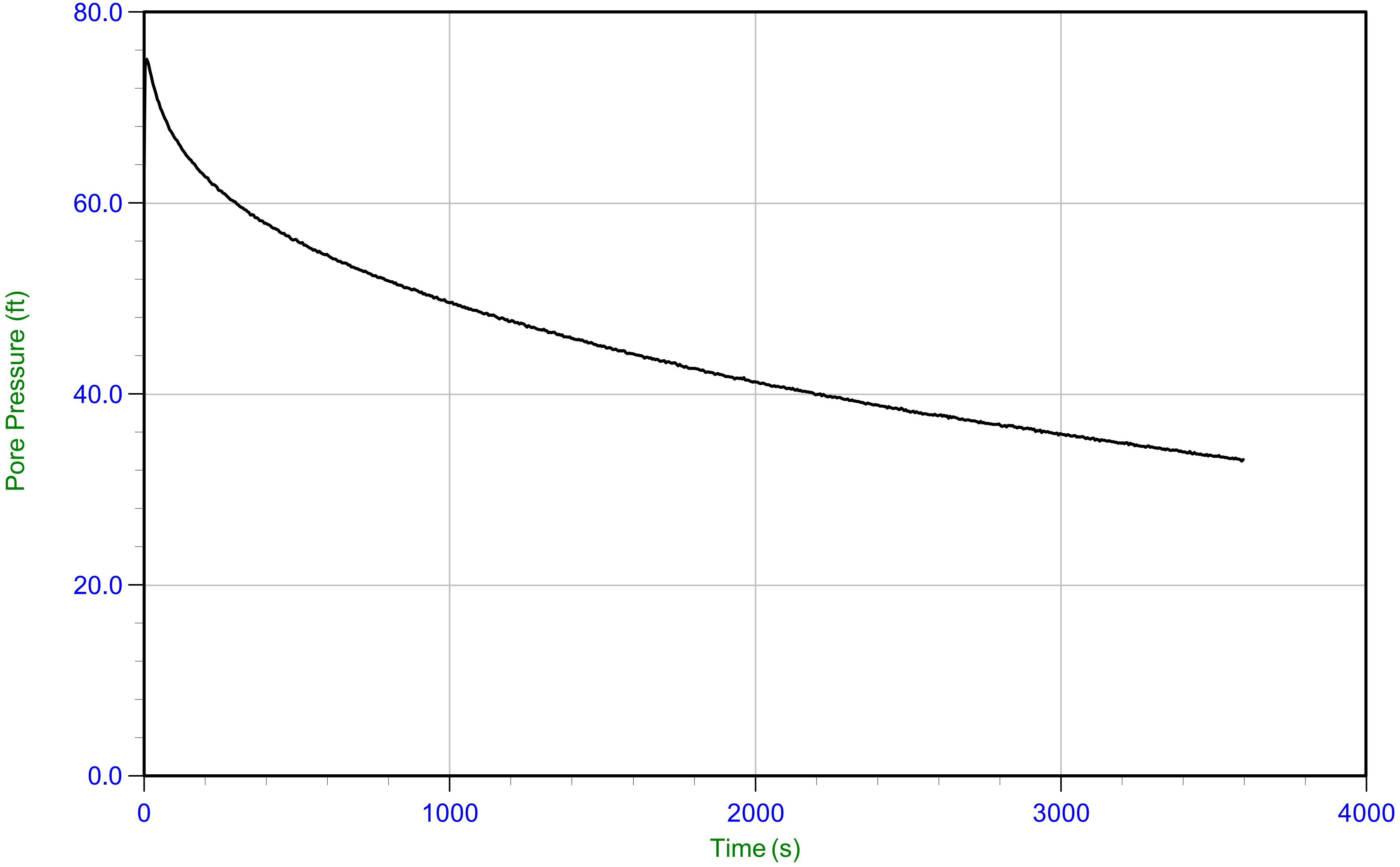
U Min: -2.9 ft
U Max: 5.9 ft

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 08:46:01
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C016
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP16.PPD
Depth: 5.500 m / 18.044 ft
Duration: 3600.0 s

U Min: 33.0 ft
U Max: 75.1 ft

WT: 1.173 m / 3.848 ft
Ueq: 14.2 ft
U(50): 44.64 ft

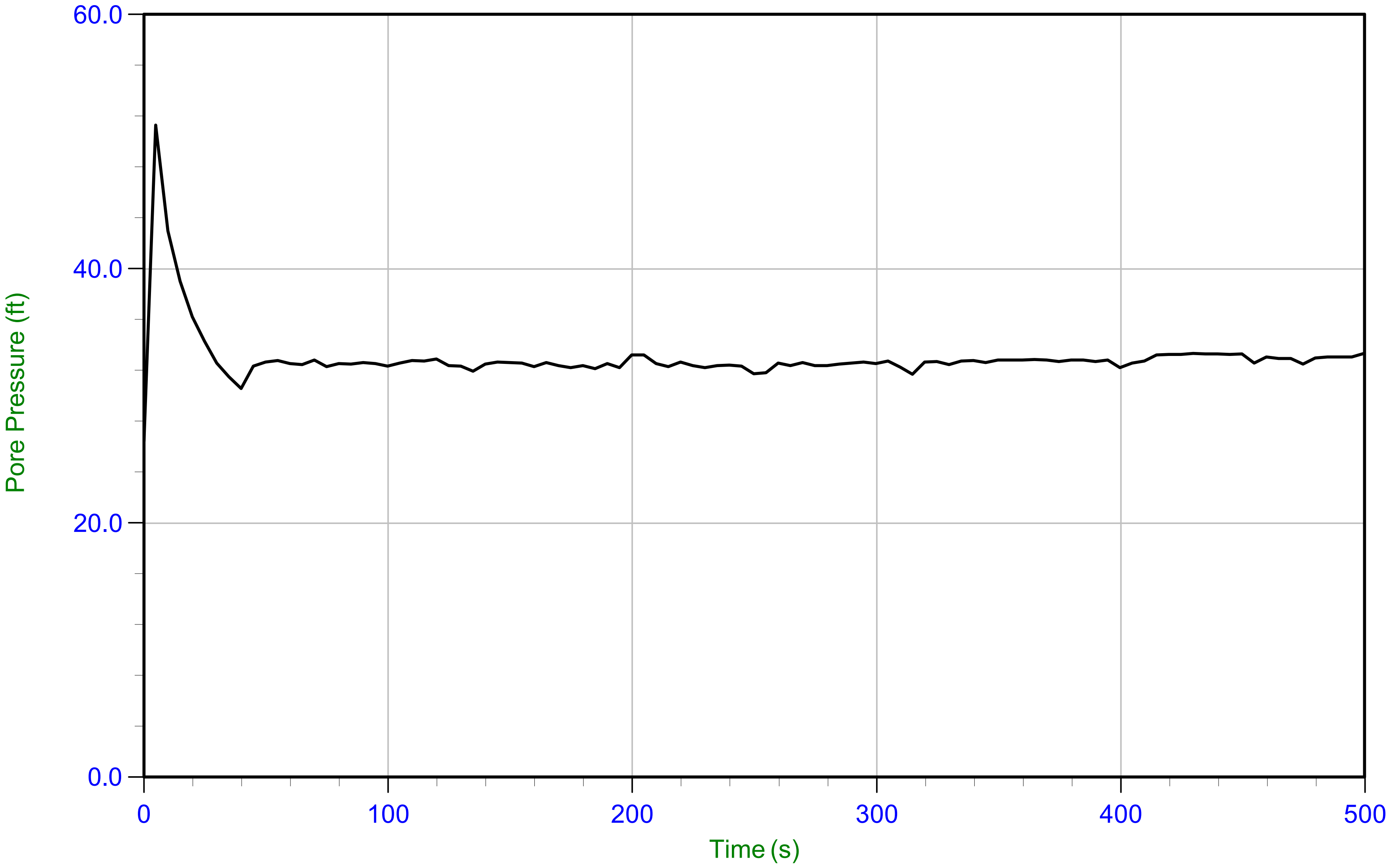
T(50): 1538.2 s
Ir: 100
Ch: 0.5 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 28-Aug-2015 08:46:01
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C016
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP16.PPD
Depth: 11.250 m / 36.909 ft
Duration: 500.0 s

U Min: 26.4 ft
U Max: 51.3 ft

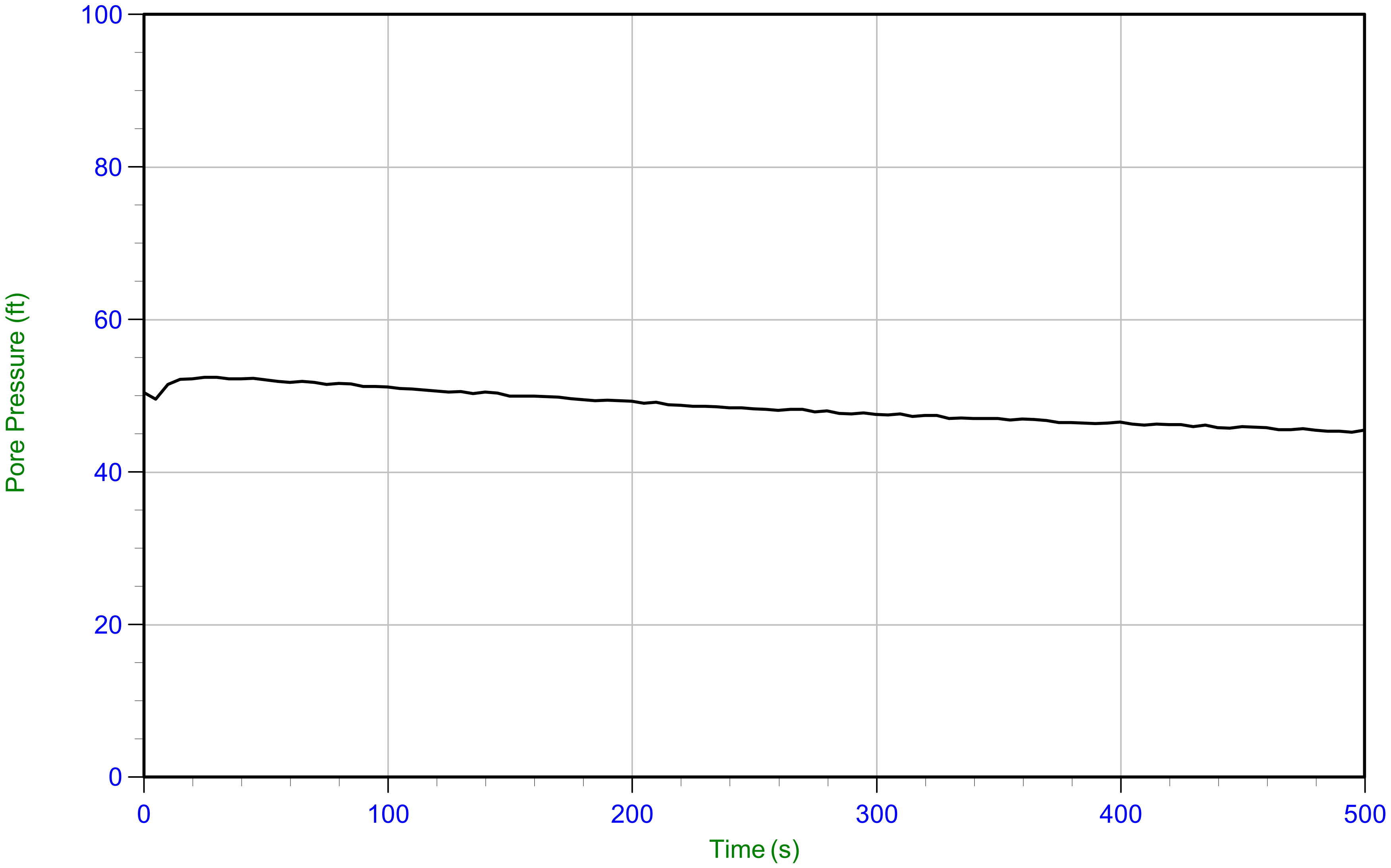
WT: 1.173 m / 3.848 ft
Ueq: 33.1 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 11:13:32
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP17.PPD
Depth: 8.500 m / 27.887 ft
Duration: 500.0 s

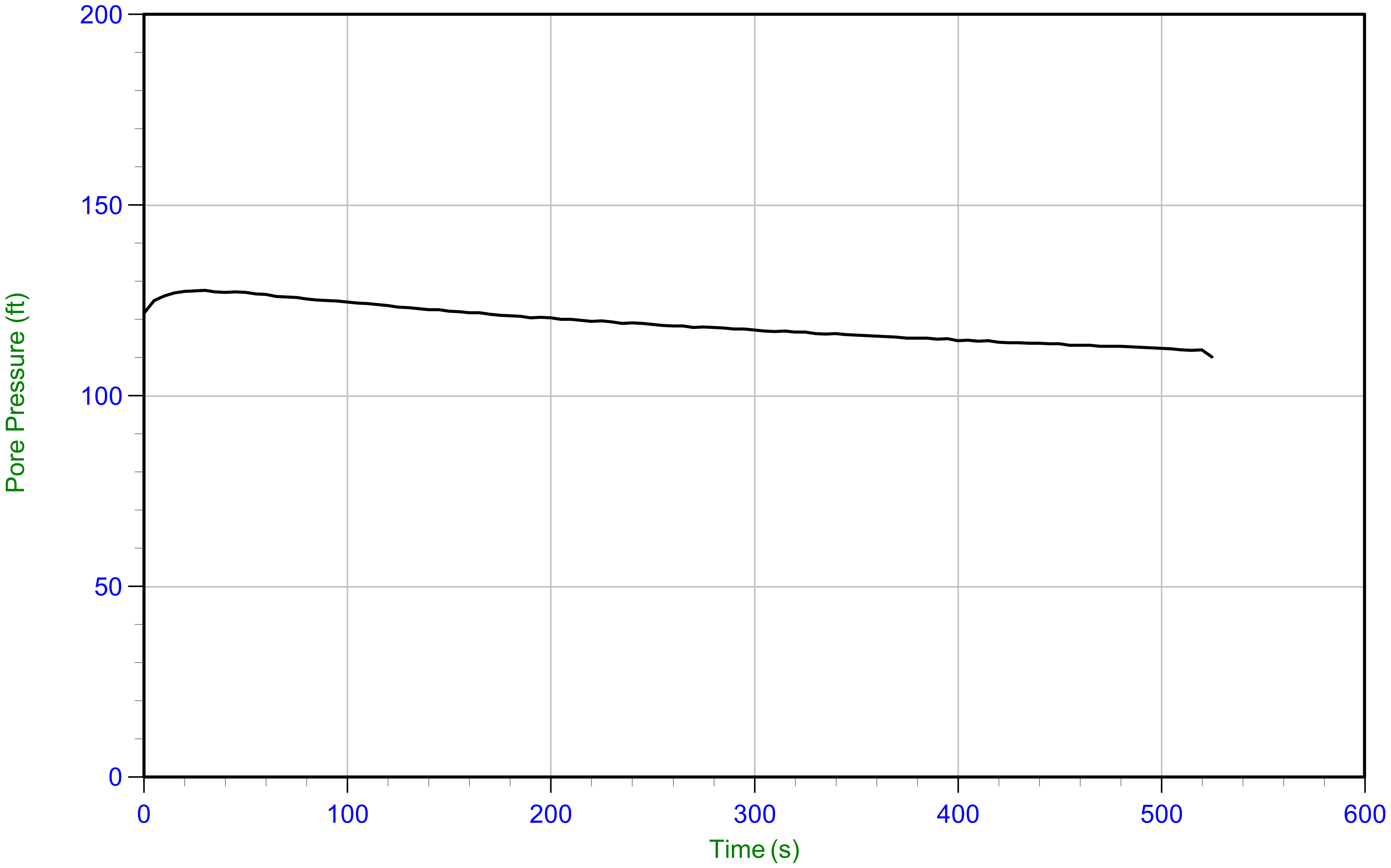
U Min: 45.3 ft
U Max: 52.5 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 11:13:32
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP17.PPD
Depth: 12.350 m / 40.518 ft
Duration: 525.0 s

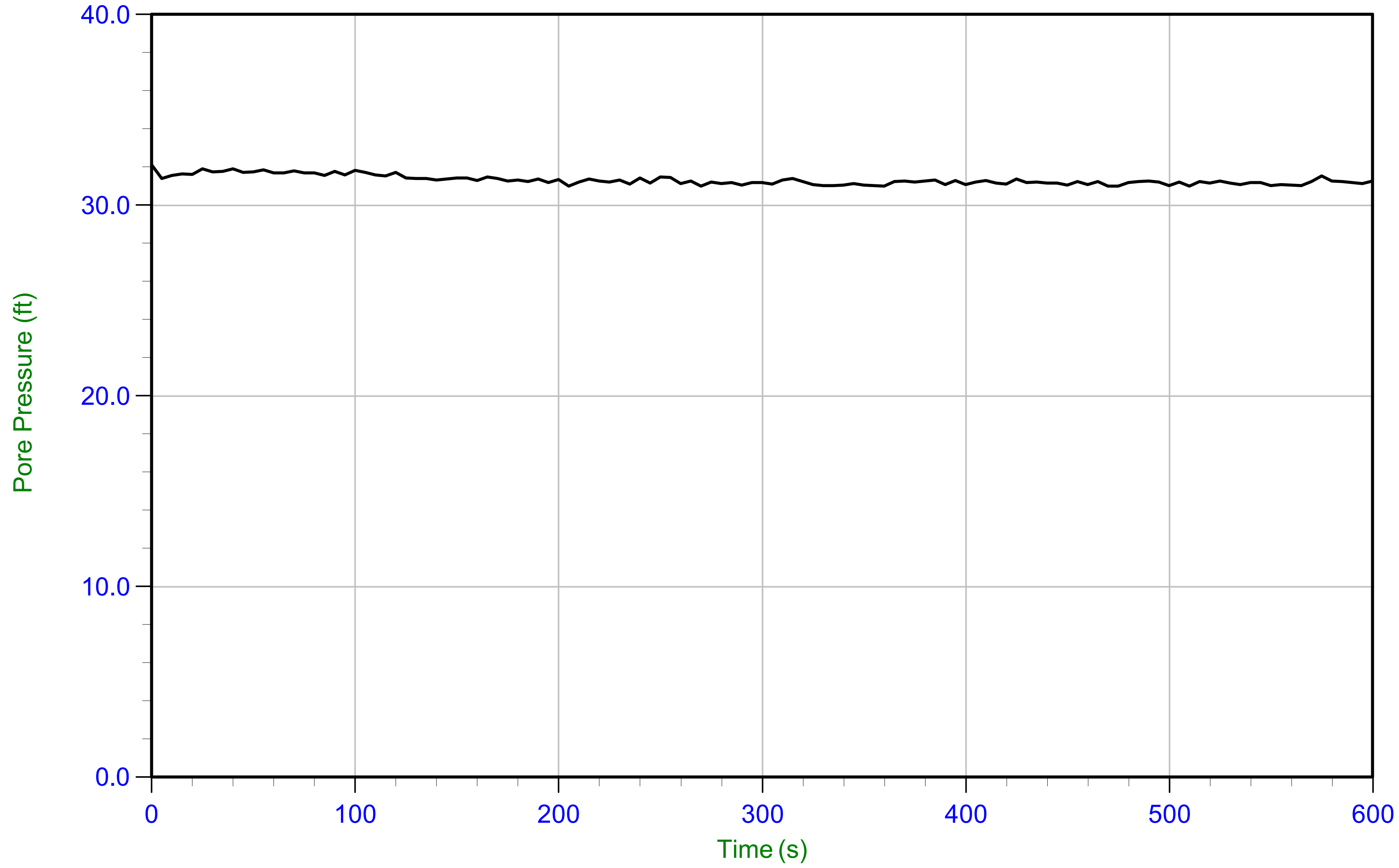
U Min: 110.3 ft
U Max: 127.7 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 11:13:32
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP17.PPD
Depth: 16.850 m / 55.281 ft
Duration: 600.0 s

U Min: 31.0 ft
U Max: 32.1 ft

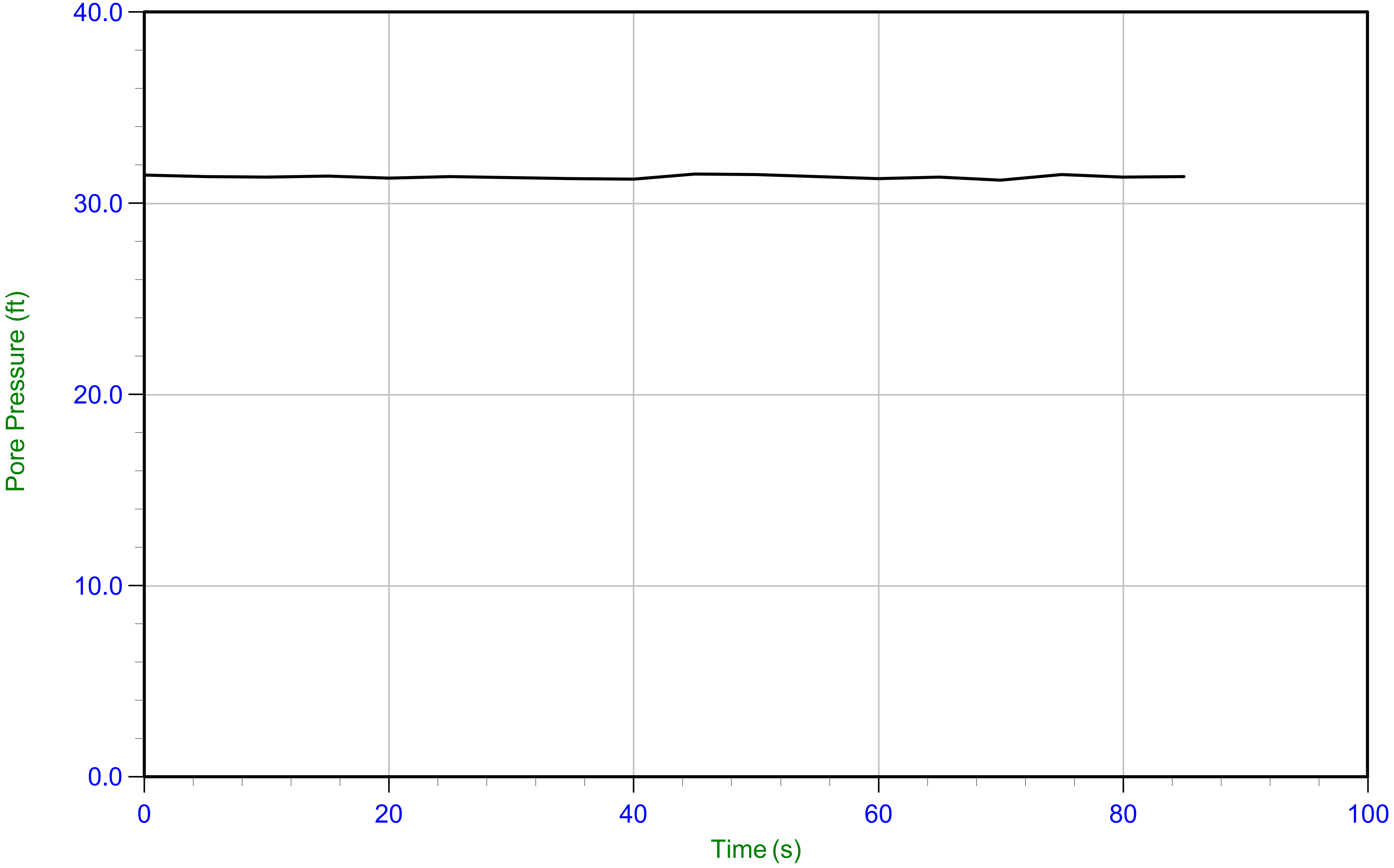
WT: 7.367 m / 24.170 ft
Ueq: 31.1 ft

CONETEC

AECOM

Job No: 15-53073
Date: 27-Aug-2015 11:13:32
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C017
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP17.PPD
Depth: 17.050 m / 55.938 ft
Duration: 85.0 s

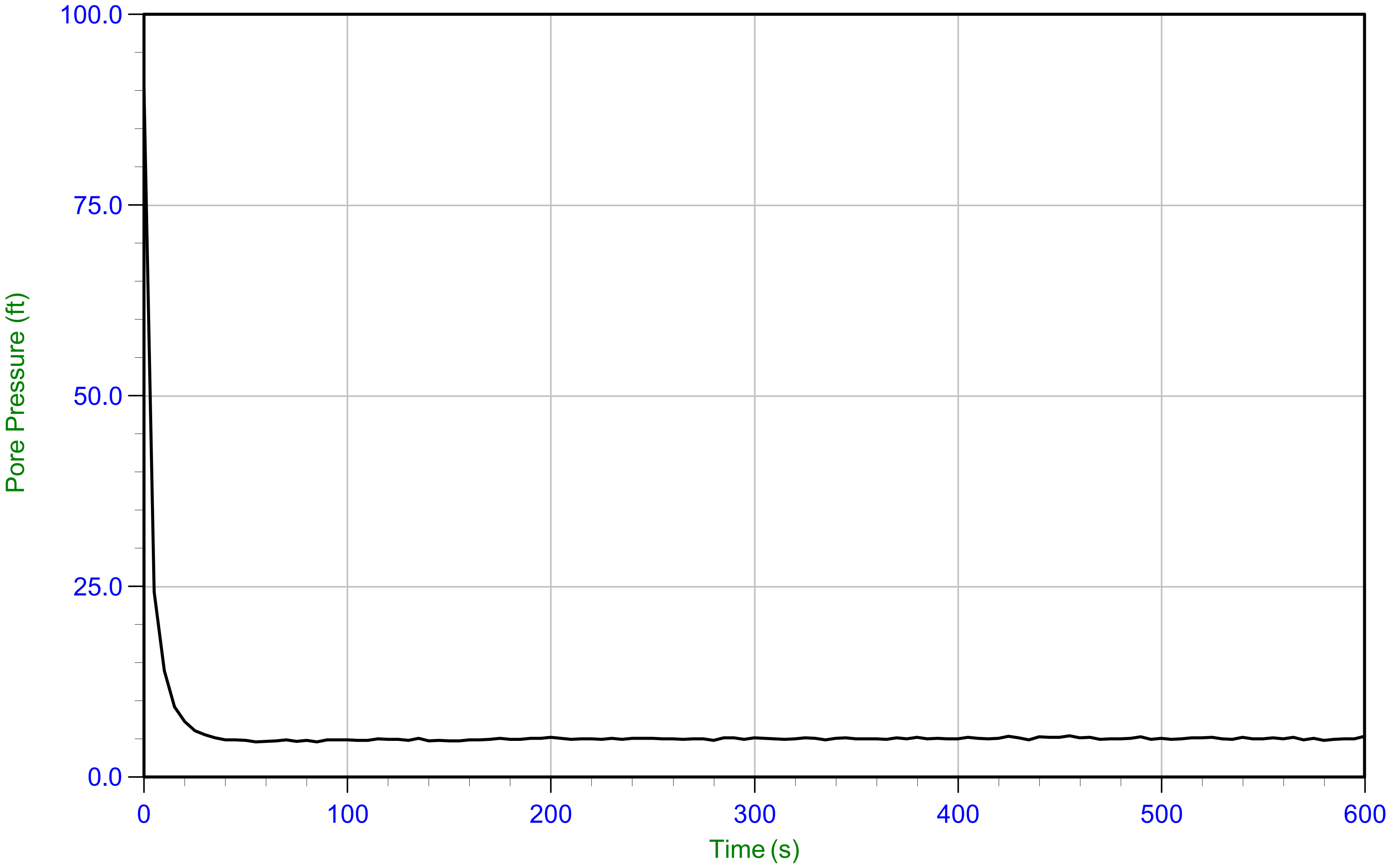
U Min: 31.2 ft
U Max: 31.5 ft

WT: 7.525 m / 24.688 ft
Ueq: 31.2 ft

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:13:53
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C019
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP19.PPD
Depth: 3.600 m / 11.811 ft
Duration: 600.0 s

U Min: 4.7 ft
U Max: 90.3 ft

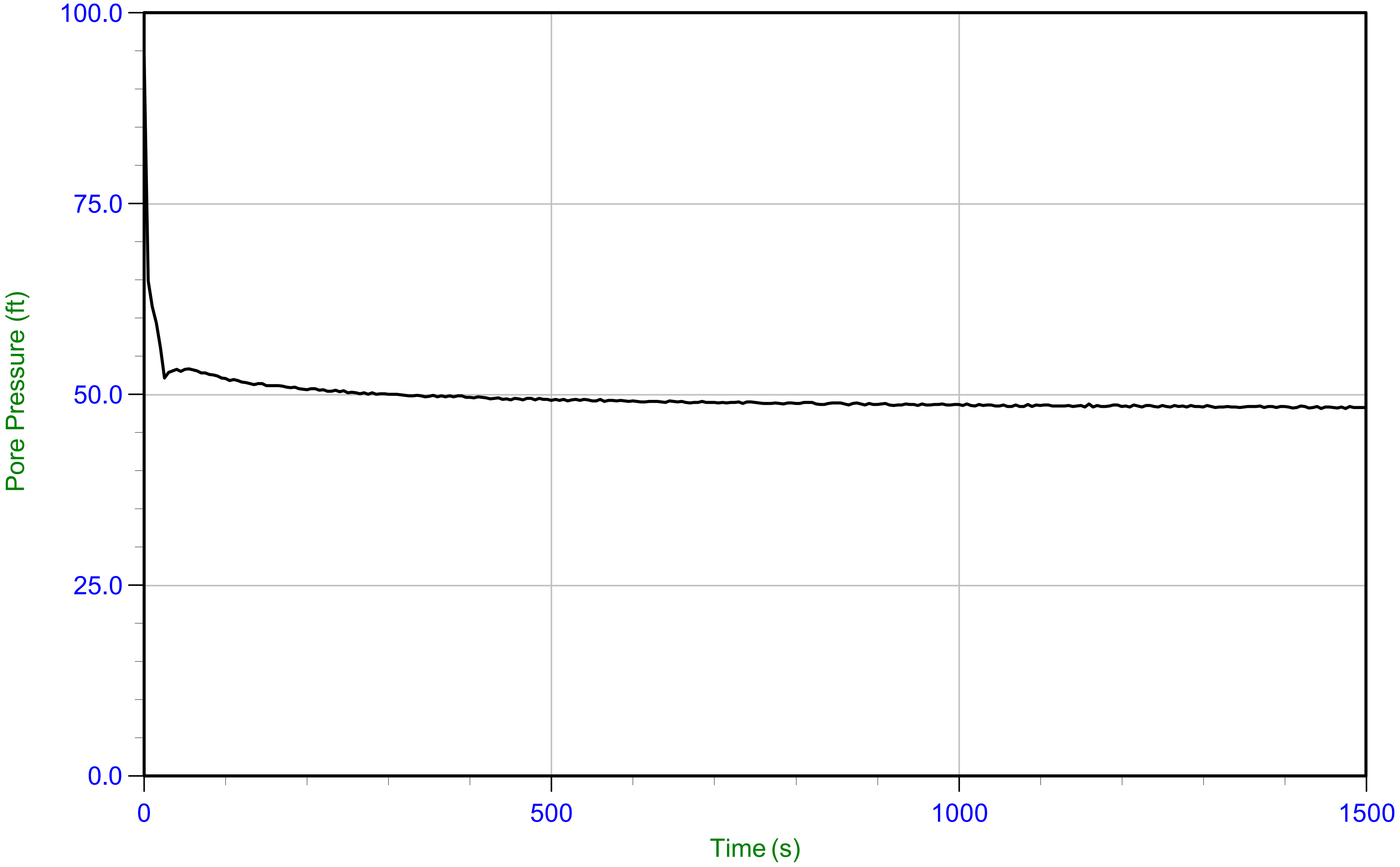
WT: 1.983 m / 6.506 ft
Ueq: 5.3 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:13:53
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C019
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP19.PPD
Depth: 16.300 m / 53.477 ft
Duration: 1500.0 s

U Min: 48.2 ft
U Max: 94.2 ft

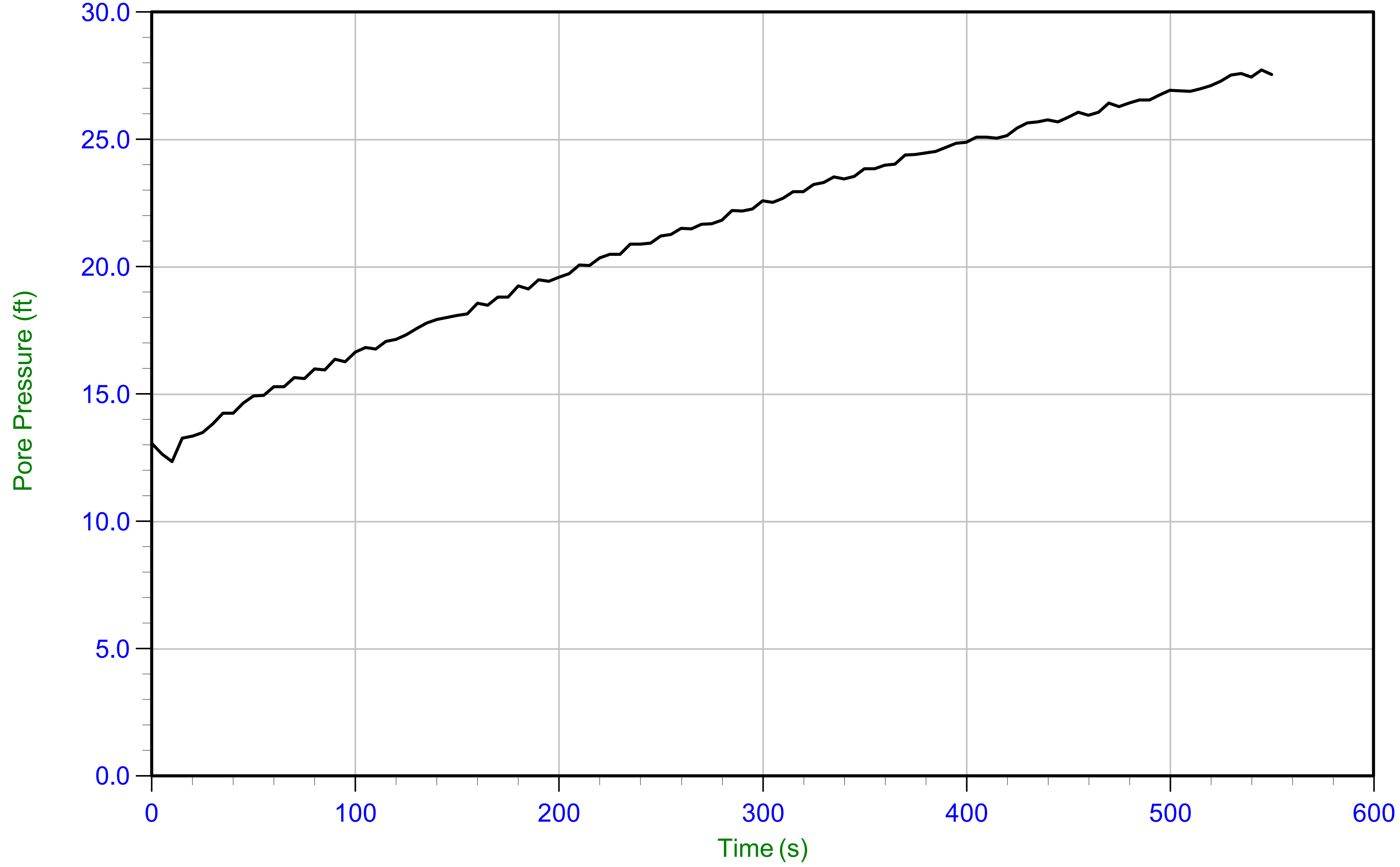
WT: 1.620 m / 5.315 ft
Ueq: 48.2 ft

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:21:35
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C021
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

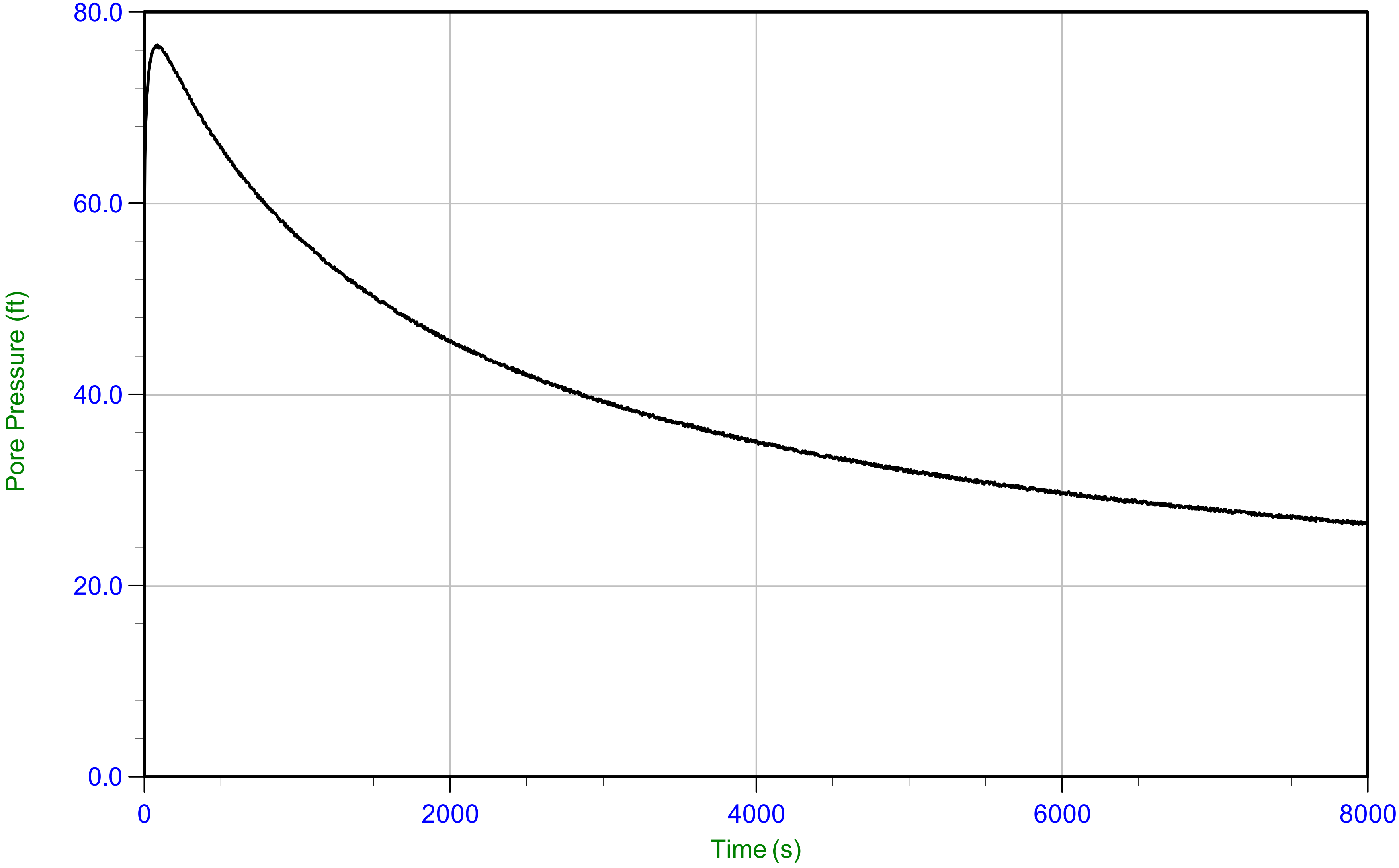
Filename: 15-53073_CP21.PPD
Depth: 4.250 m / 13.943 ft
Duration: 550.0 s

U Min: 12.4 ft
U Max: 27.7 ft

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:21:35
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C021
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP21.PPD
Depth: 7.150 m / 23.458 ft
Duration: 8000.0 s

U Min: 26.4 ft
U Max: 76.5 ft

WT: 3.962 m / 13.000 ft
Ueq: 10.5 ft
U(50): 43.50 ft

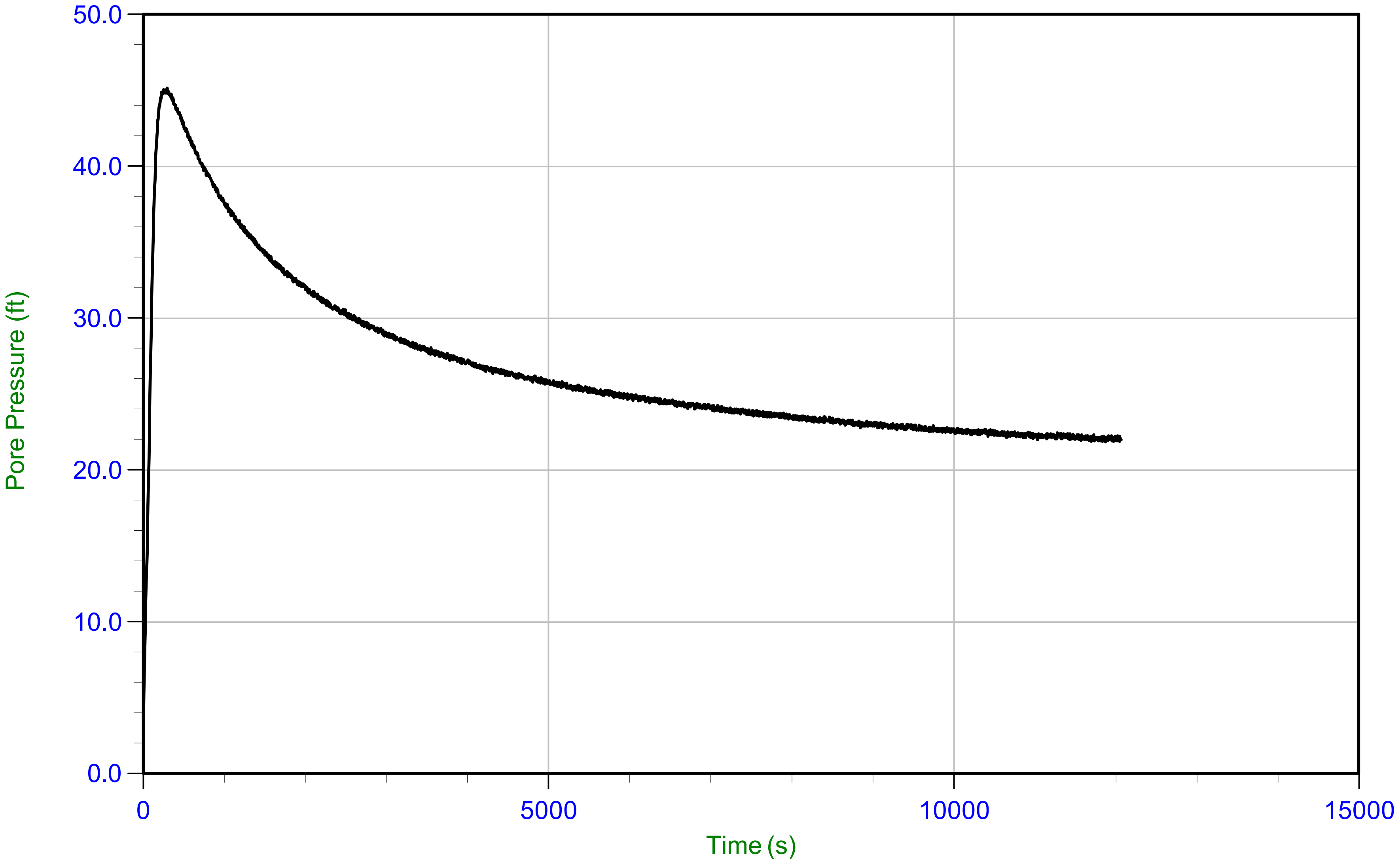
T(50): 2190.1 s
Ir: 100
Ch: 0.3 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:21:35
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C021
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP21.PPD
Depth: 10.250 m / 33.628 ft
Duration: 12070.0 s

U Min: 2.0 ft
U Max: 45.1 ft

WT: 3.962 m / 13.000 ft
Ueq: 20.6 ft
U(50): 32.88 ft

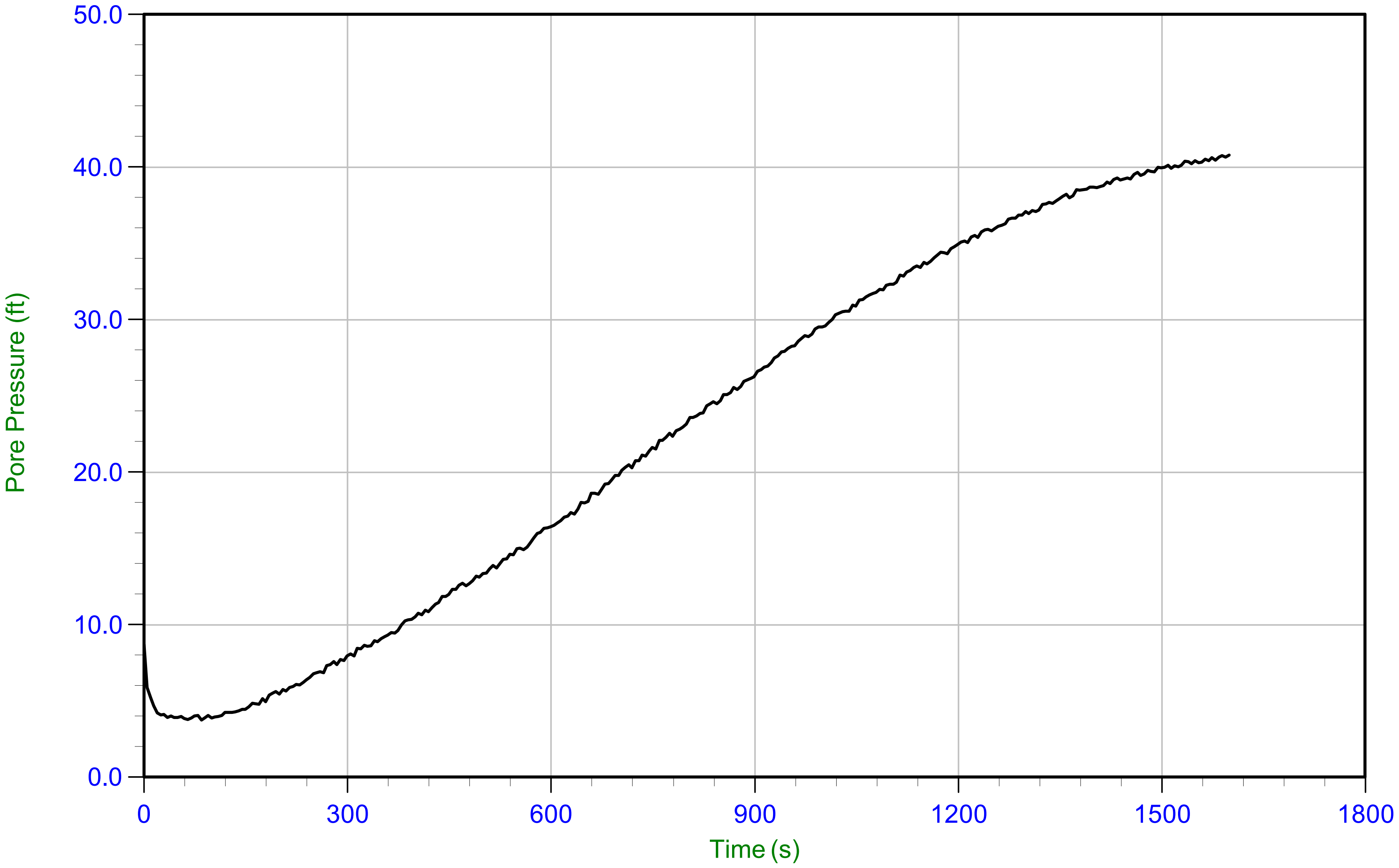
T(50): 1449.3 s
Ir: 100
Ch: 0.5 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:21:35
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C021
Cone: AD419
Cone Area: 15 sq cm



Trace Summary:

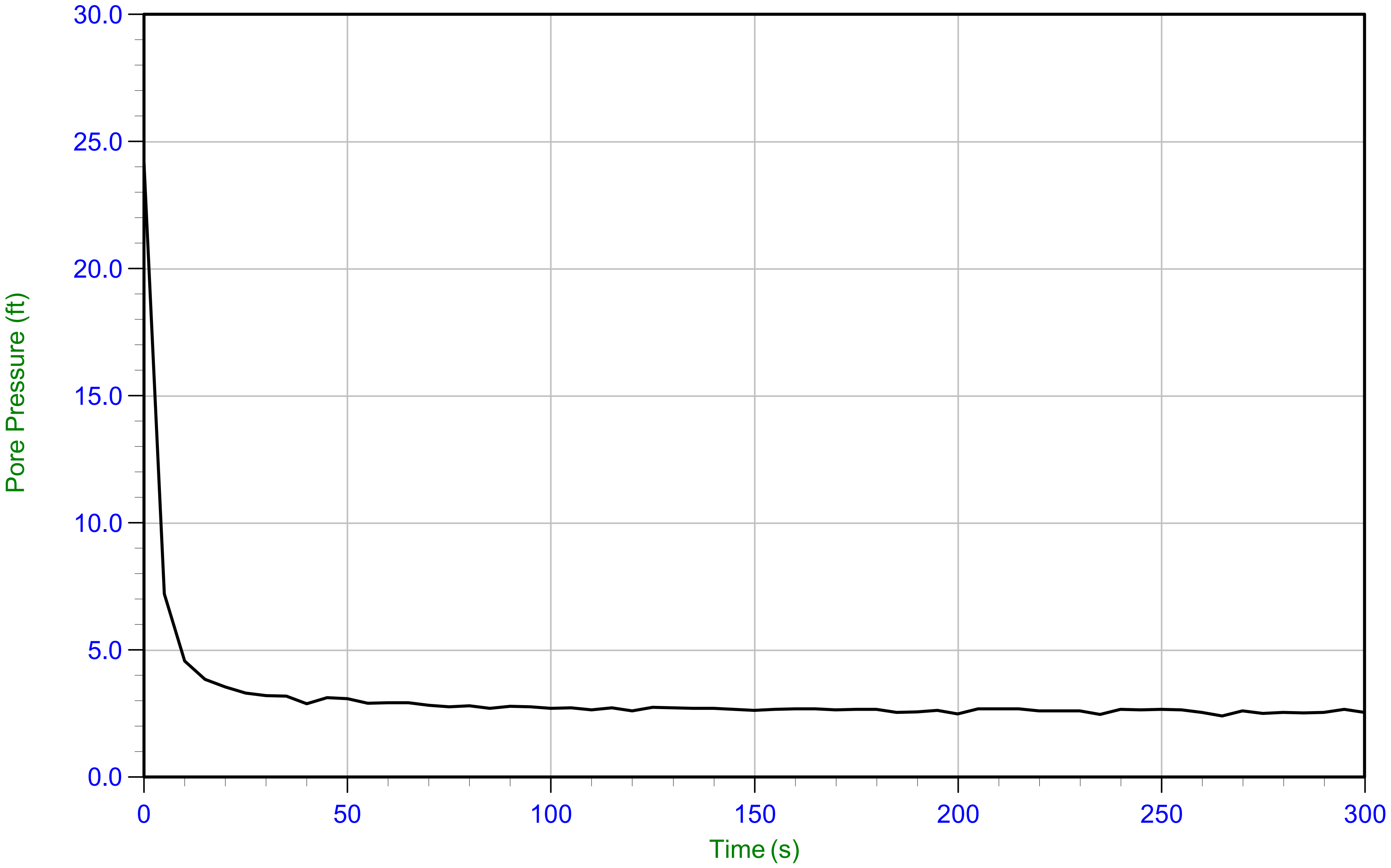
Filename: 15-53073_CP21.PPD
Depth: 14.750 m / 48.392 ft
Duration: 1600.0 s

U Min: 3.8 ft
U Max: 40.8 ft

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:35:11
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C022
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP22.PPD
Depth: 2.600 m / 8.530 ft
Duration: 300.0 s

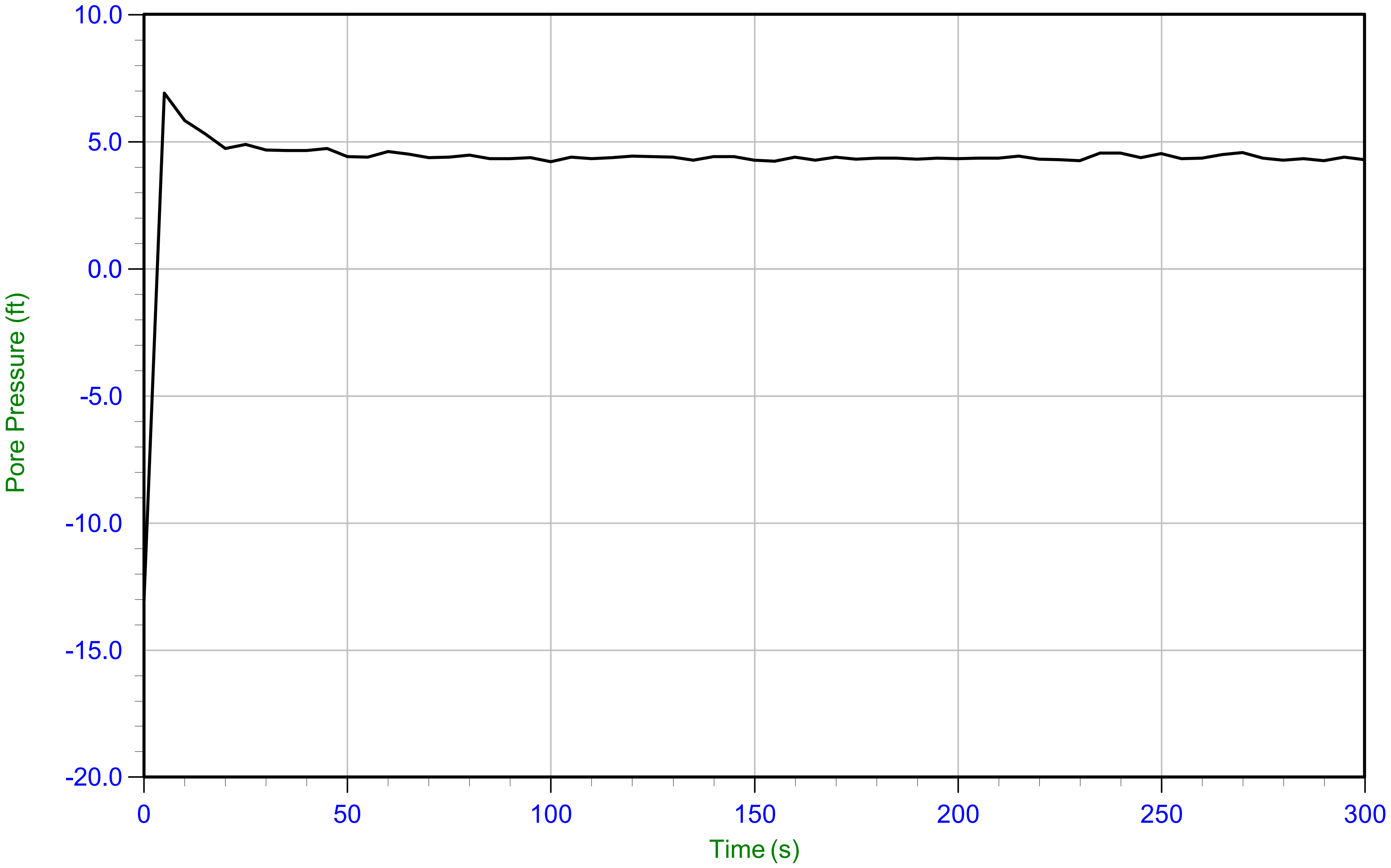
U Min: 2.4 ft
U Max: 24.2 ft

WT: 1.870 m / 6.135 ft
Ueq: 2.4 ft

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:35:11
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C022
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP22.PPD
Depth: 3.350 m / 10.991 ft
Duration: 300.0 s

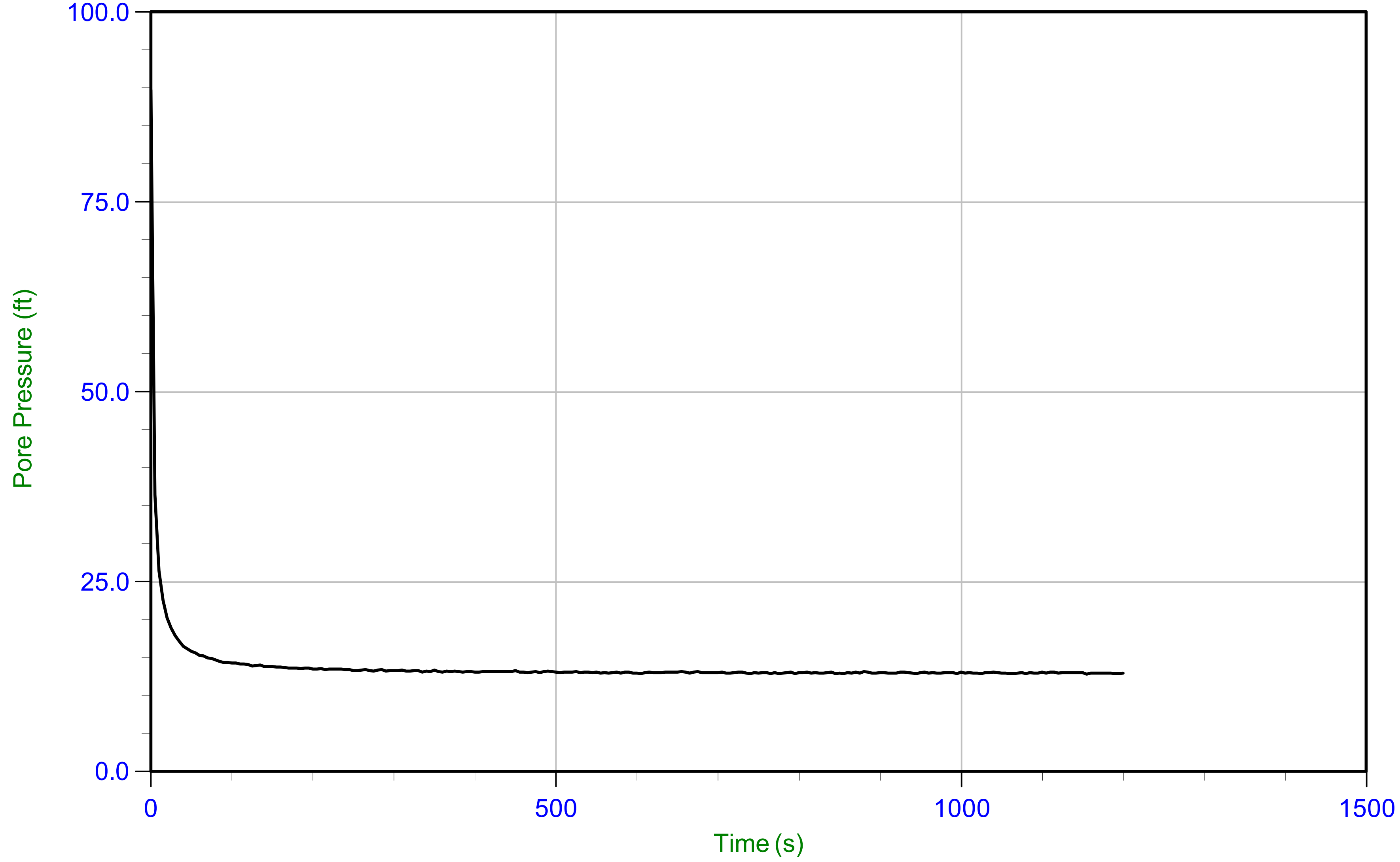
U Min: -13.1 ft
U Max: 6.9 ft

WT: 2.048 m / 6.719 ft
Ueq: 4.3 ft

AECOM

Job No: 15-53073
Date: 26-Aug-2015 10:35:11
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C022
Cone: 374
Cone Area: 15 sq cm

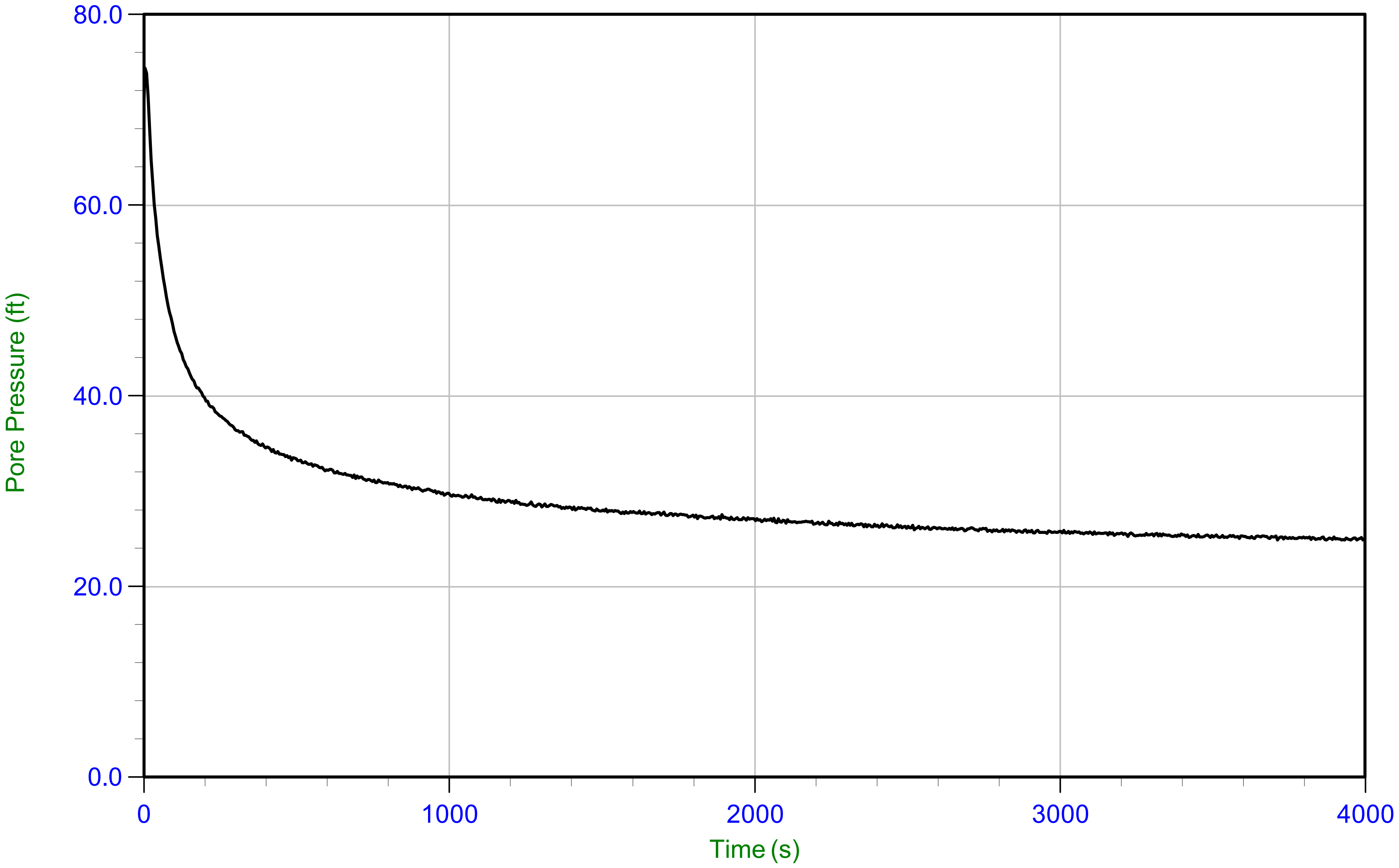


Trace Summary:

Filename: 15-53073_SP22.PPD
Depth: 6.000 m / 19.685 ft
Duration: 1200.0 s

U Min: 12.8 ft
U Max: 89.8 ft

WT: 2.084 m / 6.837 ft
Ueq: 12.8 ft



Trace Summary:

Filename: 15-53073_CP23.PPD
Depth: 11.850 m / 38.877 ft
Duration: 4000.0 s

U Min: 24.9 ft
U Max: 74.4 ft

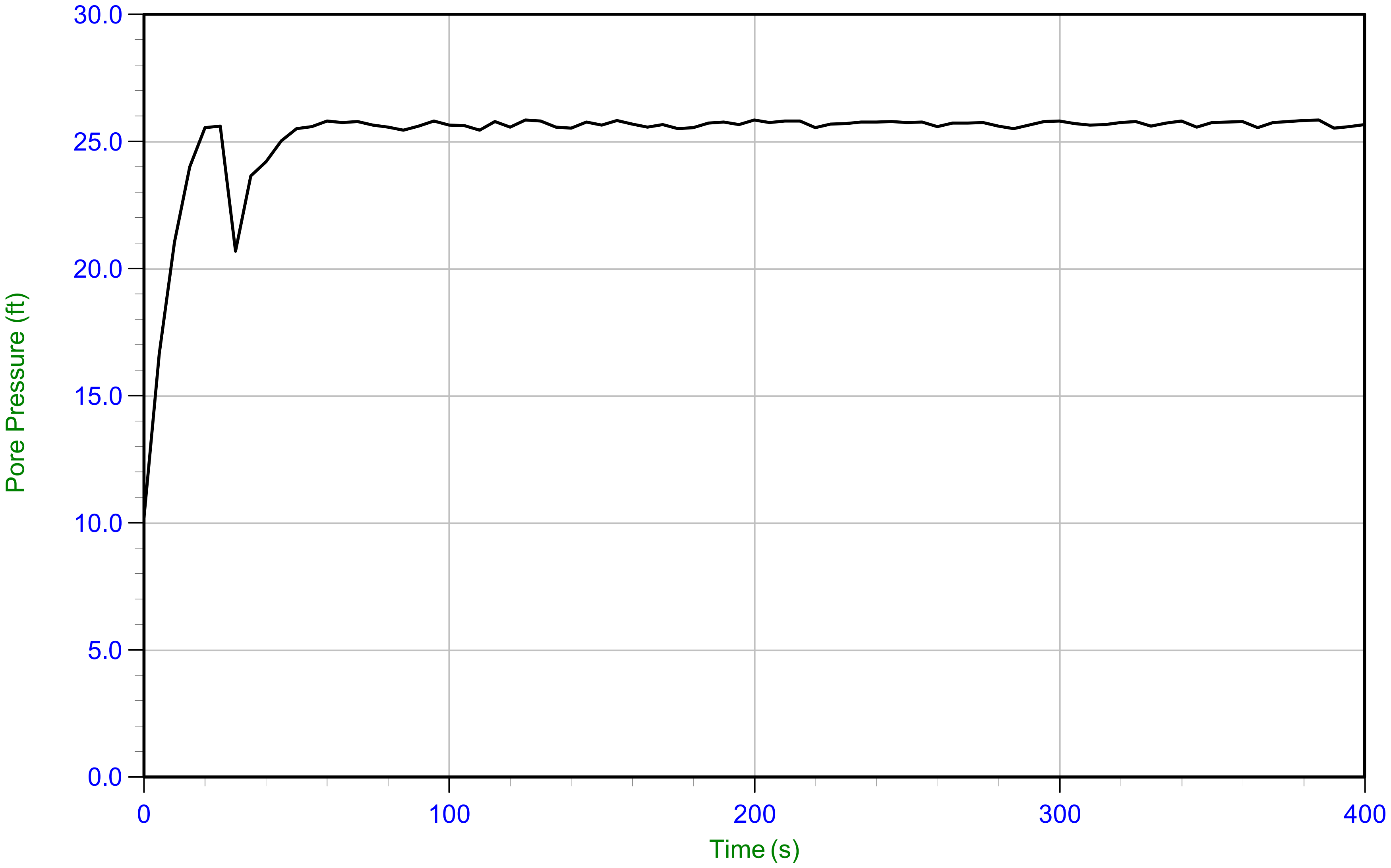
WT: 4.589 m / 15.056 ft
Ueq: 23.8 ft
U(50): 49.09 ft

T(50): 77.9 s
Ir: 100
Ch: 9.0 sq cm/min

AECOM

Job No: 15-53073
Date: 27-Aug-2015 08:52:49
Site: Edwards Power Station, Peoria, Il

Sounding: EDW-C023
Cone: AD340
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP23.PPD
Depth: 12.400 m / 40.682 ft
Duration: 400.0 s

U Min: 10.2 ft
U Max: 25.9 ft

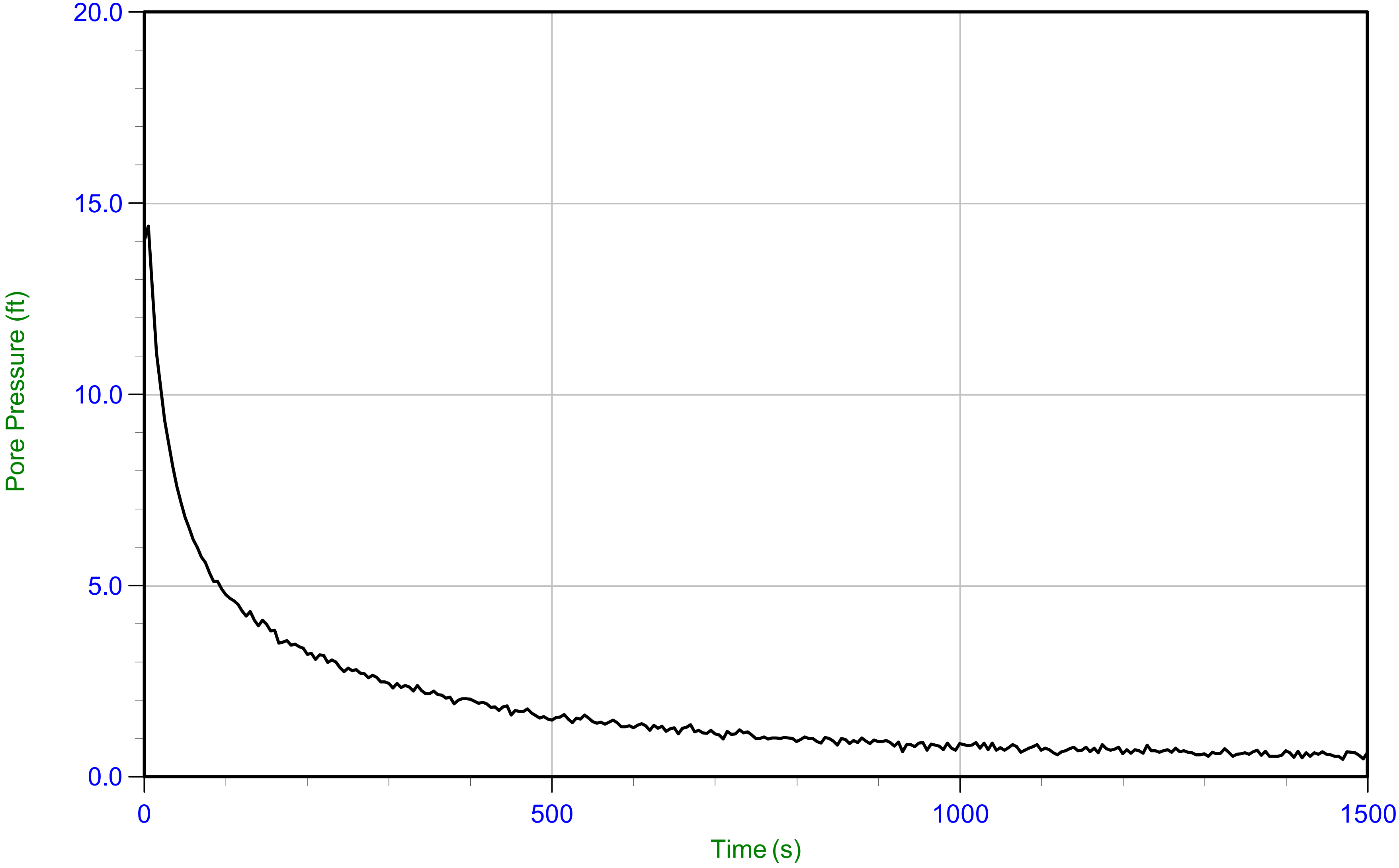
WT: 4.589 m / 15.056 ft
Ueq: 25.6 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 13:44:56
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C025
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP25.PPD
Depth: 2.000 m / 6.562 ft
Duration: 1500.0 s

U Min: 0.5 ft
U Max: 14.4 ft

WT: 1.826 m / 5.991 ft
Ueq: 0.6 ft
U(50): 7.49 ft

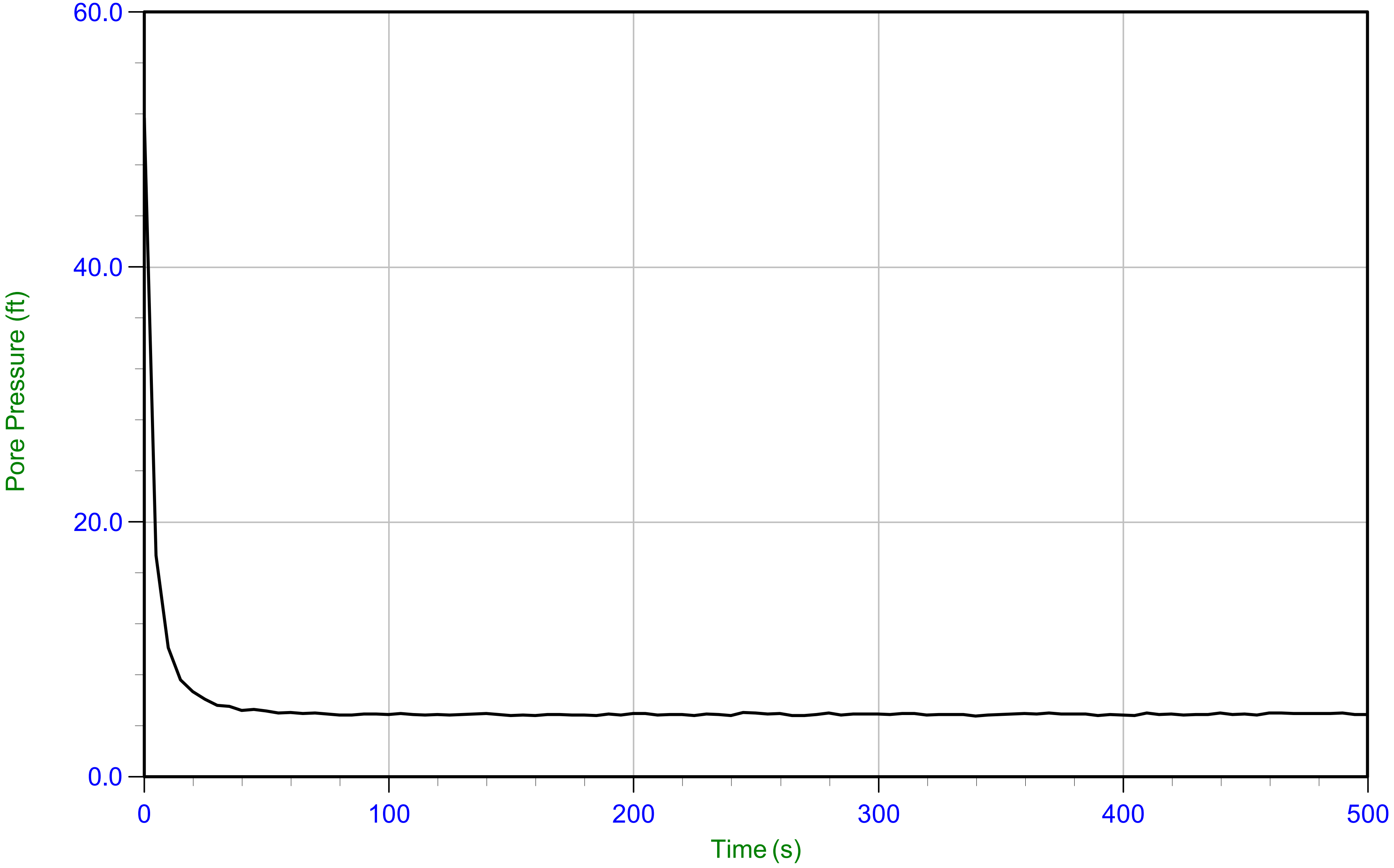
T(50): 36.3 s
Ir: 100
Ch: 19.3 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 13:44:56
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C025
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP25.PPD
Depth: 3.350 m / 10.991 ft
Duration: 500.0 s

U Min: 4.8 ft
U Max: 51.7 ft

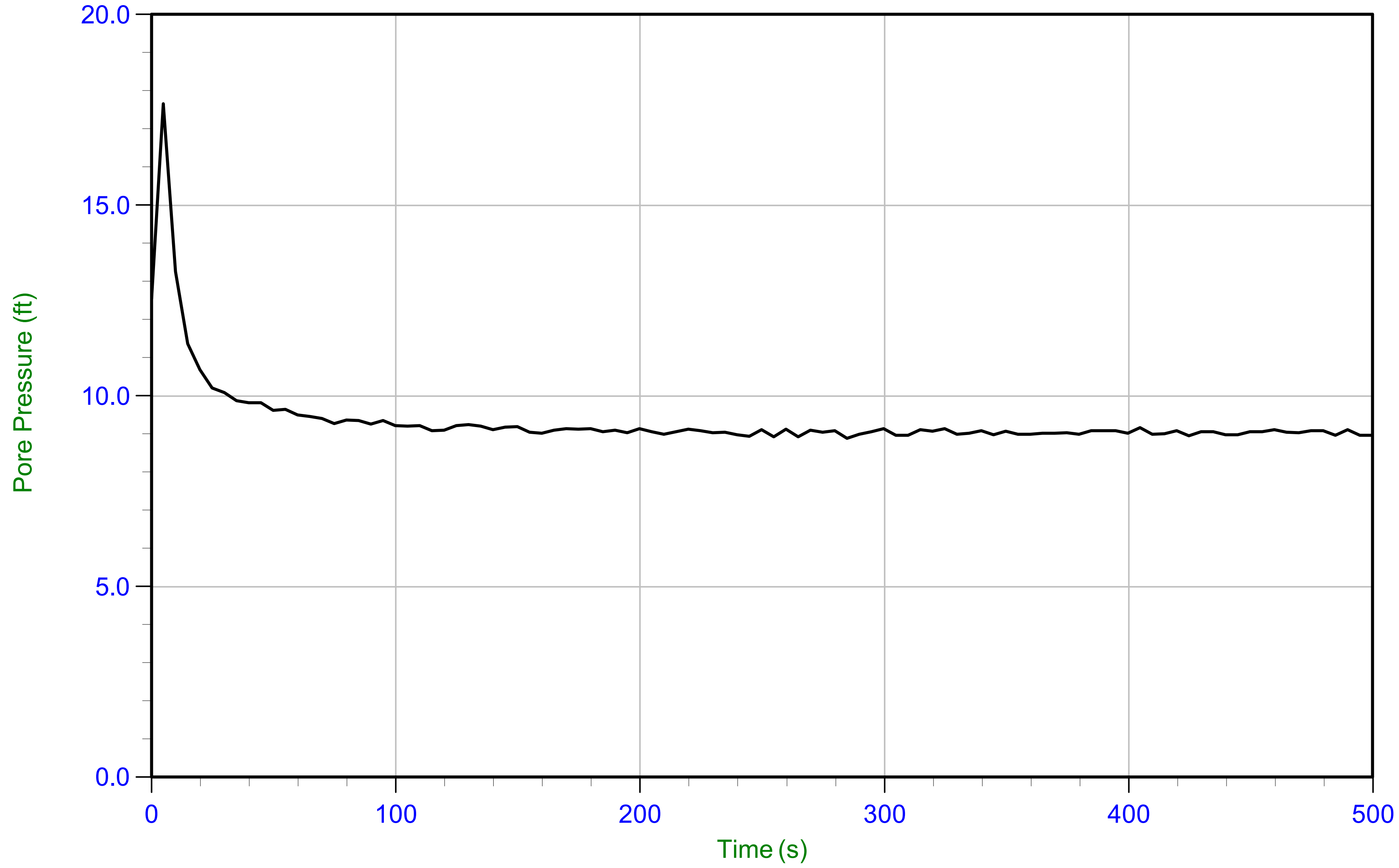
WT: 1.826 m / 5.991 ft
Ueq: 5.0 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 13:44:56
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C025
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP25.PPD
Depth: 4.600 m / 15.092 ft
Duration: 500.0 s

U Min: 8.9 ft
U Max: 17.7 ft

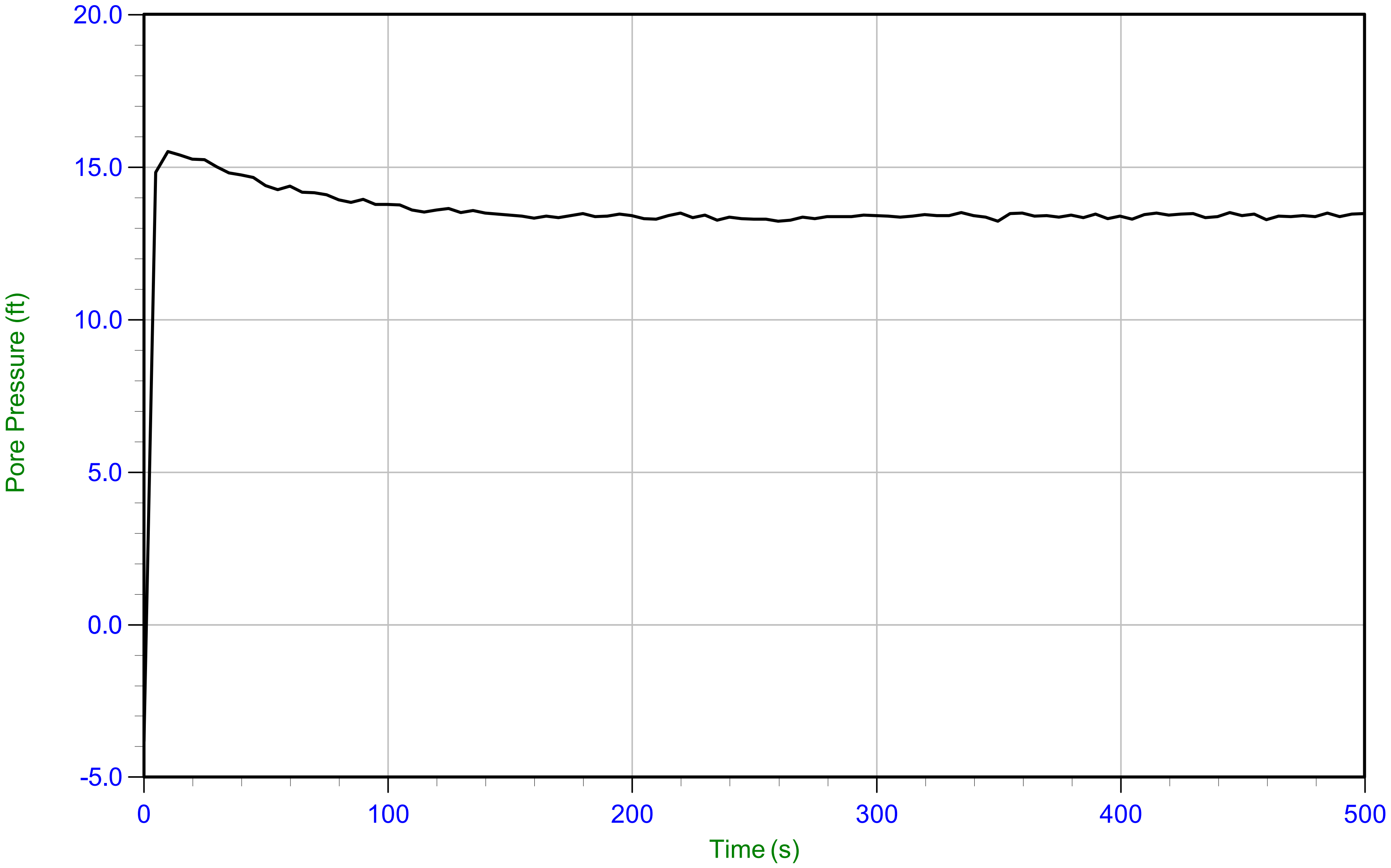
WT: 1.848 m / 6.063 ft
Ueq: 9.0 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 13:44:56
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C025
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP25.PPD
Depth: 6.100 m / 20.013 ft
Duration: 500.0 s

U Min: -3.8 ft
U Max: 15.5 ft

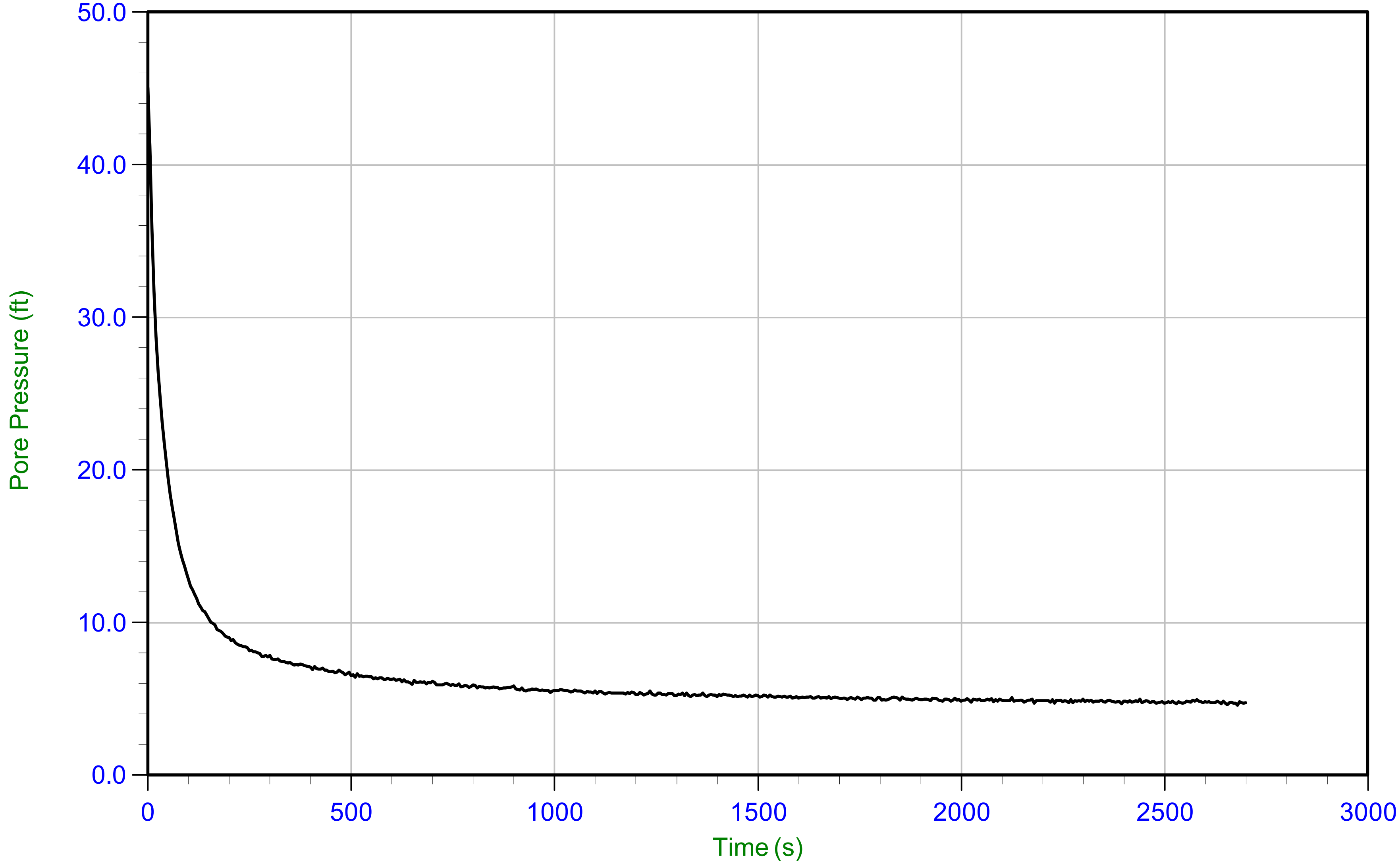
WT: 1.962 m / 6.437 ft
Ueq: 13.6 ft

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 12:20:07
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP26.PPD
Depth: 3.350 m / 10.991 ft
Duration: 2700.0 s

U Min: 4.6 ft
U Max: 45.1 ft

WT: 2.191 m / 7.188 ft
Ueq: 3.8 ft
U(50): 24.43 ft

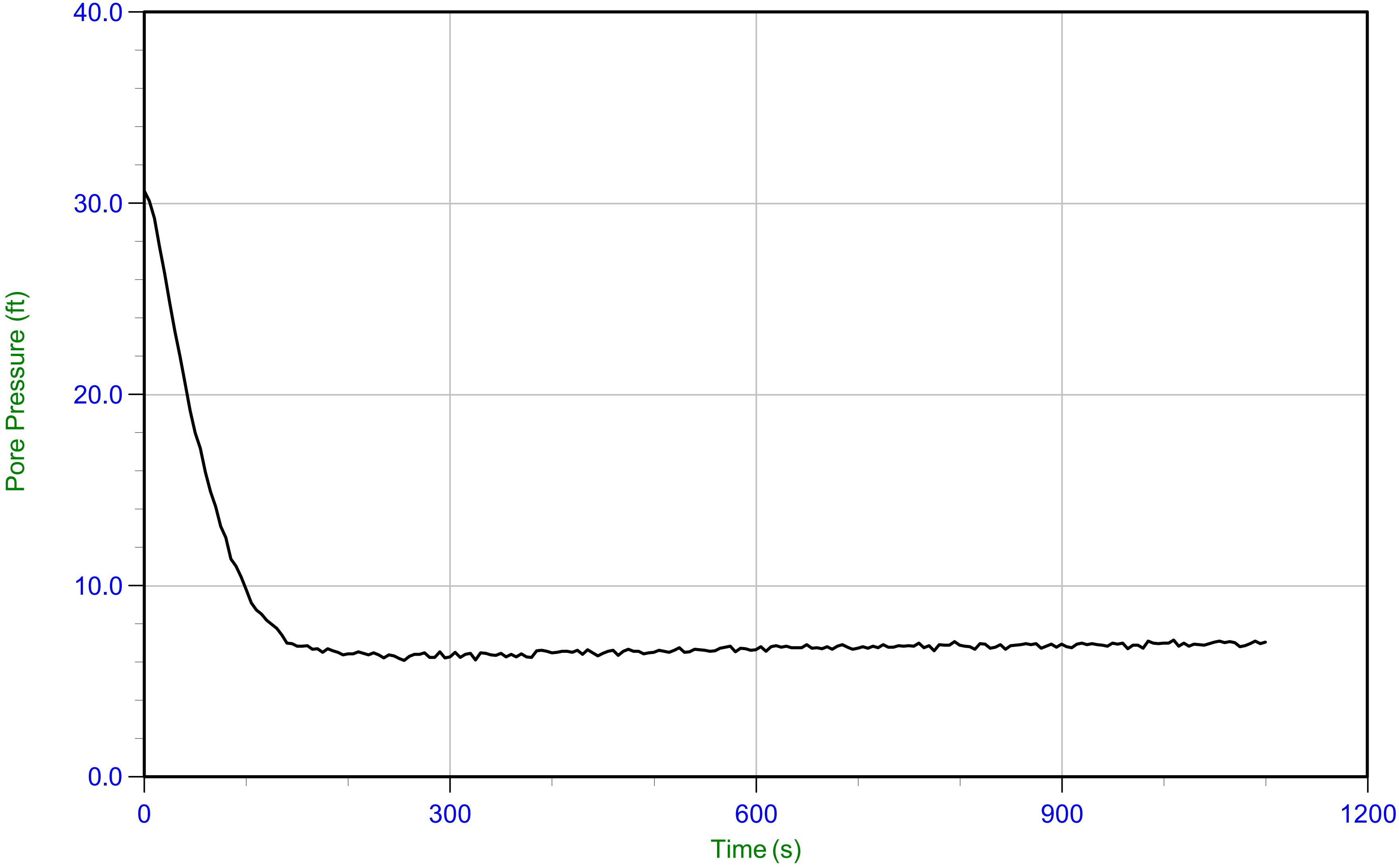
T(50): 31.2 s
Ir: 100
Ch: 22.5 sq cm/min

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 12:20:07
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP26.PPD
Depth: 4.350 m / 14.271 ft
Duration: 1100.0 s

U Min: 6.1 ft
U Max: 30.7 ft

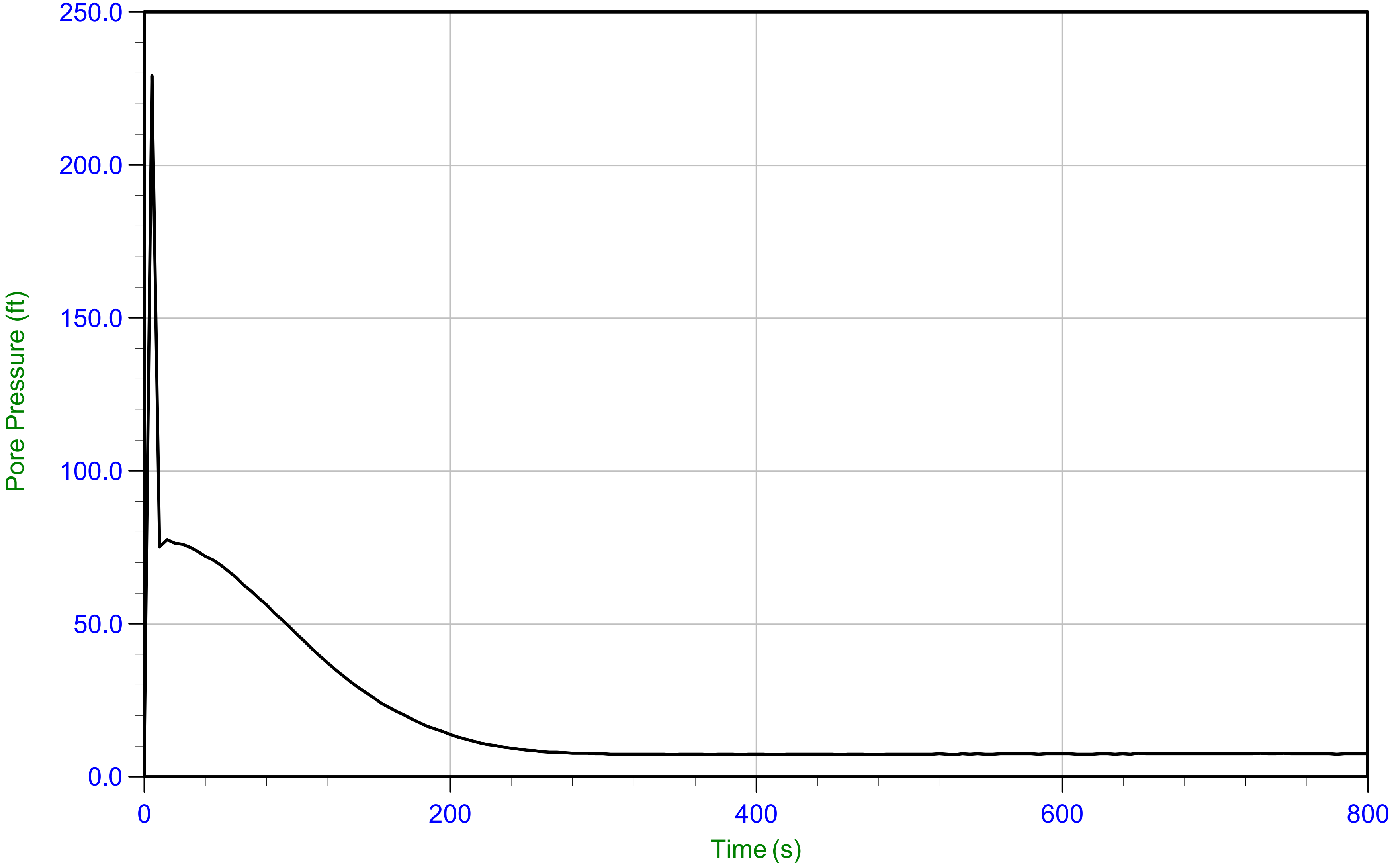
WT: 2.191 m / 7.188 ft
Ueq: 7.1 ft

CONETEC

AECOM

Job No: 15-53073
Date: 26-Aug-2015 14:00:29
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C026B
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_SP26B.PPD
Depth: 4.450 m / 14.600 ft
Duration: 800.0 s

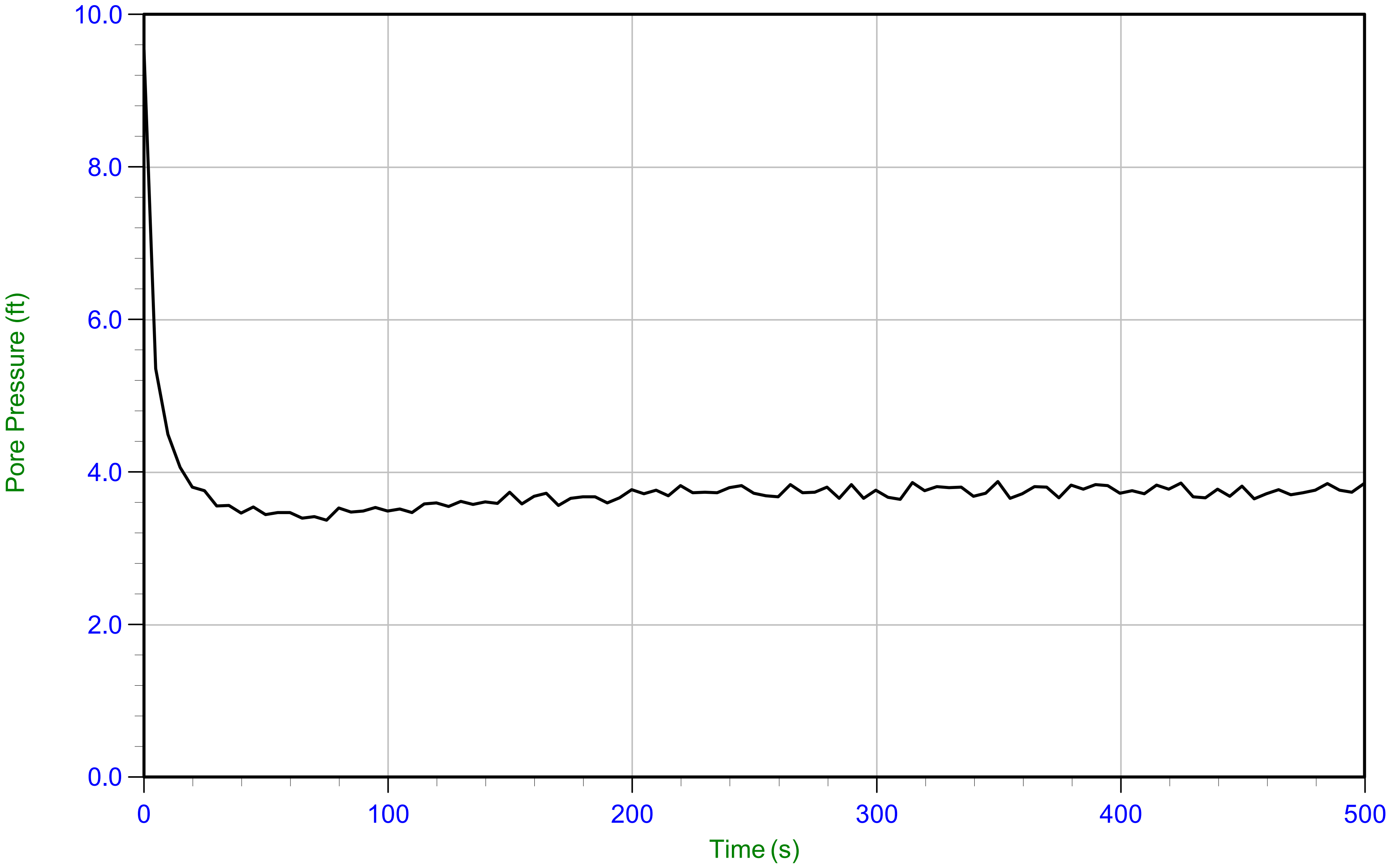
U Min: 7.3 ft
U Max: 229.3 ft

WT: 2.069 m / 6.788 ft
Ueq: 7.8 ft

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 3.400 m / 11.155 ft
Duration: 500.0 s

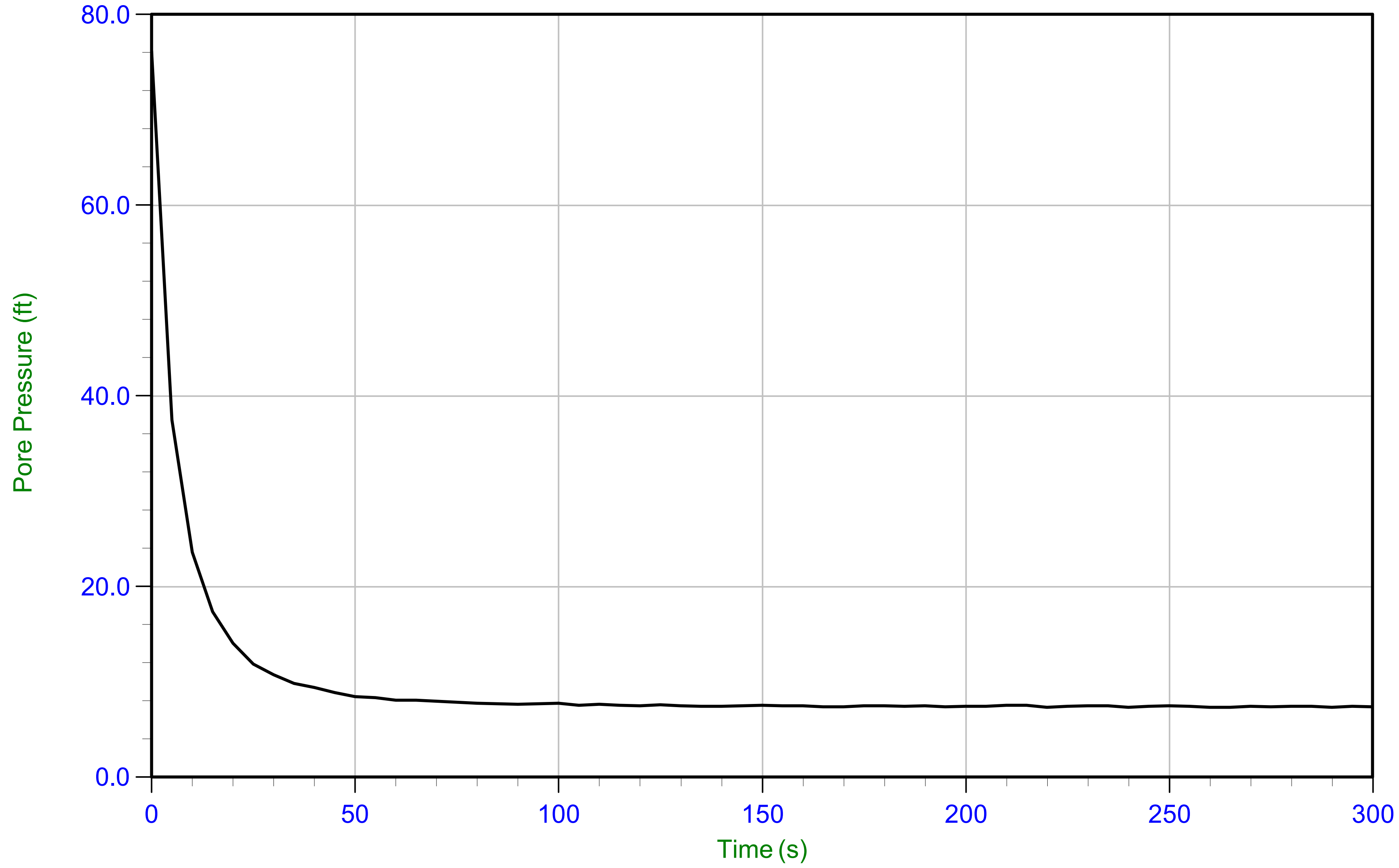
U Min: 3.4 ft
U Max: 9.5 ft

WT: 2.257 m / 7.405 ft
Ueq: 3.7 ft

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 4.350 m / 14.271 ft
Duration: 300.0 s

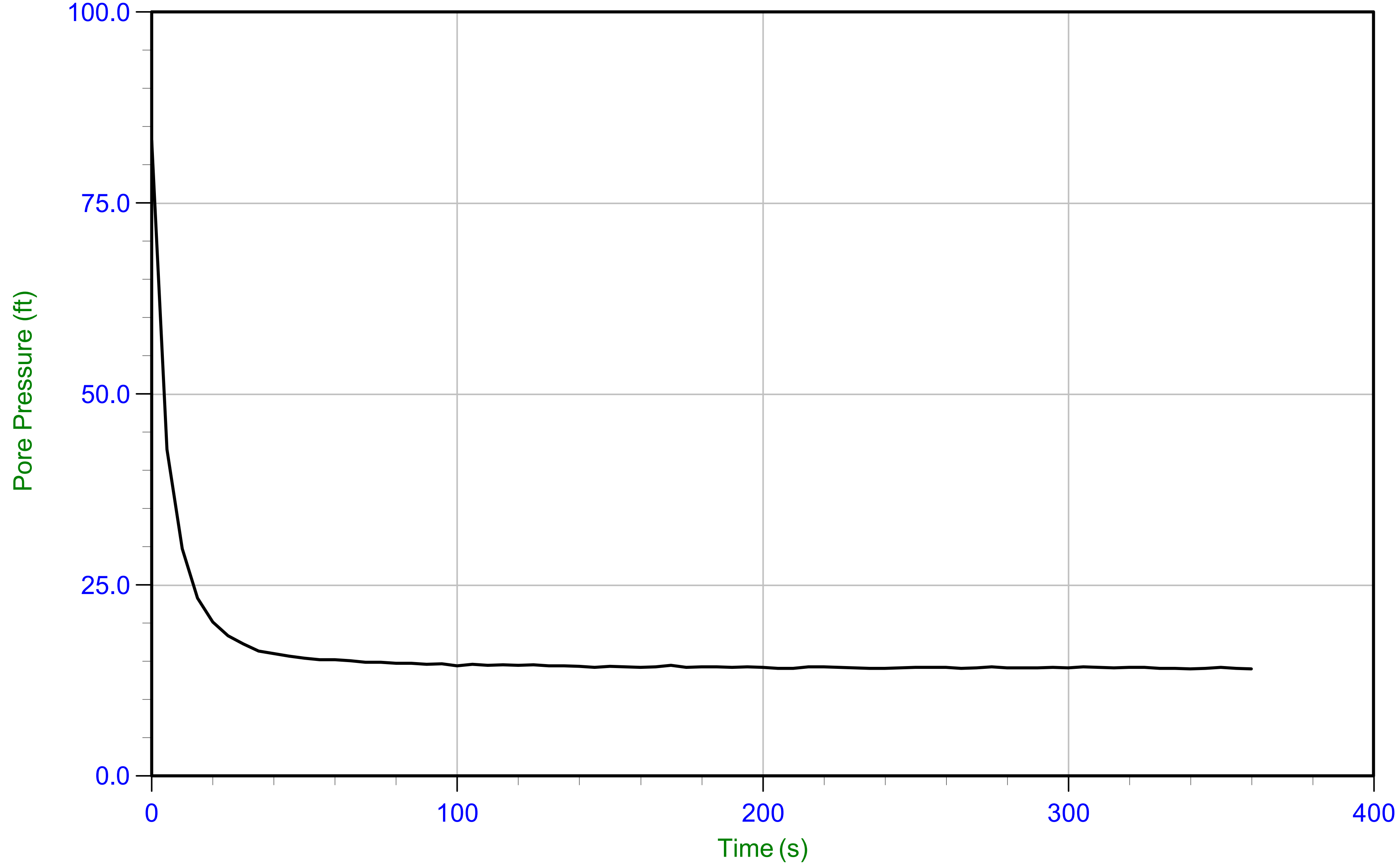
U Min: 7.3 ft
U Max: 76.2 ft

WT: 2.064 m / 6.772 ft
Ueq: 7.5 ft

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 6.400 m / 20.997 ft
Duration: 360.0 s

U Min: 14.0 ft
U Max: 83.3 ft

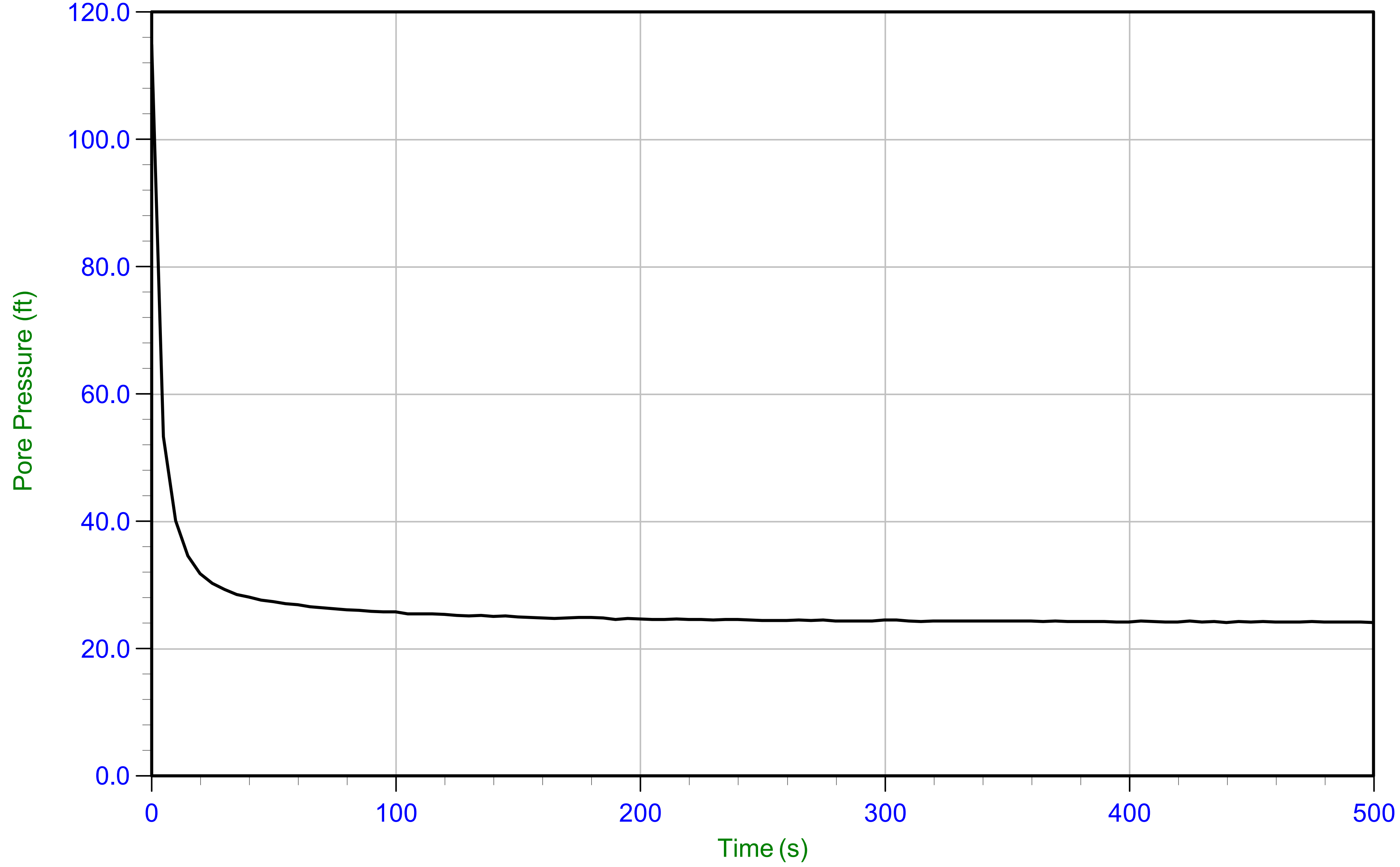
WT: 2.061 m / 6.762 ft
Ueq: 14.2 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 9.400 m / 30.840 ft
Duration: 500.0 s

U Min: 24.1 ft
U Max: 114.9 ft

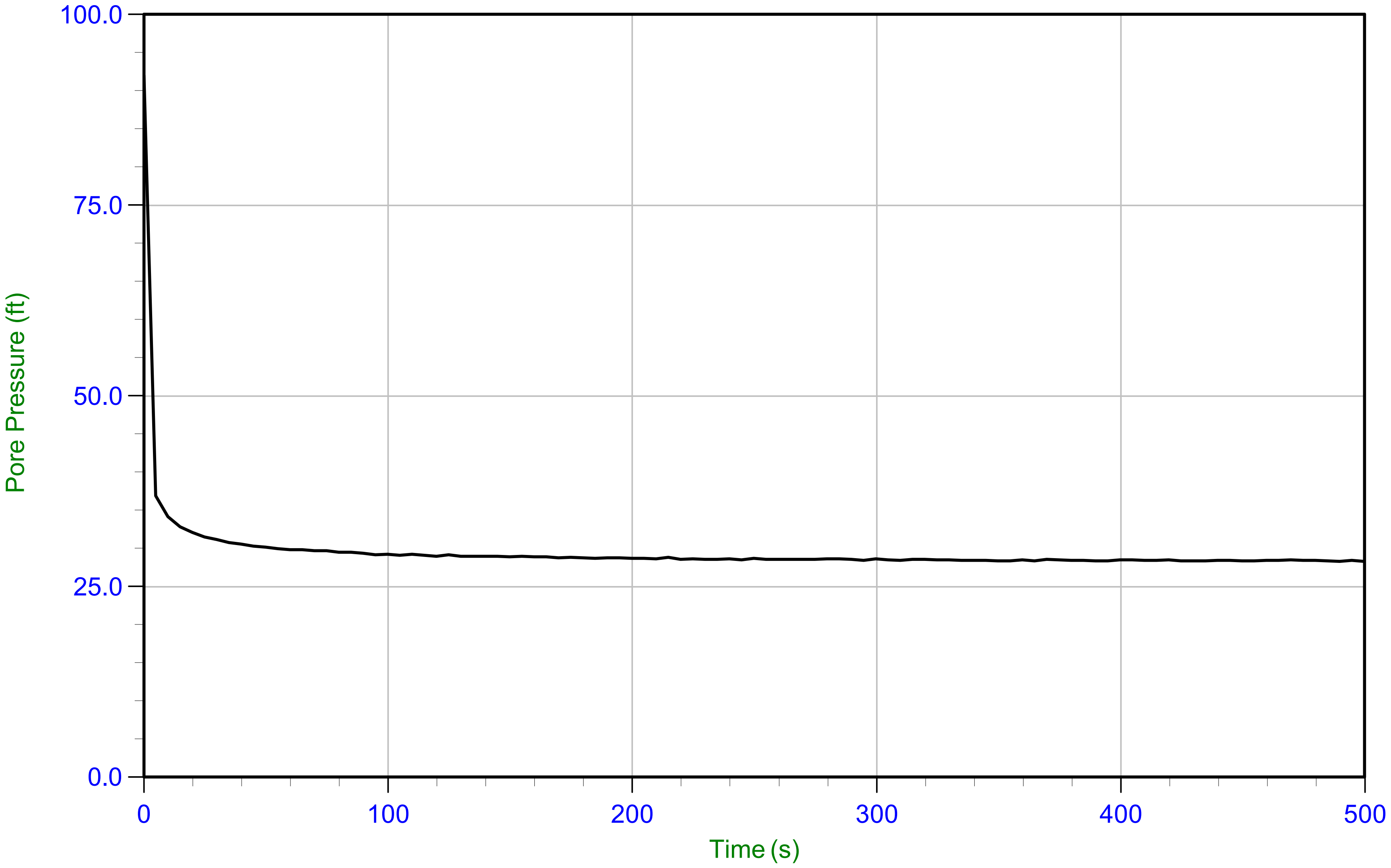
WT: 2.034 m / 6.673 ft
Ueq: 24.2 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 10.700 m / 35.105 ft
Duration: 500.0 s

U Min: 28.3 ft
U Max: 92.0 ft

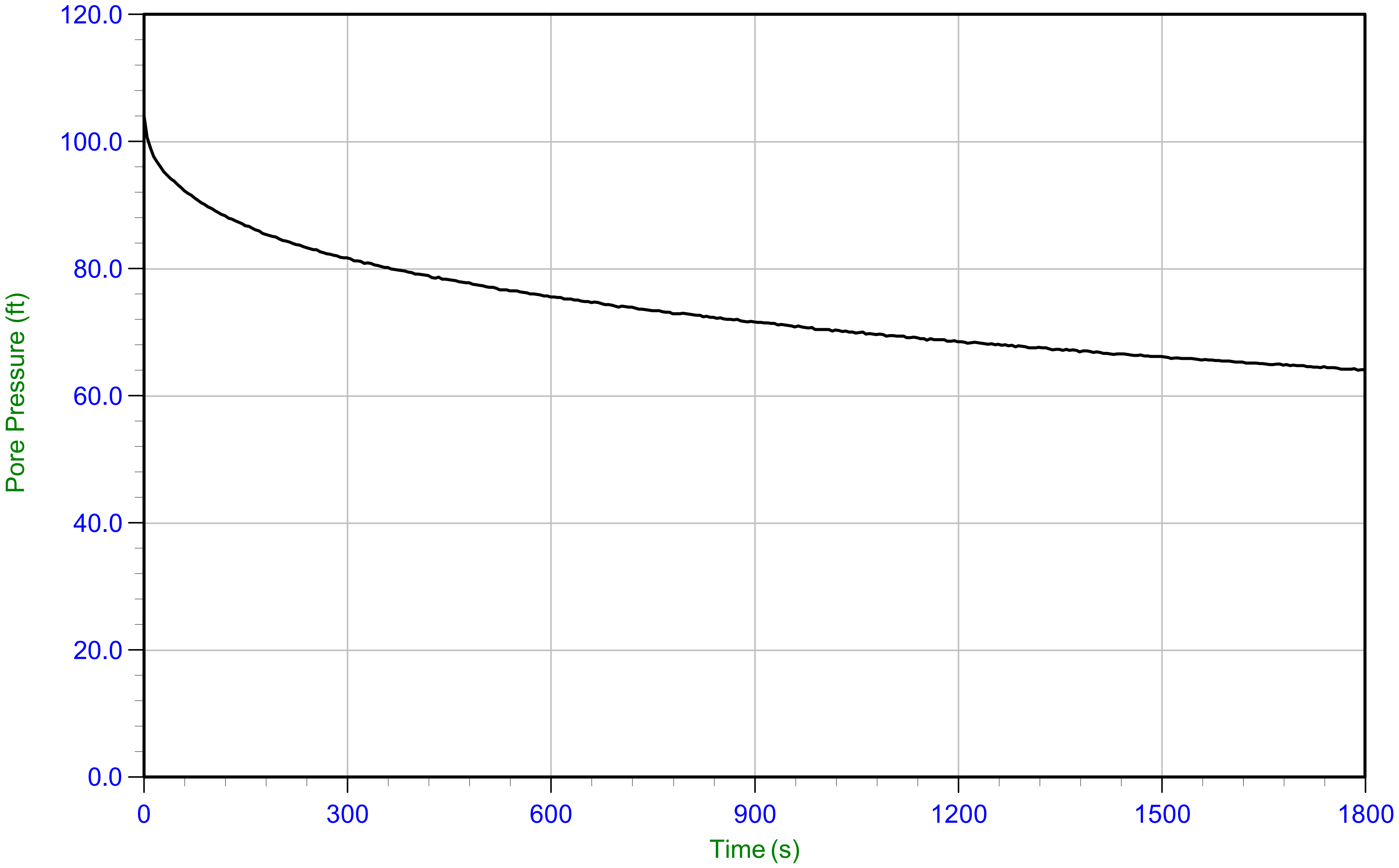
WT: 2.022 m / 6.634 ft
Ueq: 28.5 ft

CONETEC

AECOM

Job No: 15-53073
Date: 25-Aug-2015 11:00:21
Site: Edwards Power Station, Peoria, IL

Sounding: EDW-C027
Cone: 374
Cone Area: 15 sq cm



Trace Summary:

Filename: 15-53073_CP27.PPD
Depth: 12.200 m / 40.026 ft
Duration: 1800.0 s

U Min: 64.1 ft
U Max: 104.0 ft

WT: 2.064 m / 6.772 ft
Ueq: 33.3 ft
U(50): 68.65 ft

T(50): 1184.7 s
Ir: 100
Ch: 0.6 sq cm/min

Attachment E. Laboratory Test Data

Terracon

LABORATORY TESTING SUMMARY

PROJECT NAME: Dynegy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B002	S-1	0.0'-1.5'	FILL: OLIVE BROWN TRACE BROWN SILTY SAND WITH GRAVEL		38.4	4.50+								
EDW-B002	S-2	2.5'-4.0'	GRAY SANDY SILT		62.4	3.50								
EDW-B002	S-3	5.0'-7.0'	GREENISH GRAY SANDY SILT	MH	66.6						65	36	29	
EDW-B002	S-4	7.5'-10.0'	DARK GRAY FLY ASH		79.0		0.0	7.4	73.1	19.5				
EDW-B002	S-5	10.0'-12.0'	GRAY TO DARK GRAY VARVED FLY ASH		76.9						17	27	NP	
EDW-B002	S-6	15.0'-16.5'	DARK GRAY FLY ASH		52.5									
EDW-B002	S-7	20.0'-21.5'	DARK GRAY FLY ASH WITH SAND AND GRAVEL		67.8									
EDW-B002	S-8	25.0'-27.0'	DARK GRAY FLY ASH		63.9									2.471
EDW-B002	S-9	30.0'-30.5'	LIGHT GRAY LEAN CLAY WITH ORGANIC POCKETS		126.1	<.25								
EDW-B002	S-9A	30.5'-31.5'	BROWN TO RUST BROWN LEAN CLAY WITH SAND		31.1	0.50								
EDW-B002	S-10	35.0'-37.0'	GRAY LEAN CLAY WITH SAND	CL	31.6						36	18	18	
EDW-B002	S-11	40.0'-41.5'	GRAY LEAN CLAY		42.9	1.00								2.592
EDW-B002	S-12	45.0'-46.5'	GRAY TO DARK GRAY LEAN CLAY WITH SAND		57.7	0.75								
EDW-B002	S-13	50.0'-50.25'	GRAY SILT WITH SAND	ML	11.1	4.50+								
EDW-B003	S-1	0.0'-1.5'	FILL: DARK GRAY FLY ASH WITH SAND		44.4									2.469
EDW-B003	S-2	2.5'-4.0'	FILL: DARK GRAY FLY ASH WITH SAND		27.3	2.00								
EDW-B003	S-3	5.0'-6.5'	FILL: BROWN AND BLACK LEAN CLAY WITH SAND AND ORGANICS		37.2	1.00								
EDW-B003	S-4	7.5'-9.5'	FILL: DARK GRAY FLY ASH		55.5									
EDW-B003	S-5	10.0'-11.5'	FILL: DARK GRAY FLY ASH		50.6		2.3	19.8	56.3	21.6				
EDW-B003	S-6	15.0'-16.5'	FILL: DARK GRAY FLY ASH WITH SAND AND GRAVEL		29.7									2.772
EDW-B003	S-7	20.0'-21.5'	FILL: DARK GRAY FLY ASH WITH SAND AND GRAVEL		42.1									
EDW-B003	S-8	25.0'-27.0'	FILL: DARK GRAY FLY ASH WITH SAND		54.9									
EDW-B003	S-9	30.0'-32.0'	FILL: VERY DARK GRAY VARVED FLY ASH		71.7		0.0	20.6	66.4	13.0				
EDW-B003	S-10	35.0'-36.5'	FILL: DARK GRAY FLY ASH WITH SAND		51.9									
EDW-B003	S-10A	36.5'-37.0'	GRAY LEAN CLAY WITH ORGANIC POCKETS		43.0	2.25								
EDW-B003	S-11	40.0'-41.5'	GRAY TO BROWNISH GRAY LEAN CLAY WITH SAND		31.6	1.25								
EDW-B003	S-12	45.0'-47.0'	DARK GRAY FAT CLAY WITH SAND	CH	46.0						51	17	34	
EDW-B003	S-13	50.0'-51.5'	BROWNISH GRAY TO GREENISH GRAY LEAN CLAY WITH SAND		55.4	0.50								
EDW-B003	S-14	55.0'-55.5'	BLUISH GRAY CLAYEY SILT		23.3	3.50								
EDW-B003	S-14A	55.5'-55.92'	BLUISH GRAY SILT		9.8									
EDW-B003	S-15	60.0'-60.25'	BLUISH GRAY SILT		7.1									

LABORATORY TESTING SUMMARY

PROJECT NAME: Dynegy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B004	S-1	0.0'-1.5'	FILL: DARK GRAY FLY ASH		18.9	4.50+								
EDW-B004	S-2	2.5'-3.5'	FILL: DARK GRAY FLY ASH WITH SAND		28.5	4.00								
EDW-B004	S-2A	3.5'-4.0'	BROWN TO GRAY LEAN CLAY WITH SAND - FLY ASH NOTED		20.1	3.25								
EDW-B004	S-3	5.0'-6.5'	BROWN AND GRAY LEAN CLAY		21.6	1.75								
EDW-B004	S-4	7.5'-9.0'	GRAY AND DARK GRAY LEAN CLAY WITH ORGANICS	CL	23.4	4.00	0.0	9.3	43.3	47.4	37	16	21	
EDW-B004	S-5	10.0'-11.5'	BROWN AND DARK GRAY LEAN CLAY		21.5	2.25								
EDW-B004	S-6	12.5'-14.0'	BROWN AND GRAY LEAN CLAY WITH SAND		25.4	1.25								
EDW-B004	S-7	15.0'-16.5'	DARK GRAY LEAN CLAY		25.8	2.50								
EDW-B004	S-8	20.0'-21.5'	BROWN AND GRAY LEAN CLAY WITH SAND		31.3	1.00								
EDW-B004	S-9	25.0'-26.0'	BROWN AND GRAY LEAN CLAY WITH SAND AND SAND POCKETS		23.0	1.25								
EDW-B004	S-9A	26.0'-26.5'	GRAY AND BROWN CLAYEY SAND		19.5	0.75								
EDW-B004	S-10	30.0'-31.5'	GRAYISH BROWN AND DARK GRAY LEAN CLAY WITH SAND - ORGANIC		19.7	3.75								
EDW-B004	S-11	36.0'-38.0'	BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND	CL	20.1						35	17	18	
EDW-B004	S-12	40.0'-41.5'	BROWN, RUST BROWN AND GRAY LEAN CLAY		30.0	1.25								
EDW-B004	S-13	45.0'-46.0'	GRAY LEAN CLAY		39.5	1.00								
EDW-B004	S-13A	46.0'-46.5'	BROWNISH GRAY LEAN CLAY WITH SAND		35.1									
EDW-B004	S-14	50.0'-51.5'	GRAY LEAN CLAY WITH SAND		65.2	1.75								2.617
EDW-B004	S-15	55.0'-56.5'	BROWN AND BLUISH GRAY LEAN CLAY WITH SAND		33.4	1.25								
EDW-B004	S-15A	56.0'-56.5'	BLUISH GRAY SILT		13.2									
EDW-B004	S-16	60.0'-60.25'	BLUISH GRAY SOFT SHALE		8.8									
EDW-B005	S-1	0.0'-1.5'	FILL: BROWN AND DARK BROWN CLAYEY SAND WITH GRAVEL AND SILT		45.8	4.50								
EDW-B005	S-2	2.5'-4.0'	FILL: BROWN SANDY SILT WITH GRAVEL		26.0									
EDW-B005	S-3	5.0'-6.5'	FILL: BROWN SANDY SILT WITH CLAY CHUNKS	MH	50.9	3.25					61	54	7	
EDW-B005	S-4	8.5'-10.0'	FILL: BROWN SANDY SILT WITH GRAVEL		37.4	4.50+								
EDW-B005	S-5	10.0'-11.5'	FILL: LIGHT BROWN AND GRAY CLAYEY SAND WITH GRAVEL		44.3									
EDW-B005	S-6	15.0'-16.5'	FILL: BROWN SANDY SILT WITH GRAVEL		41.4									
EDW-B005	S-7	20.0'-21.5'	FILL: GRAY FLY ASH		51.1	1.75	3.1	21.3	51.7	23.9				
EDW-B005	S-8	25.0'-26.0'	FILL: BROWNISH GRAY CLAYEY SILT WITH SAND AND GRAVEL		55.3									
EDW-B005	S-8A	26.0'-27.0'	FILL: GRAY AND BLACK ORGANIC SILT	OL	47.6						44	29	15	
EDW-B005	S-9	29.0'-31.0'	FILL: DARK GRAY FLY ASH		69.3									
EDW-B005	S-10	35.0'-36.5'	GRAY AND GRAYISH BLACK LEAN CLAY WITH SAND AND ORGANICS		37.3	1.00								
EDW-B005	S-11	41.0'-43.0'	GRAY FAT CLAY SHELL - ORGANICS NOTED	CH	44.8						57	22	35	
EDW-B005	S-12	45.0'-46.5'	DARK GRAY AND GREENISH GRAY LEAN CLAY WITH SAND - ORGANICS AND SHALE NOTED		88.7	1.00								2.521
EDW-B005	S-13	50.0'-51.0'	BLUISH GRAY CLAYEY SILT		15.9	4.50+								
EDW-B005	S-14	51.0'-51.5'	BLUISH GRAY SOFT SHALE		12.8									

LABORATORY TESTING SUMMARY

PROJECT NAME: Dynergy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B006	S-1	0.0'-1.5'	FILL: DARK BROWN AND DARK GRAY LEAN CLAY WITH SAND AND BRICK		26.4	2.25								
EDW-B006	S-2	2.5'-5.0'	RUST BROWN AND GRAY MOTTLED LEAN CLAY		30.1	1.25								
EDW-B006	S-3	5.0'-6.5'	GRAY AND DARK GRAY LEAN CLAY TRACE SAND	CL	24.8	2.25					48	19	29	
EDW-B006	S-4	7.5'-10.0'	GRAY AND RUST BROWN MOTTLED LEAN CLAY		26.0	2.50								
EDW-B006	S-5	10.0'-11.5'	BROWNISH GRAY LEAN CLAY		34.2	1.25								
EDW-B006	S-6	13.0'-15.0'	GRAY FAT CLAY WITH SAND	CH	31.1						62	20	42	
EDW-B006	S-7	15.0'-16.5'	BROWNISH GRAY LEAN CLAY		40.8	1.00								
EDW-B006	S-8	20.0'-21.5'	BROWN AND GRAY LEAN CLAY WITH SAND		43.4	0.75								
EDW-B006	S-9	26.0'-28.0'	DARK GRAY ORGANIC SILT	OH	76.0						72	37	35	
EDW-B006	S-10	30.0'-31.0'	GRAY LEAN CLAY WITH SAND - ORGANIC POCKETS NOTED		43.4	0.50								
EDW-B006	S-10A	31.0'-31.5'	BLUISH GRAY LEAN CLAY WITH SAND AND SILT		19.6									
EDW-B006	S-11	35.0'-35.42'	BLUISH GRAY SILT WITH SAND		14.2	3.50								
EDW-B008	S-1	0.0'-1.5'	BROWN LEAN CLAY WITH SAND AND GRAVEL		13.2	4.50+								
EDW-B008	S-2	2.5'-4.0'	DARK BROWN LEAN CLAY WITH SAND	CL	19.5	3.75					42	22	20	
EDW-B008	S-3	5.0'-6.5'	DARK GRAY AND RUST BROWN MOTTLED LEAN CLAY WITH SAND		42.3	2.00								
EDW-B008	S-4	7.5'-9.0'	BROWN AND LIGHT GRAY LEAN CLAY WITH SAND		22.8	2.00								
EDW-B008	S-5	11.0'-13.0'	BROWN AND GRAY FAT CLAY WITH SAND	CH	33.6						52	19	33	
EDW-B008	S-6	15.0'-16.5'	GRAY LEAN CLAY WITH SAND		64.6	0.50								
EDW-B008	S-7	20.0'-21.5'	BROWN AND GRAY LEAN CLAY - SHELL NOTED		44.4	0.50								
EDW-B008	S-8	24.0'-26.5'	DARK GRAY FAT CLAY SHELL - ORGANICS NOTED	CH	68.9						67	31	36	
EDW-B008	S-9	30.0'-31.5'	GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND		71.4	0.50								
EDW-B008	S-10	35.0'-36.5'	GRAY LEAN CLAY WITH SAND - WOODCHIPS, ORGANICS AND SHELL NOTED		56.9	0.25								
EDW-B008	S-11	40.0'-40.33'	BLUISH GRAY SILT WITH SOFT SHALE		12.6	3.00								

LABORATORY TESTING SUMMARY

PROJECT NAME: Dynegy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B010	S-1 TOP	0.0'-0.5'	FILL: BROWN SAND WITH GRAVEL		7.2									
EDW-B010	BOTTOM	0.0'-0.5'	FILL: BROWN LEAN CLAY WITH SAND AND GRAVEL		17.4	4.50+								
EDW-B010	S-1A	0.5'-1.5'	FILL: DARK GRAY FLY ASH		27.9									
EDW-B010	S-2	2.5'-3.0'	FILL: DARK GRAY FLY ASH		20.9									
EDW-B010	S-2A	3.0'-4.0'	FILL: DARK GRAY FLY ASH		30.7	4.50								
EDW-B010	S-3	5.0'-6.5'	FILL: DARK BROWN AND DARK GRAY SAND WITH GRAVEL - FLY ASH NOTED	SP	14.8		12.6	54.8	26.0	6.6				
EDW-B010	S-4	7.5'-9.0'	BROWN WITH RUST BROWN STAINS LEAN CLAY WITH SAND		22.0	3.75								
EDW-B010	S-5	10.0'-11.5'	BROWN AND RUST BROWN LEAN CLAY WITH SAND		24.0	2.00								
EDW-B010	S-6	12.5'-14.0'	BROWN LEAN CLAY		28.0	1.25								
EDW-B010	S-7	15.0'-17.0'	BROWN AND GRAY MOTTLED LEAN CLAY	CL	30.5						48	18	30	
EDW-B010	S-8	20.0'-21.5'	GRAY LEAN CLAY		32.9	0.75								
EDW-B010	S-9	25.0'-26.5'	GRAY LEAN CLAY WITH SAND		21.4	0.50								
EDW-B010	S-10	30.0'-32.0'	BLUISH GRAY LEAN CLAY	CL	30.0						40	15	25	
EDW-B010	S-11	35.0'-36.5'	BROWNISH GRAY LEAN CLAY		28.2	1.50								
EDW-B010	S-12	40.0'-41.0'	BROWN, RUST BROWN AND GRAY SILTY SAND WITH GRAVEL		17.0									
EDW-B010	S-13	45.0'-45.25'	BLUISH GRAY CLAYEY SILT - SHALE NOTED		16.4	4.50								
EDW-B011	S-1	0.0'-1.5'	FILL: DARK GRAY FLY ASH		27.7	4.50+								
EDW-B011	S-2	2.5'-4.0'	FILL: DARK GRAY AND BLACK FLY ASH - ASPHALT NOTED		16.3	4.50+								
EDW-B011	S-3	5.0'-6.5'	FILL: GRAY FLY ASH		29.4	4.50+								
EDW-B011	S-4	7.5'-9.0'	FILL: DARK GRAY FLY ASH		45.3	3.00								
EDW-B011	S-5	9.0'-11.0'	FILL: VERY DARK GRAY FLY ASH		70.0		15.5	21.3	46.0	17.2				
EDW-B011	S-6	15.0'-17.0'	FILL: DARK GRAY FLY ASH		63.2									
EDW-B011	S-7	19.5'-21.5'	FILL: GRAY FLY ASH		84.9		0.2	16.7	58.0	25.1				
EDW-B011	S-8	25.0'-27.0'	FILL: DARK GRAY FLY ASH - CLAY NOTED		74.7									2.691
EDW-B011	S-9	30.0'-32.0'	FILL: DARK GRAY FLY ASH		73.7									
EDW-B011	S-10	35.0'-37.0'	FILL: DARK GRAY FLY ASH		93.9									
EDW-B011	S-13	40.0'-41.5'	BROWN AND GRAY LEAN CLAY		47.9	1.00								
EDW-B011	S-14	45.0'-46.5'	GRAYISH BROWN FAT CLAY WITH SAND	CH	63.3	0.50					63	21	42	
EDW-B011	S-15	50.0'-51.5'	DARK GRAY AND GRAYISH BROWN LEAN CLAY		62.5	0.50								
EDW-B011	S-16	55.0'-56.5'	GRAY LEAN CLAY		52.9	0.75								
EDW-B011	S-17	60.0'-60.25'	BLUISH GRAY SOFT SHALE		9.1									

LABORATORY TESTING SUMMARY

PROJECT NAME: Dynegy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B012	S-1	0.0'-1.5'	FILL: BROWN SANDY SILT WITH GRAVEL		23.0									
EDW-B012	S-2	2.5'-4.0'	FILL: DARK GRAY FLY ASH		23.8	4.50+					28	26	2	
EDW-B012	S-3	5.0'-6.5'	FILL: DARK GRAY FLY ASH		26.5		0.0	9.6	73.7	16.7				
EDW-B012	S-4	7.5'-9.0'	FILL: DARK GRAY FLY ASH		26.5	4.50								
EDW-B012	S-5	10.0'-11.0'	FILL: DARK BROWN LEAN CLAY WITH SAND - FLY ASH NOTED		24.7	3.75								
EDW-B012	S-5A	11.0'-11.5'	BROWN AND GRAYISH BROWN LEAN CLAY		24.9	2.00								
EDW-B012	S-6	12.5'-14.0'	BROWN LEAN CLAY		22.0	3.50								
EDW-B012	S-7	15.0'-16.5'	BROWN AND RUST BROWN MOTTLED LEAN CLAY	CL	24.3	3.25					48	19	29	
EDW-B012	S-8	20.0'-22.0'	BROWNISH GRAY MOTTHED LEAN CLAY WITH SAND		23.8									
EDW-B012	S-9	25.0'-26.5'	BROWNISH GRAY LEAN CLAY WITH SAND		23.2	1.25								
EDW-B012	S-10	30.0'-31.5'	BROWN AND GRAY LEAN CLAY		24.8	1.50								
EDW-B012	S-11	35.0'-36.5'	RUST BROWN AND GRAY LEAN CLAY WITH SAND		28.3	1.50								
EDW-B012	S-12	40.0'-41.5'	BLUISH GRAY AND BROWNISH GRAY LEAN CLAY		32.2	1.00								
EDW-B012	S-13	45.0'-46.5'	BROWNISH GRAY LEAN CLAY		50.2	1.25								
EDW-B012	S-14	47.0'-49.0'	DARK GRAY FAT CLAY	CH	50.8						54	20	34	
EDW-B012	S-15	49.0'-50.5'	GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND		67.4	1.00								
EDW-B012	S-16	55.0'-55.5'	GRAY LEAN CLAY WITH SAND		50.5	1.75								
EDW-B012	S-16A	55.5'-56.5'	BLUISH GRAY CLAYEY SILT		15.3	4.50								
EDW-B012	S-17	60.0'-60.21'	BLUISH GRAY CLAYEY SILT		17.9	1.50								
EDW-B013	S-1	0.0'-1.5'	FILL: BROWN AND DARK BROWN LEAN CLAY WITH SAND AND GRAVEL		13.6	4.50+								
EDW-B013	S-2	2.5'-4.0'	BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND		17.4	4.50+								
EDW-B013	S-3	6.0'-8.0'	BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL	CL	24.3						49	21	28	
EDW-B013	S-4	8.0'-9.5'	DARK GRAY AND RUST BROWN MOTTLED LEAN CLAY		24.3	3.00								
EDW-B013	S-5	10.0'-11.5'	DARK GRAY LEAN CLAY		25.4	2.25								
EDW-B013	S-6	15.0'-16.5'	DARK GRAY AND BROWNISH GRAY LEAN CLAY	CL	25.5	1.50					41	17	24	
EDW-B013	S-7	20.0'-21.5'	BROWN AND DARK GRAY LEAN CLAY		23.5	1.75								
EDW-B013	S-8	25.0'-26.5'	DARK BROWNISH GRAY LEAN CLAY		27.7									
EDW-B013	S-9	30.0'-31.5'	GRAY AND RUST BROWN MOTTLED SANDY LEAN CLAY		20.2	0.50								
EDW-B013	S-10	32.0'-34.0'	GRAY AND BROWN LEAN CLAY WITH SAND	CL	33.3						42	23	19	
EDW-B013	S-11	34.0'-35.5'	DARK GRAY LEAN CLAY		58.0	0.50								
EDW-B013	S-12	40.0'-41.5'	GRAY LEAN CLAY WITH SAND		54.5	1.75								
EDW-B013	S-13	45.0'-46.5'	GRAY LEAN CLAY - CALCIUM CABONATE SEAMS AND SHELL NOTED		66.2	1.25								
EDW-B013	S-3	6.0'-8.0'	BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL		20.0									

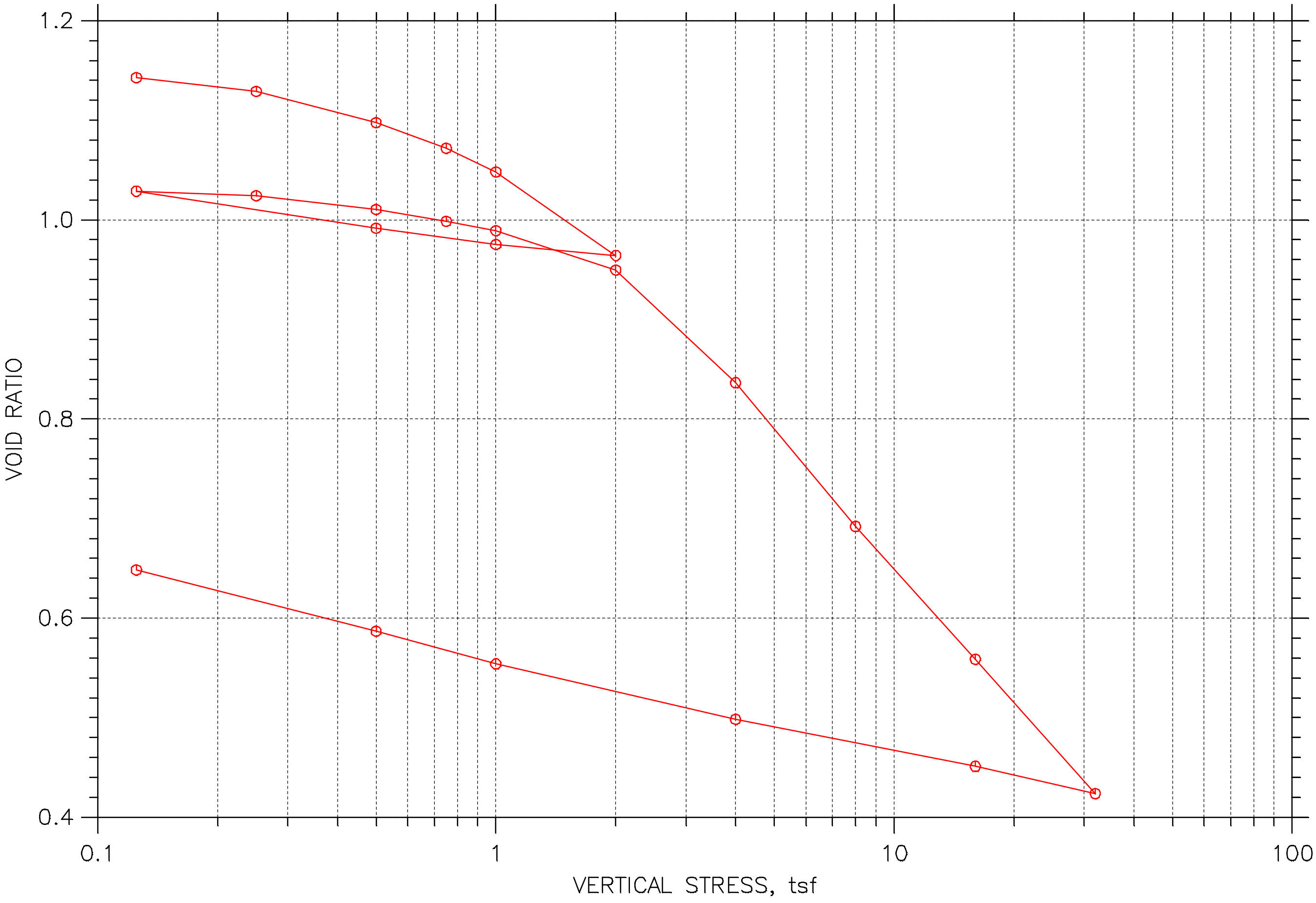
LABORATORY TESTING SUMMARY

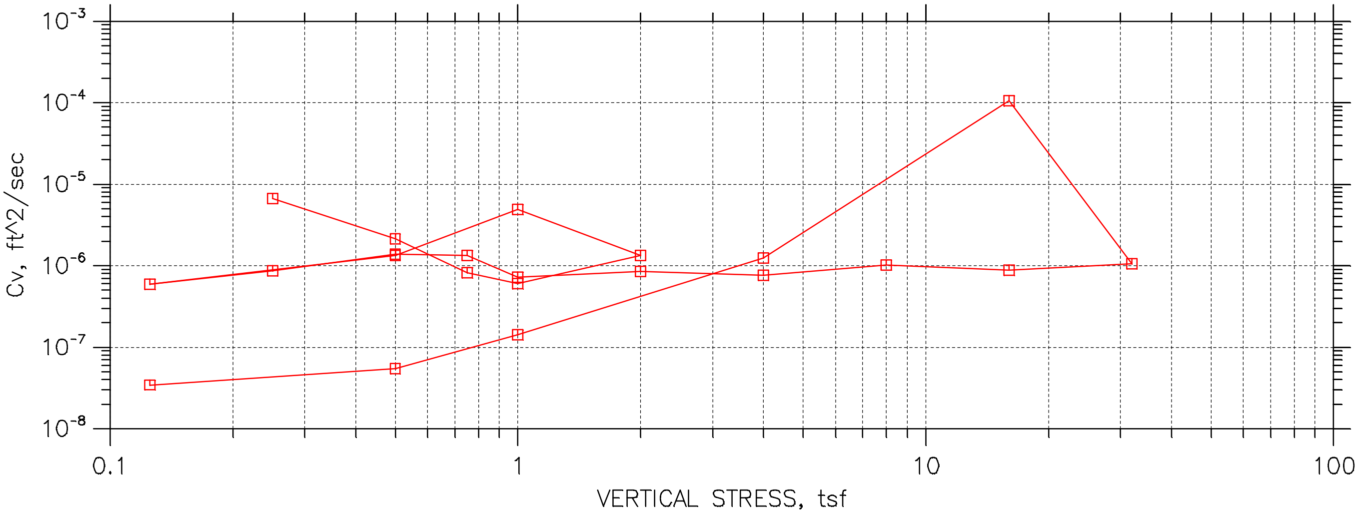
PROJECT NAME: Dynegy - Edwards Site **PROJECT NUMBER:** MR155218 **CLIENT:** AECOM

Boring Number	Sample Number	Depth	Description	USCS	WC %	Qp (tsf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Specific Gravity
EDW-B014	S-1	0.0'-1.5'	FILL: DARK GRAY FLY ASH		28.2	4.00								
EDW-B014	S-2	2.5'-3.5'	FILL: DARK GRAY CLAYEY SILT - FLY ASH NOTED		40.8	1.50								
EDW-B014	S-2A	3.5'-4.0'	FILL: GRAY CLAYEY SILT WITH SAND - FLY ASH NOTED		50.0									
EDW-B014	S-4	7.0'-8.5'	FILL: GRAY SILTY SAND WITH GRAVEL - FLY ASH NOTED	SM	60.2		0.0	35.1	45.4	19.5				
EDW-B014	S-6	15.0'-17.0'	FILL: GRAY AND DARK GRAY FLY ASH		78.7	3.50								
EDW-B014	S-7	20.0'-22.5'	FILL: DARK GRAY FLY ASH		86.5	1.50								2.524
EDW-B014	S-8	25.0'-26.7'	FILL: DARK GRAY FLY ASH - CLAY NOTED		73.1									
EDW-B014	S-9	30.0'-31.5'	GRAY AND DARK GRAY LEAN CLAY - ORGANIC POCKETS NOTED		48.7									
EDW-B014	S-10	35.0'-36.7'	GRAY LEAN CLAY		31.6	0.75								
EDW-B014	S-11	40.0'-40.5'	BLUISH GRAY LEAN CLAY WITH SAND AND GRAVEL		27.3	4.00								2.719
EDW-B014	S-11A	40.5'-41.0'	BLUISH GRAY AND GREENISH GRAY SILT WITH SOFT SHALE		19.6	4.50+								
EDW-B014	S-11B	41.0'-41.5'	GRAY SOFT SHALE		10.2									
EDW-B014	S-12	45.0'-45.5'	GRAY SILT WITH SAND		14.5	4.50								
EDW-B015	S-1	0.0'-1.5'	FILL: GRAYISH BROWN SANDY SILT		54.7									
EDW-B015	S-2	2.5'-4.0'	BROWN SAND WITH GRAVEL		4.5									
EDW-B015	S-3	5.0'-6.5'	BROWN SAND WITH GRAVEL		5.4									
EDW-B015	S-4	7.5'-9.0'	BROWN SAND WITH GRAVEL		7.2									
EDW-B015	S-5	10.0'-11.5'	BROWN SAND WITH GRAVEL		6.5									
EDW-B015	S-6	13.0'-14.25'	BROWN AND GRAY GRAVEL		3.6									
EDW-B015	S-7	15.0'-16.5'	LIGHT GRAY GRAVEL WITH SAND - LIMESTONE FRAGMENTS NOTED		8.2									
EDW-B015	S-8	20.0'-21.5'	GRAY GRAVEL WITH SAND		7.8									
EDW-B015	S-9	25.0'-26.5'	LIGHT GRAY GRAVEL WITH SAND AND SILT		8.1									
EDW-B015	S-10	31.0'-33.0'	BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL	CL	20.2						24	13	11	
EDW-B015	S-11	35.0'-36.5'	GRAY AND DARK GRAY LEAN CLAY		33.8	1.50								
EDW-B015	S-12	37.0'-39.0'	DARK GRAY FAT CLAY	CH	41.0						66	23	43	
EDW-B015	S-13	39.0'-40.5'	BROWN AND GRAY LEAN CLAY		36.2	0.50								
EDW-B015	S-14	45.0'-46.5'	BROWN AND GRAY LEAN CLAY WITH SAND		49.4	1.00								
EDW-B015	S-15	50.0'-51.0'	GRAY LEAN CLAY		30.9	1.50								
EDW-B015	S-16	55.0'-55.5'	BLUISH GRAY SILT - SHALE NOTED		11.0	4.25								

CONSOLIDATION TEST DATA

SUMMARY REPORT





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

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CONSOLIDATION TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B003
Sample No.: S-12
Test No.: EDW003S12

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 10/26/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 45.0'-47.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY FAT CLAY WITH SAND CH
Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.72
Initial Void Ratio: 1.15
Final Void Ratio: 0.65

Liquid Limit: 51
Plastic Limit: 24
Plasticity Index: 27

Initial Height: 1.00 in
Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	X-14	RING	RING	X-19
Wt. Container + Wet Soil, gm	165.03	249.08	236.35	164.81
Wt. Container + Dry Soil, gm	127.13	213.35	213.35	142.68
Wt. Container, gm	44.81	111.54	111.54	44.72
Wt. Dry Soil, gm	82.32	101.81	101.81	97.96
Water Content, %	46.04	35.09	22.59	22.59
Void Ratio	---	1.15	0.65	---
Degree of Saturation, %	---	83.18	94.86	---
Dry Unit Weight, pcf	---	79.069	103.05	---

CONSOLIDATION TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B003
Sample No.: S-12
Test No.: EDW003S12

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 10/26/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 45.0'-47.0'
Elevation: ----

Soil Description: DARK GRAY FAT CLAY WITH SAND CH
Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435

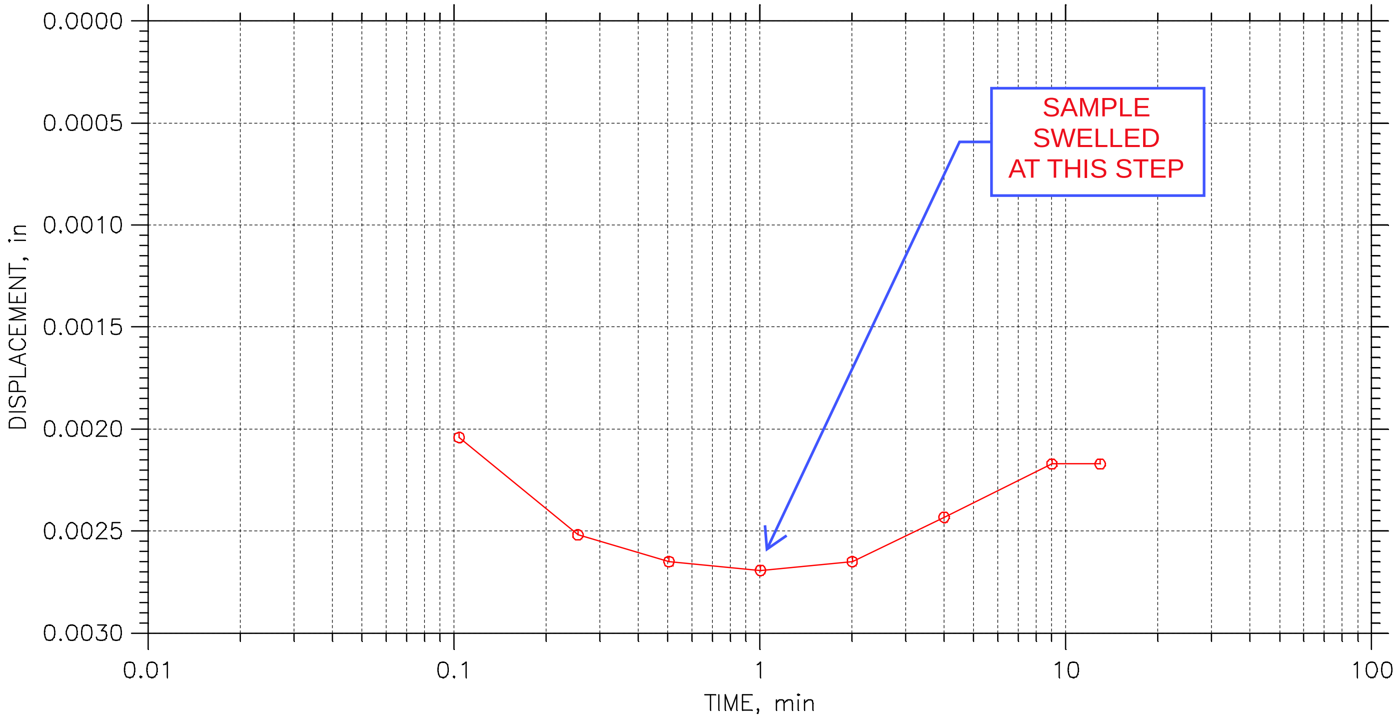
	Applied	Final	Void	Strain	T50 Fitting		Coefficient of Consolidation		
	Stress	Displacement	Ratio	at End	Sq.Rt.	Log	Sq.Rt.	Log	Ave.
	tsf	in		%	min	min	ft^2/sec	ft^2/sec	ft^2/sec
1	0.125	0.002172	1.143	0.22	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.25	0.008644	1.129	0.87	1.0	0.6	5.41e-006	8.79e-006	6.69e-006
3	0.5	0.02315	1.098	2.32	3.9	1.2	1.42e-006	4.45e-006	2.15e-006
4	0.75	0.03518	1.072	3.53	6.5	4.7	8.27e-007	1.15e-006	9.61e-007
5	1	0.04617	1.048	4.63	8.6	0.0	6.06e-007	0.00e+000	6.06e-007
6	2	0.08522	0.964	8.54	3.7	0.0	1.33e-006	0.00e+000	1.33e-006
7	1	0.08005	0.975	8.02	1.0	0.0	4.94e-006	0.00e+000	4.94e-006
8	0.5	0.07245	0.992	7.26	3.7	0.0	1.33e-006	0.00e+000	1.33e-006
9	0.125	0.05516	1.029	5.53	8.4	0.0	5.93e-007	0.00e+000	5.93e-007
10	0.25	0.05733	1.024	5.74	5.8	0.0	8.68e-007	0.00e+000	8.68e-007
11	0.5	0.06376	1.010	6.39	3.6	0.0	1.38e-006	0.00e+000	1.38e-006
12	0.75	0.06924	0.999	6.94	3.7	0.0	1.33e-006	0.00e+000	1.33e-006
13	1	0.07358	0.989	7.37	11.4	2.0	4.29e-007	2.42e-006	7.28e-007
14	2	0.09195	0.950	9.21	8.7	2.5	5.48e-007	1.92e-006	8.53e-007
15	4	0.1446	0.836	14.49	5.8	5.7	7.57e-007	7.69e-007	7.63e-007
16	8	0.2117	0.692	21.21	3.8	3.7	1.02e-006	1.04e-006	1.03e-006
17	16	0.2736	0.559	27.42	3.8	3.6	8.62e-007	9.02e-007	8.81e-007
18	32	0.3363	0.424	33.70	2.1	3.1	1.30e-006	8.96e-007	1.06e-006
19	16	0.3237	0.451	32.43	0.0	0.0	1.05e-004	0.00e+000	1.05e-004
20	4	0.3017	0.498	30.23	2.1	0.0	1.25e-006	0.00e+000	1.25e-006
21	1	0.2758	0.554	27.64	20.3	0.0	1.42e-007	0.00e+000	1.42e-007
22	0.5	0.2611	0.586	26.16	78.7	39.4	3.86e-008	7.70e-008	5.14e-008
23	0.125	0.2322	0.648	23.27	93.5	0.0	3.45e-008	0.00e+000	3.45e-008

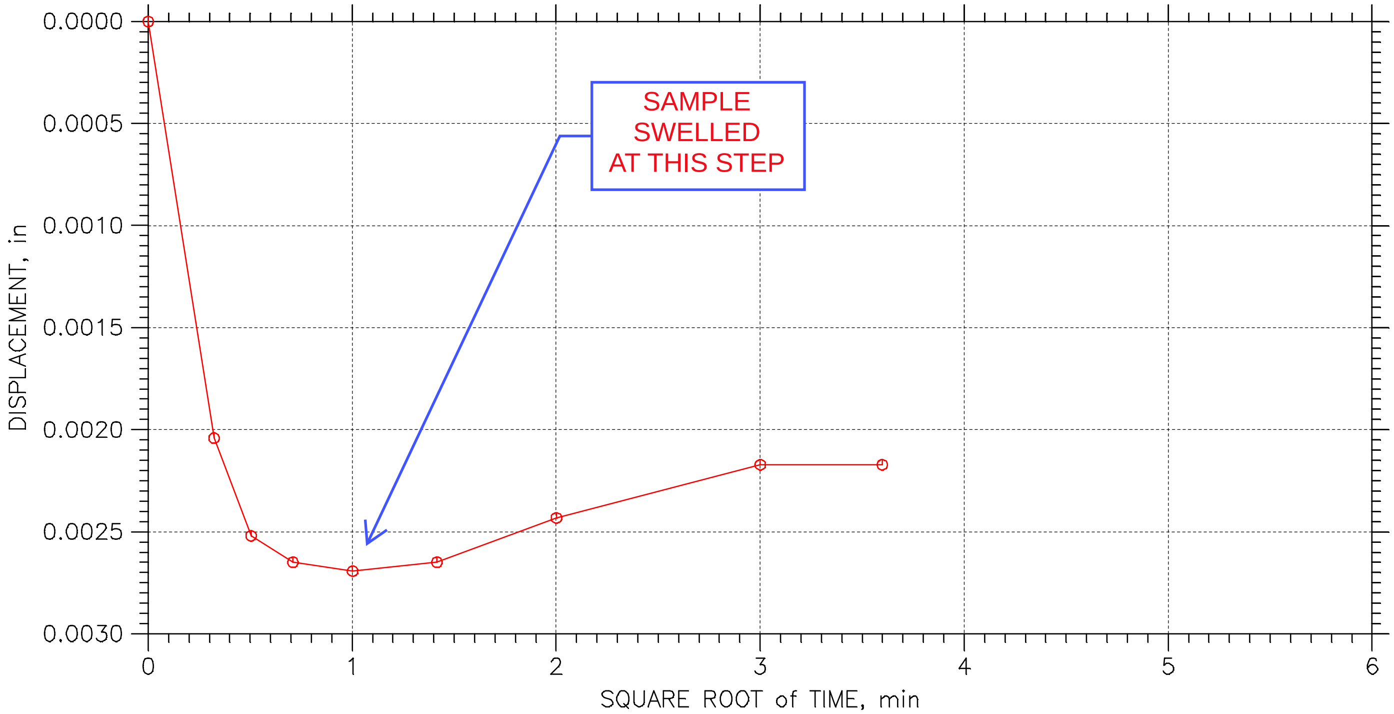
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

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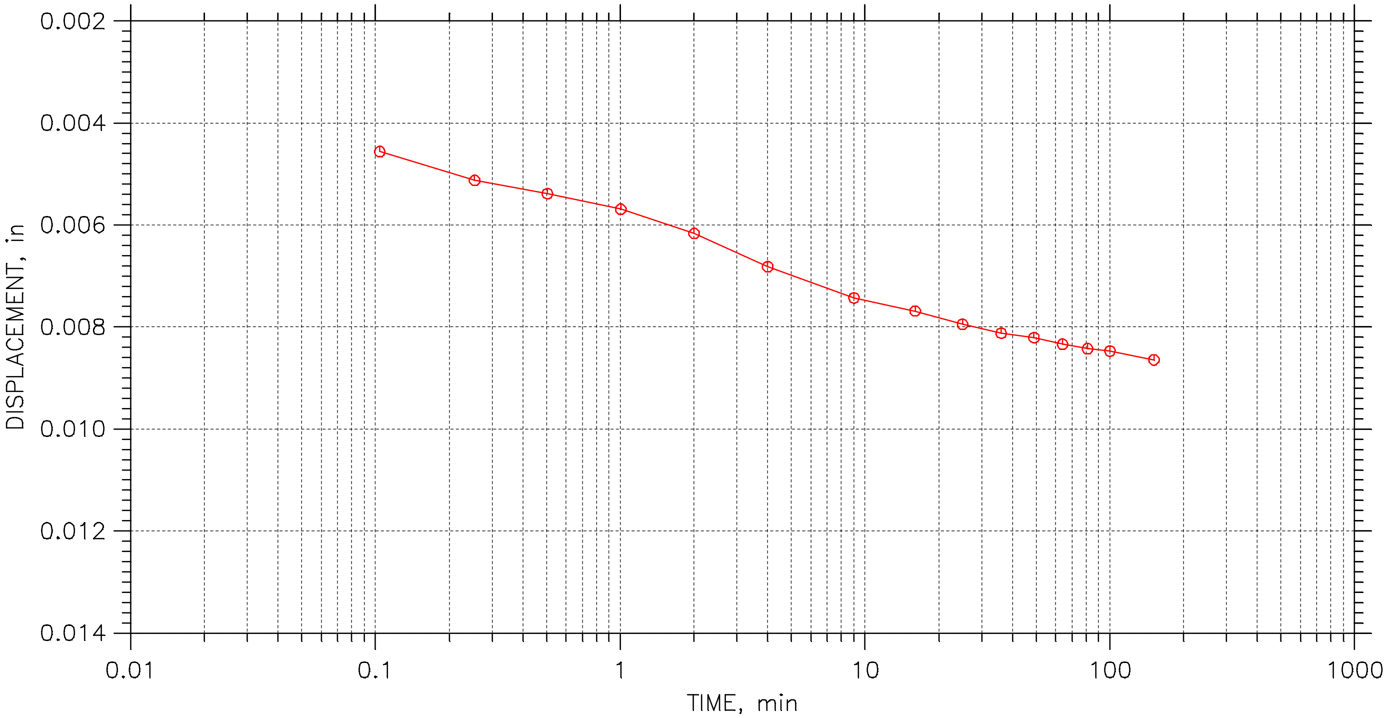
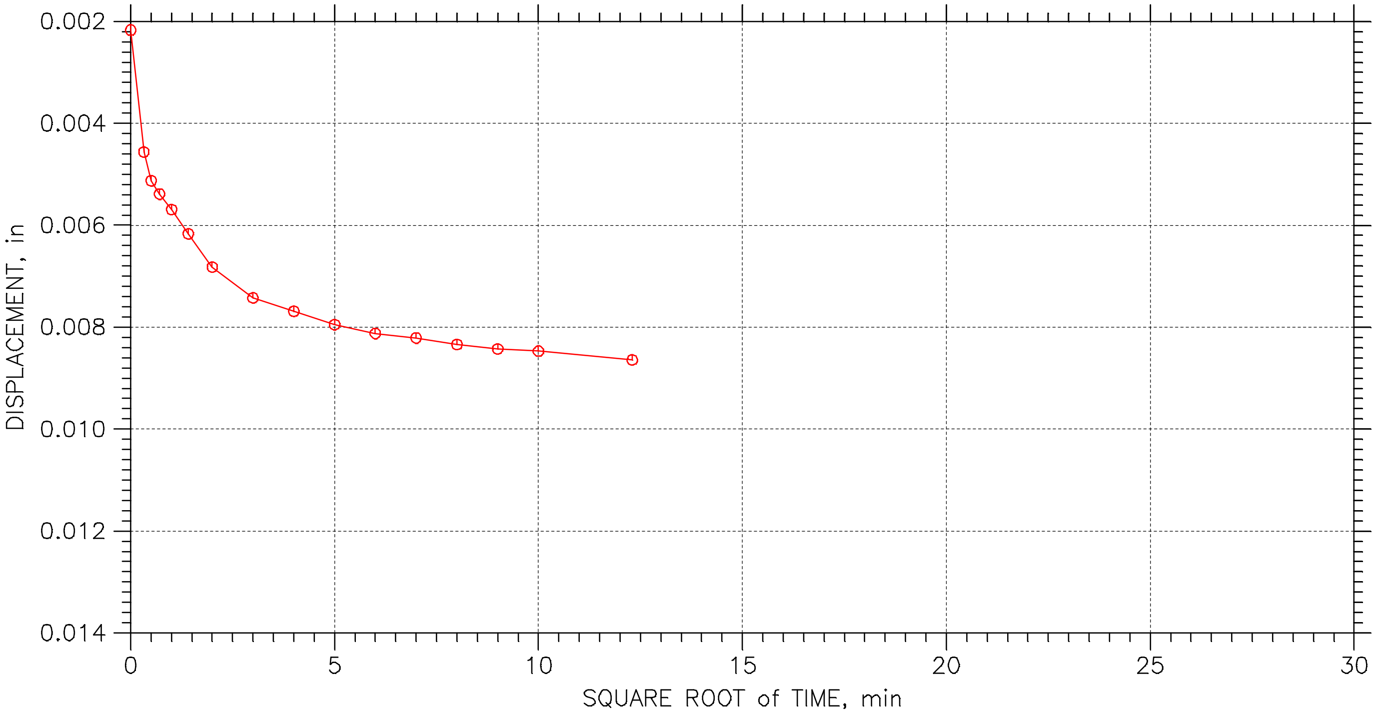
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

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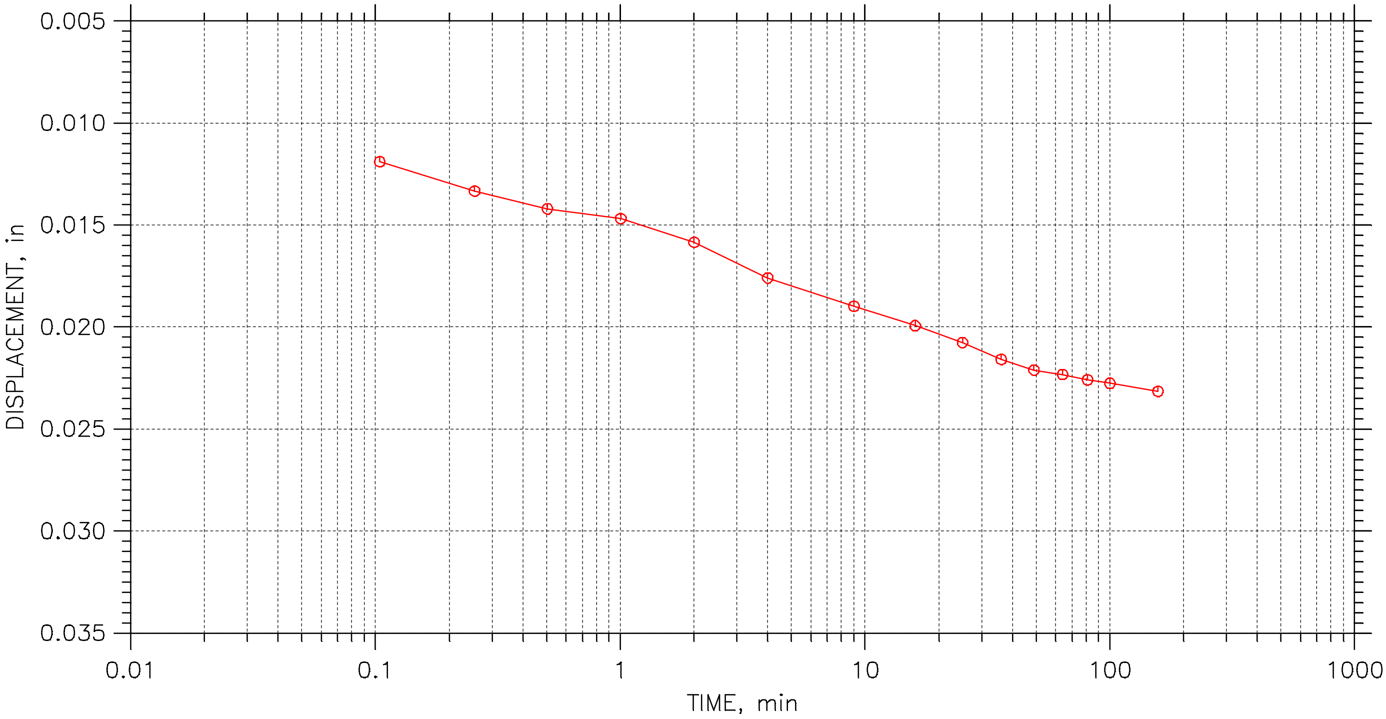
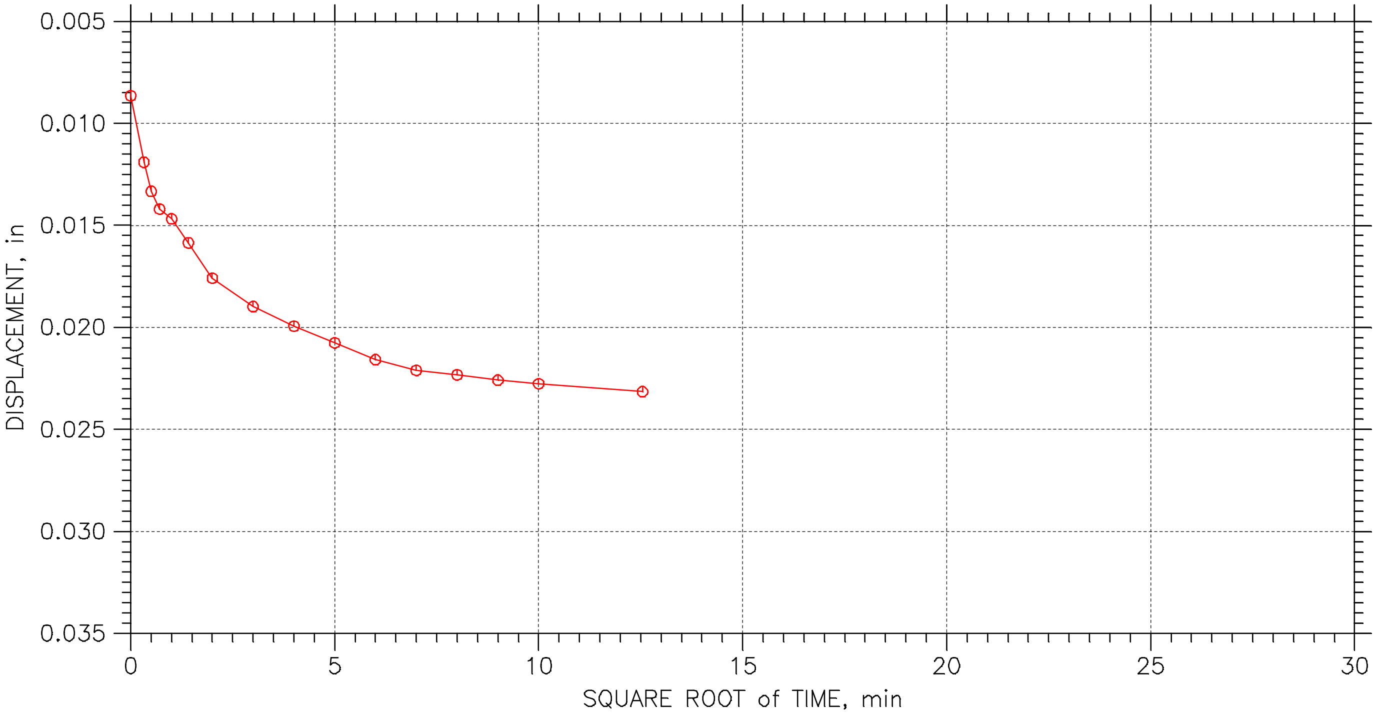
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

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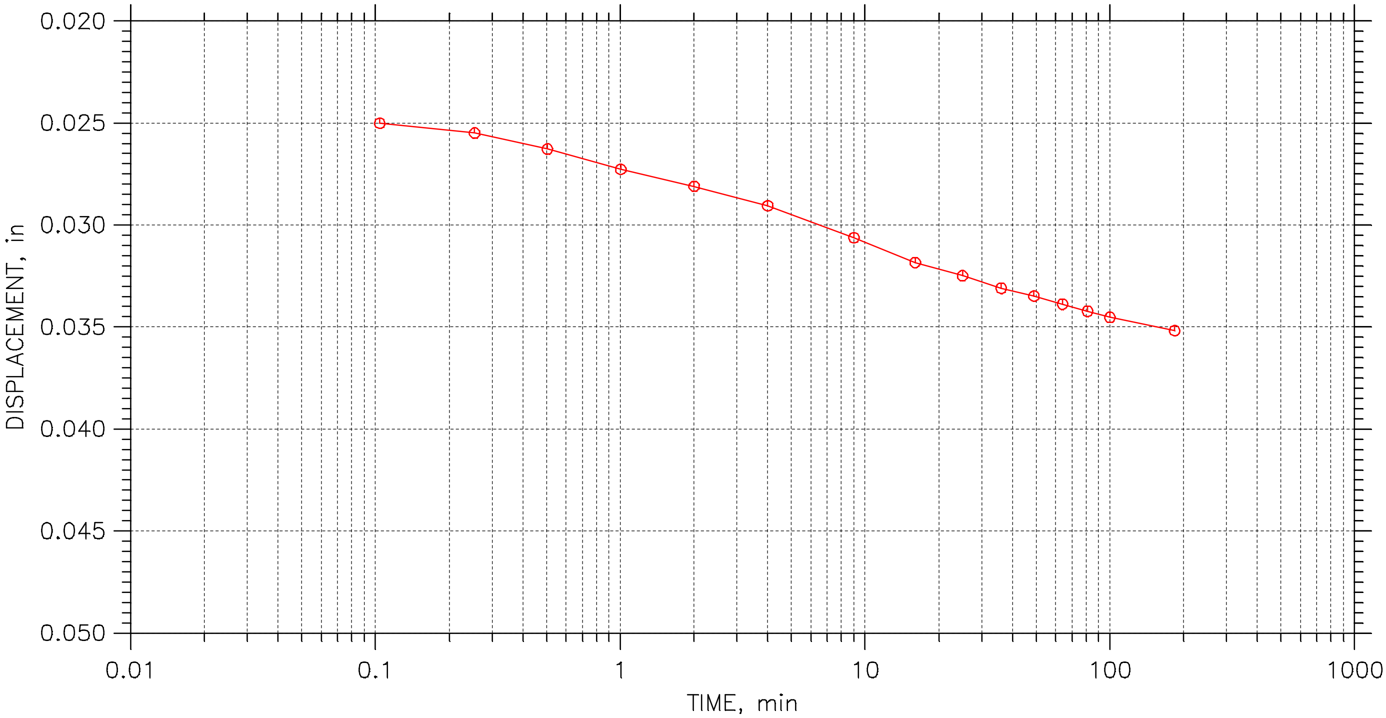
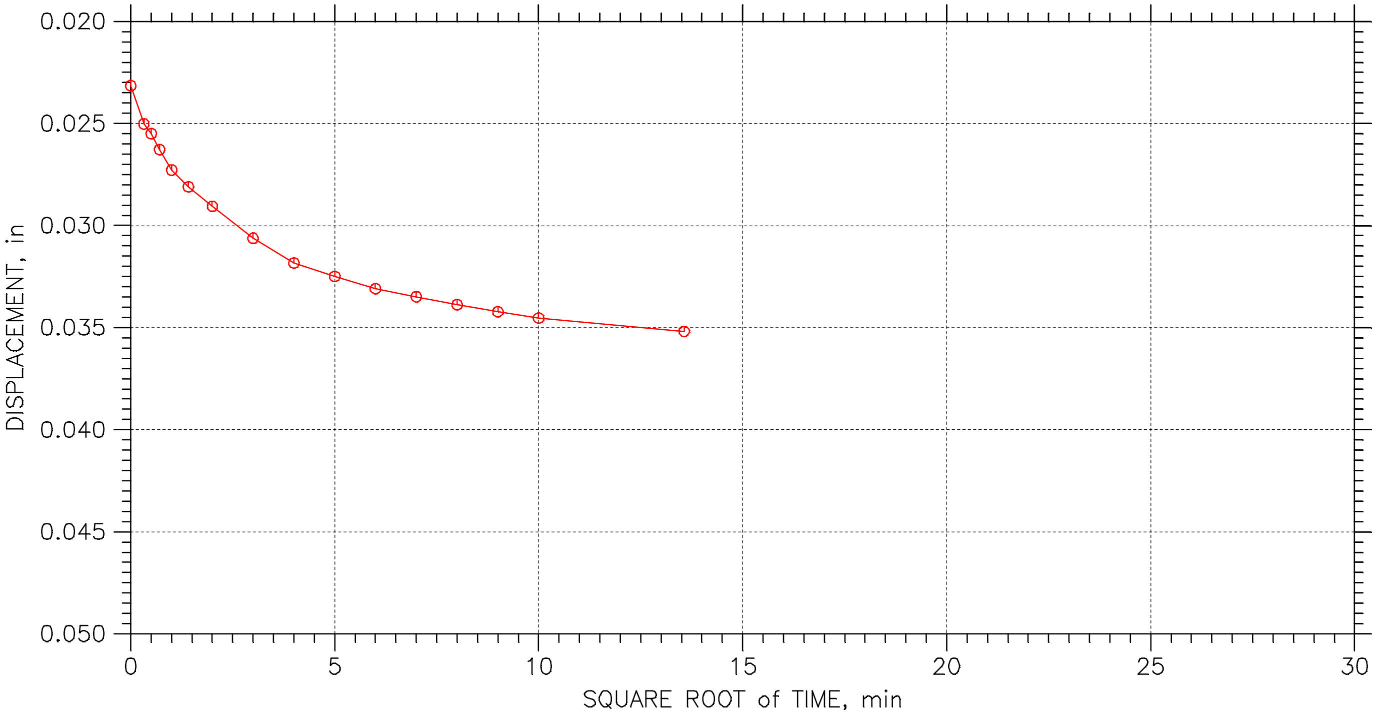
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

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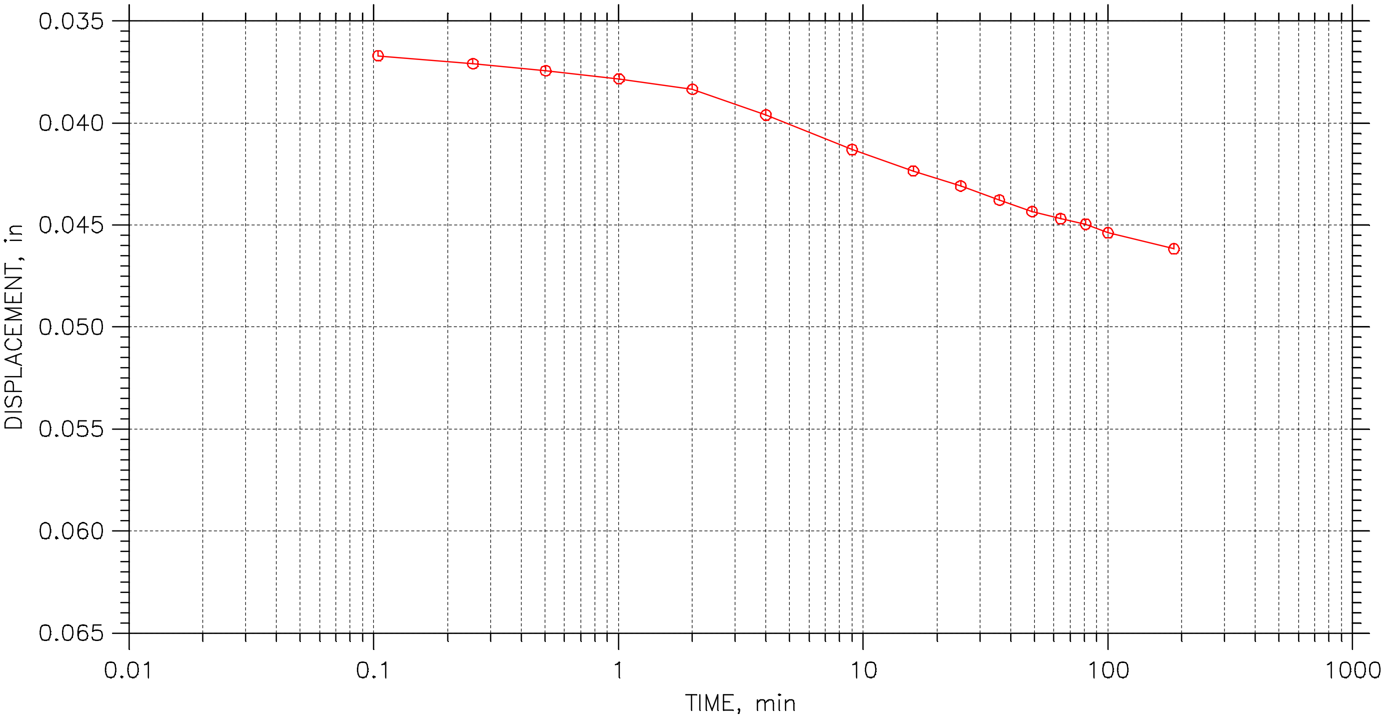
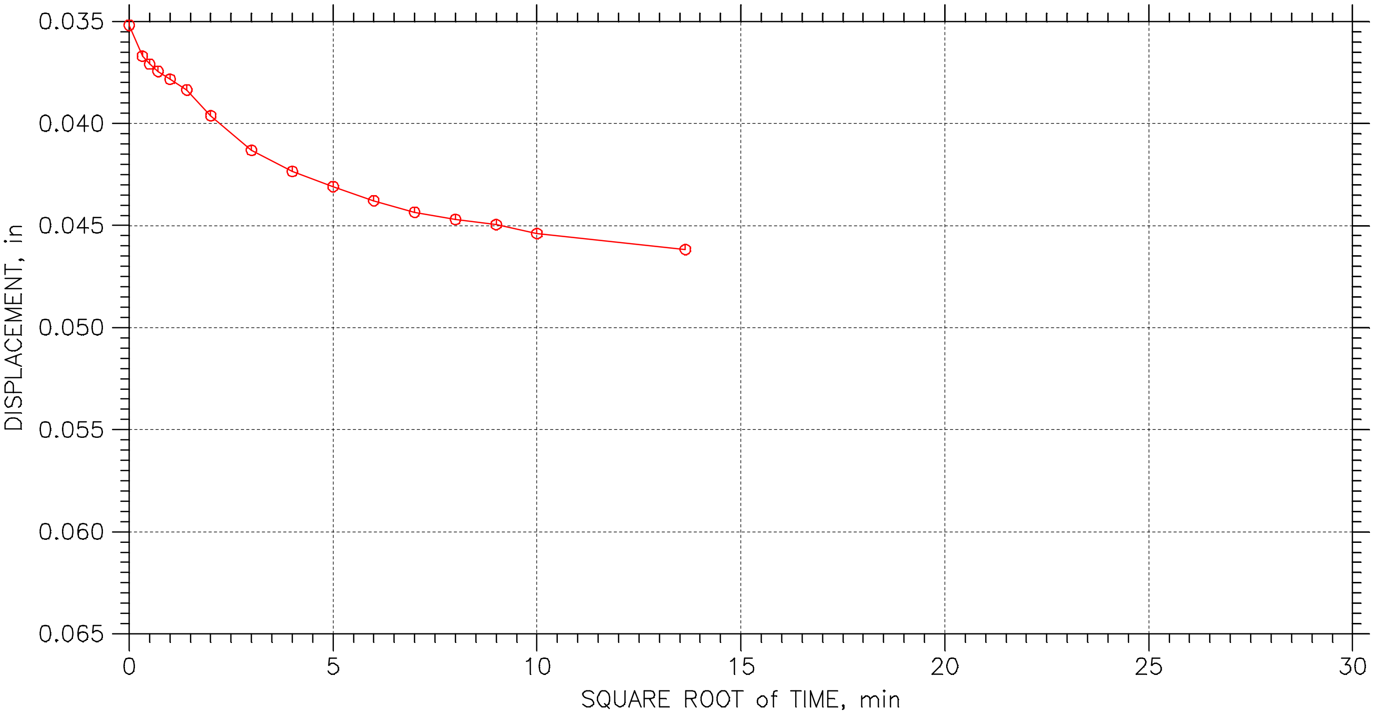
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

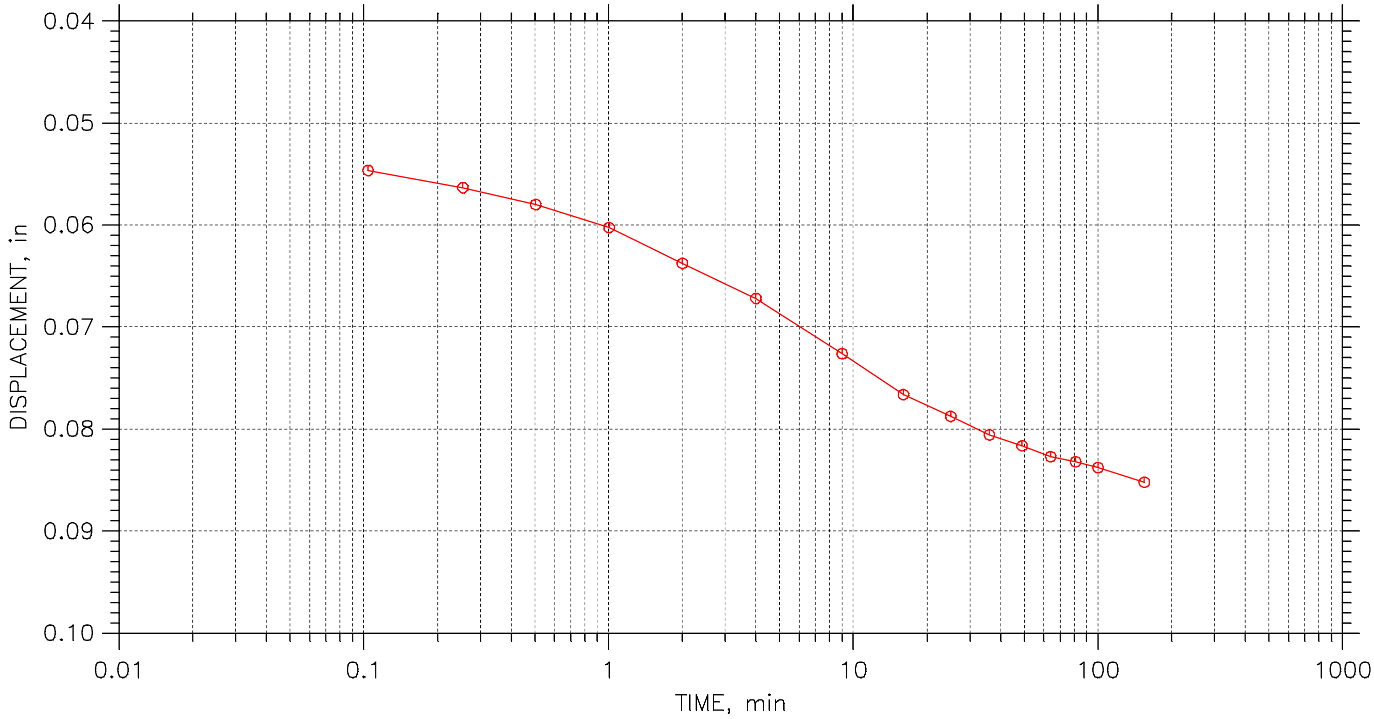
Mon, 16-NOV-2015 17:10:54

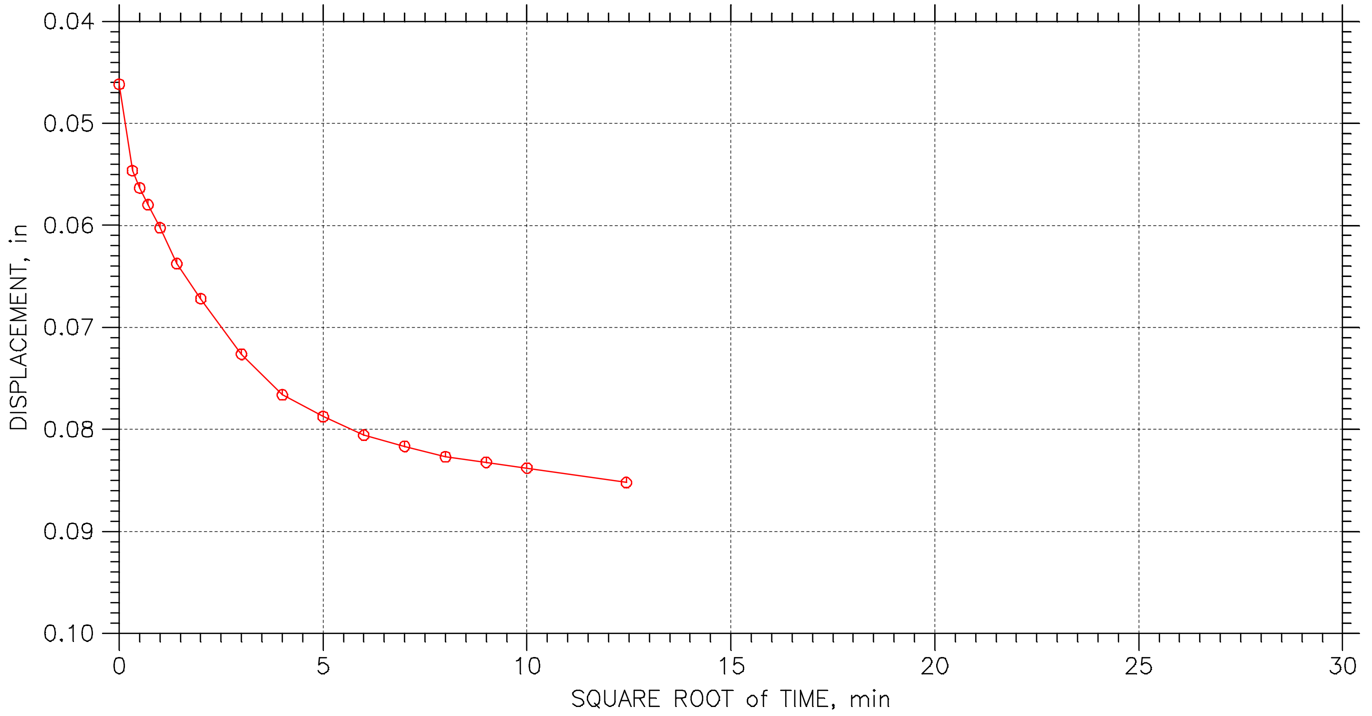
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

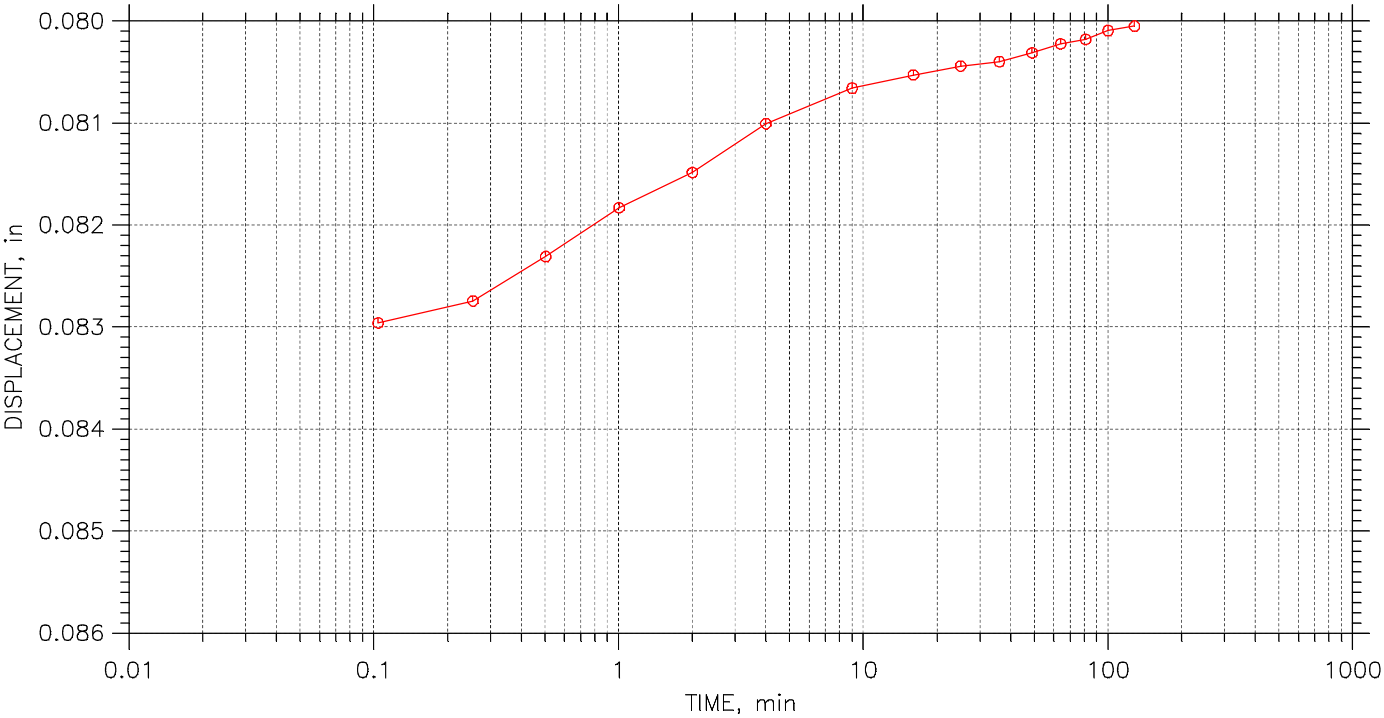
Mon, 16-NOV-2015 17:10:56

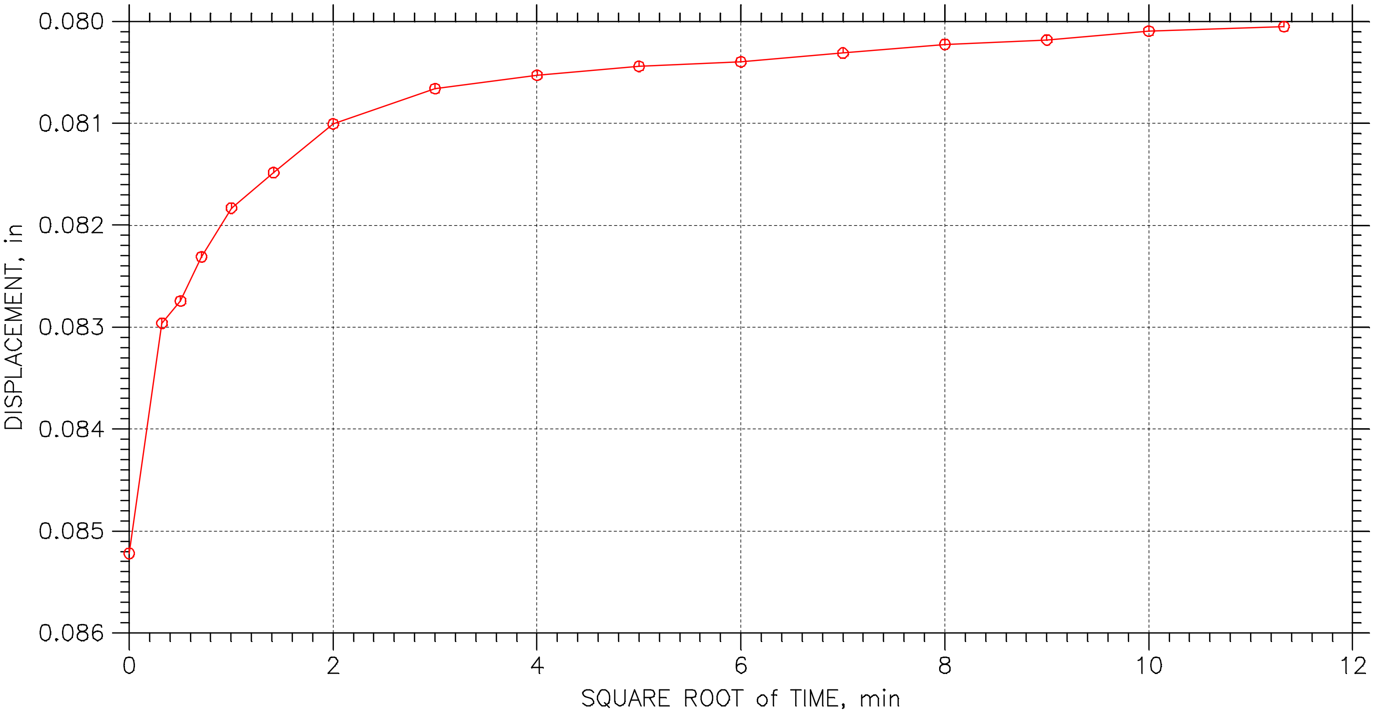
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

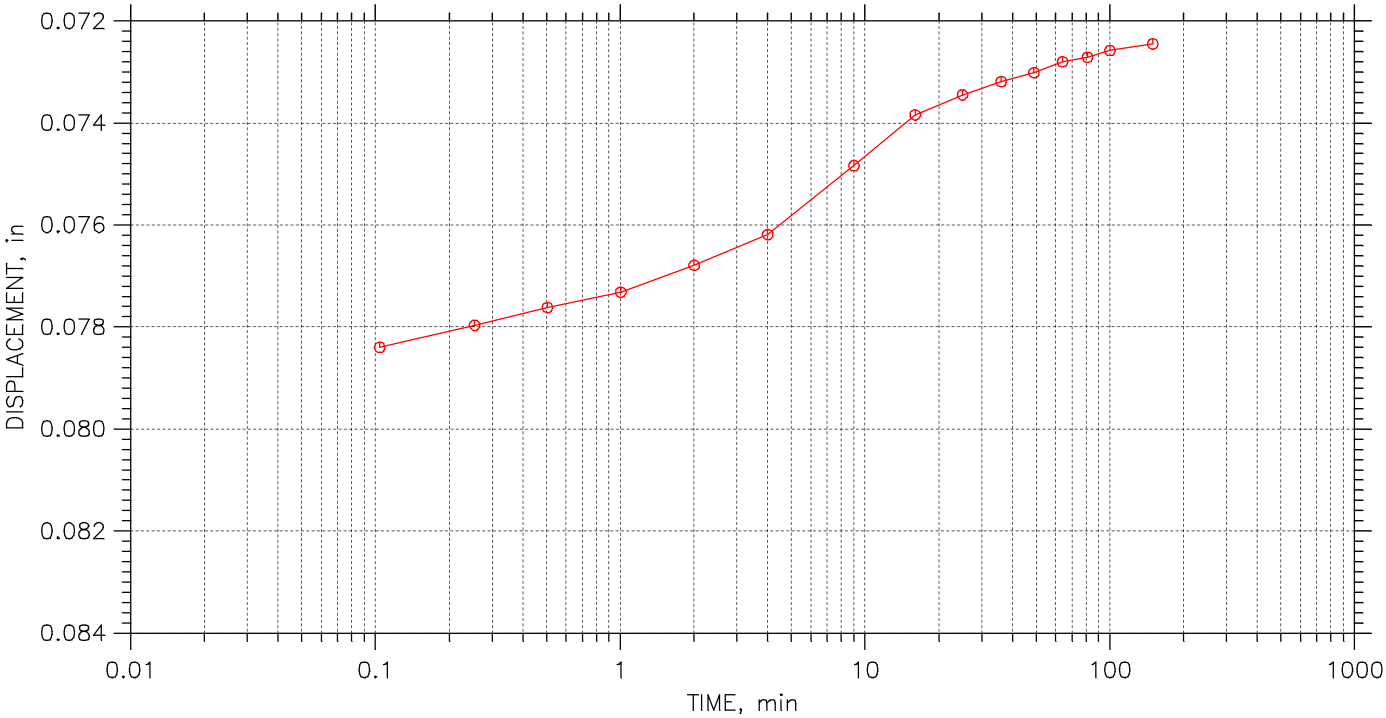
Mon, 16-NOV-2015 17:10:57

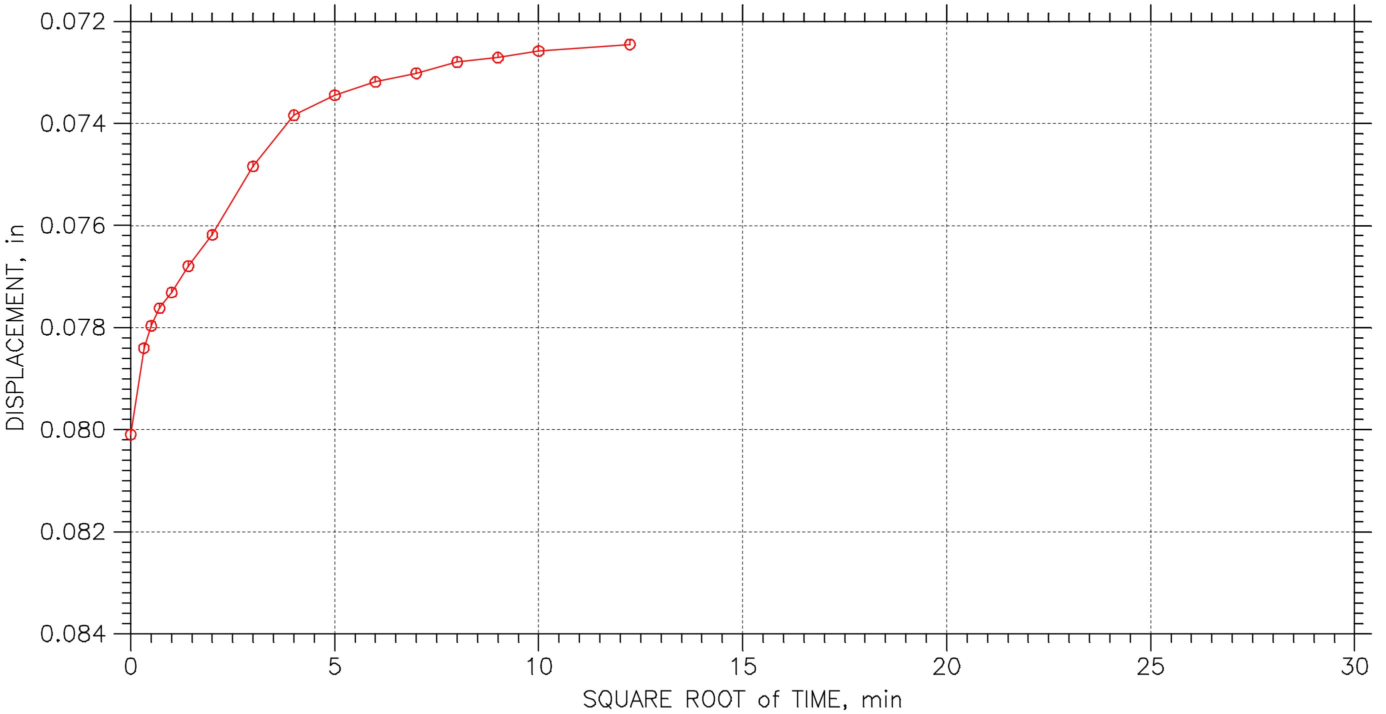
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

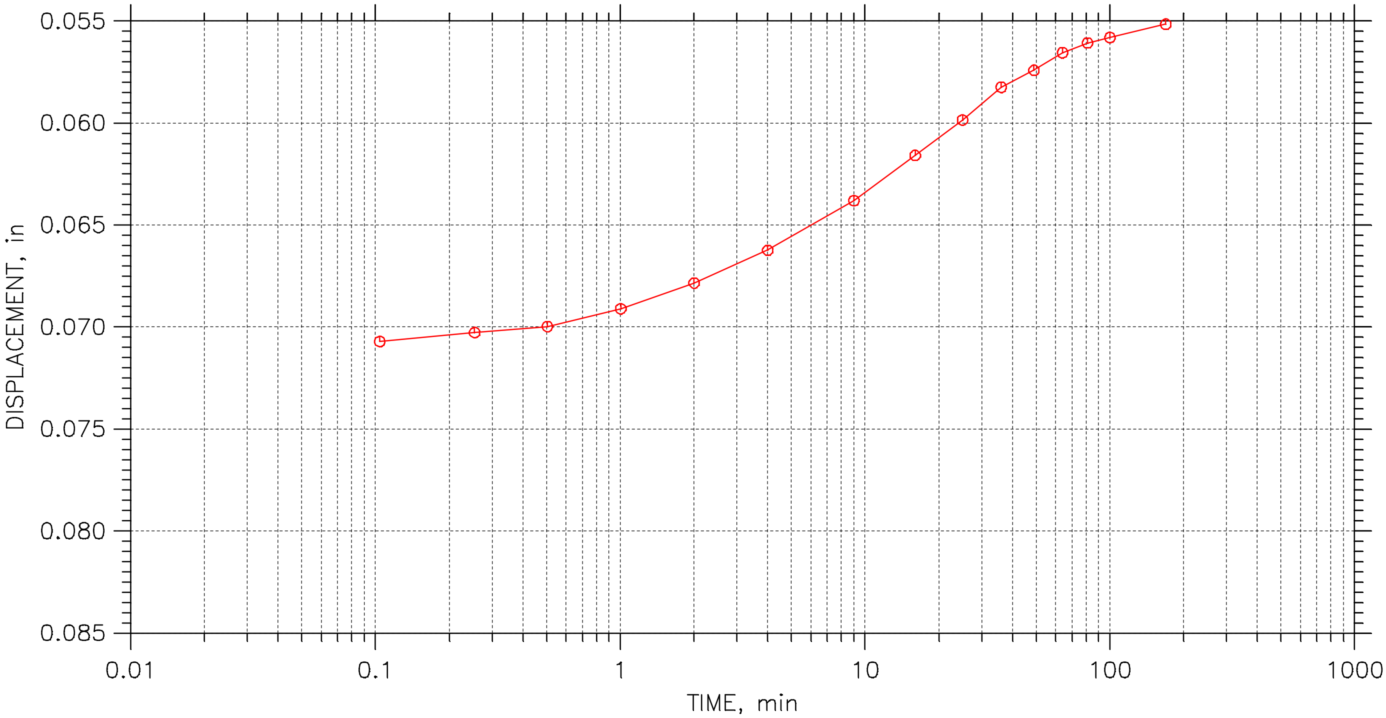
Mon, 16-NOV-2015 17:10:59

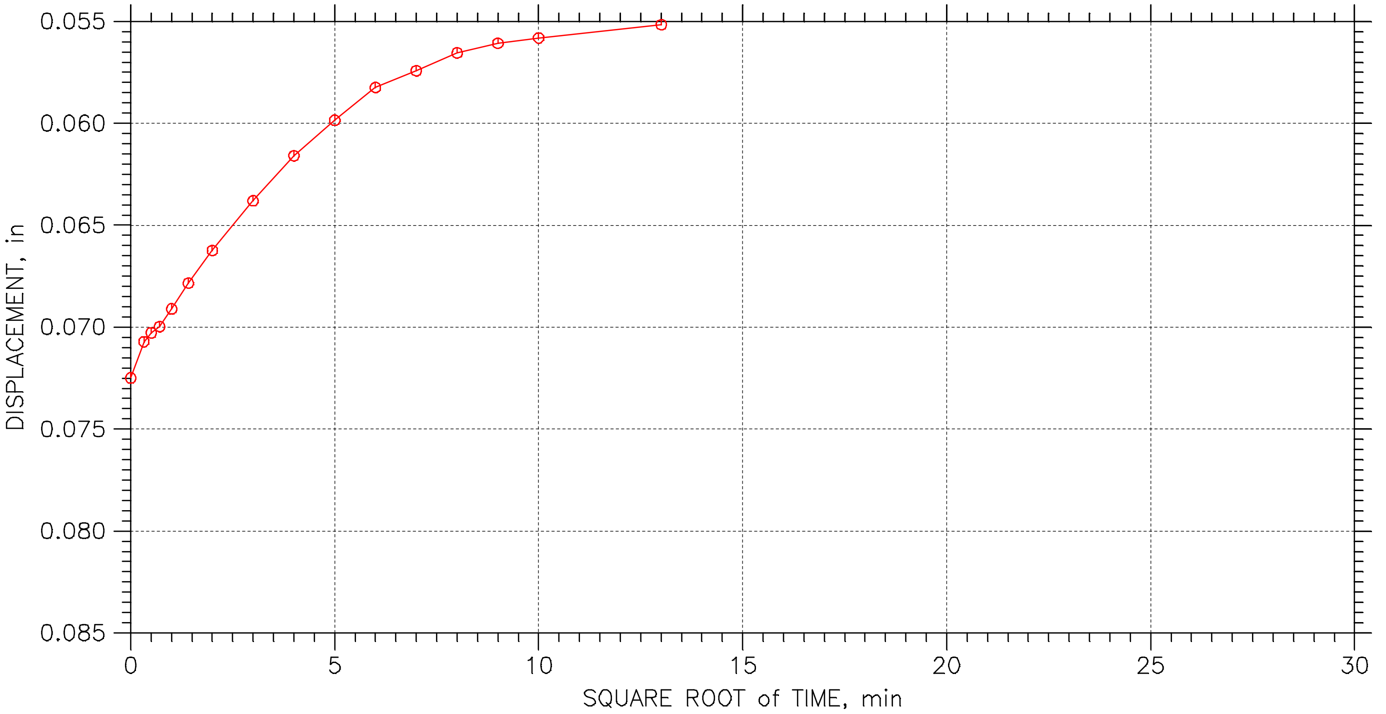
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

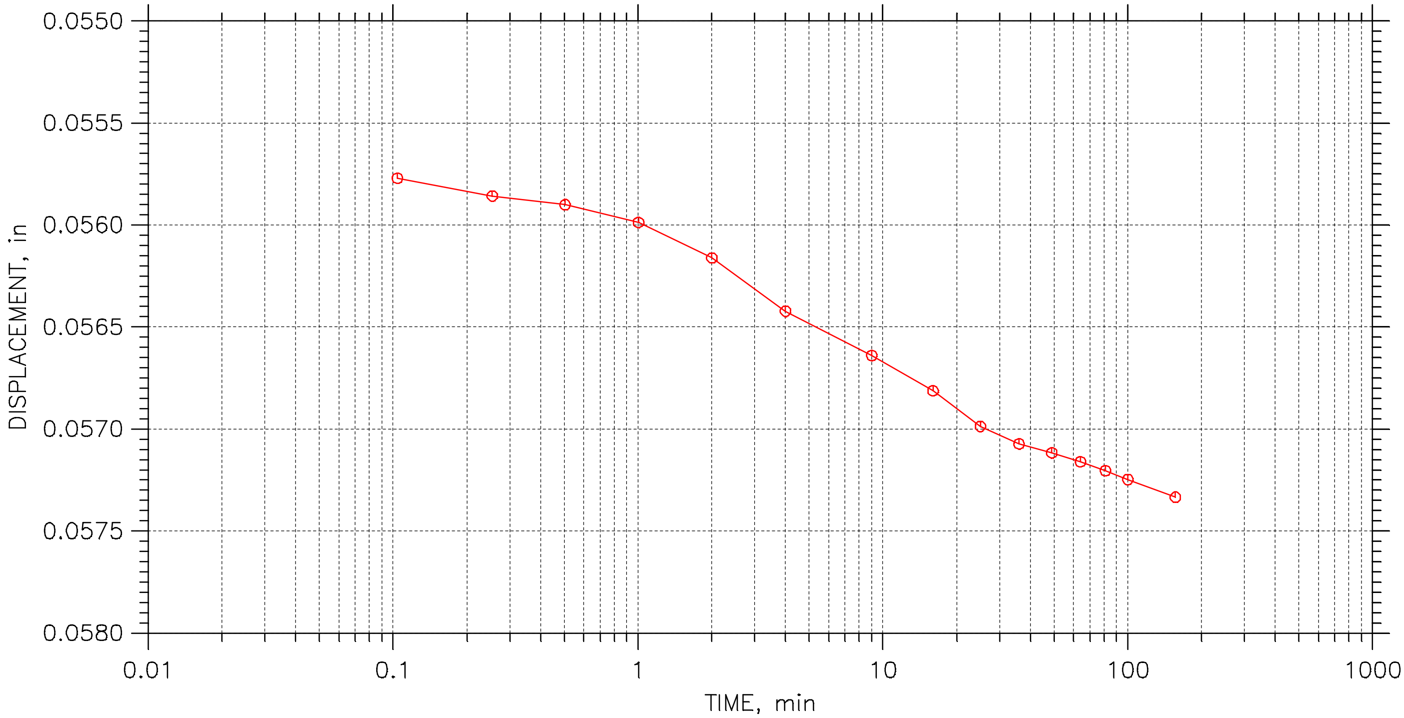
Mon, 16-NOV-2015 17:11:00

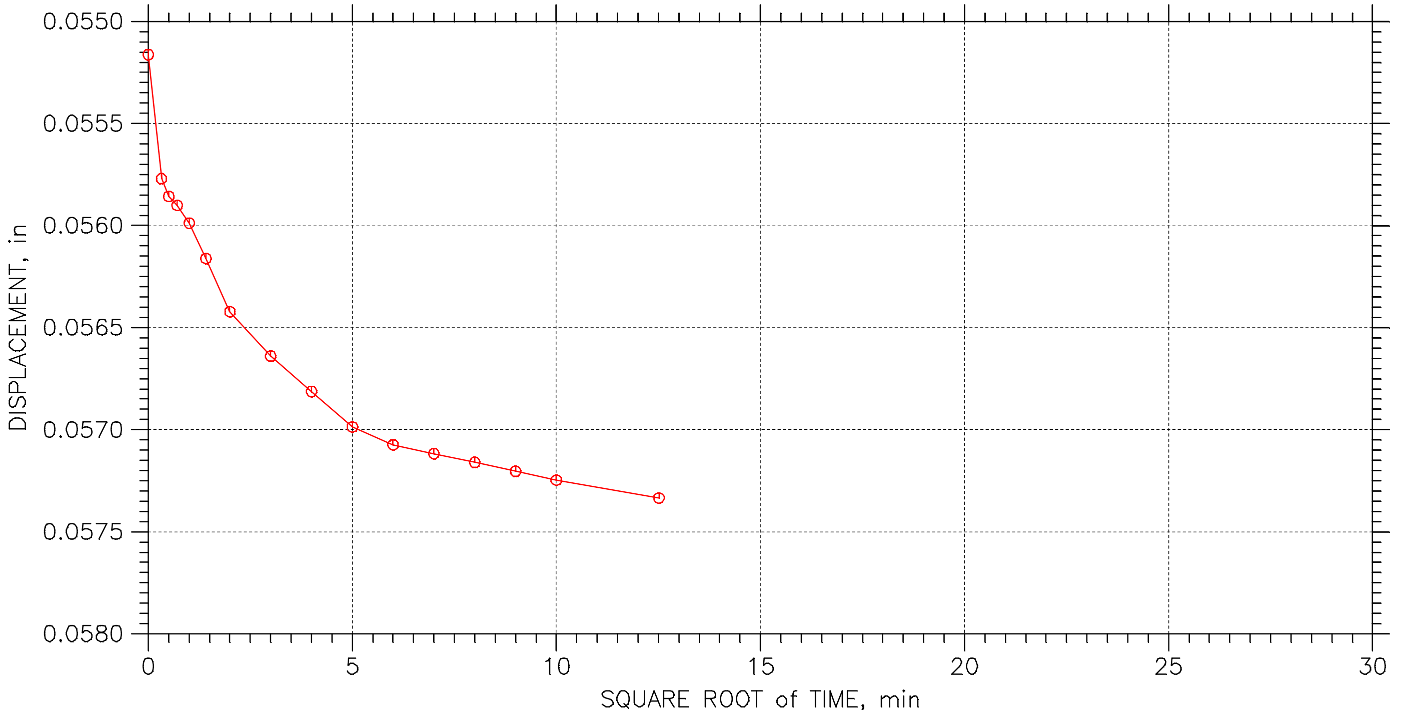
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

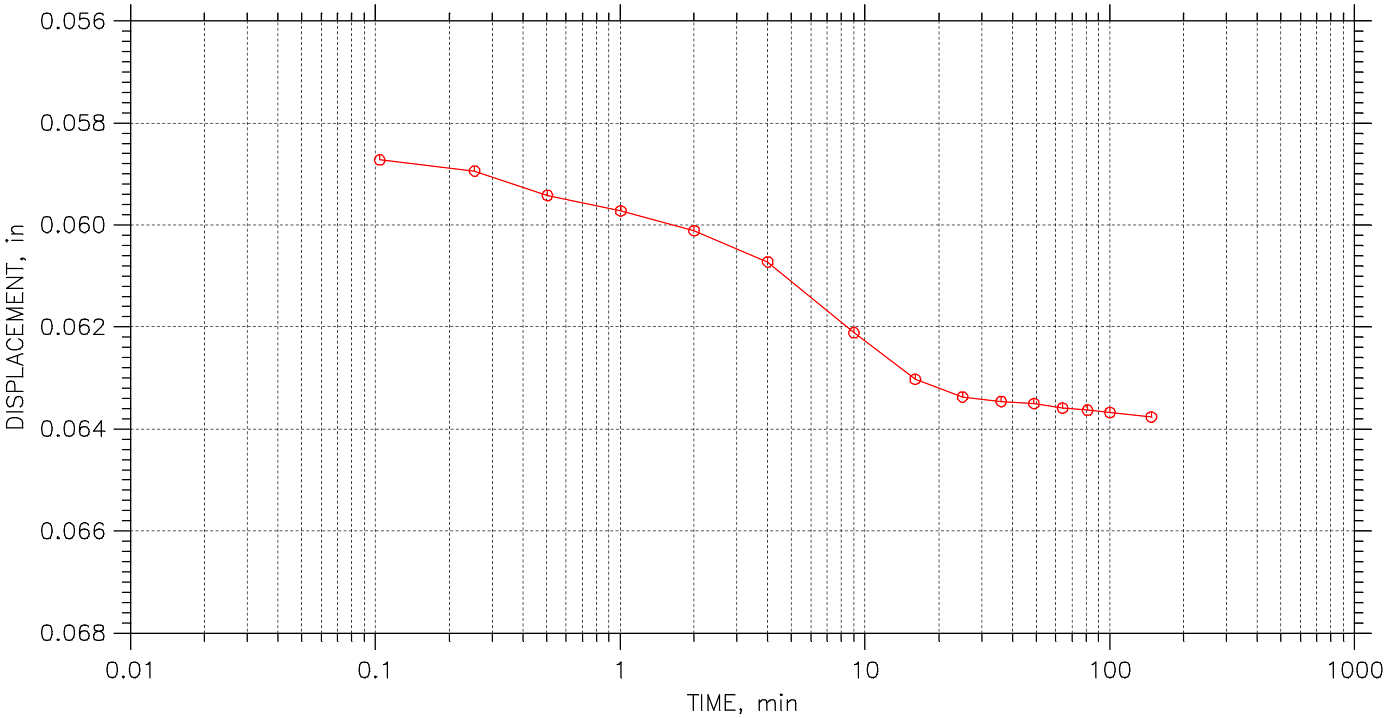
Mon, 16-NOV-2015 17:11:01

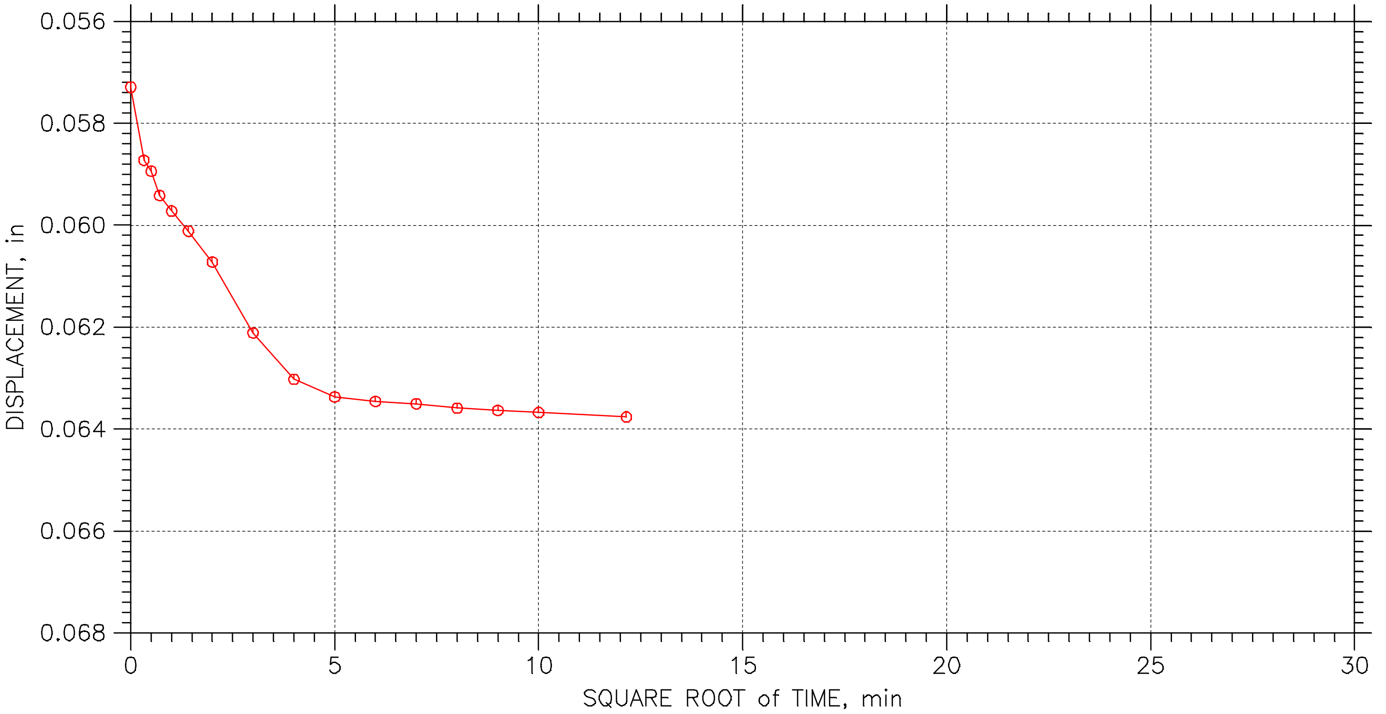
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

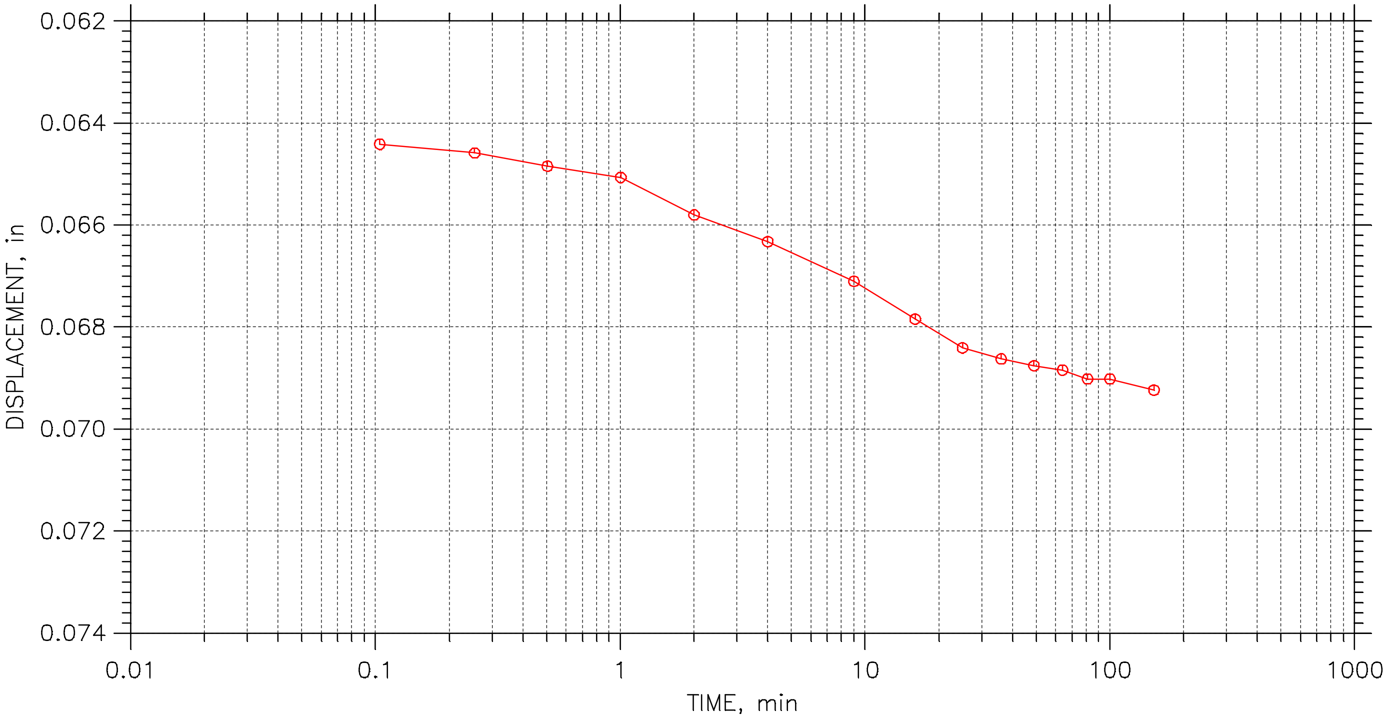
Mon, 16-NOV-2015 17:11:03

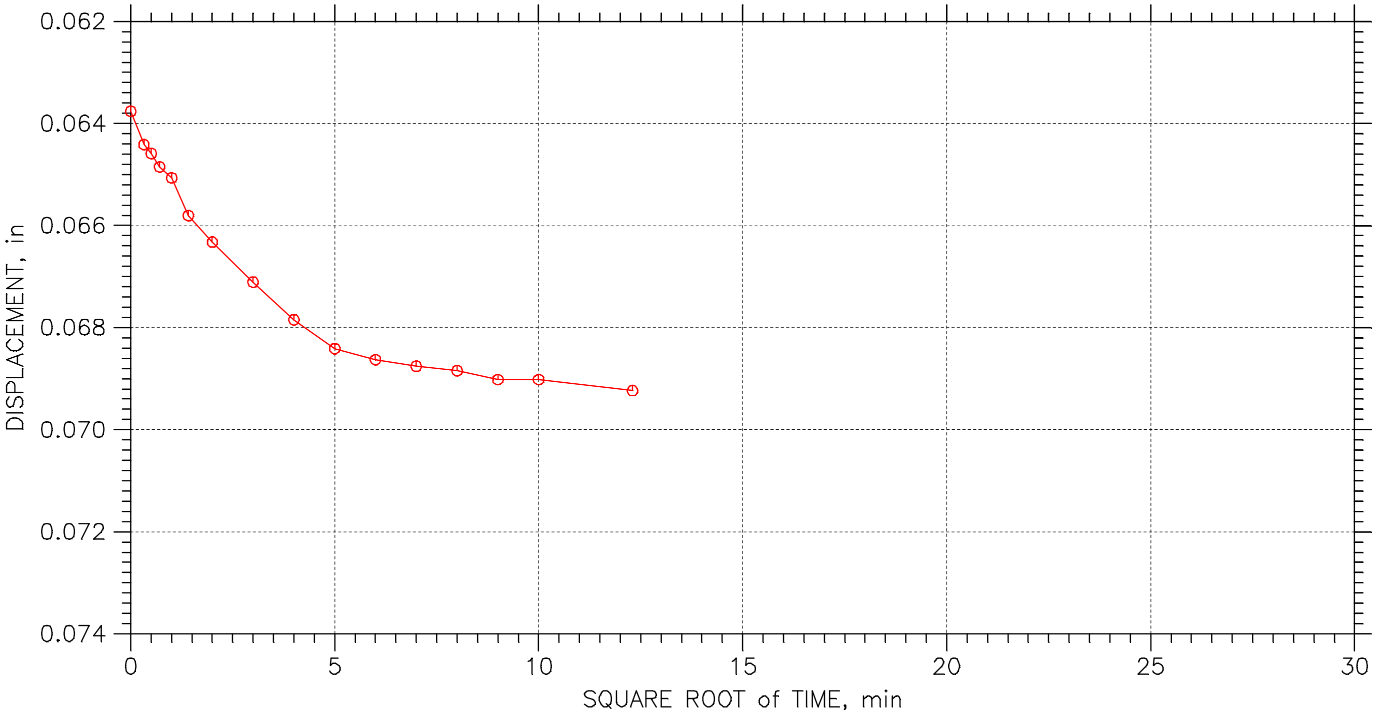
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf





Terracon Consulting Engineers & Scientists			
	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

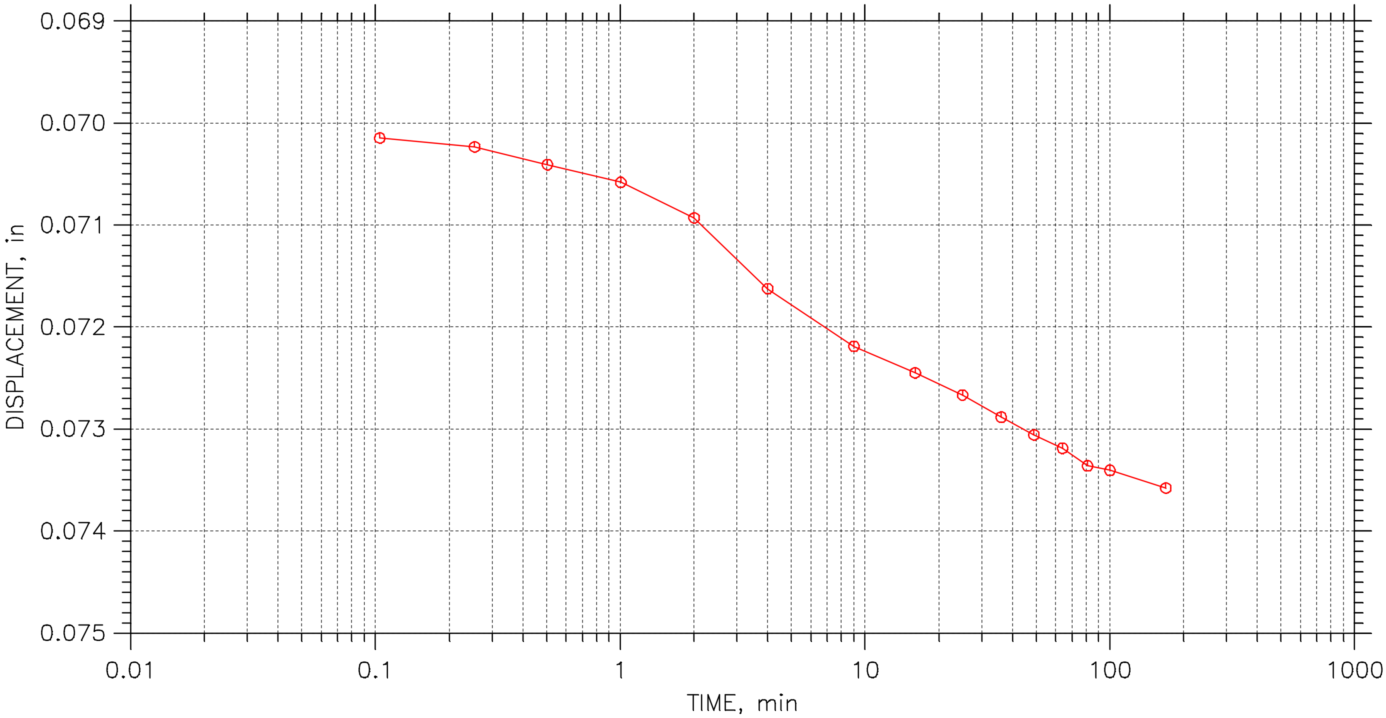
Mon, 16-NOV-2015 17:11:04

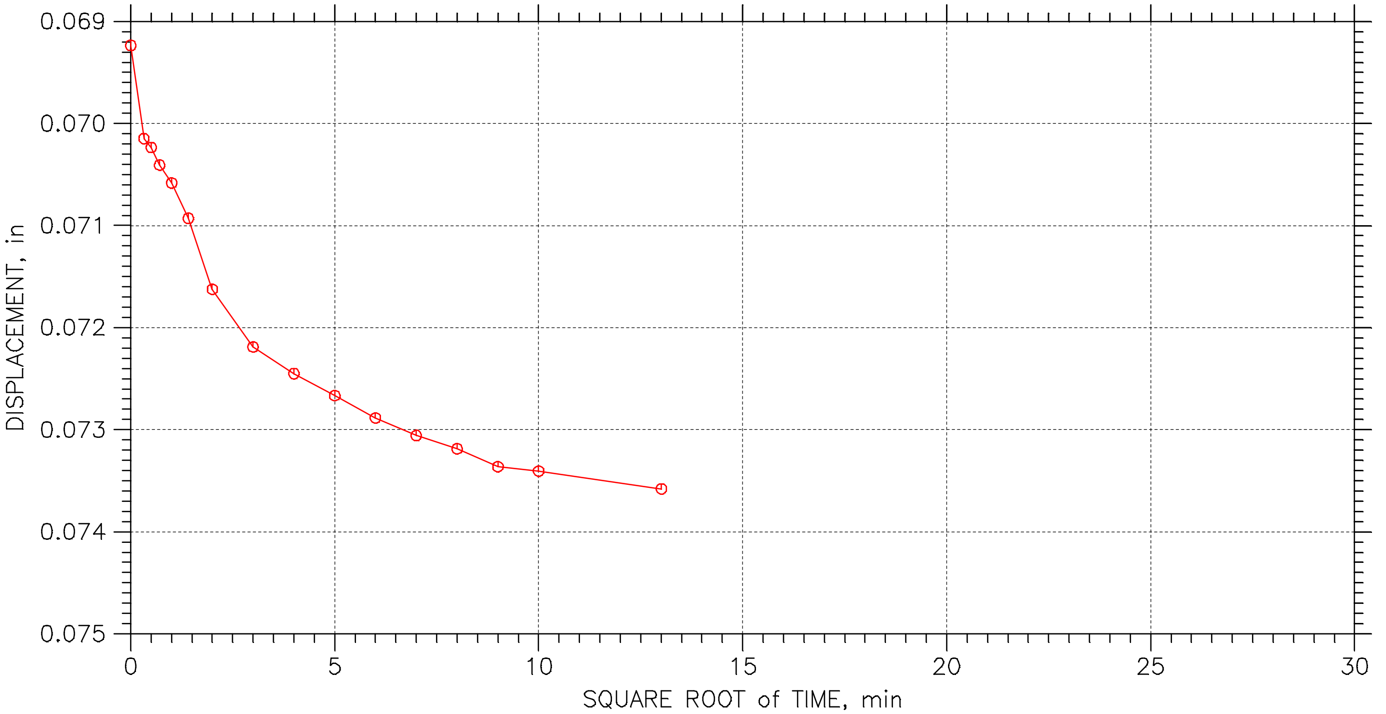
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

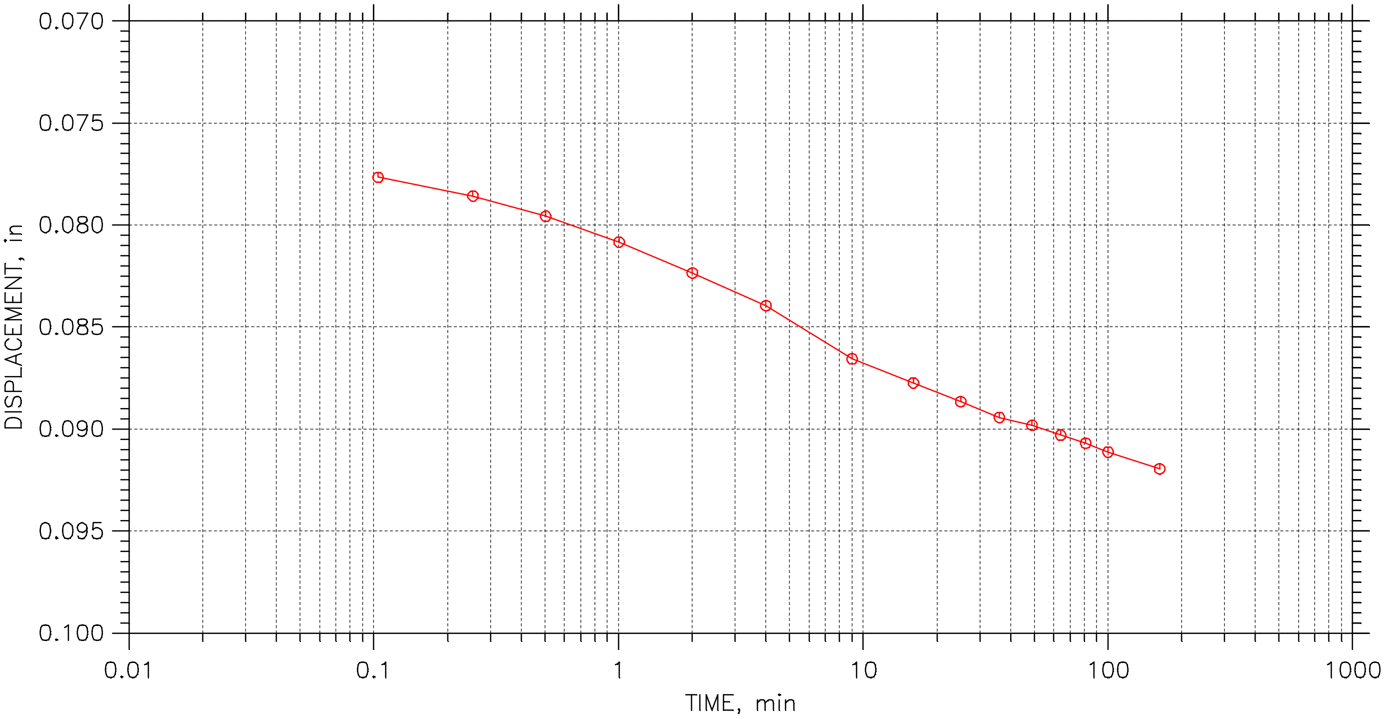
Mon, 16-NOV-2015 17:11:06

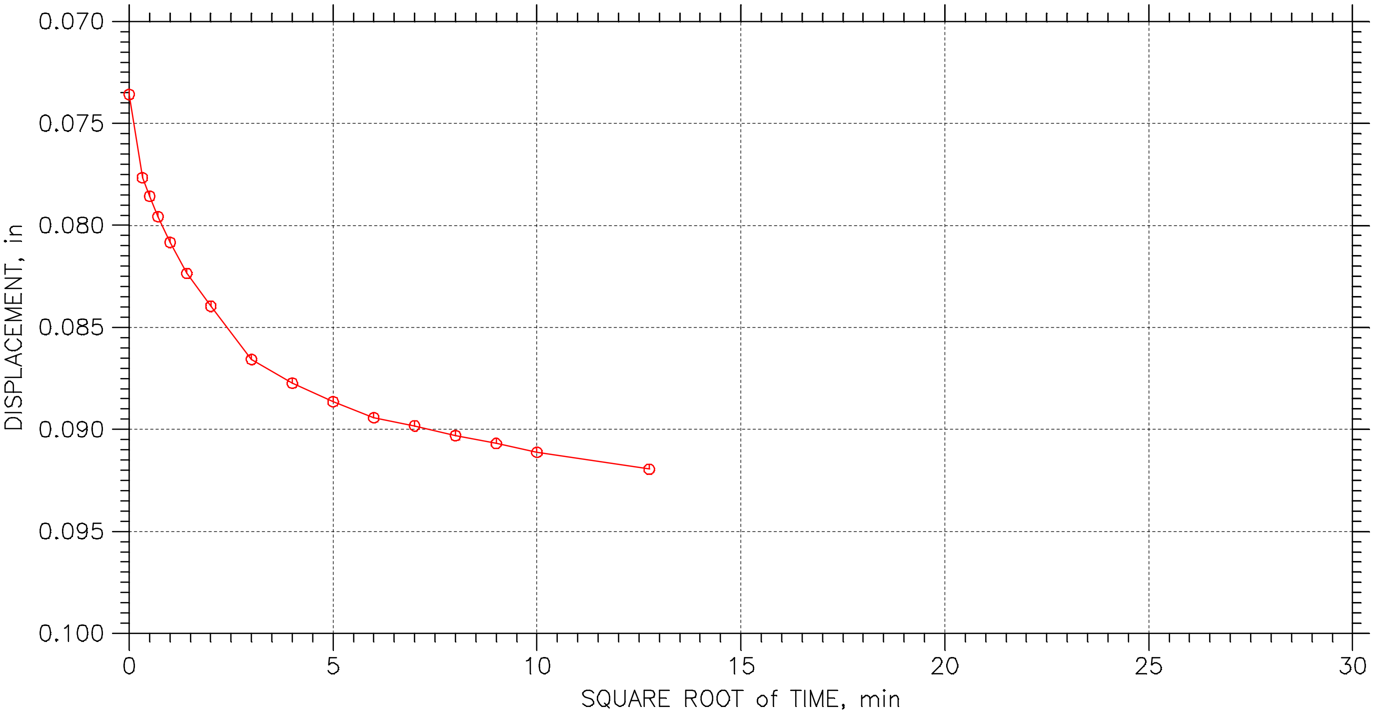
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

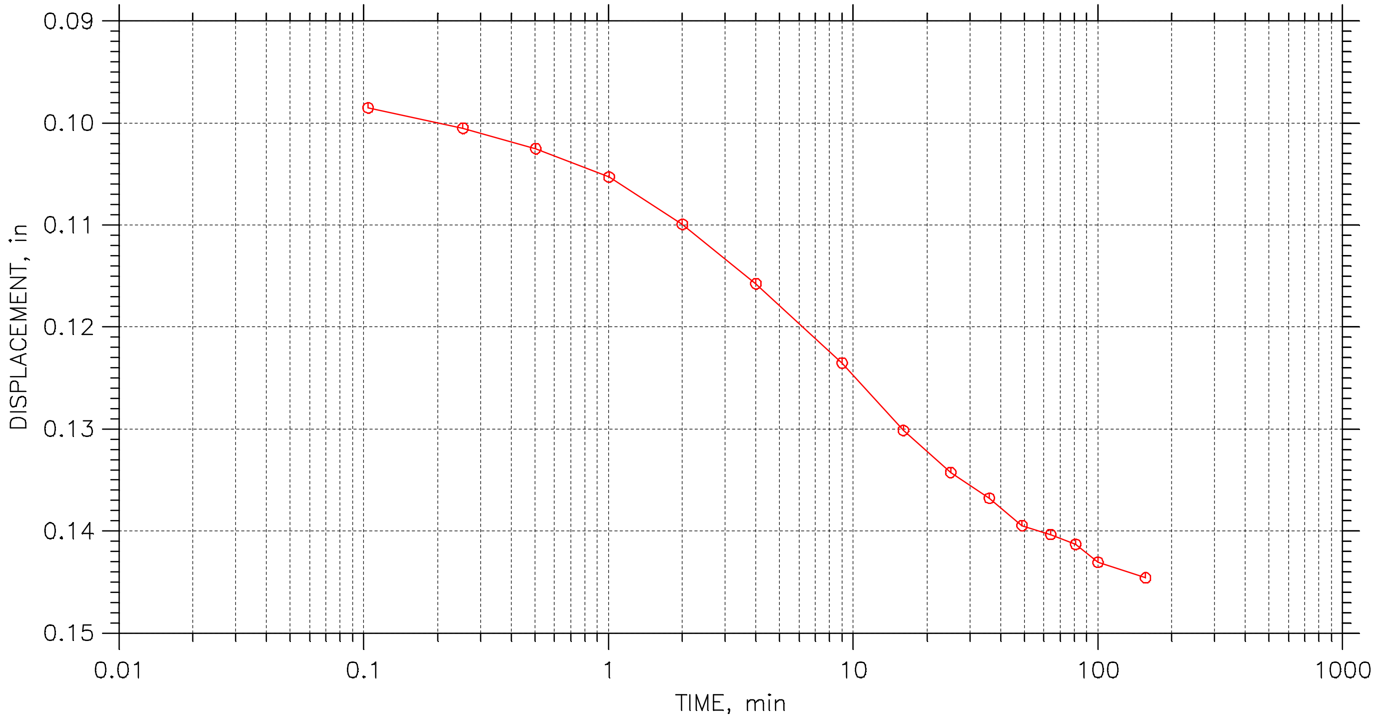
Mon, 16-NOV-2015 17:11:07

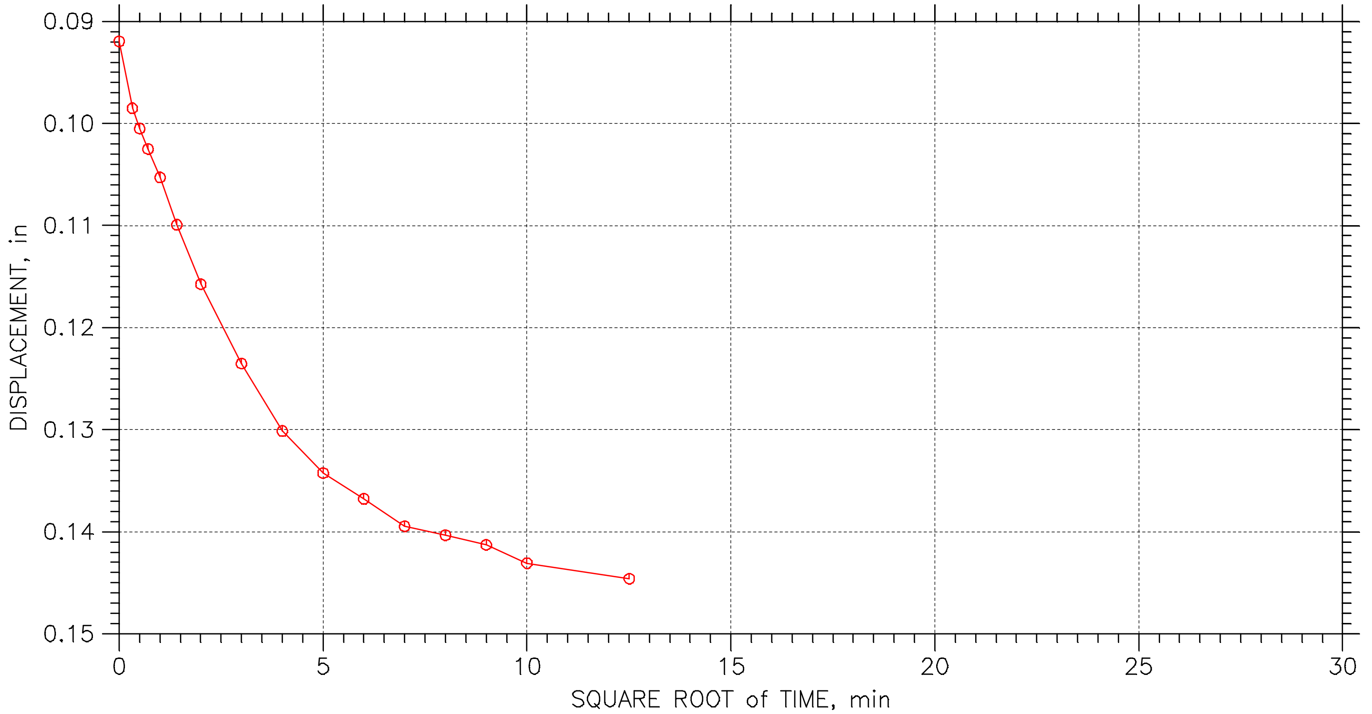
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

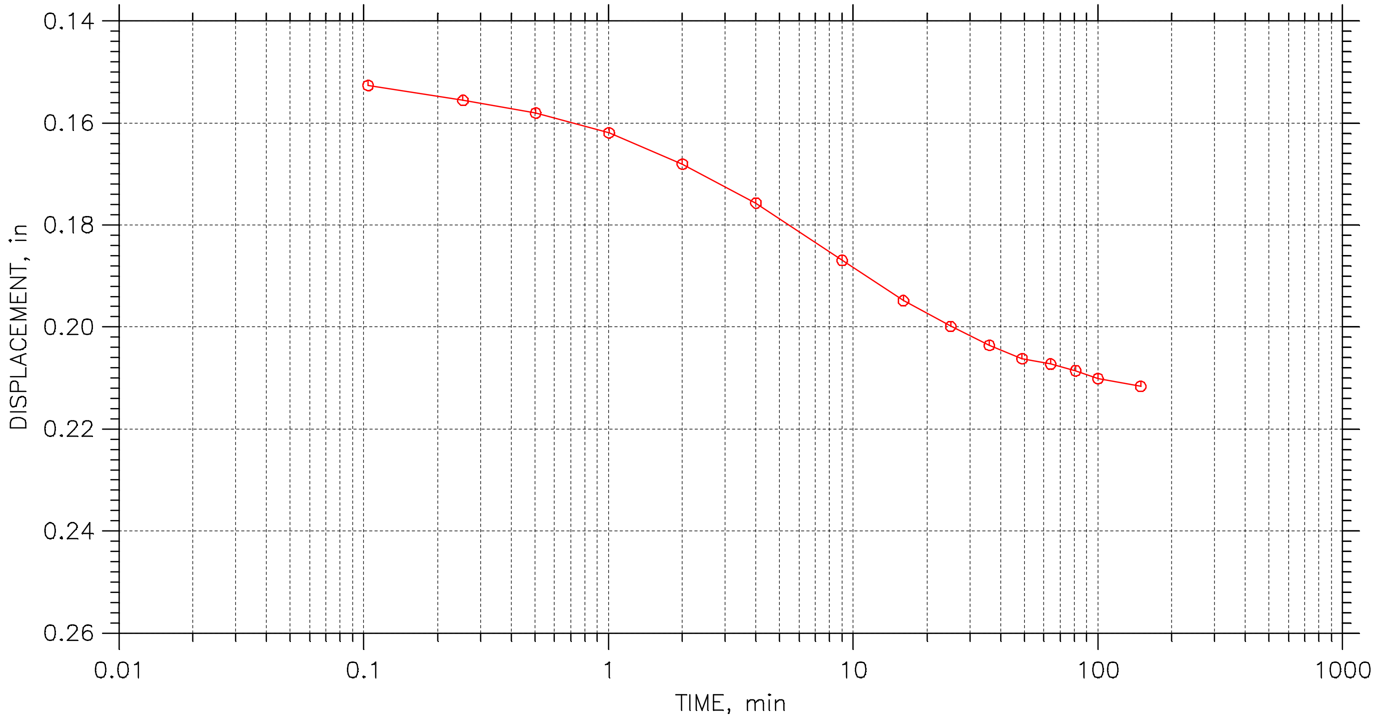
Mon, 16-NOV-2015 17:11:08

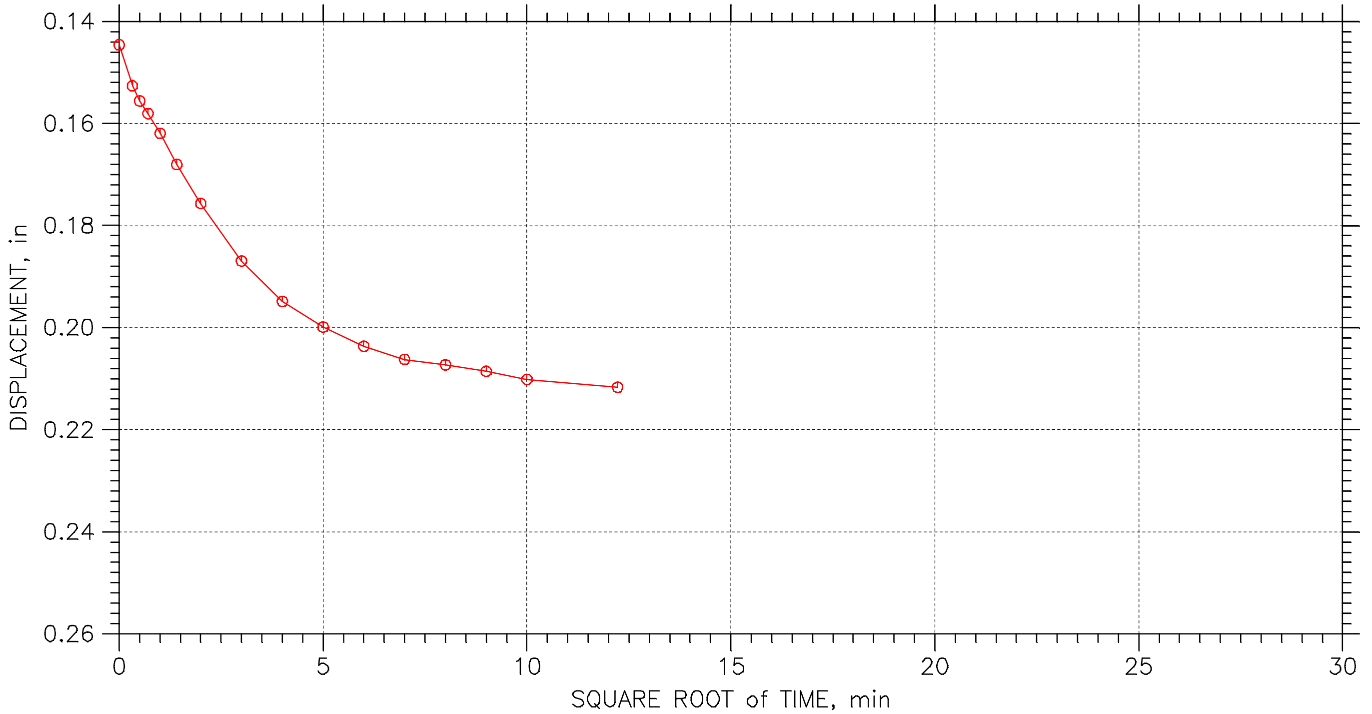
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

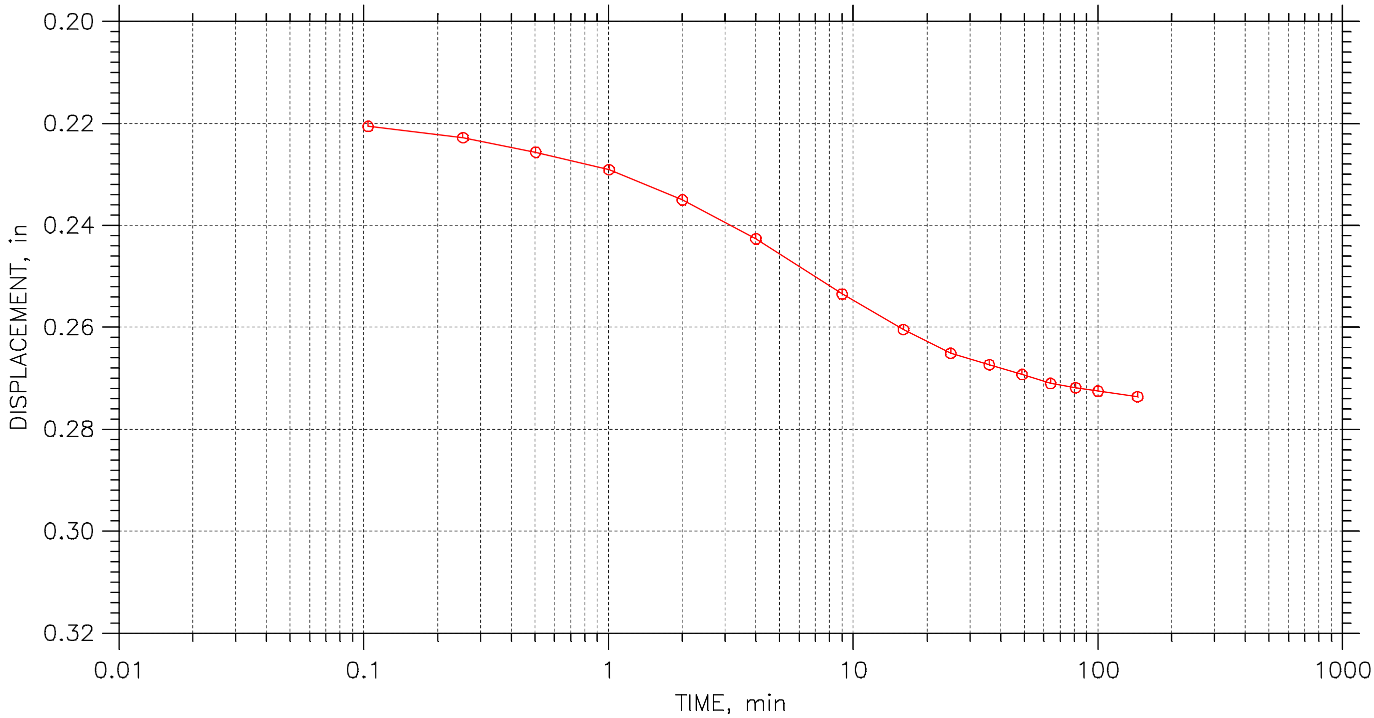
Mon, 16-NOV-2015 17:11:10

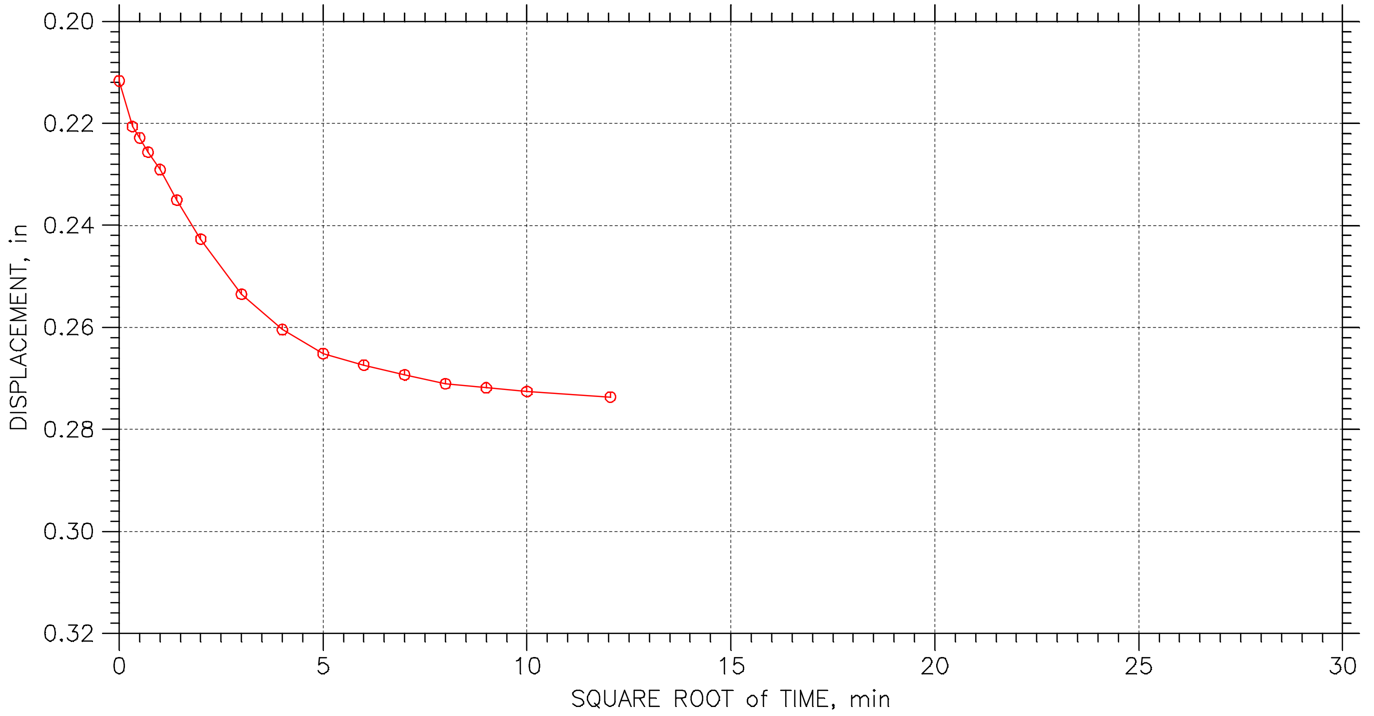
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

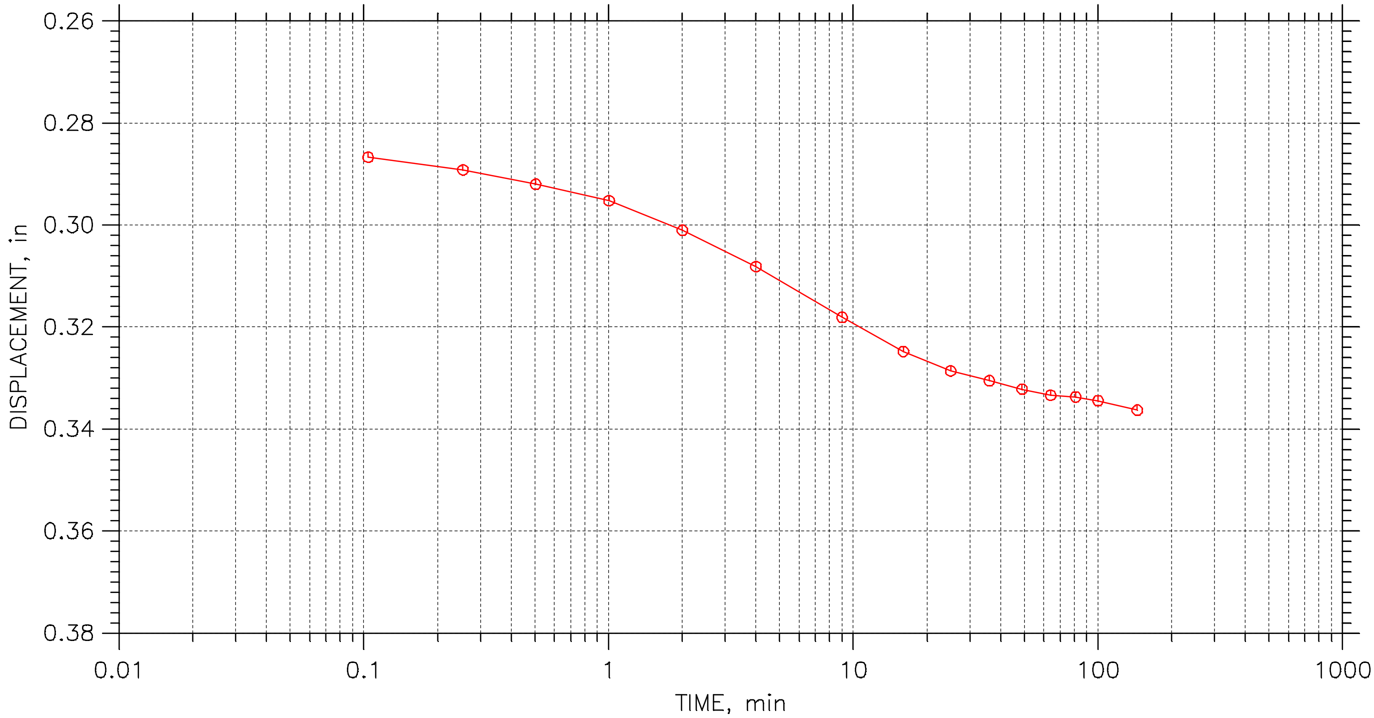
Mon, 16-NOV-2015 17:11:11

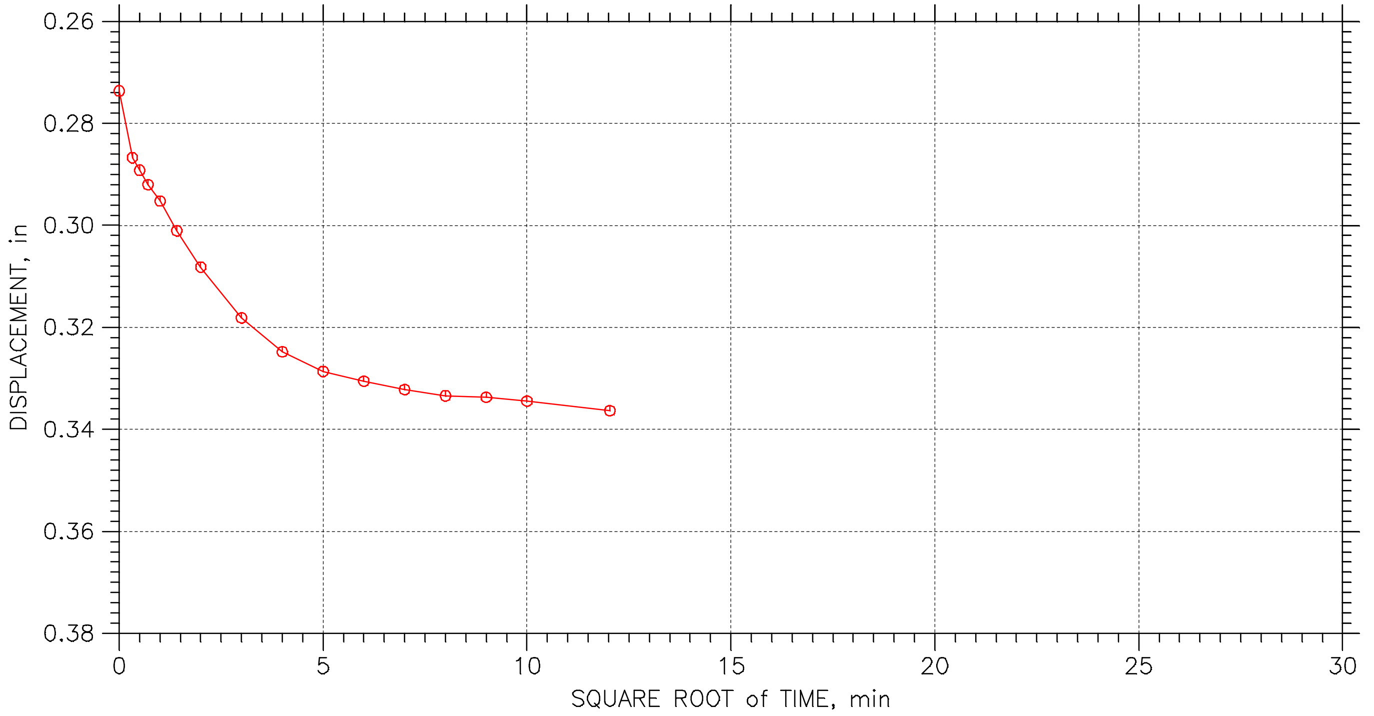
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf





Terracon Consulting Engineers & Scientists			
	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

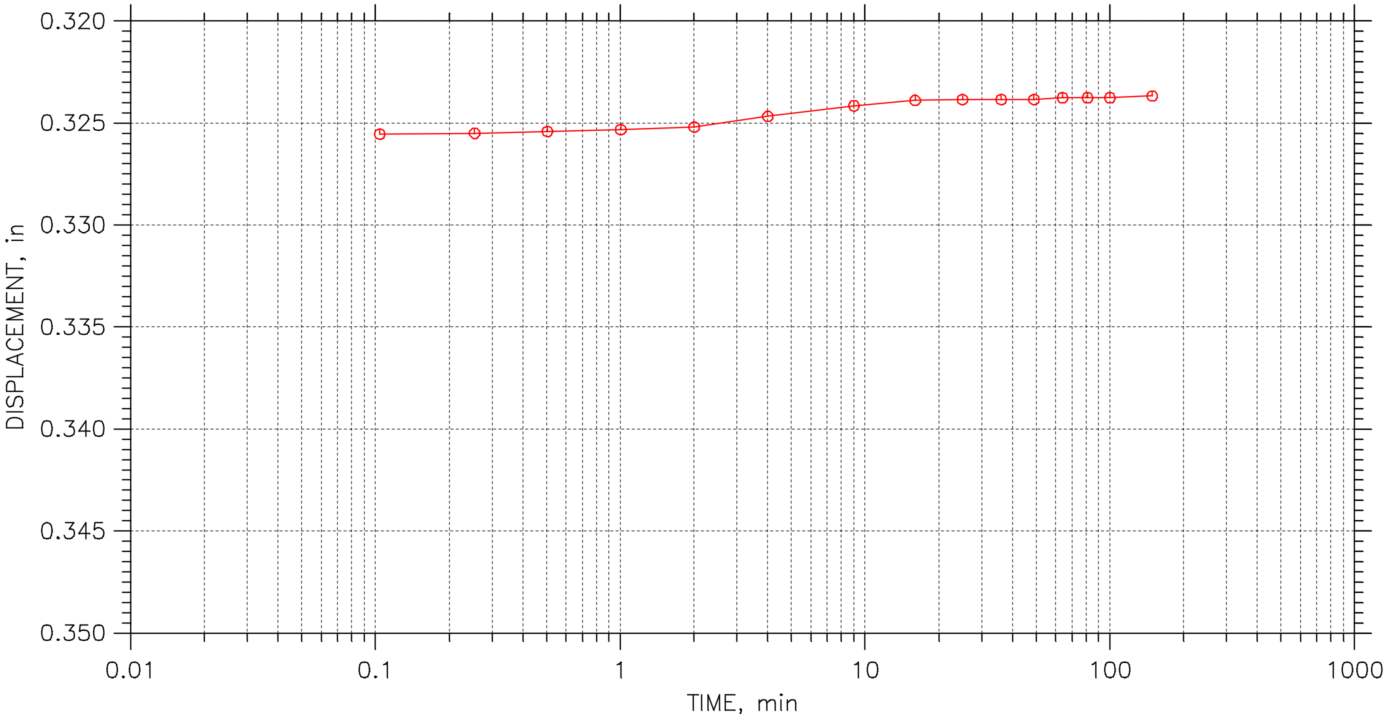
Mon, 16-NOV-2015 17:11:12

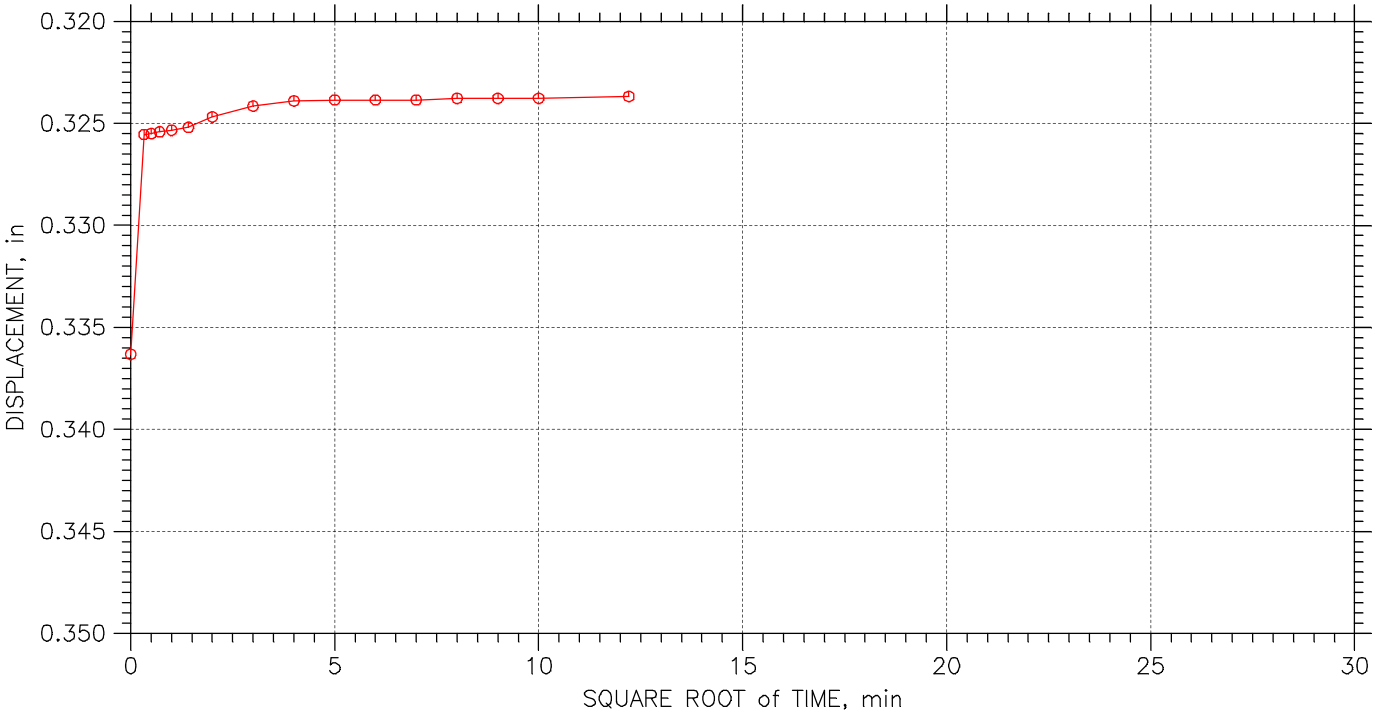
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

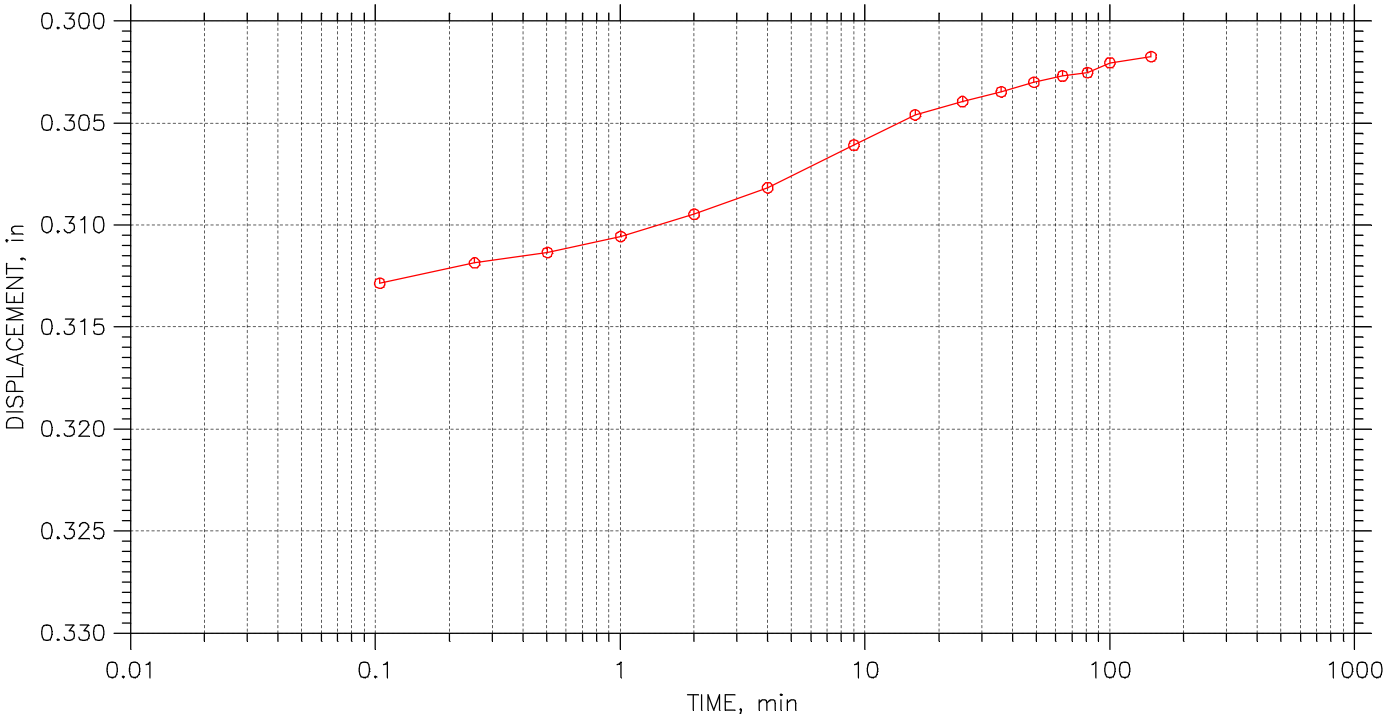
Mon, 16-NOV-2015 17:11:14

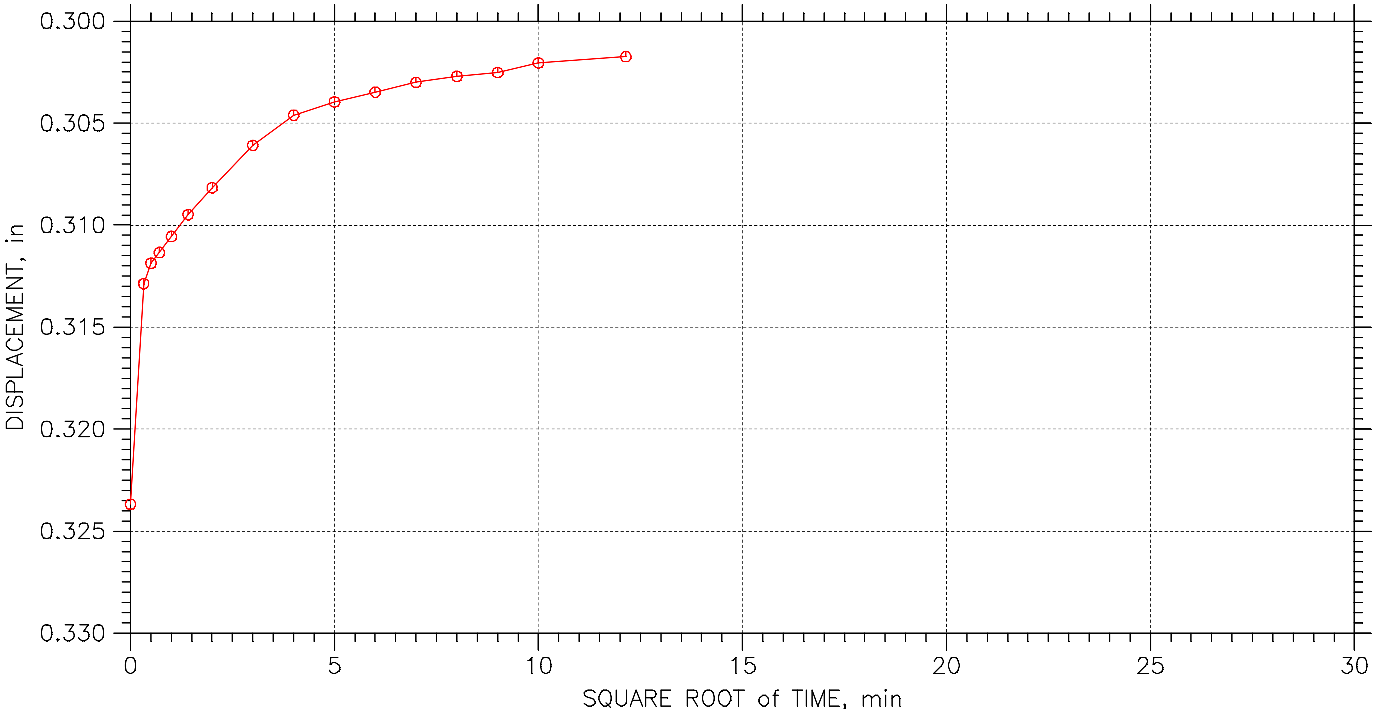
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

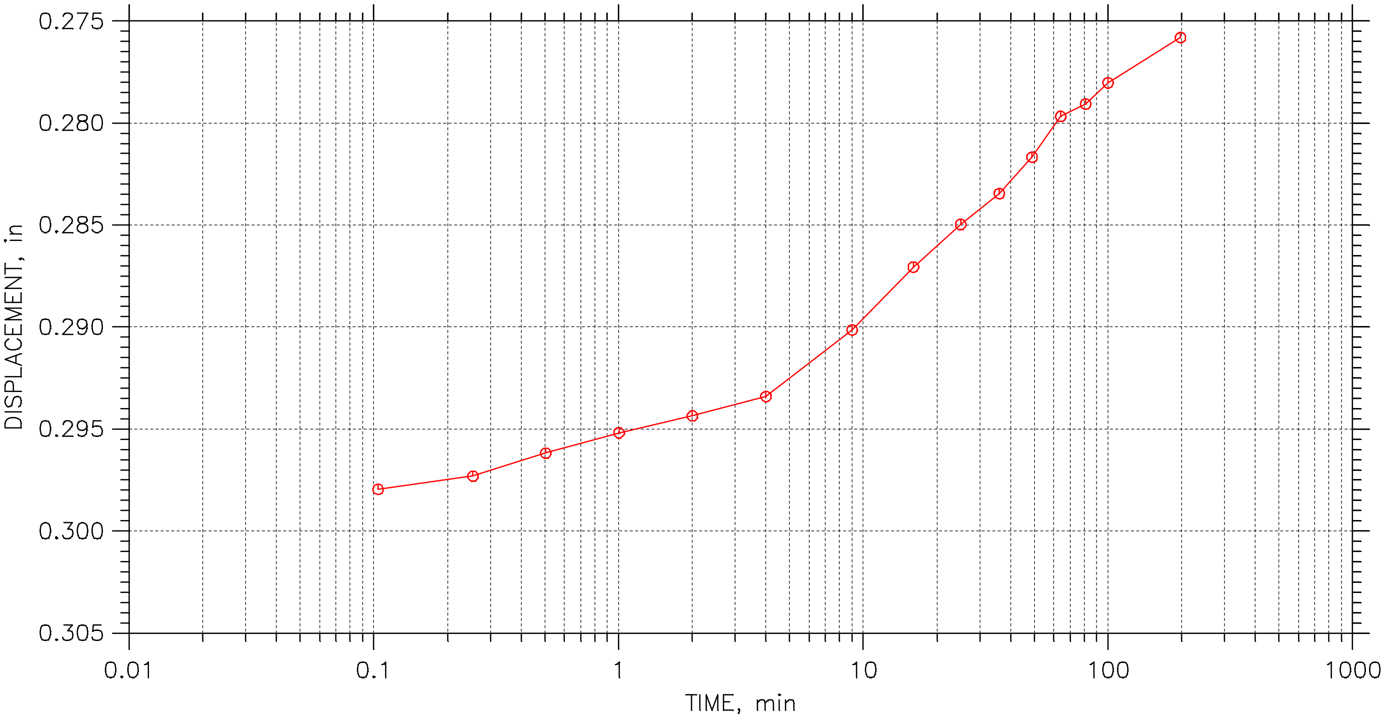
Mon, 16-NOV-2015 17:11:15

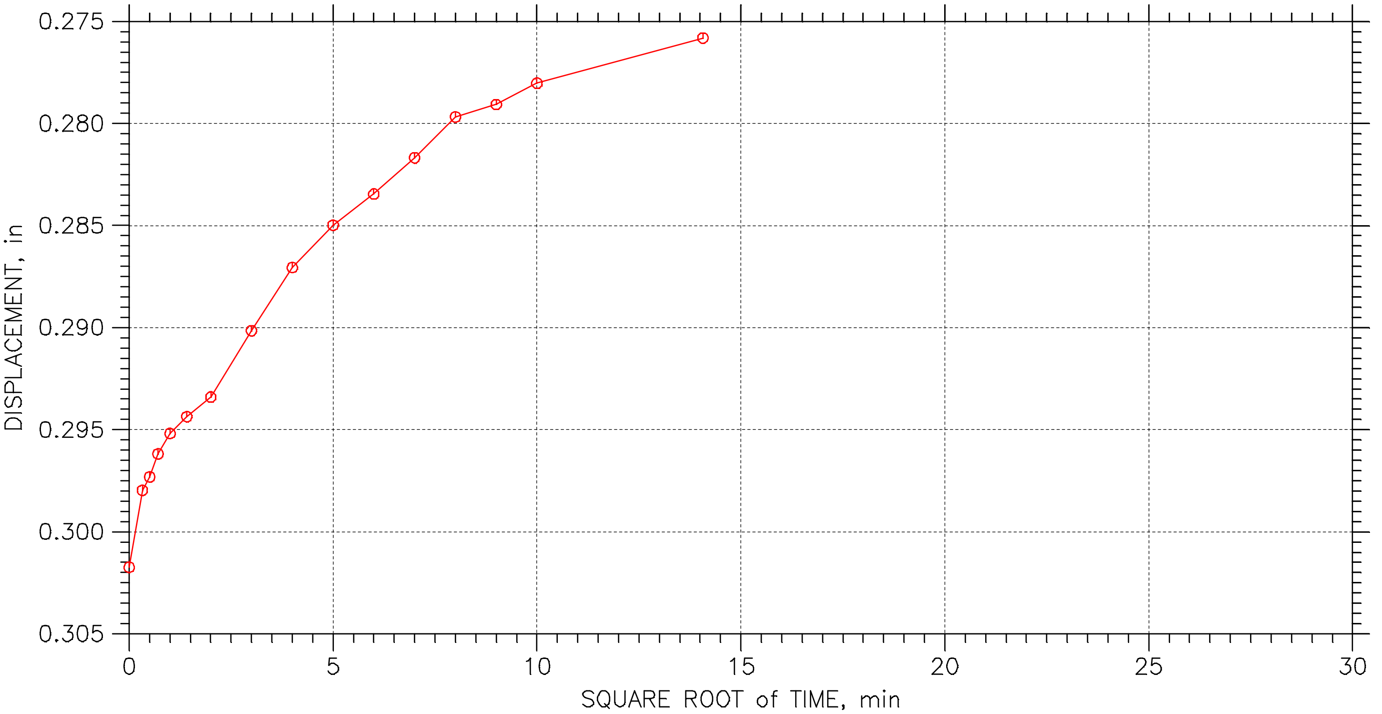
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

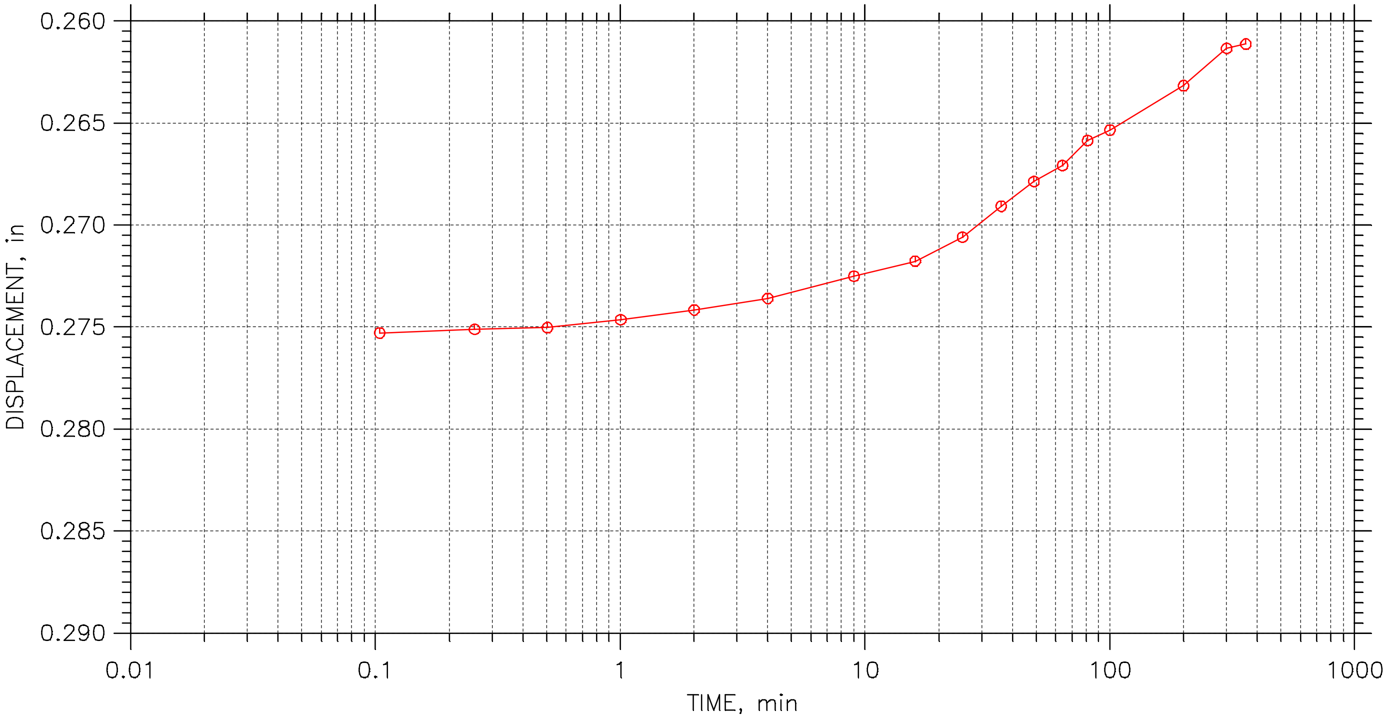
Mon, 16-NOV-2015 17:11:16

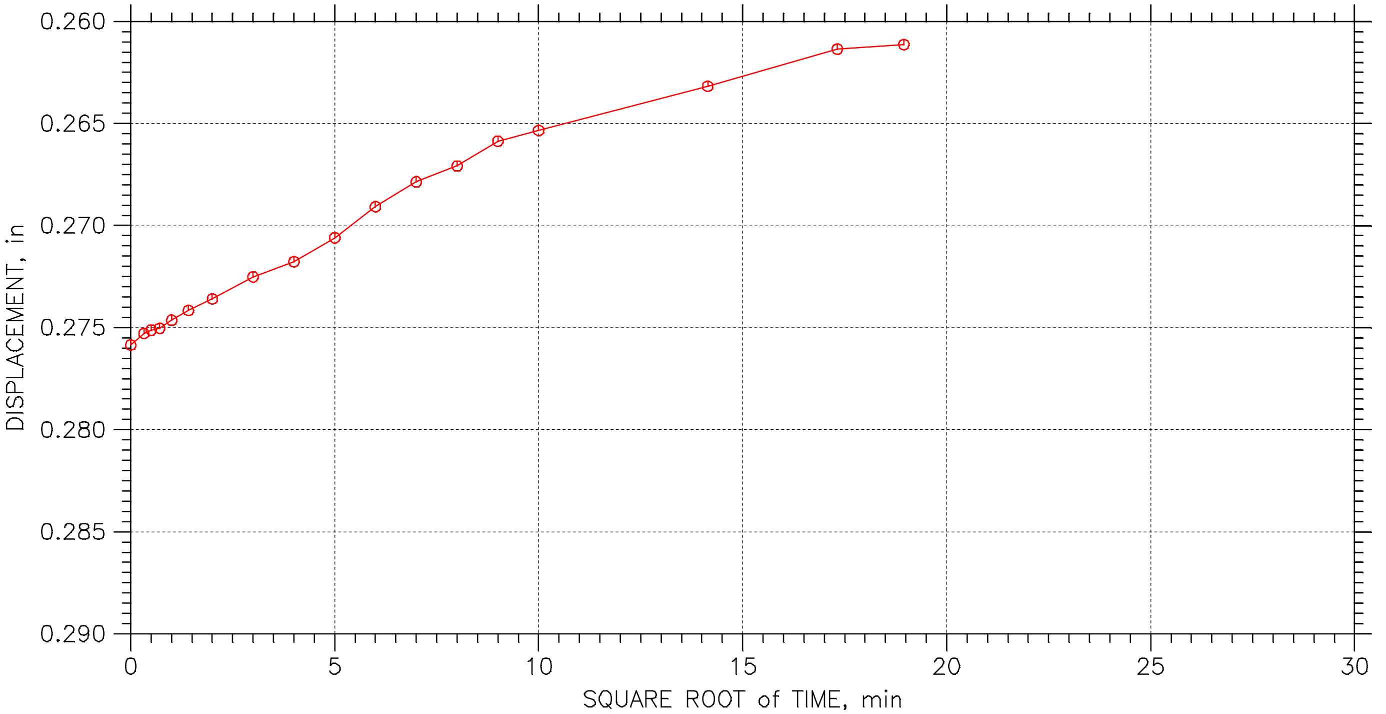
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

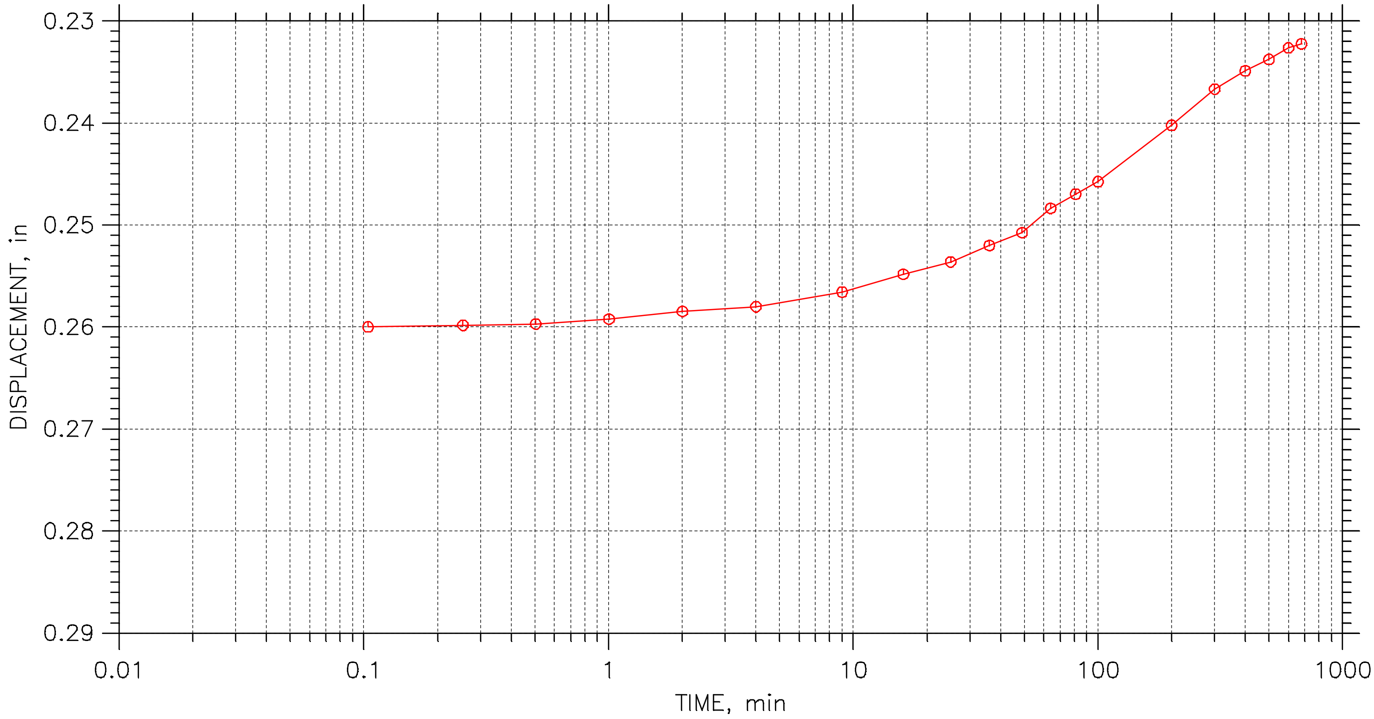
Mon, 16-NOV-2015 17:11:18

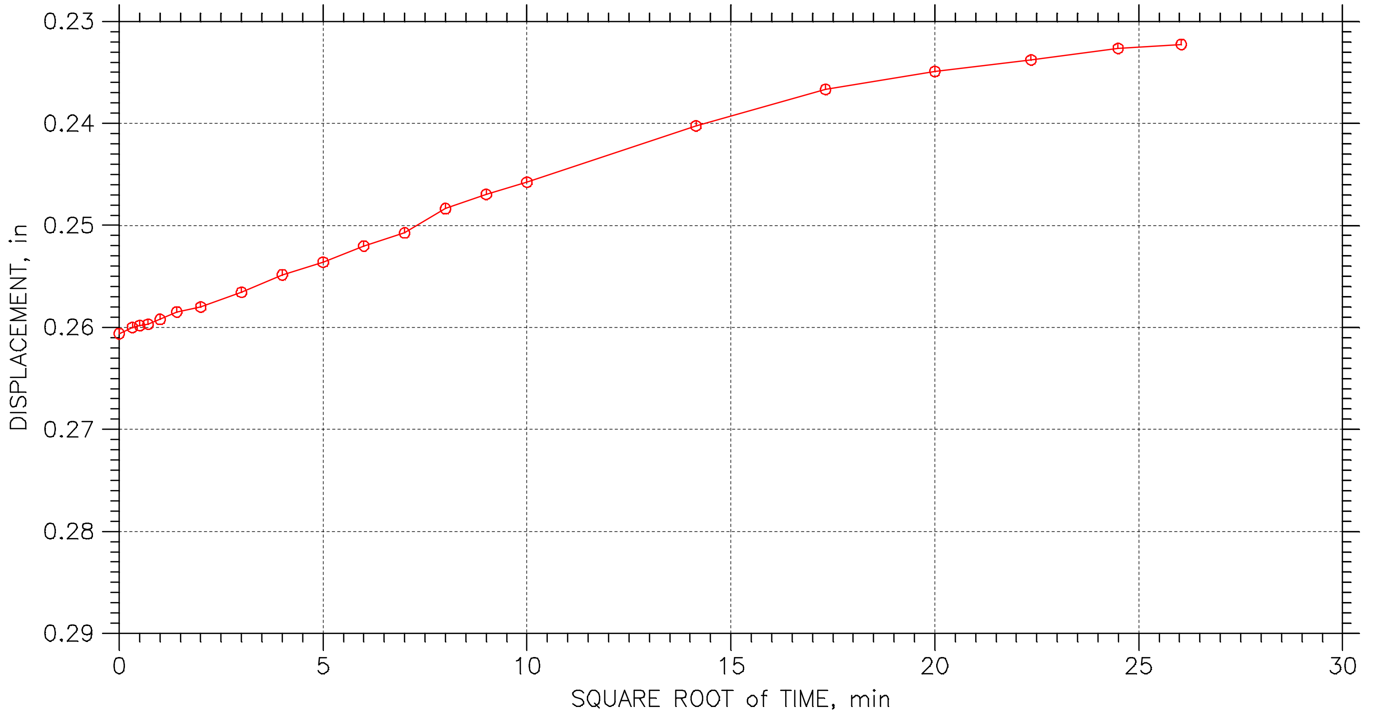
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



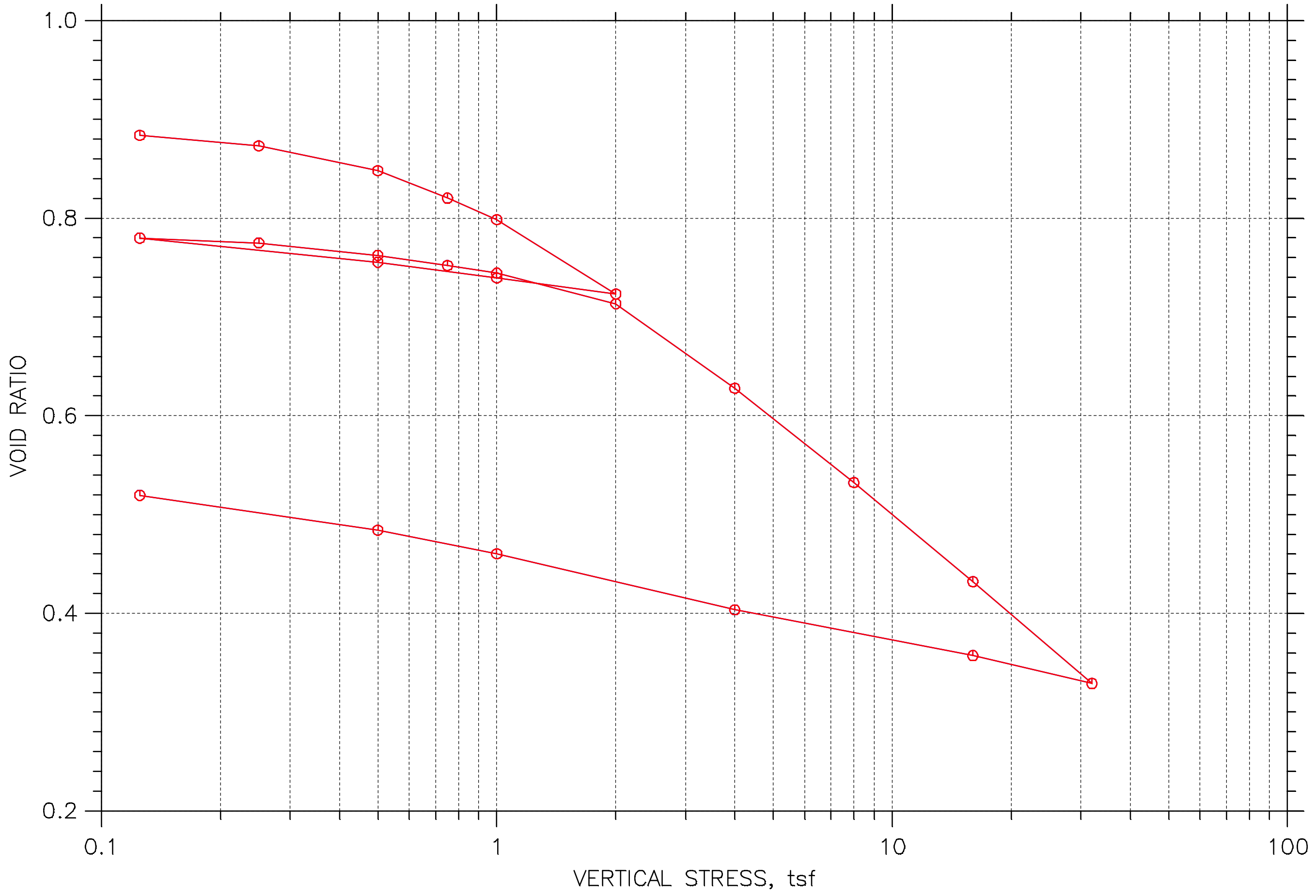


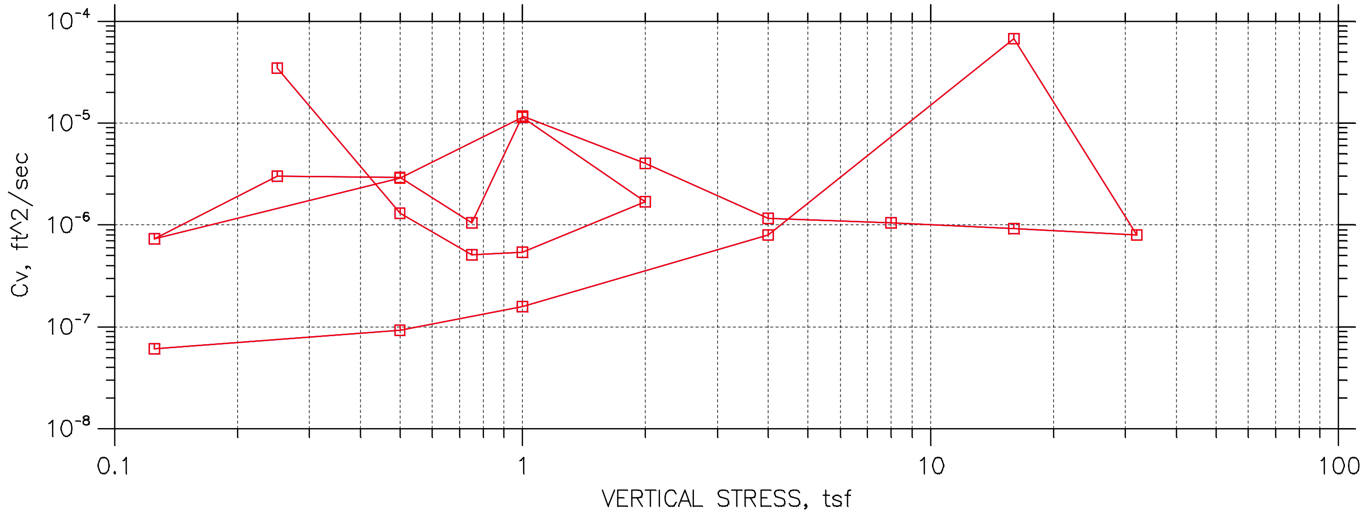
Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B003	Tested By: HP	Checked By: BCM
	Sample No.: S-12	Test Date: 10/26/15	Depth: 45.0'-47.0'
	Test No.: EDW003S12	Sample Type: 3.0'' ST	Elevation: ----
	Description: DARK GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 1.1 tsf Cc = 0.445 Ccr = 0.054 TEST PERFORMED AS PER ASTM D2435		

Mon, 16-NOV-2015 17:11:19

CONSOLIDATION TEST DATA

SUMMARY REPORT





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

Mon, 16-NOV-2015 17:16:44

CONSOLIDATION TEST DATA

Terracon
Consulting Engineers & Scientists

Project: DYNEGY EDWARDS
Boring No.: EDW-B008 S5
Sample No.: S-5
Test No.: EDWB008S5

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 10/26/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 11.0'-13.0'
Elevation: -----

Soil Description: BROWN AND GRAY FAT CLAY WITH SAND CH
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.72
Initial Void Ratio: 0.91
Final Void Ratio: 0.52

Liquid Limit: 52
Plastic Limit: 19
Plasticity Index: 33

Initial Height: 0.75 in
Specimen Diameter: 2.49 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	X19	RING	RING	A-8
Wt. Container + Wet Soil, gm	194.52	185.3	175.79	131.94
Wt. Container + Dry Soil, gm	156.81	159.5	159.5	115.76
Wt. Container, gm	44.78	74.3	74.3	31.14
Wt. Dry Soil, gm	112.03	85.199	85.199	84.62
Water Content, %	33.66	30.28	19.12	19.12
Void Ratio	---	0.91	0.52	---
Degree of Saturation, %	---	90.87	100.68	---
Dry Unit Weight, pcf	---	89.066	111.96	---

CONSOLIDATION TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B008 S5
Sample No.: S-5
Test No.: EDWB008S5

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 10/26/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 11.0'-13.0'
Elevation: -----

Soil Description: BROWN AND GRAY FAT CLAY WITH SAND CH
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435

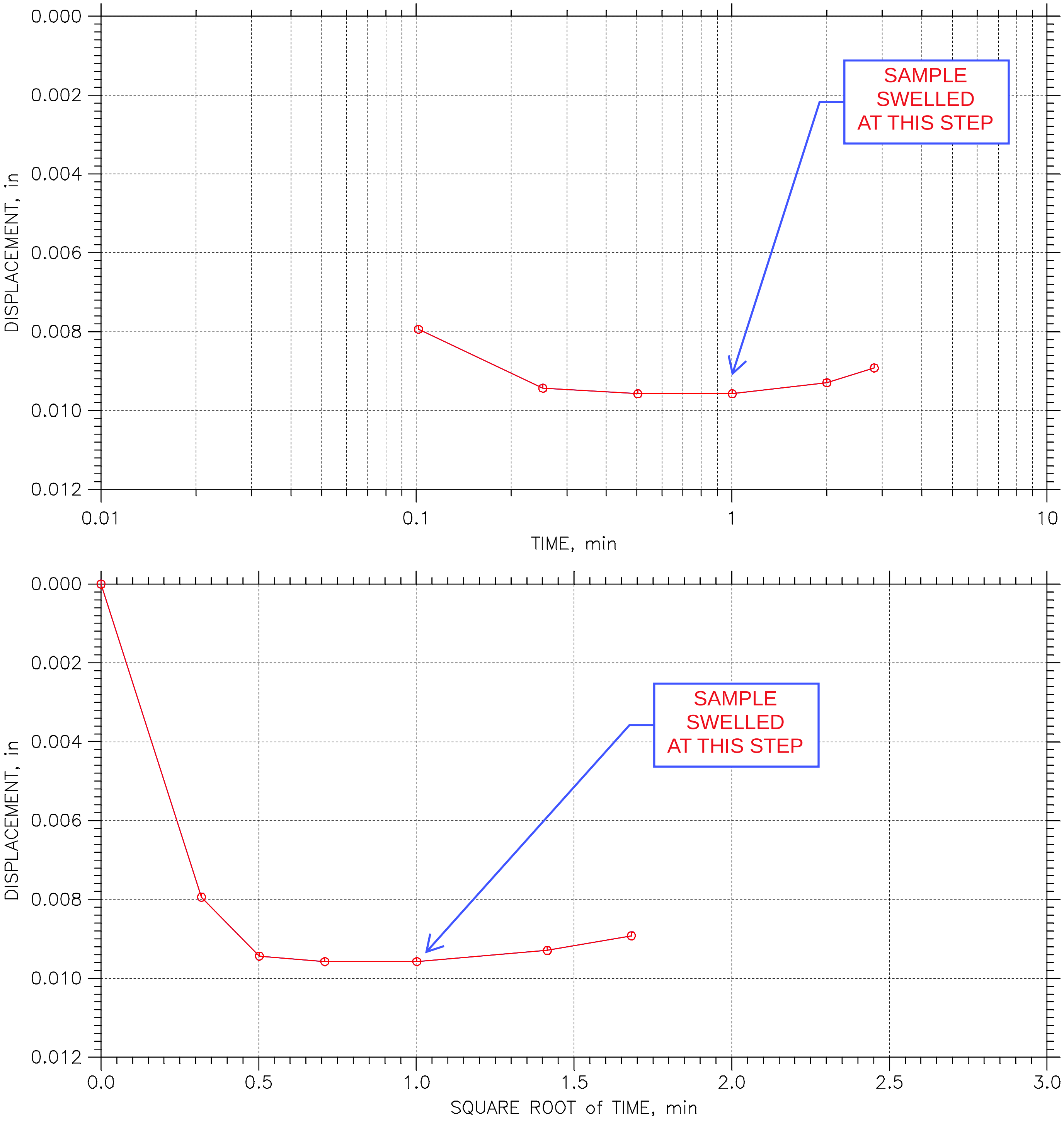
	Applied	Final	Void	Strain	T50 Fitting		Coefficient of Consolidation		
	Stress	Displacement	Ratio	at End	Sq.Rt.	Log	Sq.Rt.	Log	Ave.
	tsf	in		%	min	min	ft^2/sec	ft^2/sec	ft^2/sec
1	0.125	0.008922	0.884	1.19	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.25	0.01289	0.874	1.72	0.1	0.0	3.48e-005	0.00e+000	3.48e-005
3	0.5	0.02294	0.848	3.07	1.5	0.5	2.05e-006	5.95e-006	3.05e-006
4	0.75	0.03373	0.821	4.51	5.8	0.0	5.07e-007	0.00e+000	5.07e-007
5	1	0.04241	0.798	5.67	3.8	3.2	7.58e-007	8.96e-007	8.21e-007
6	2	0.07189	0.723	9.61	2.1	1.1	1.30e-006	2.41e-006	1.69e-006
7	1	0.06554	0.739	8.76	0.2	0.0	1.15e-005	0.00e+000	1.15e-005
8	0.5	0.05914	0.756	7.91	0.9	0.0	2.88e-006	0.00e+000	2.88e-006
9	0.125	0.0497	0.780	6.64	3.7	0.0	7.35e-007	0.00e+000	7.35e-007
10	0.25	0.05157	0.775	6.89	0.9	0.0	3.01e-006	0.00e+000	3.01e-006
11	0.5	0.05657	0.762	7.56	0.9	0.0	2.94e-006	0.00e+000	2.94e-006
12	0.75	0.06059	0.752	8.10	3.9	1.3	6.94e-007	2.10e-006	1.04e-006
13	1	0.06357	0.744	8.50	0.2	0.0	1.18e-005	0.00e+000	1.18e-005
14	2	0.07577	0.713	10.13	0.9	0.4	2.80e-006	7.14e-006	4.02e-006
15	4	0.1094	0.628	14.62	2.1	0.0	1.17e-006	0.00e+000	1.17e-006
16	8	0.1468	0.532	19.63	2.1	0.0	1.04e-006	0.00e+000	1.04e-006
17	16	0.1861	0.432	24.88	2.1	0.0	9.17e-007	0.00e+000	9.17e-007
18	32	0.2266	0.329	30.29	2.1	0.0	7.97e-007	0.00e+000	7.97e-007
19	16	0.2155	0.357	28.81	0.0	0.0	6.68e-005	0.00e+000	6.68e-005
20	4	0.1974	0.403	26.38	2.1	0.0	7.97e-007	0.00e+000	7.97e-007
21	1	0.1751	0.460	23.40	11.4	0.0	1.58e-007	0.00e+000	1.58e-007
22	0.5	0.1661	0.483	22.21	8.8	0.0	2.16e-007	0.00e+000	2.16e-007
23	0.125	0.153	0.517	20.45	32.0	0.0	6.18e-008	0.00e+000	6.18e-008

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf



SAMPLE SWELLED AT THIS STEP

SAMPLE SWELLED AT THIS STEP

Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

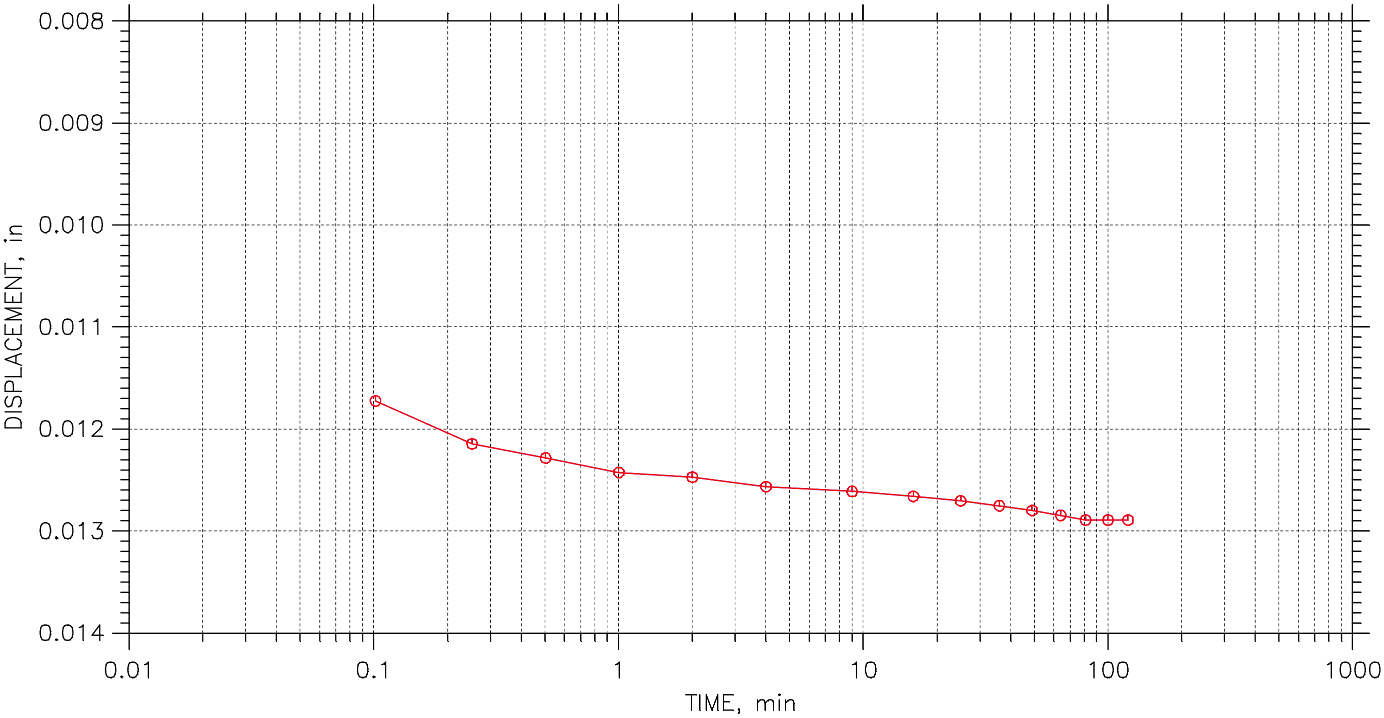
Mon, 16-NOV-2015 18:54:39

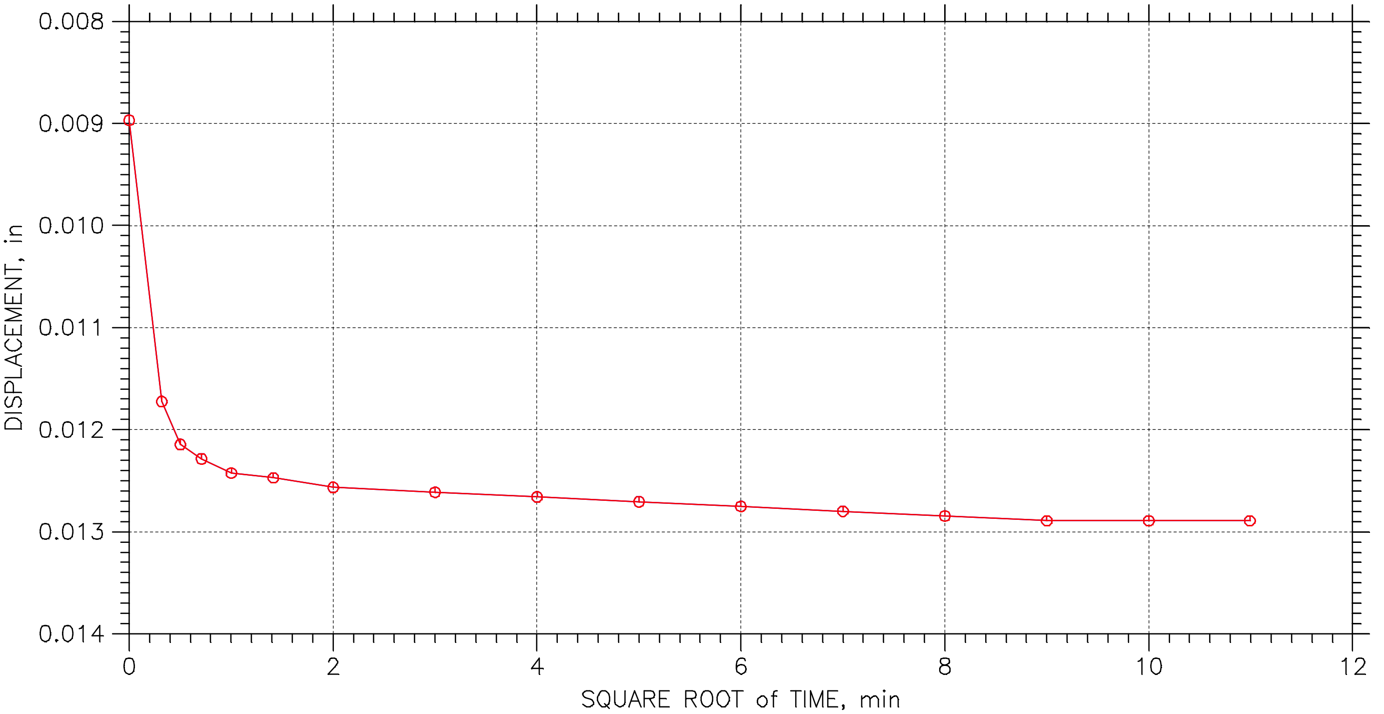
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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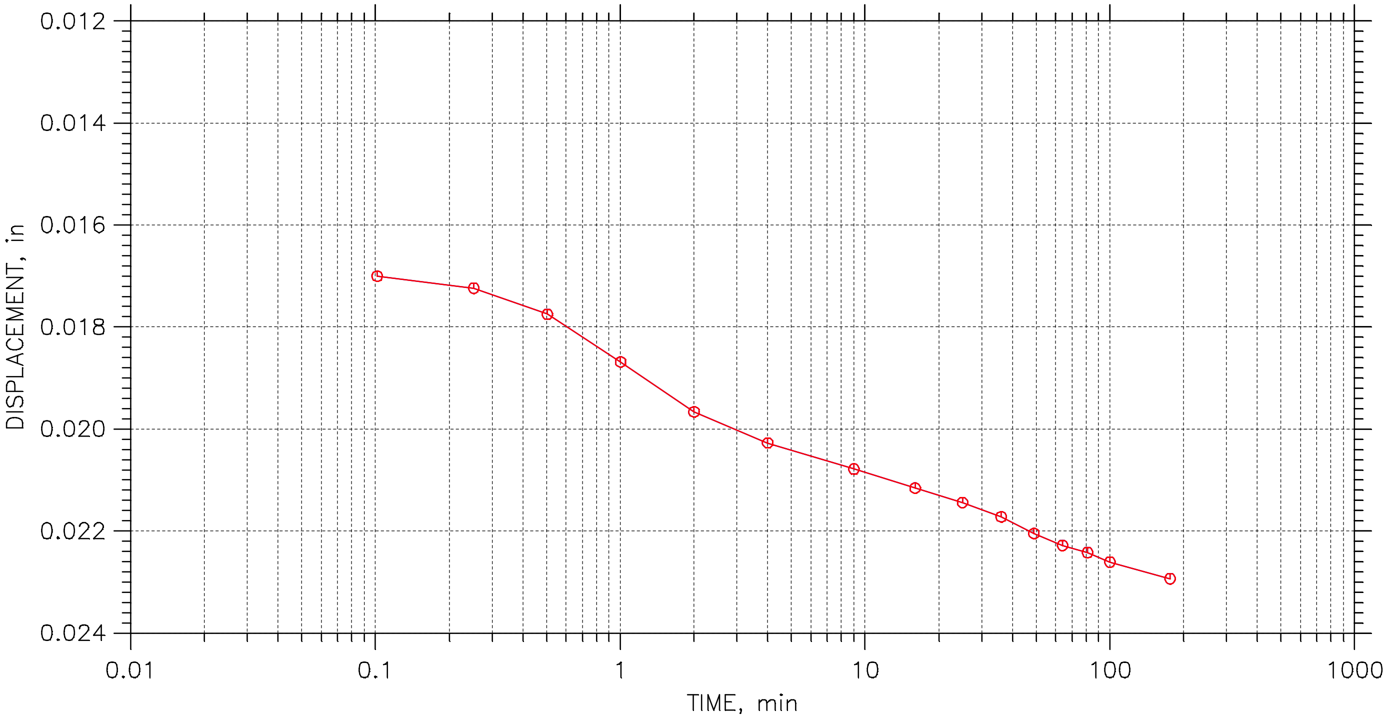
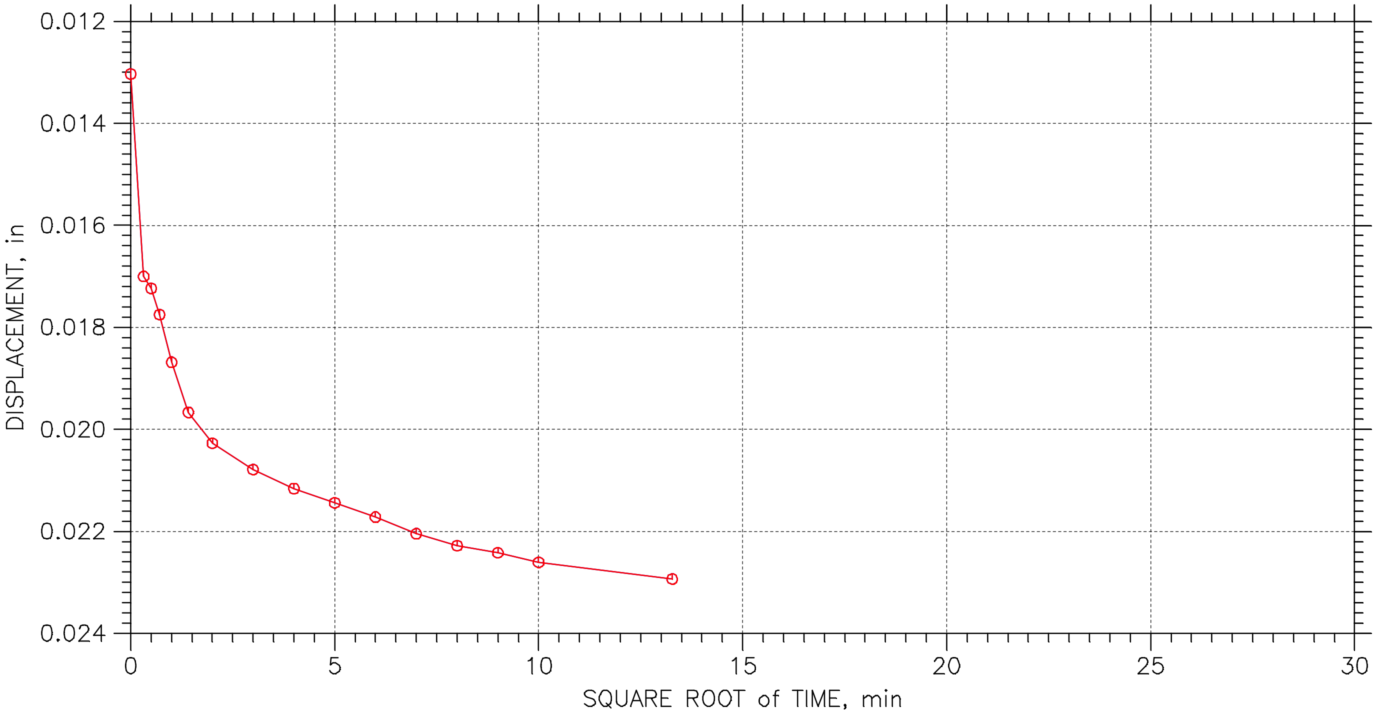
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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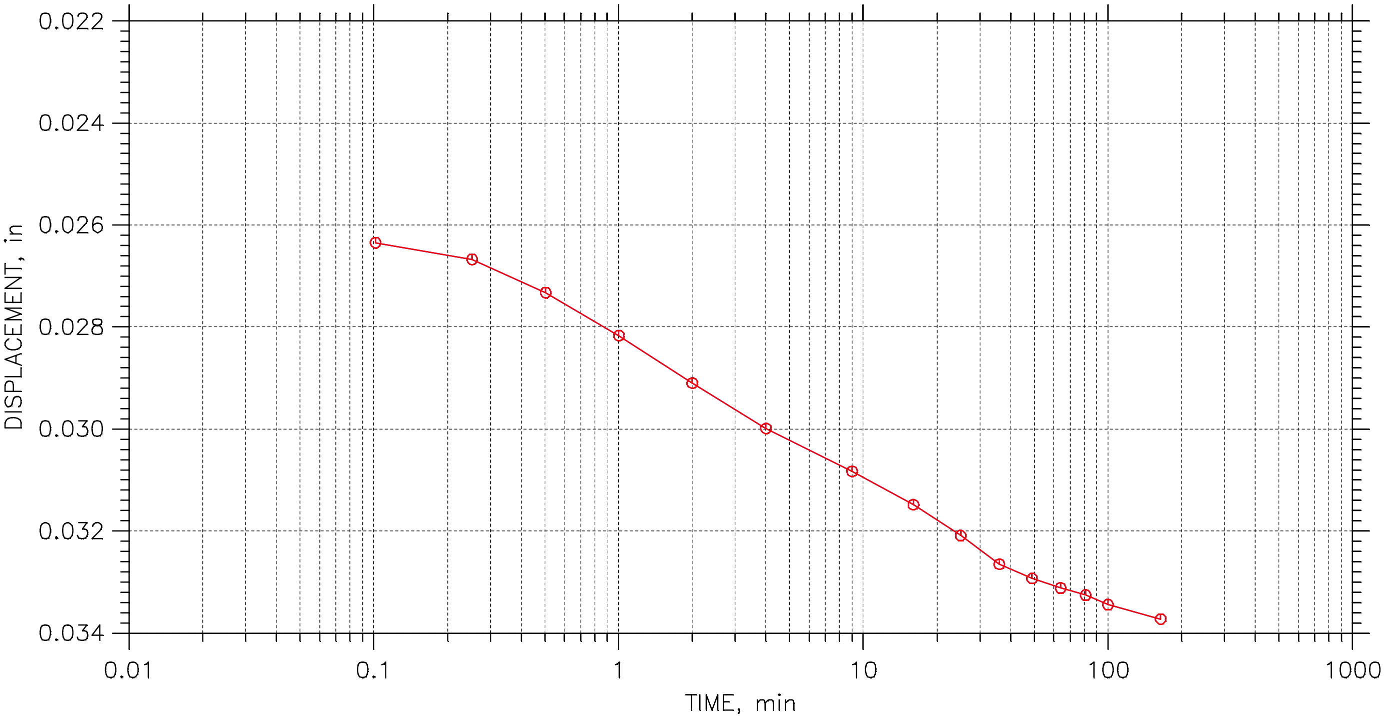
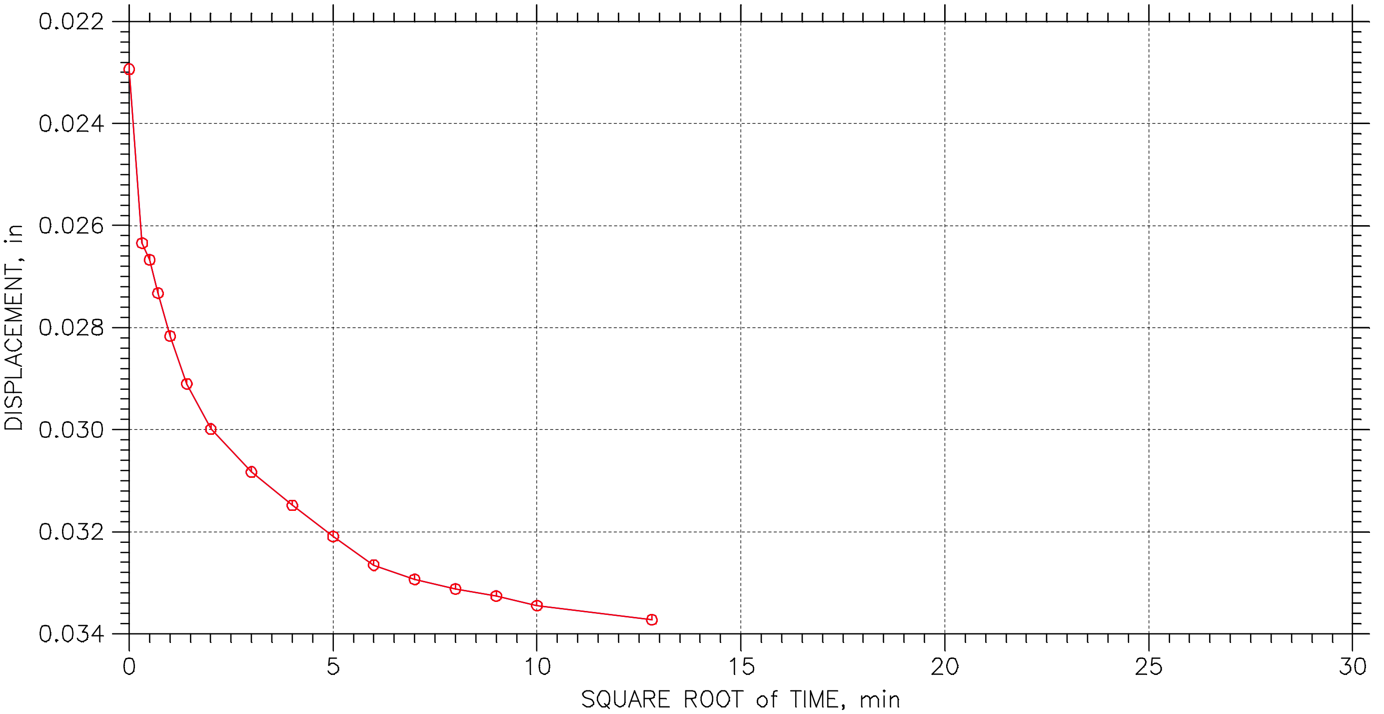
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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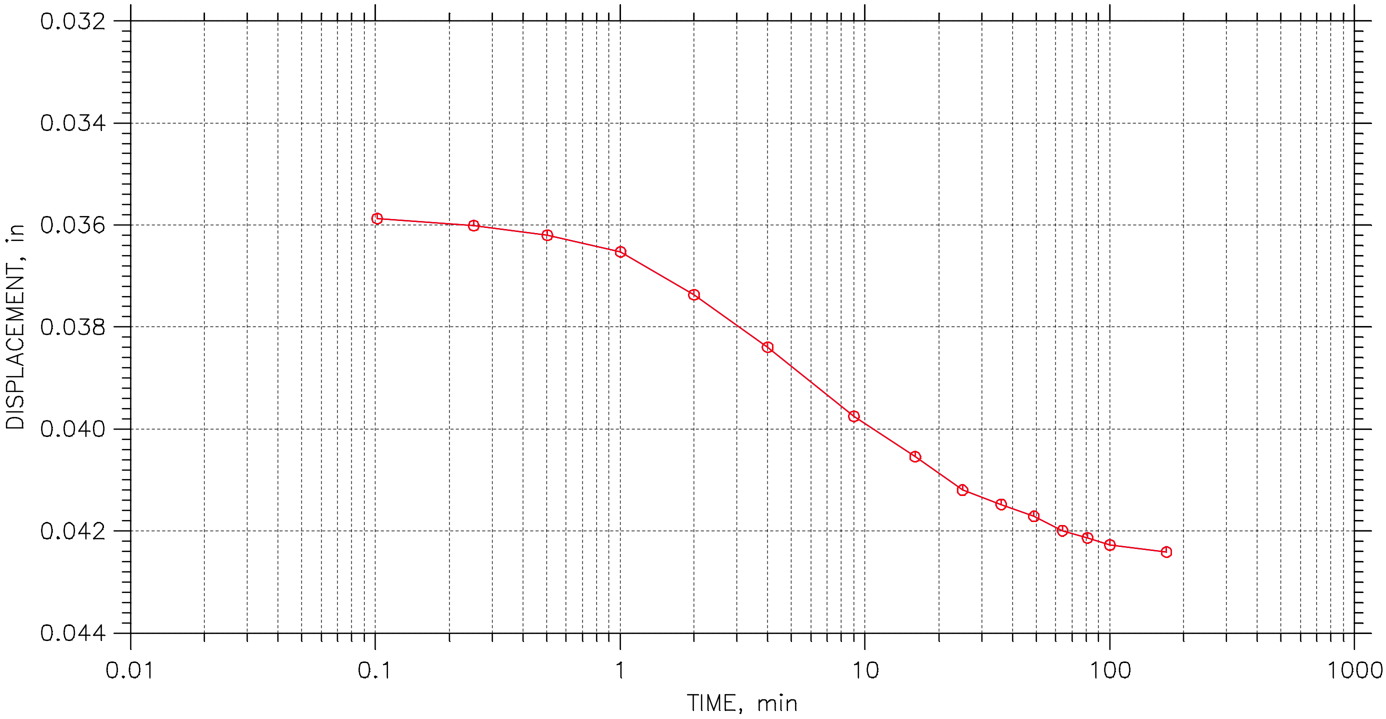
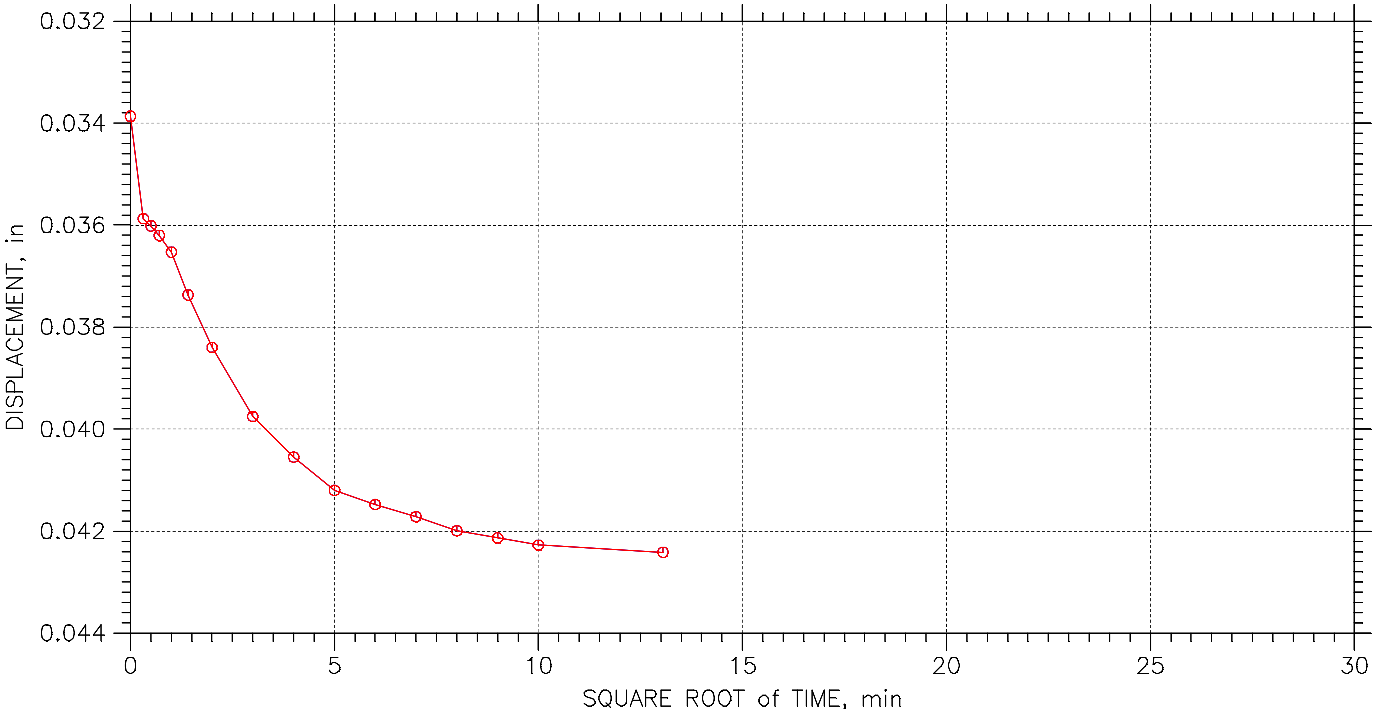
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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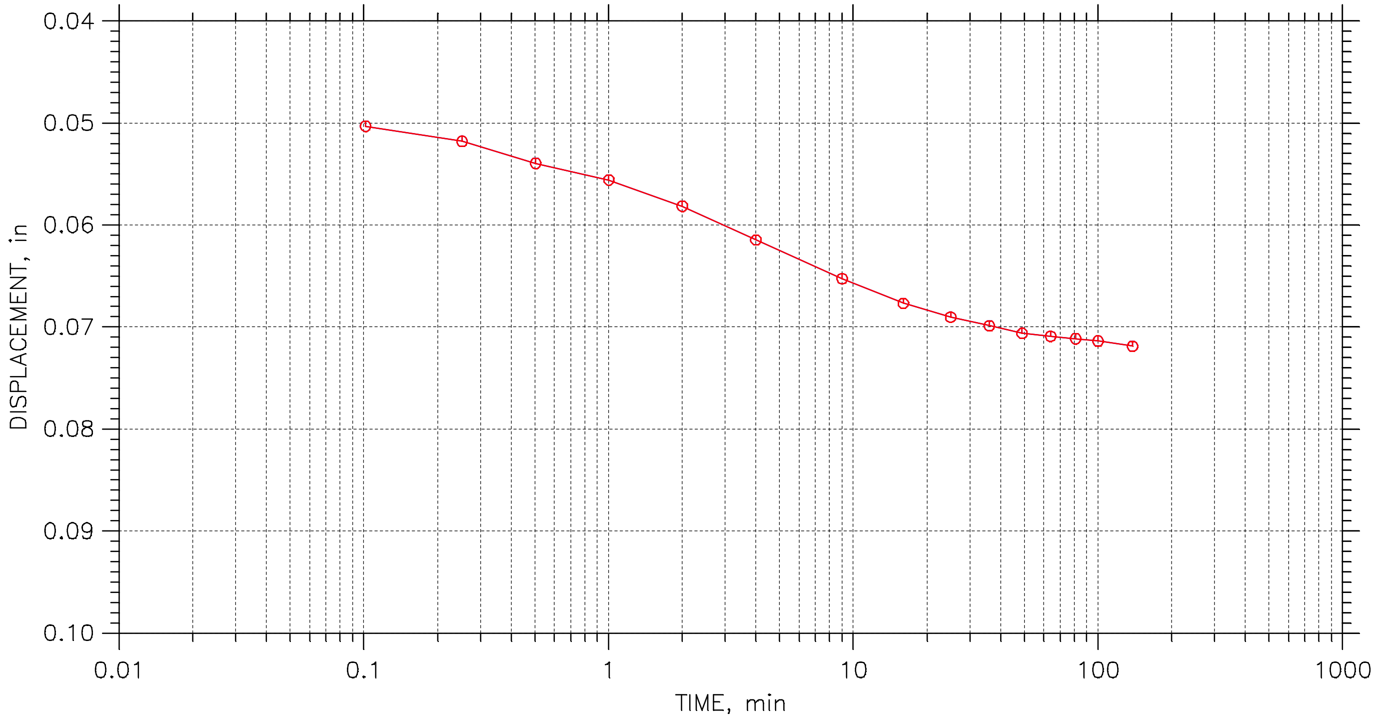
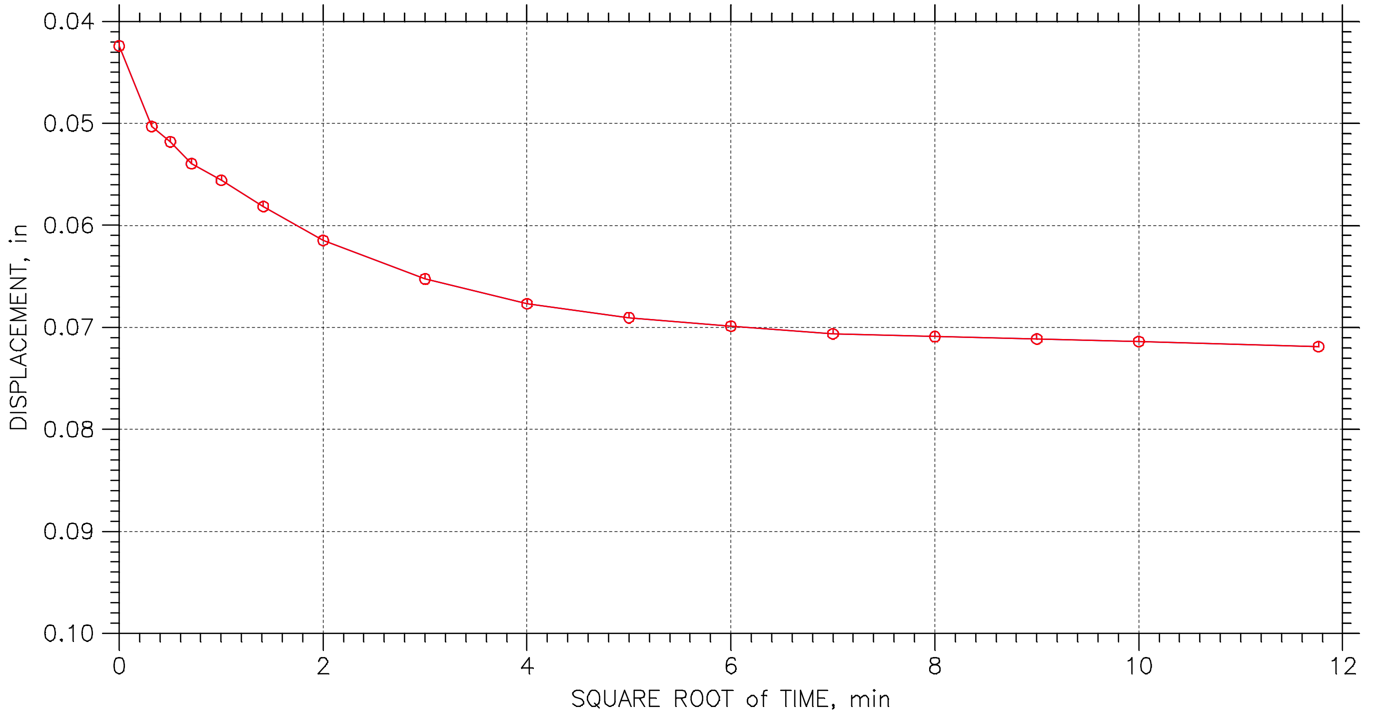
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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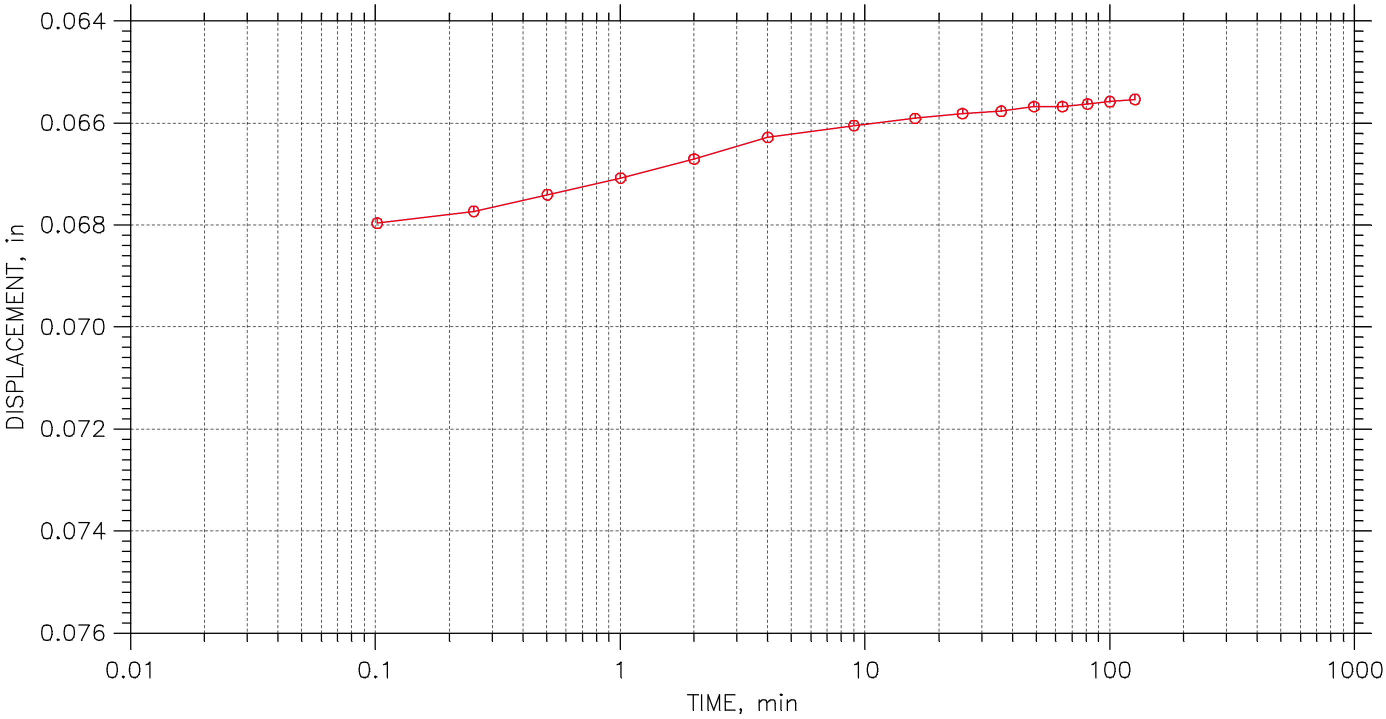
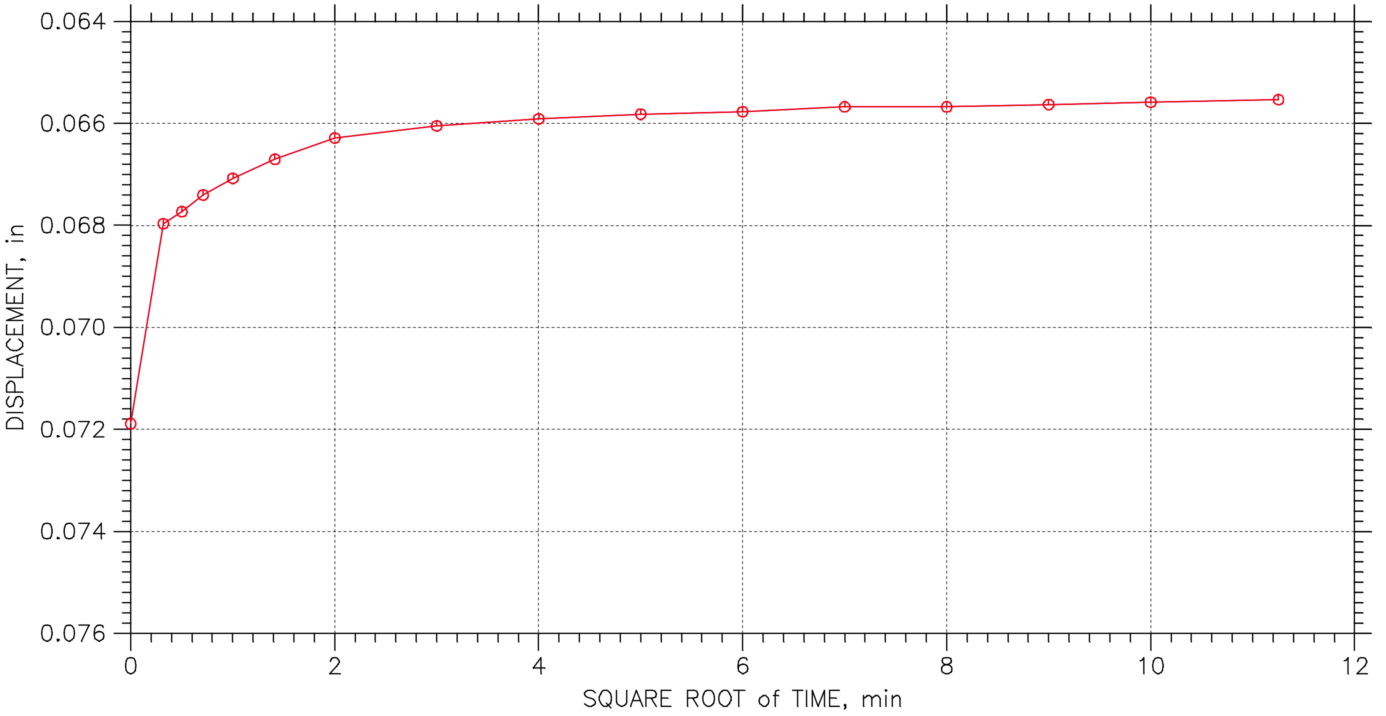
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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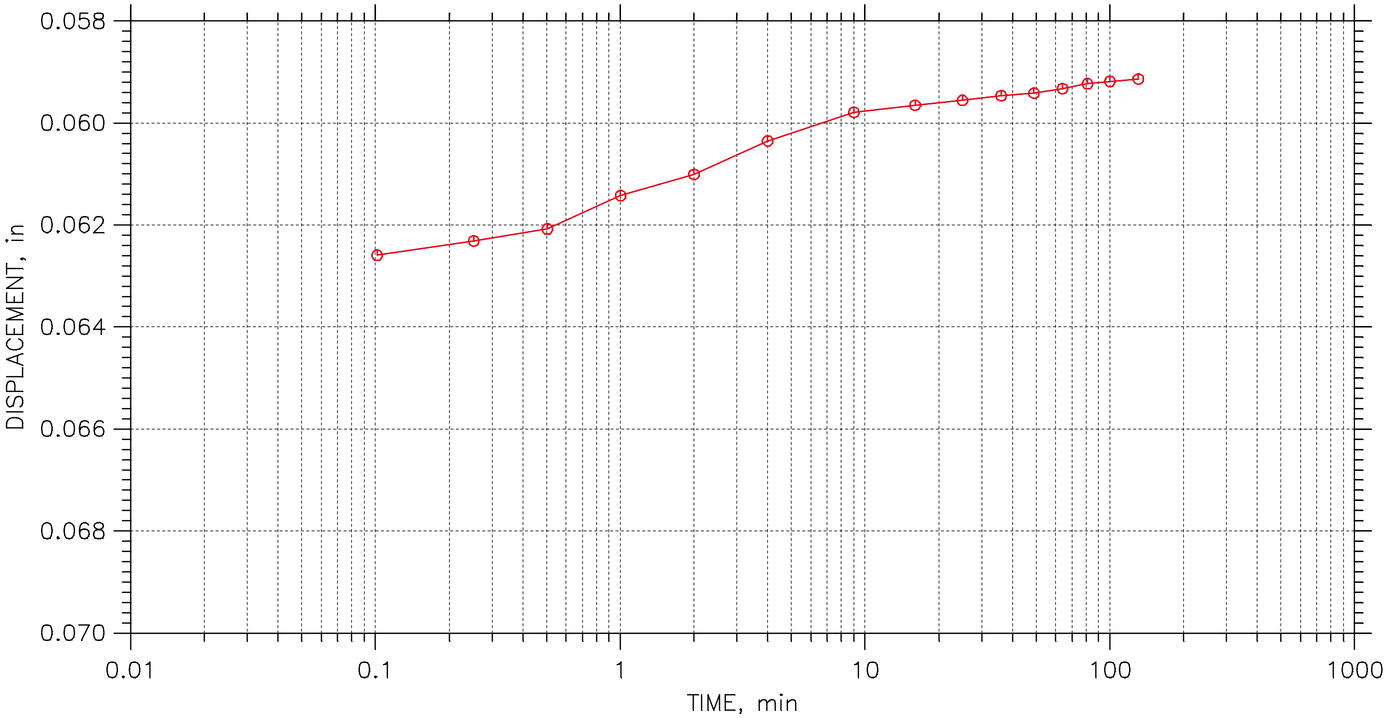
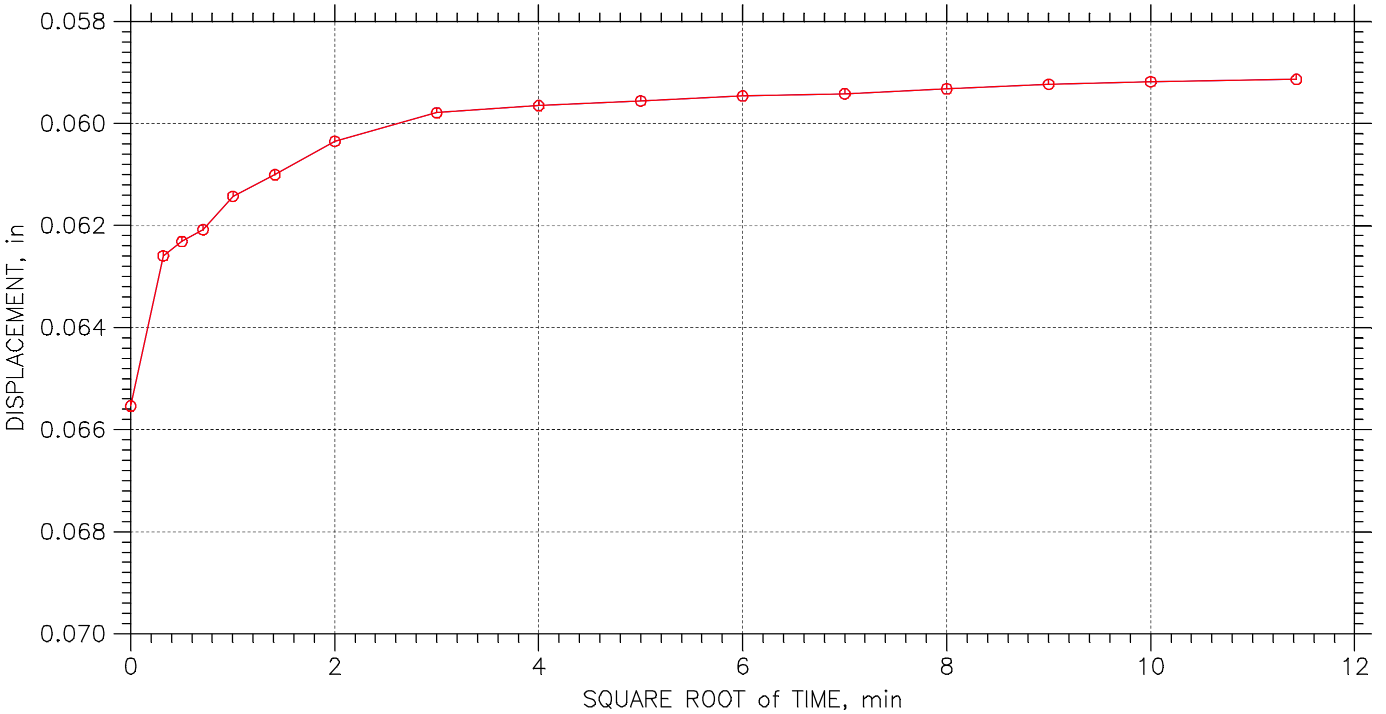
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf





Terracon
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Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----

Description: BROWN AND GRAY FAT CLAY WITH SAND CH

Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435

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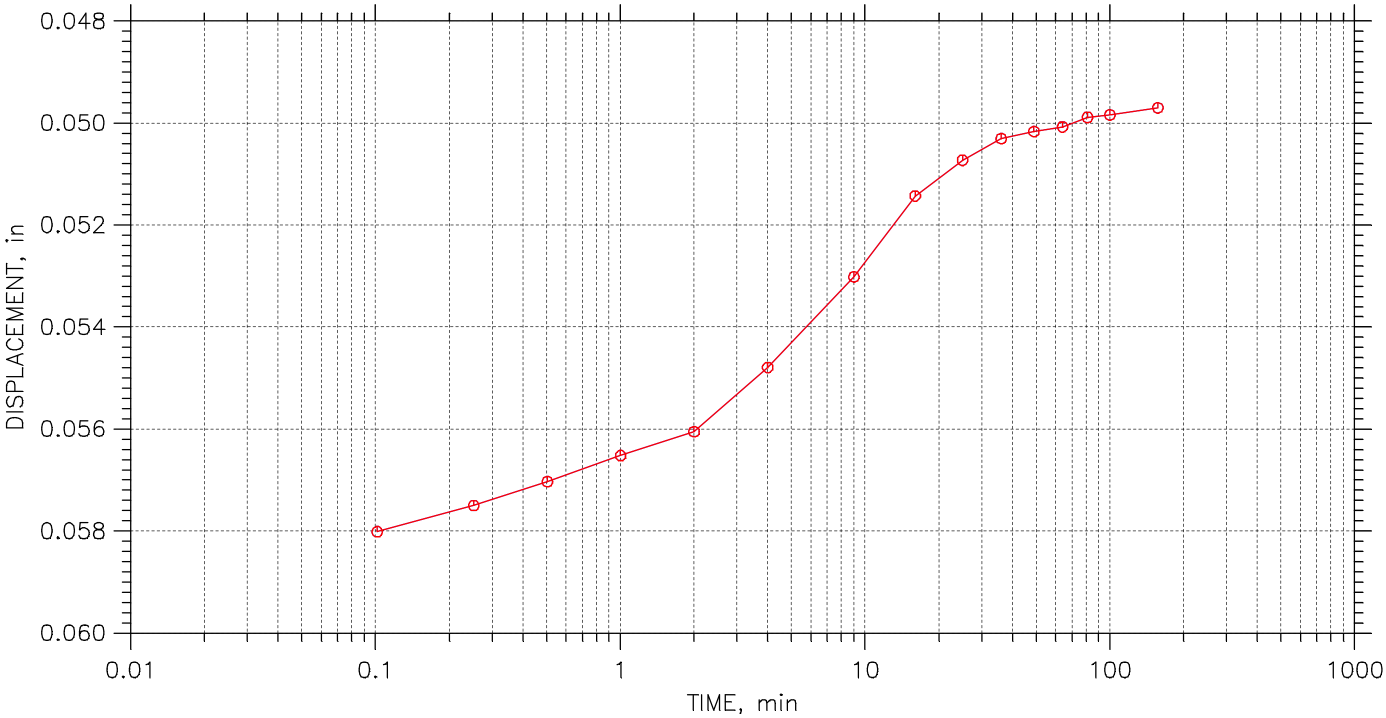
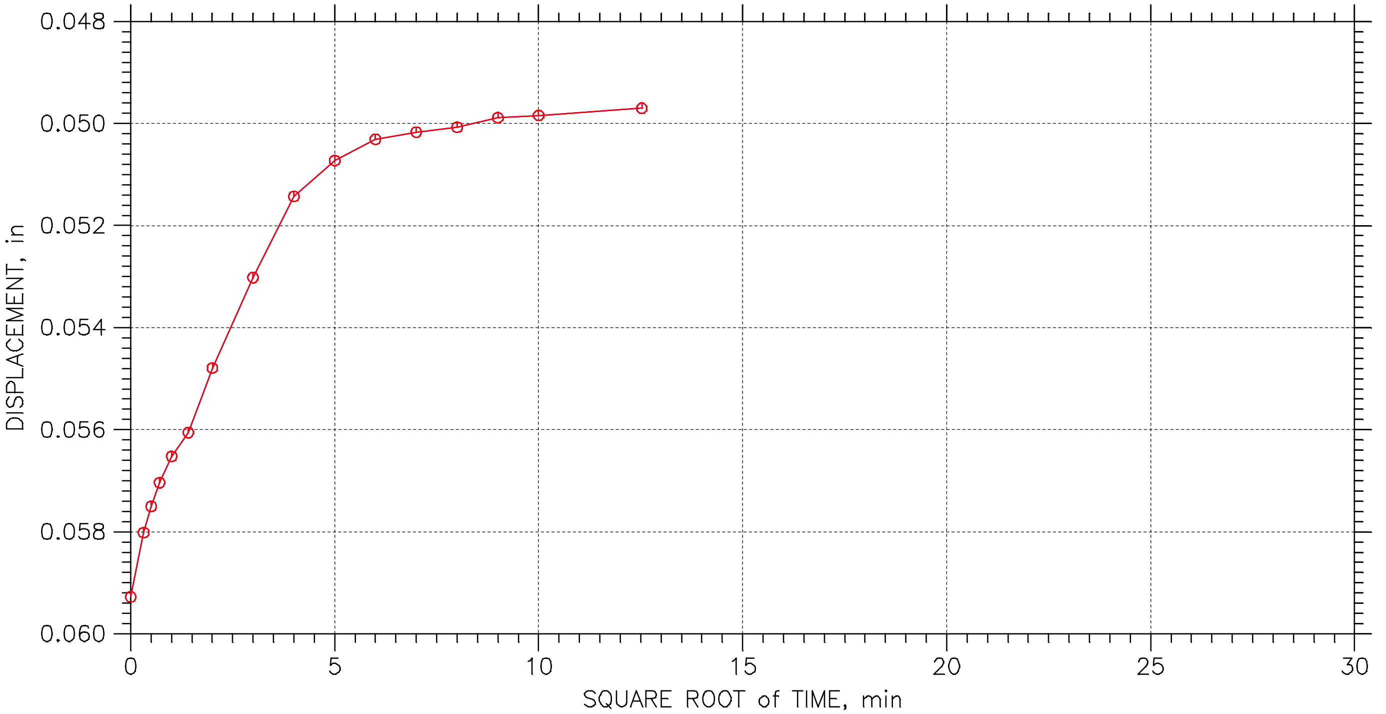
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

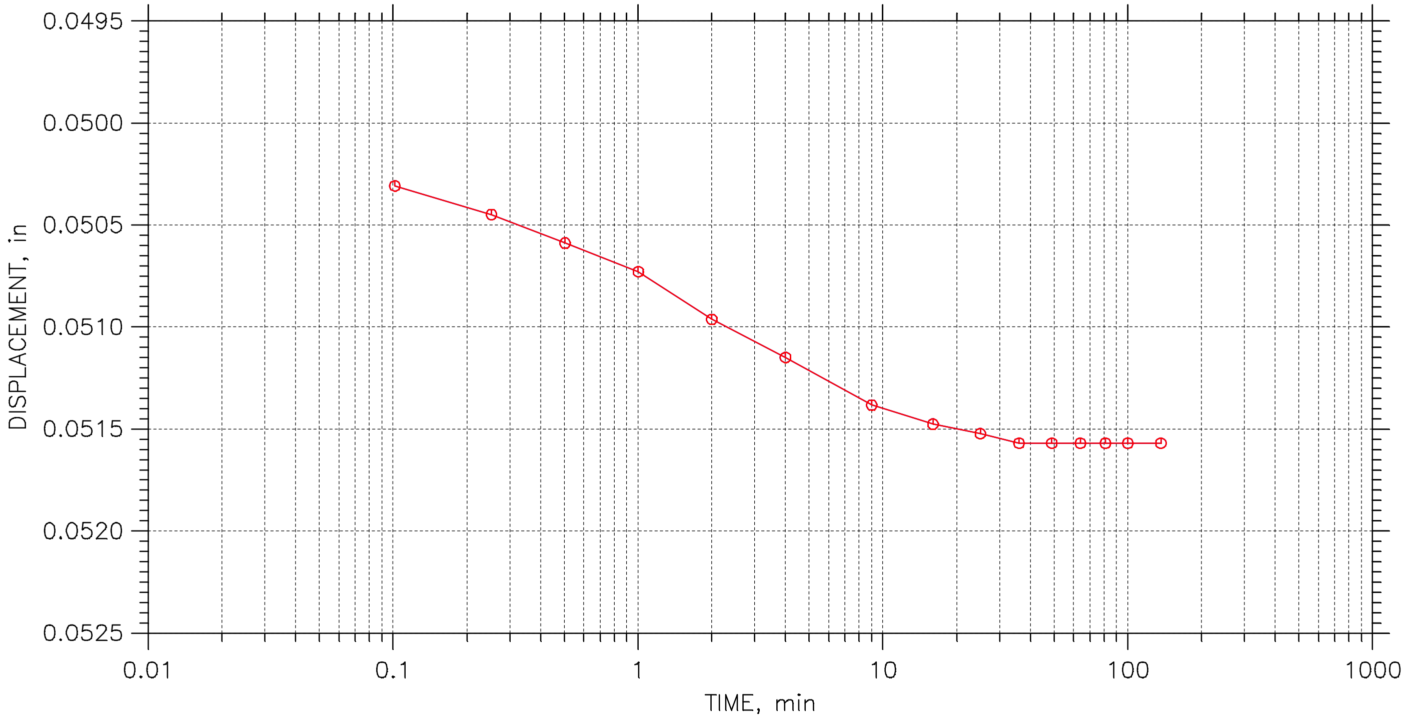
Mon, 16-NOV-2015 18:54:52

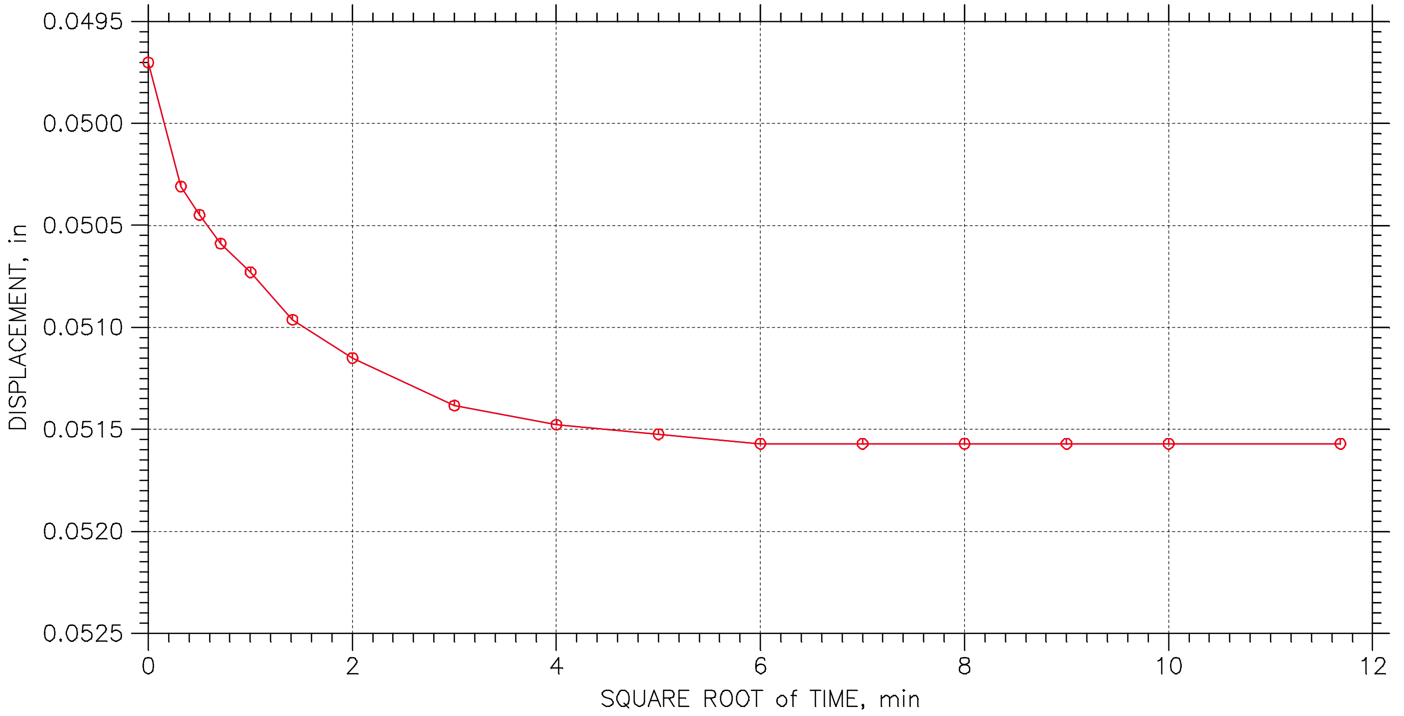
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

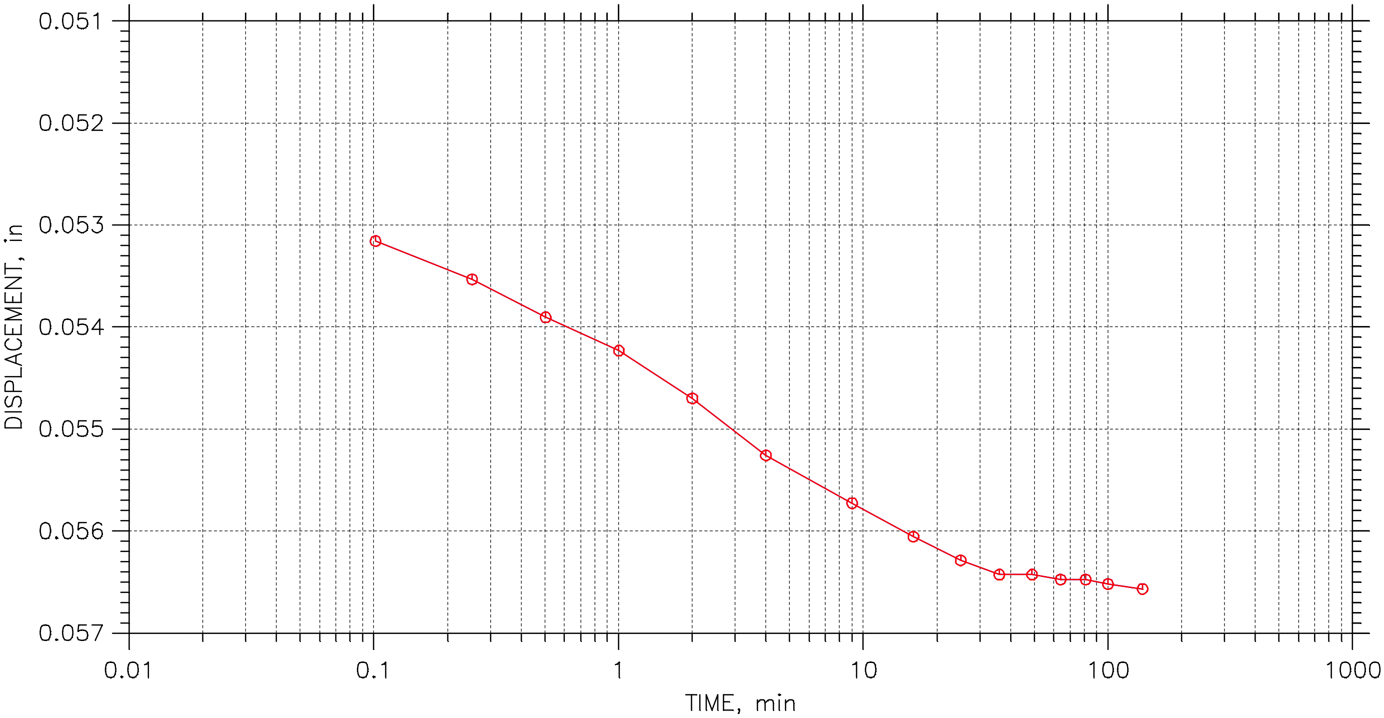
Mon, 16-NOV-2015 18:54:53

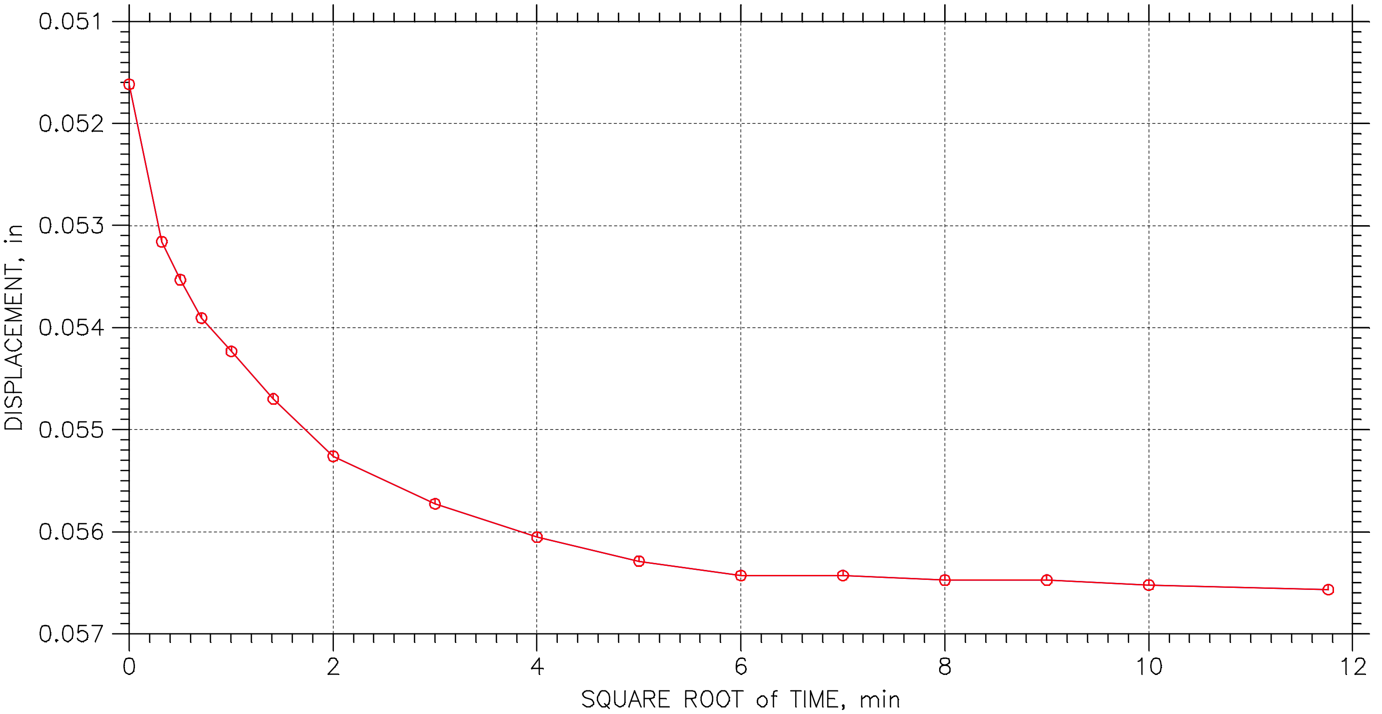
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

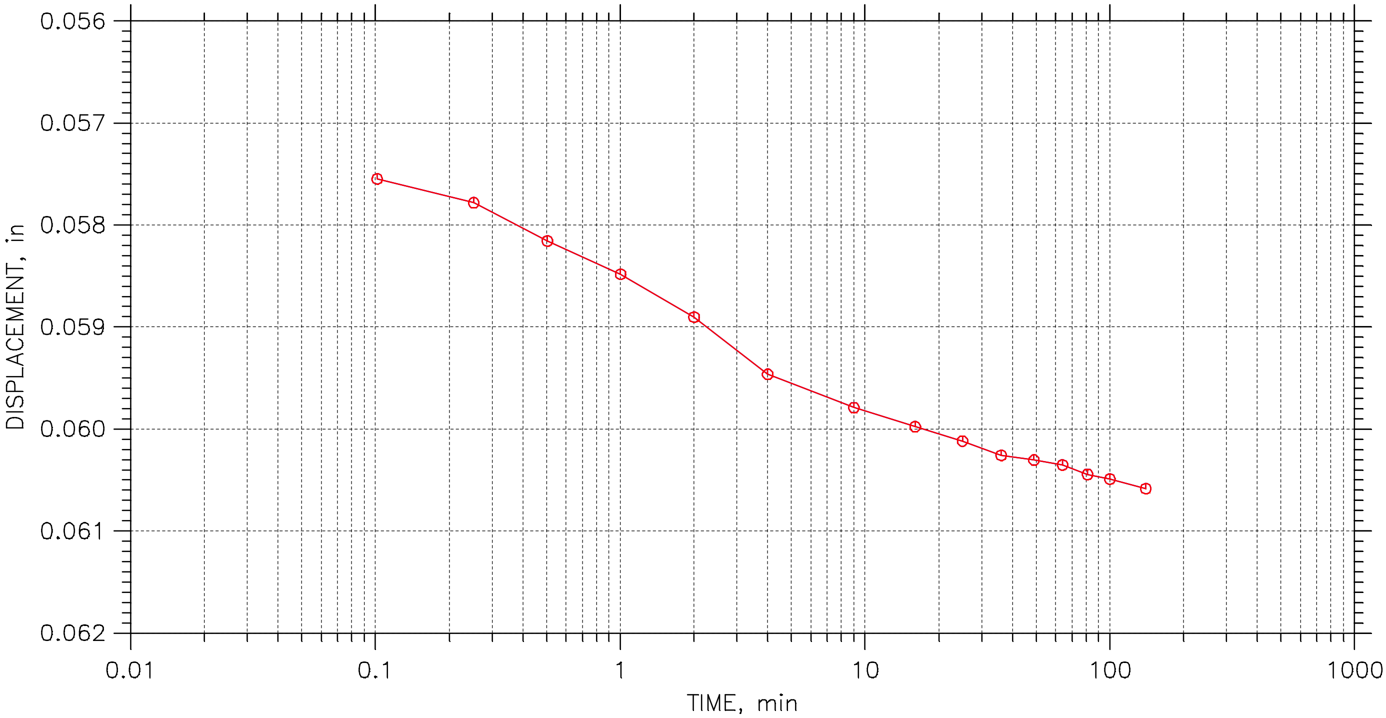
Mon, 16-NOV-2015 18:54:55

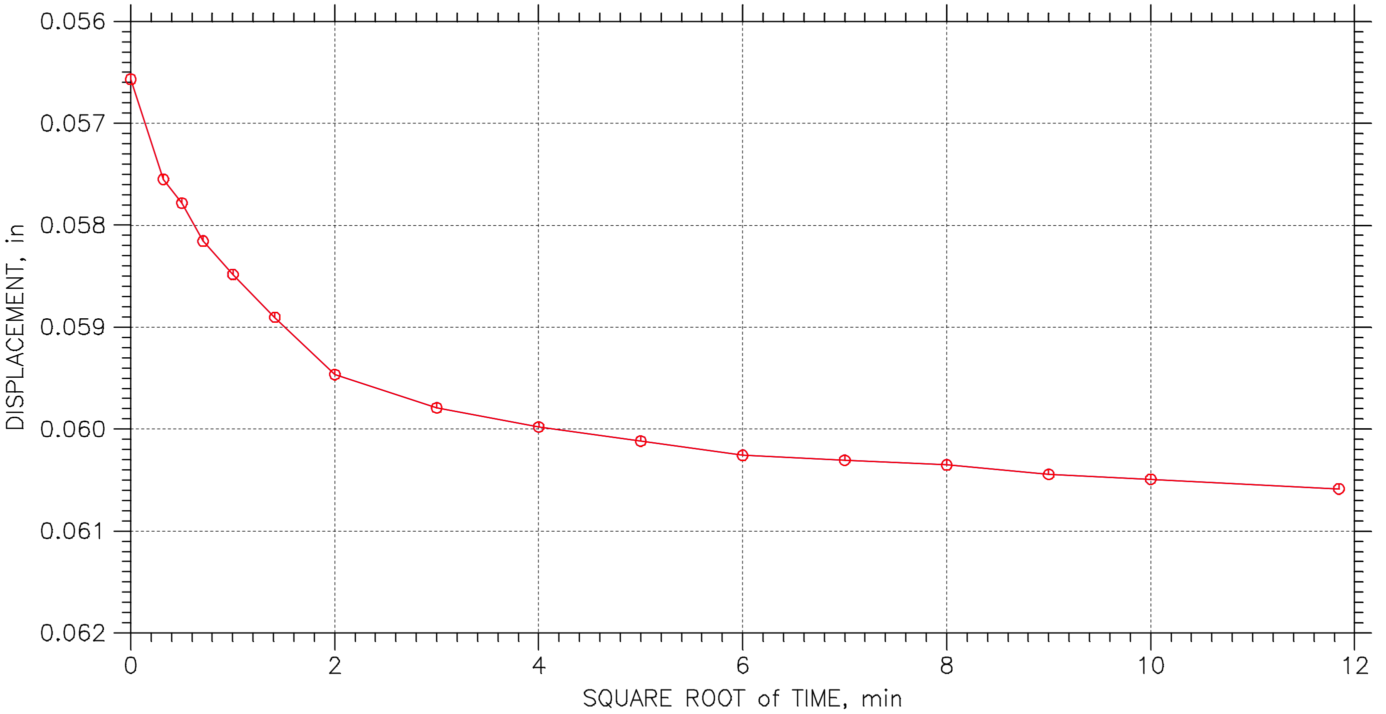
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

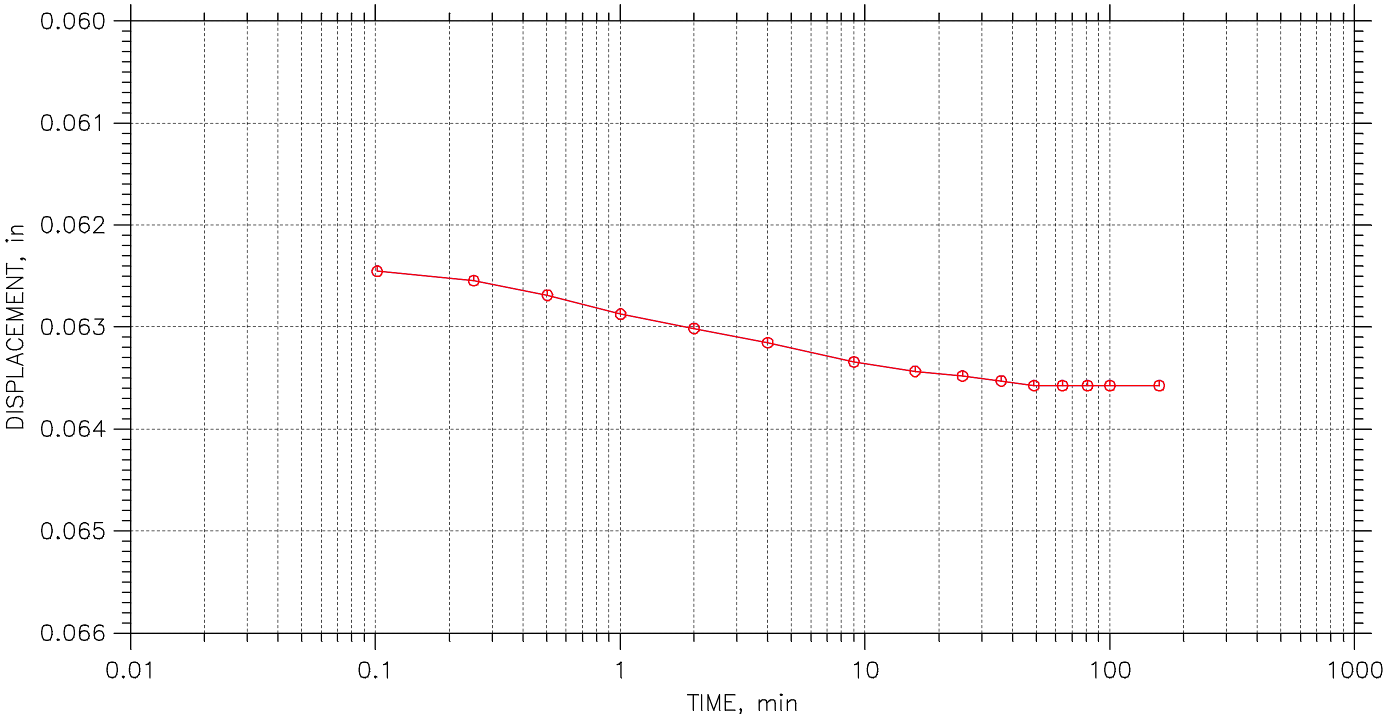
Mon, 16-NOV-2015 18:54:57

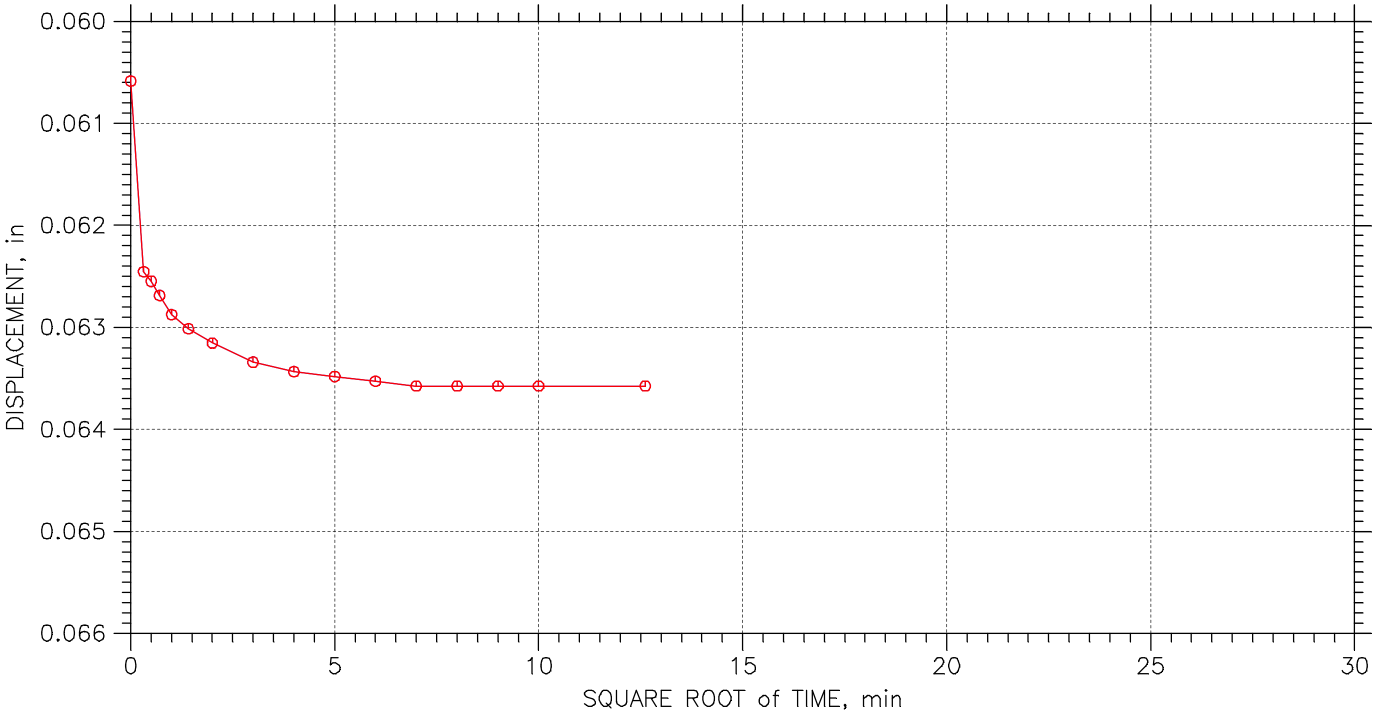
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

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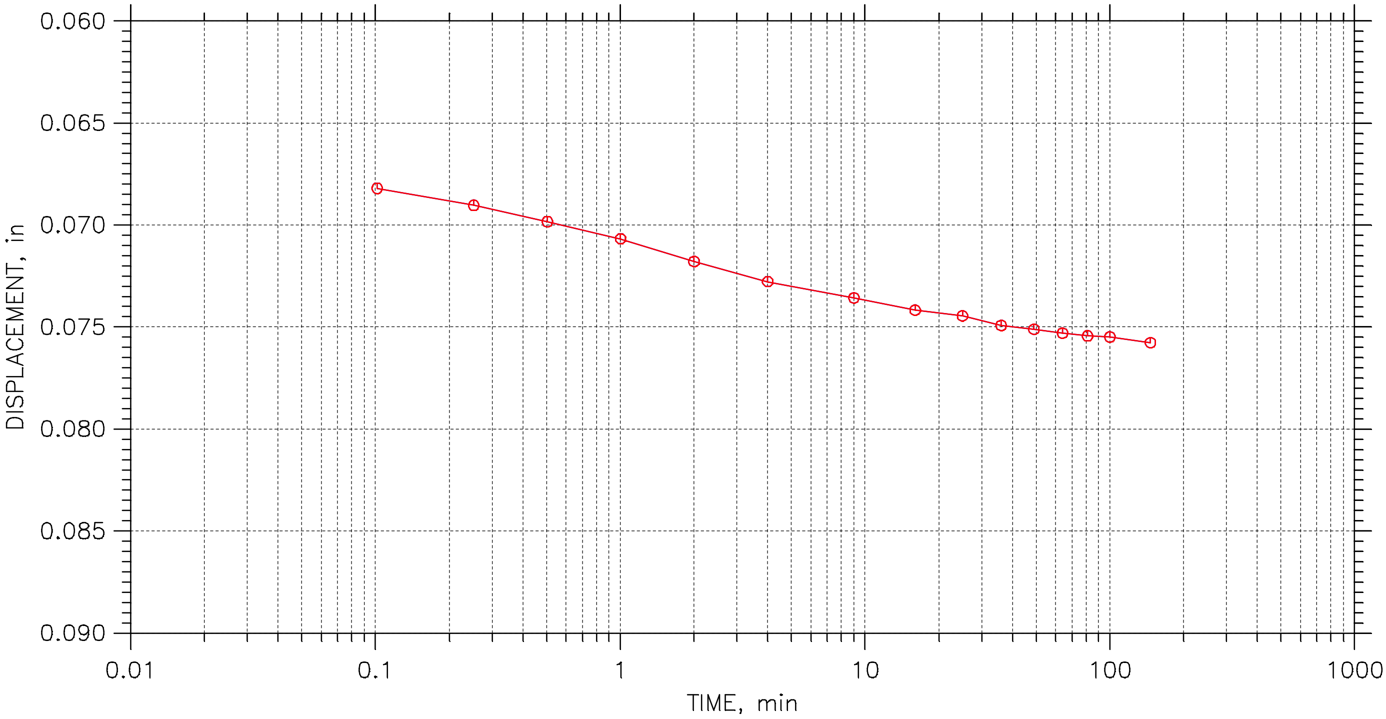
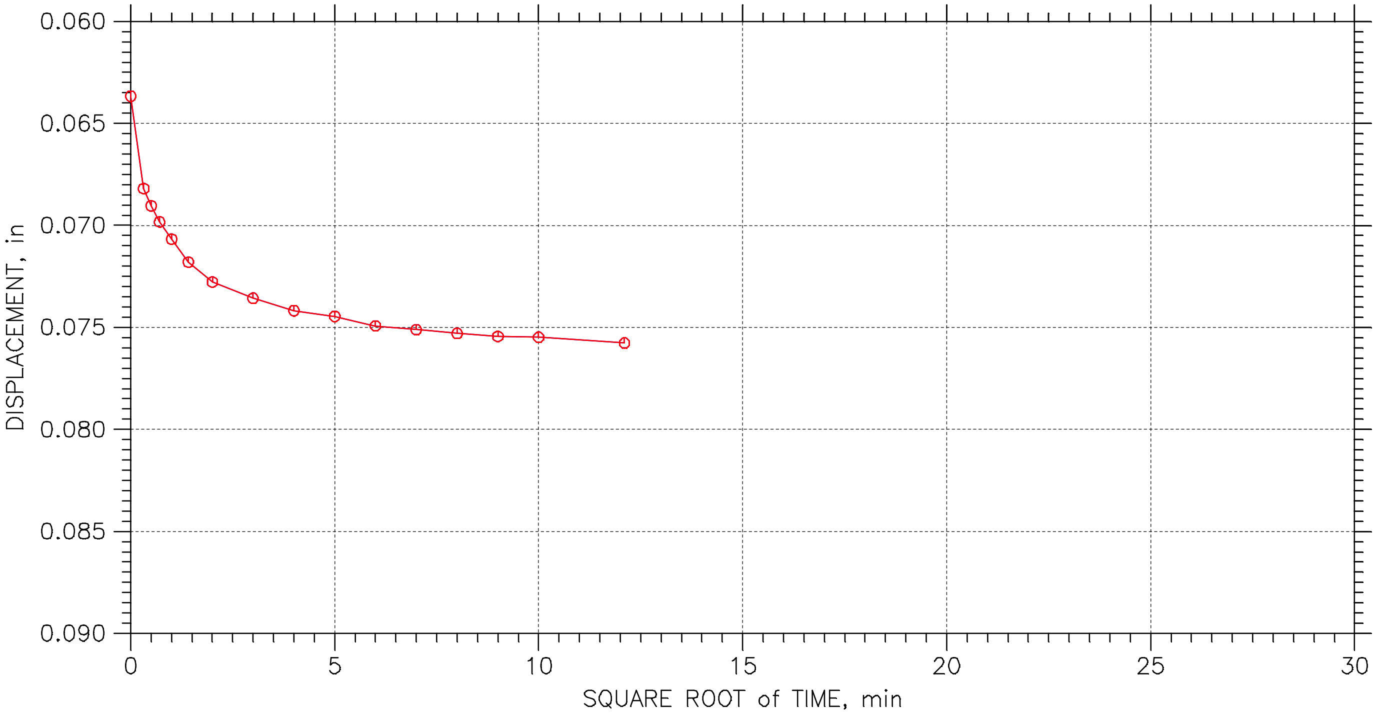
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

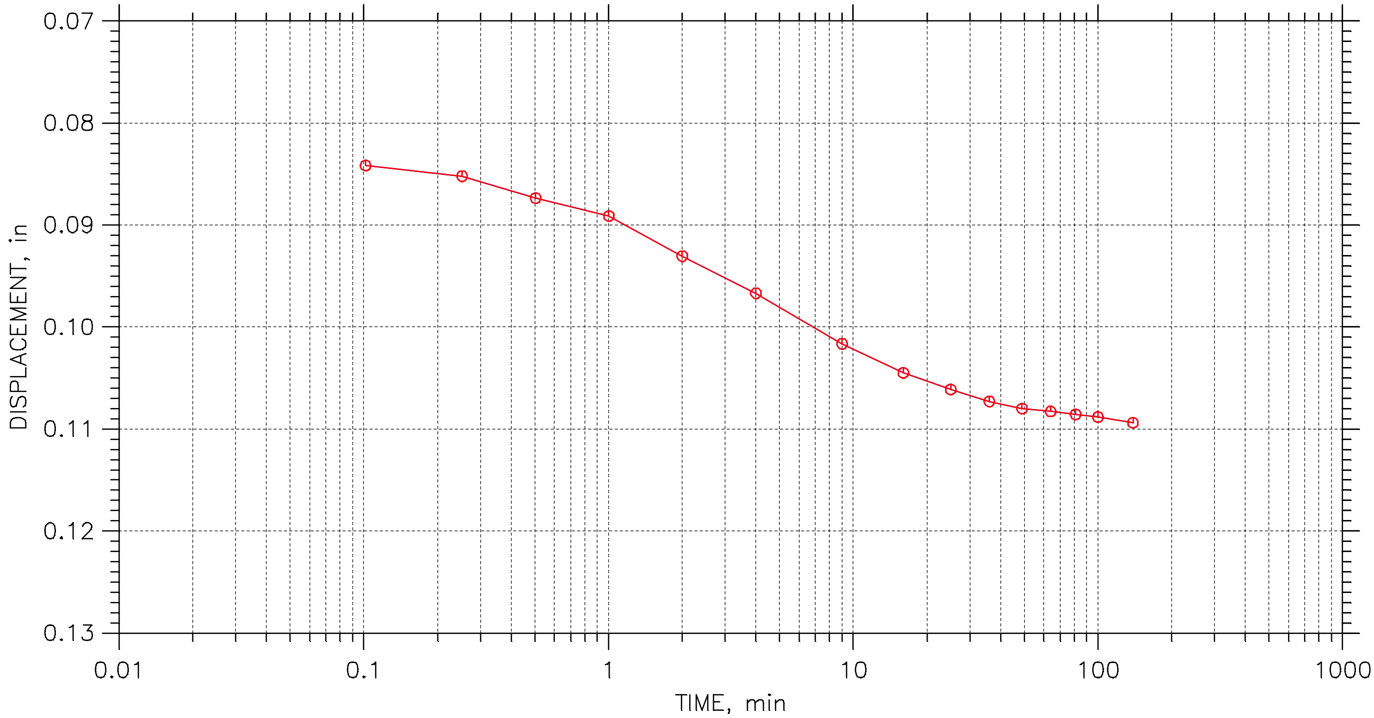
Mon, 16-NOV-2015 18:55:00

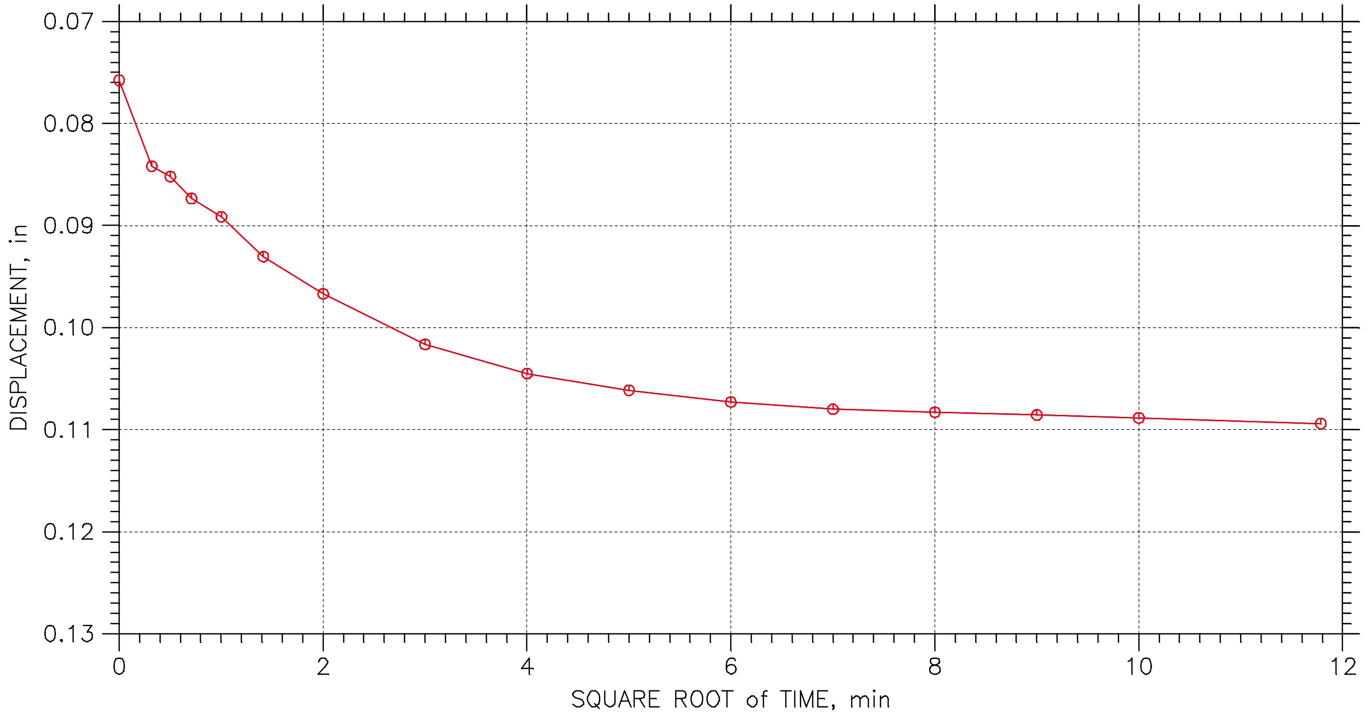
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

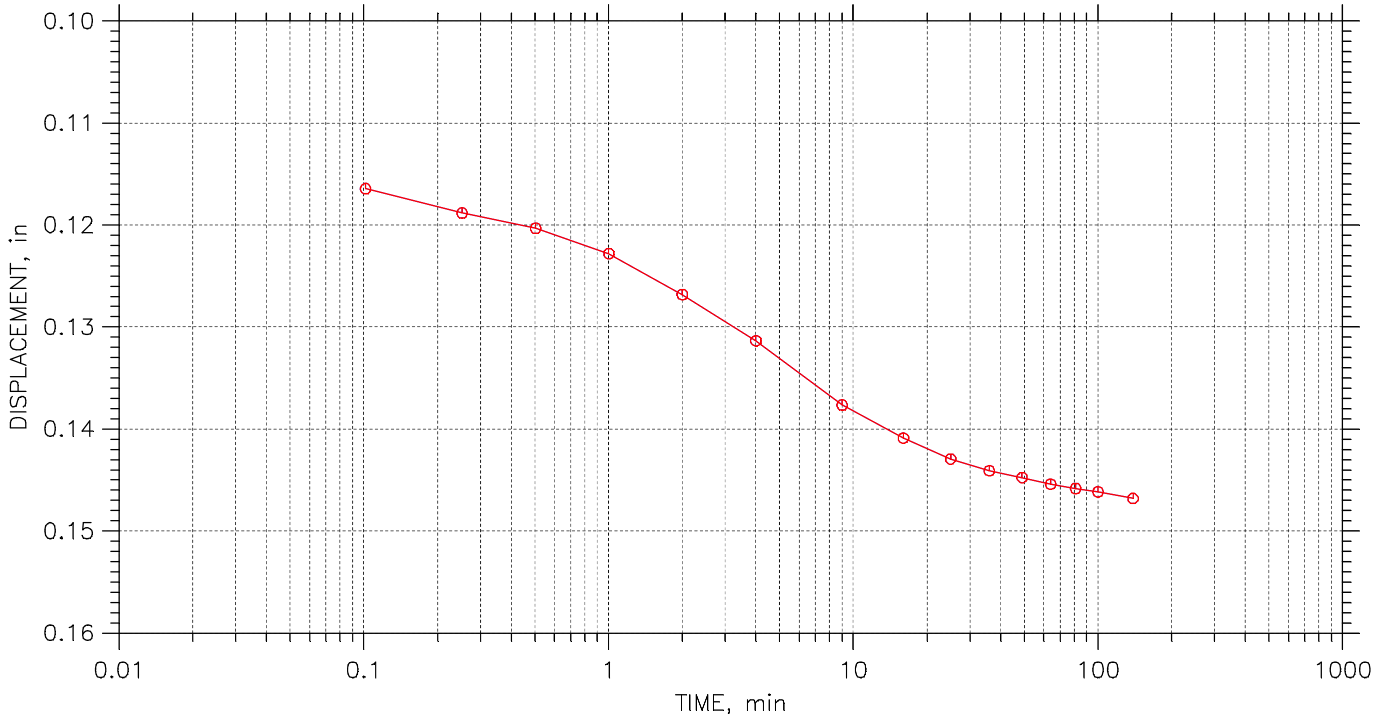
Mon, 16-NOV-2015 18:55:01

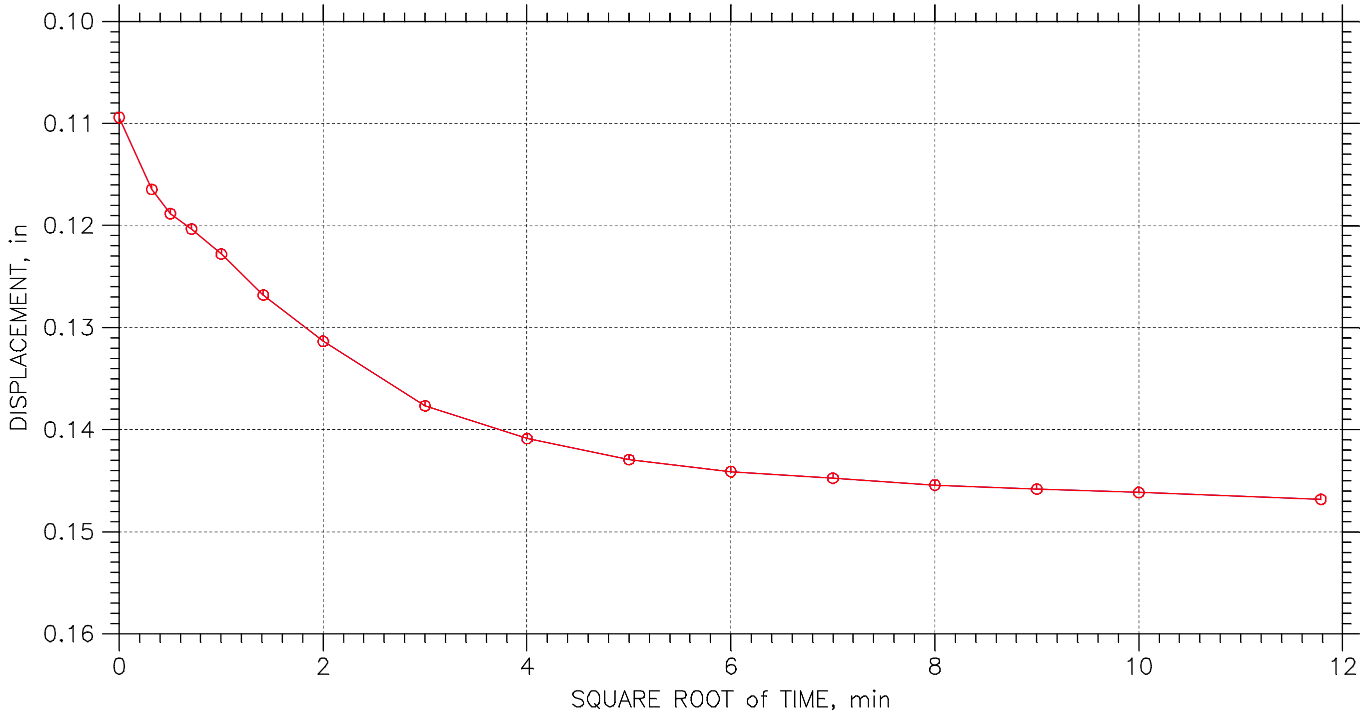
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf





Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

Terracon
Consulting Engineers & Scientists

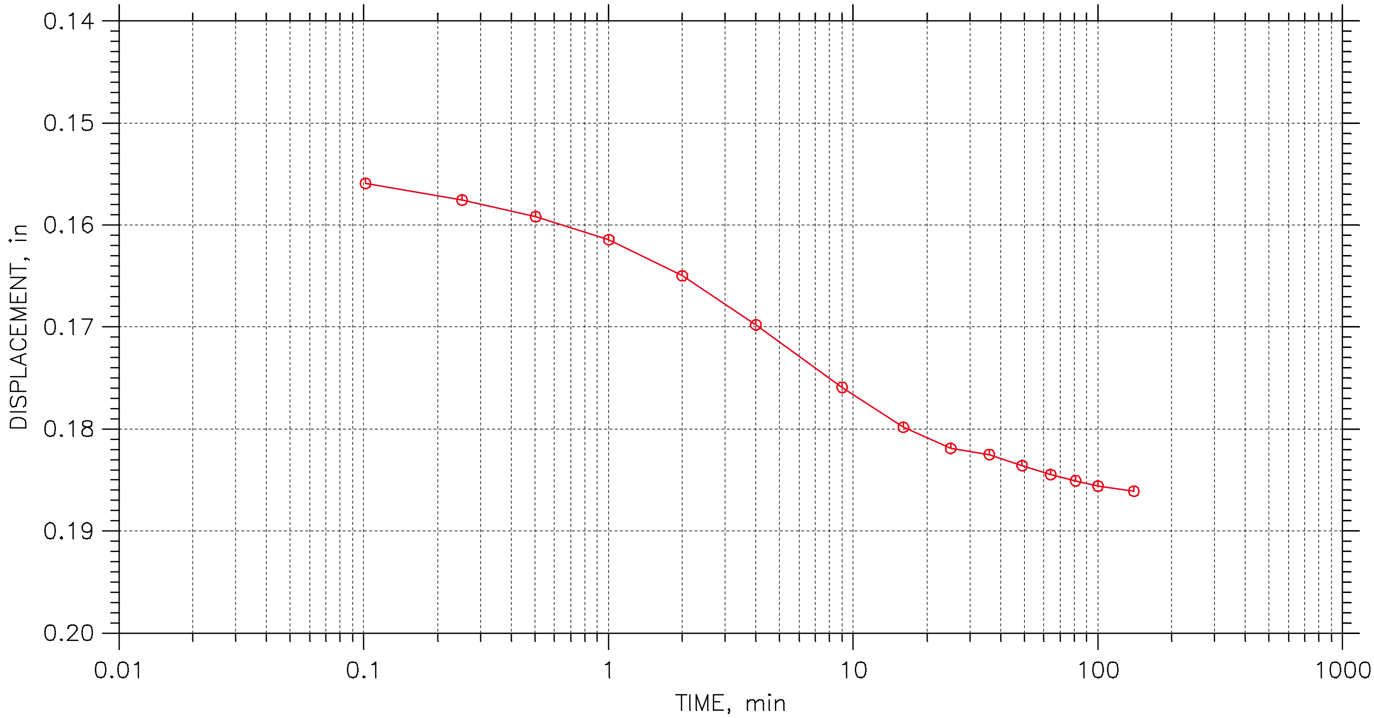
Mon, 16-NOV-2015 18:55:03

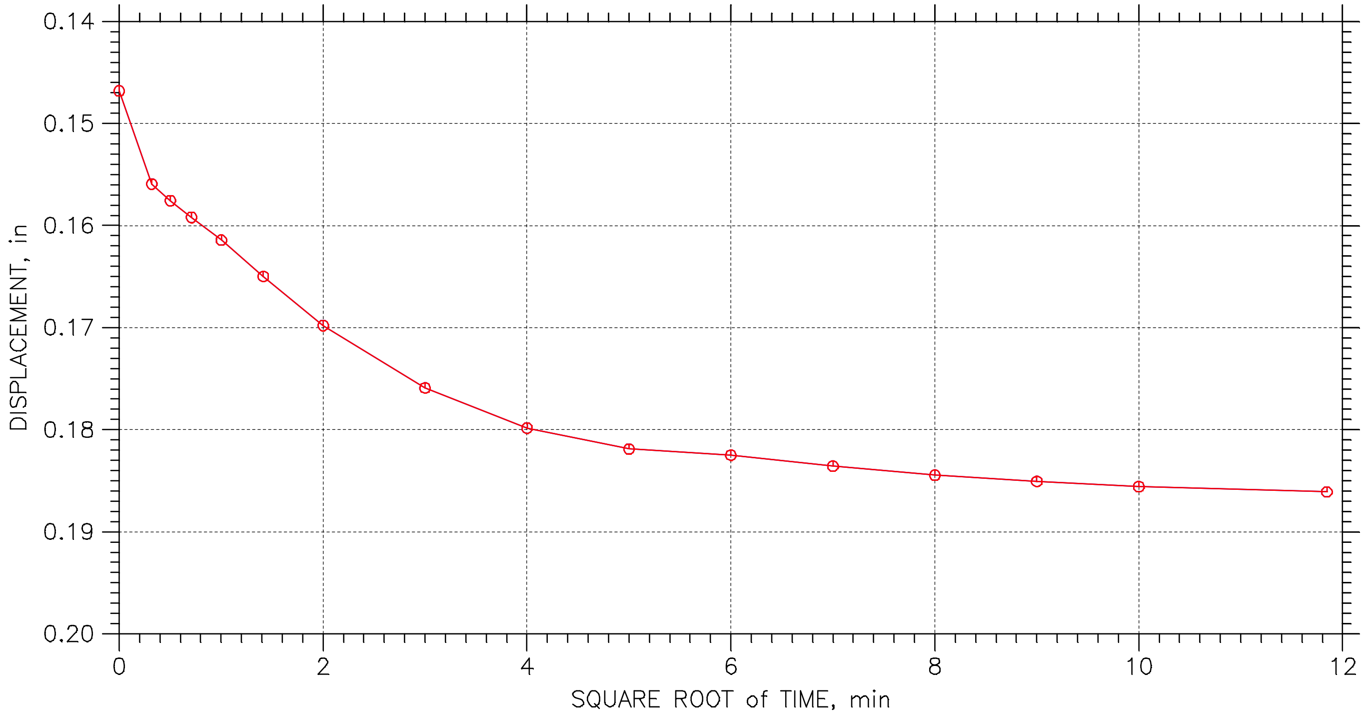
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf





Terracon Consulting Engineers & Scientists			
	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

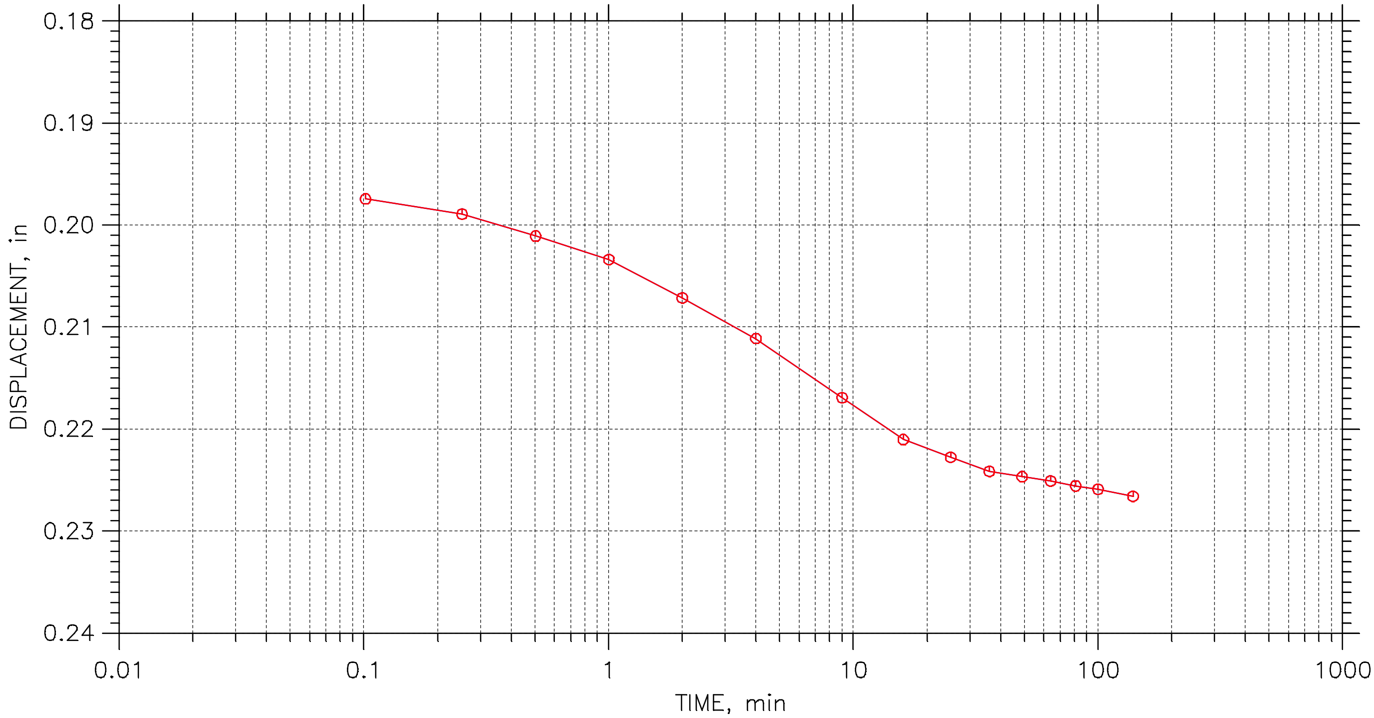
Mon, 16-NOV-2015 18:55:04

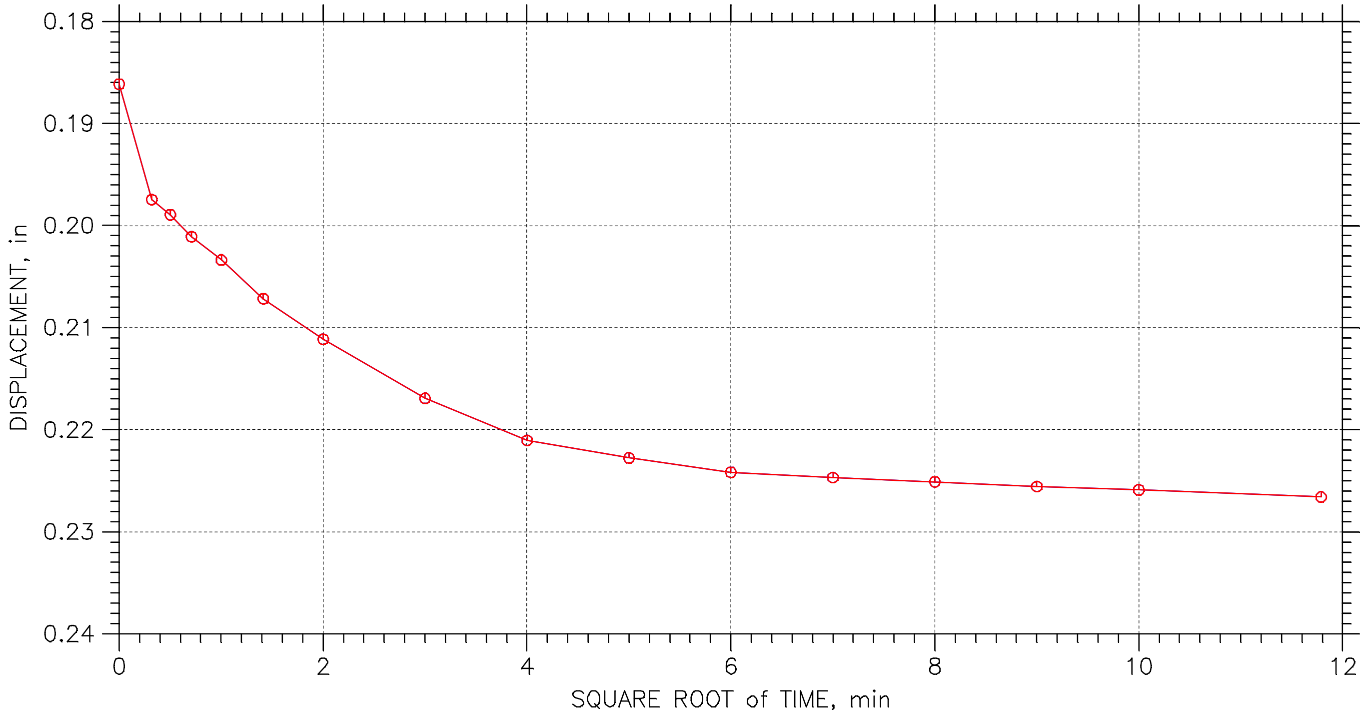
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf





Terracon
Consulting Engineers & Scientists

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

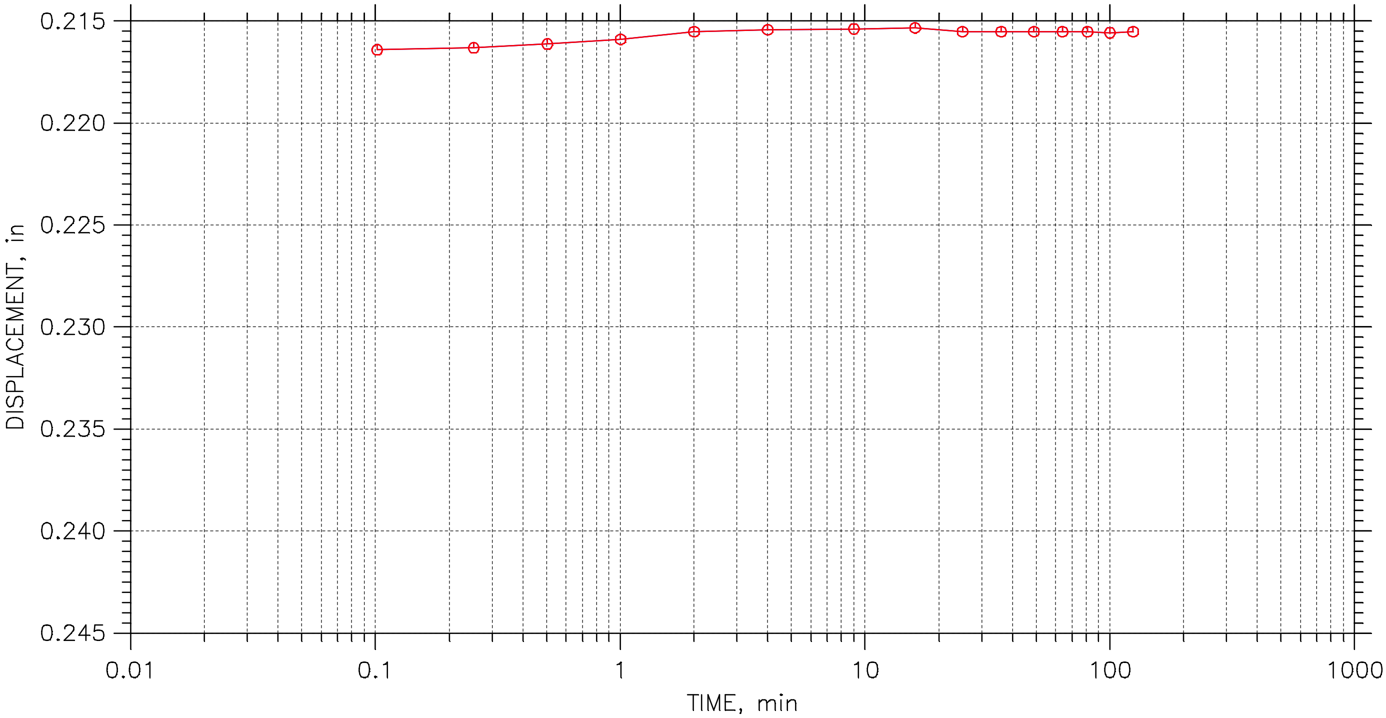
Mon, 16-NOV-2015 18:55:06

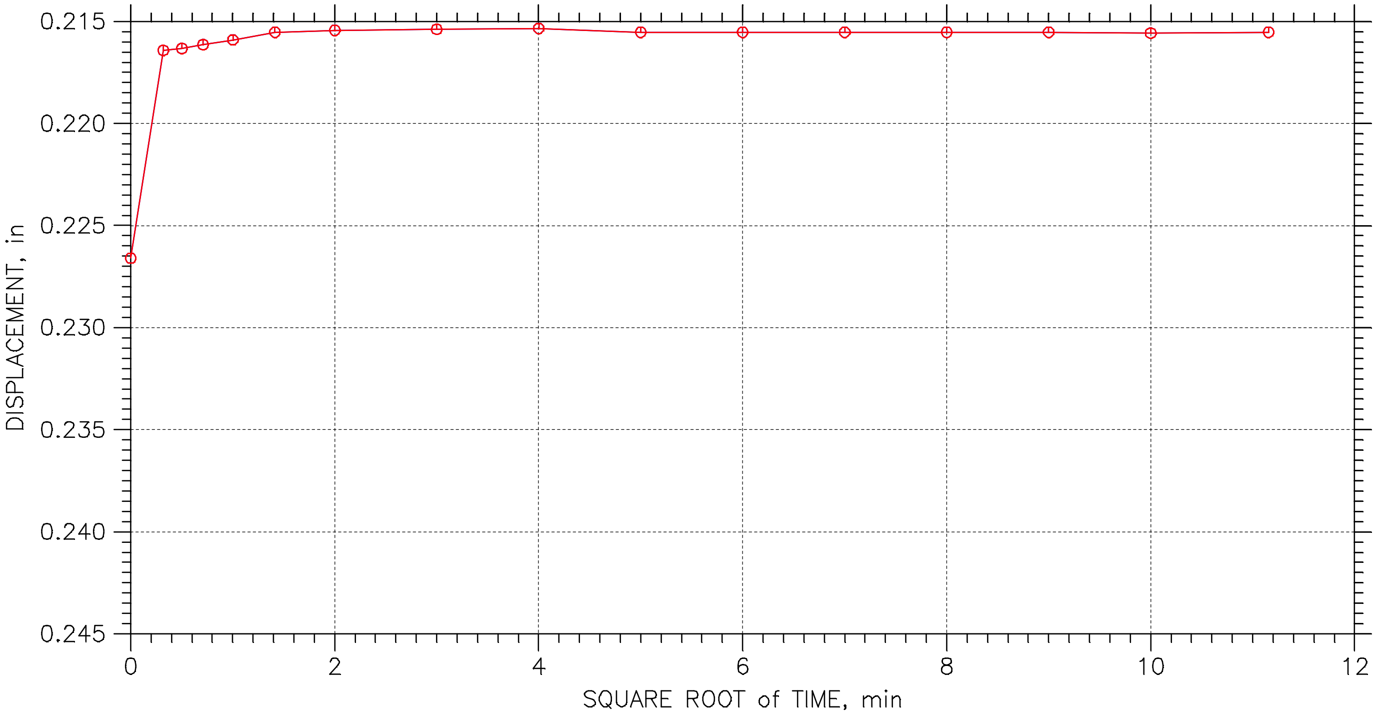
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf





Terracon Consulting Engineers & Scientists			
	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

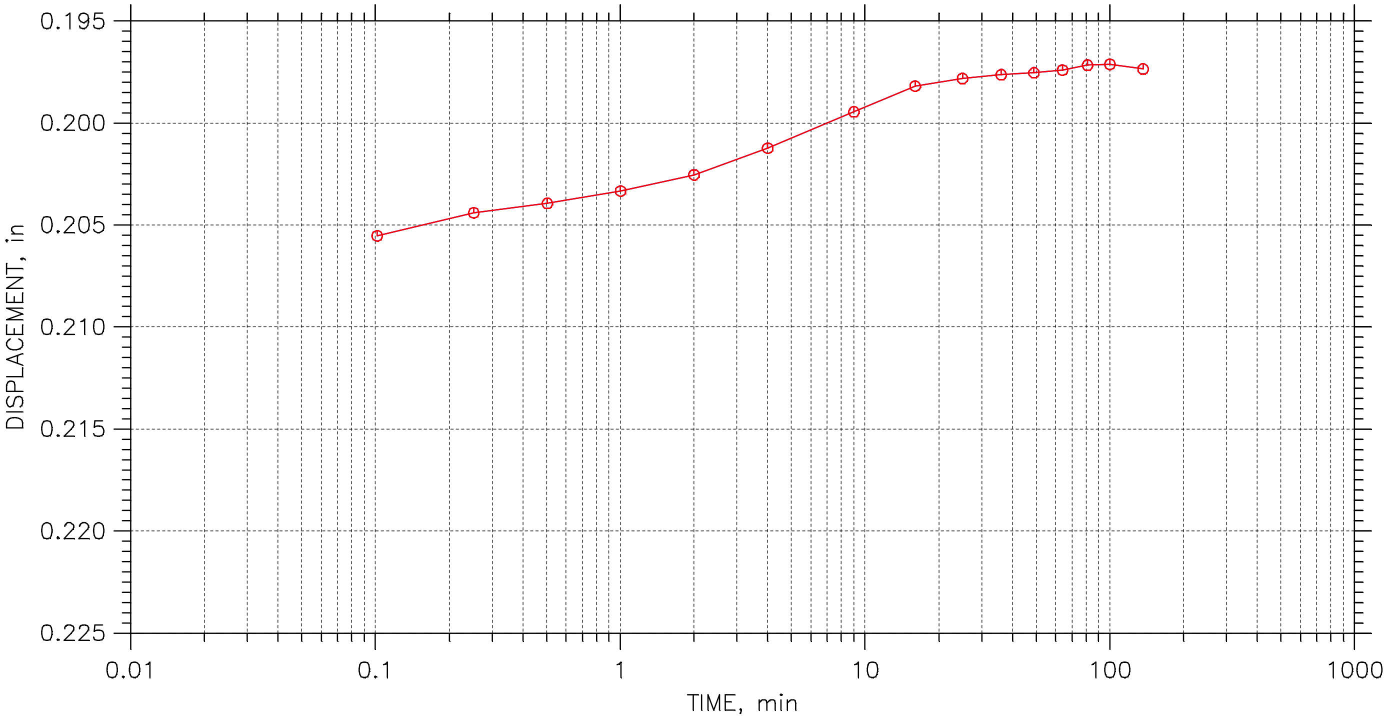
Mon, 16-NOV-2015 18:55:07

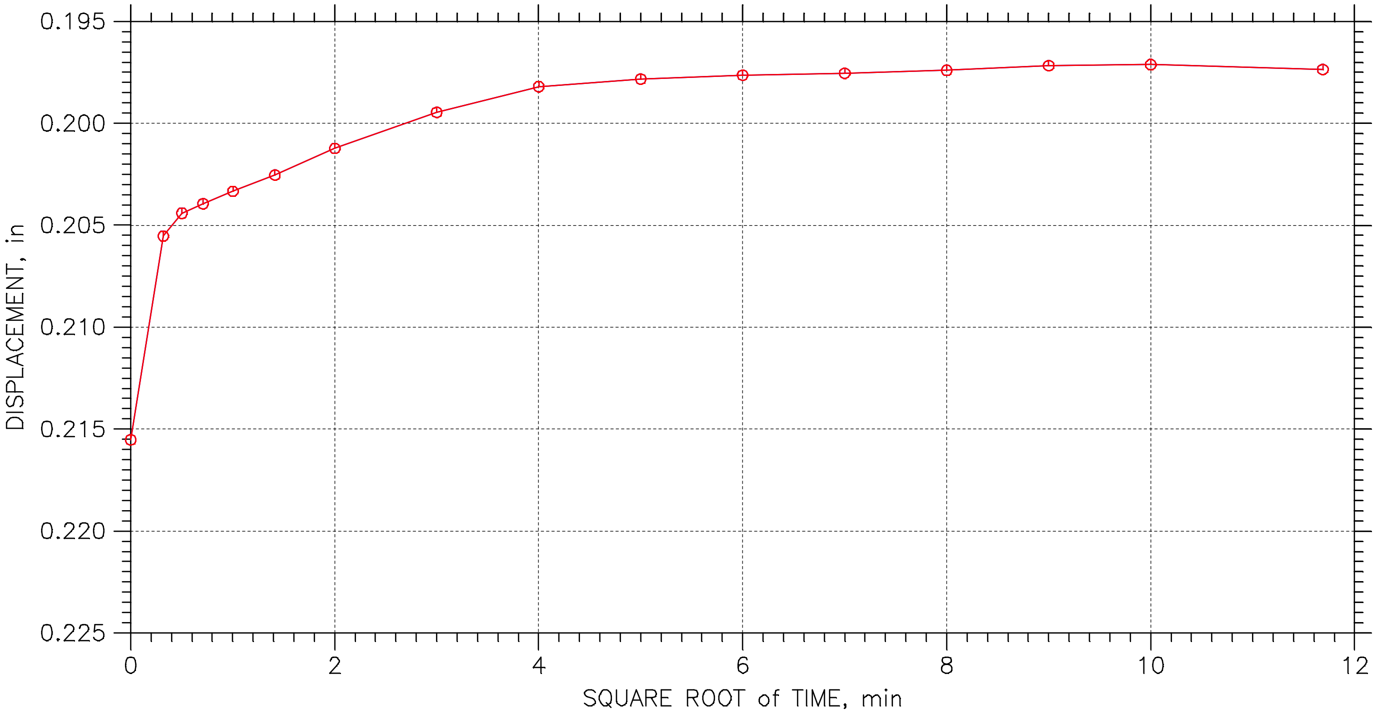
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf





Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

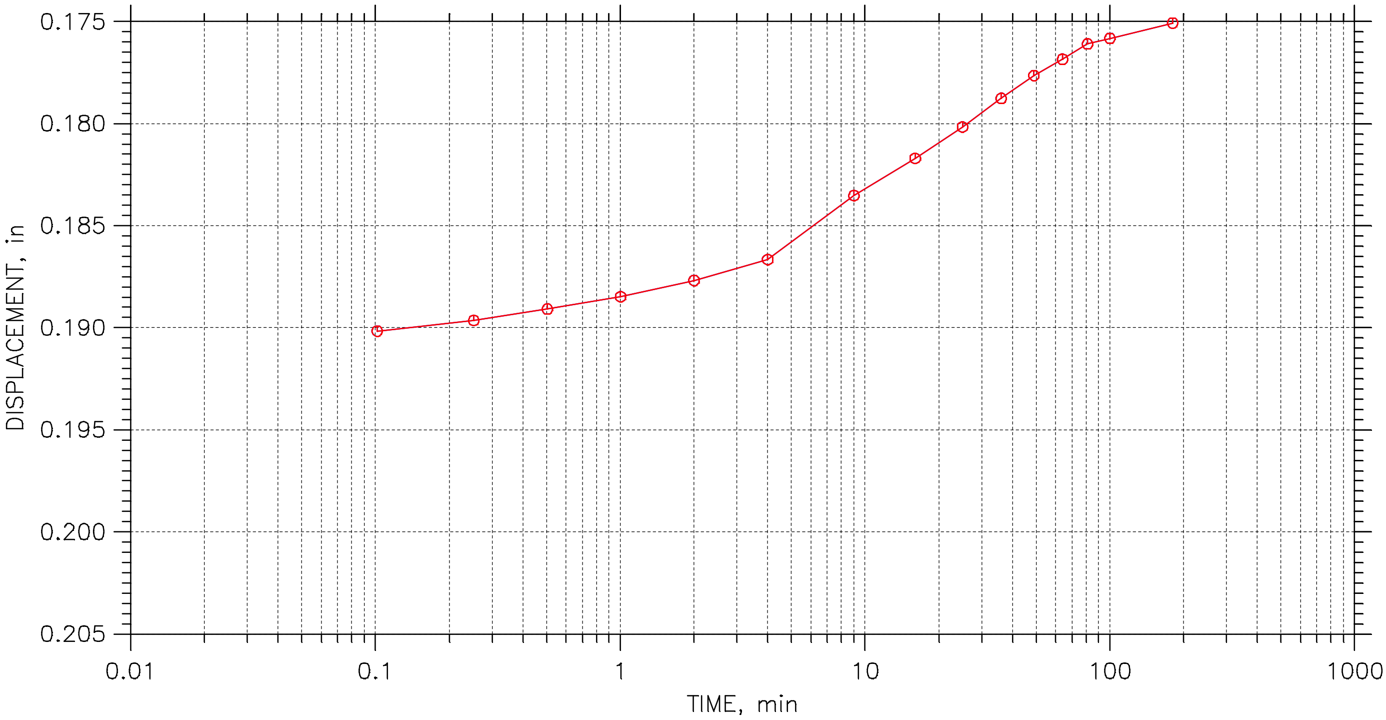
Mon, 16-NOV-2015 18:55:09

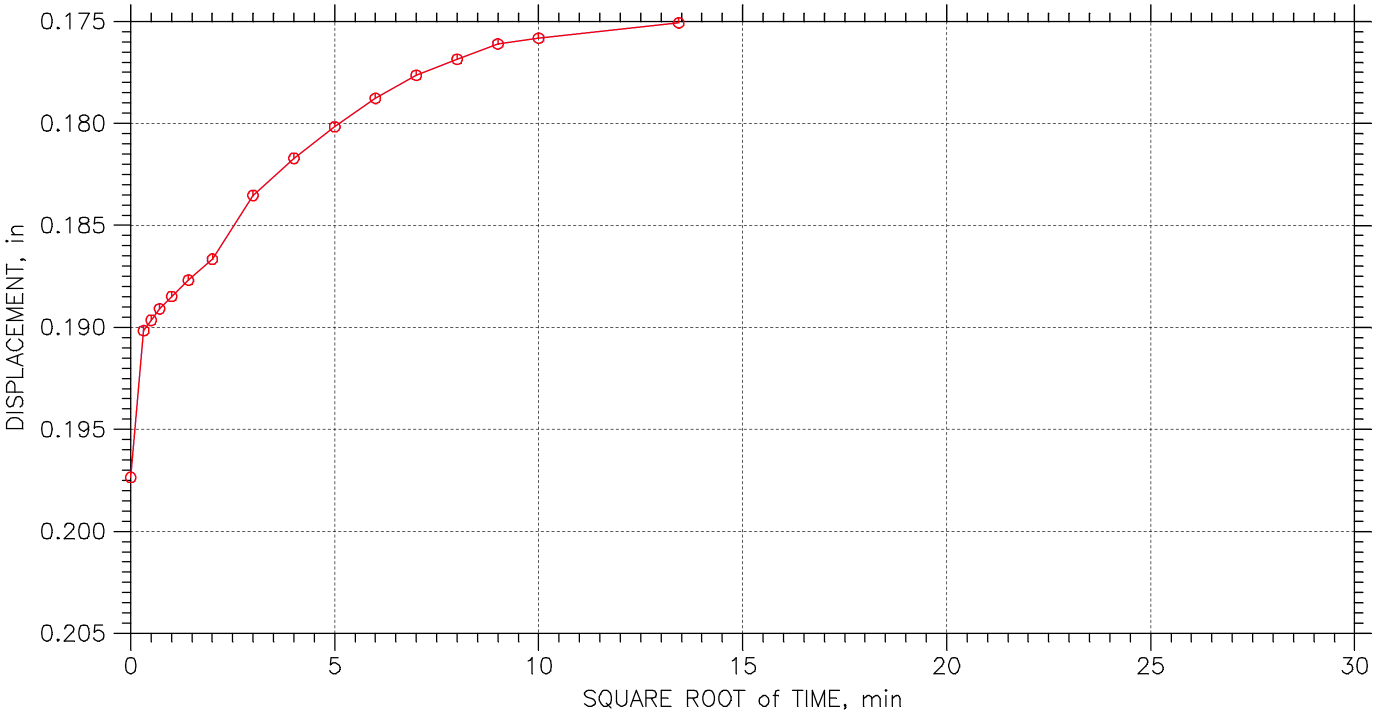
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf





Terracon
Consulting Engineers & Scientists

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

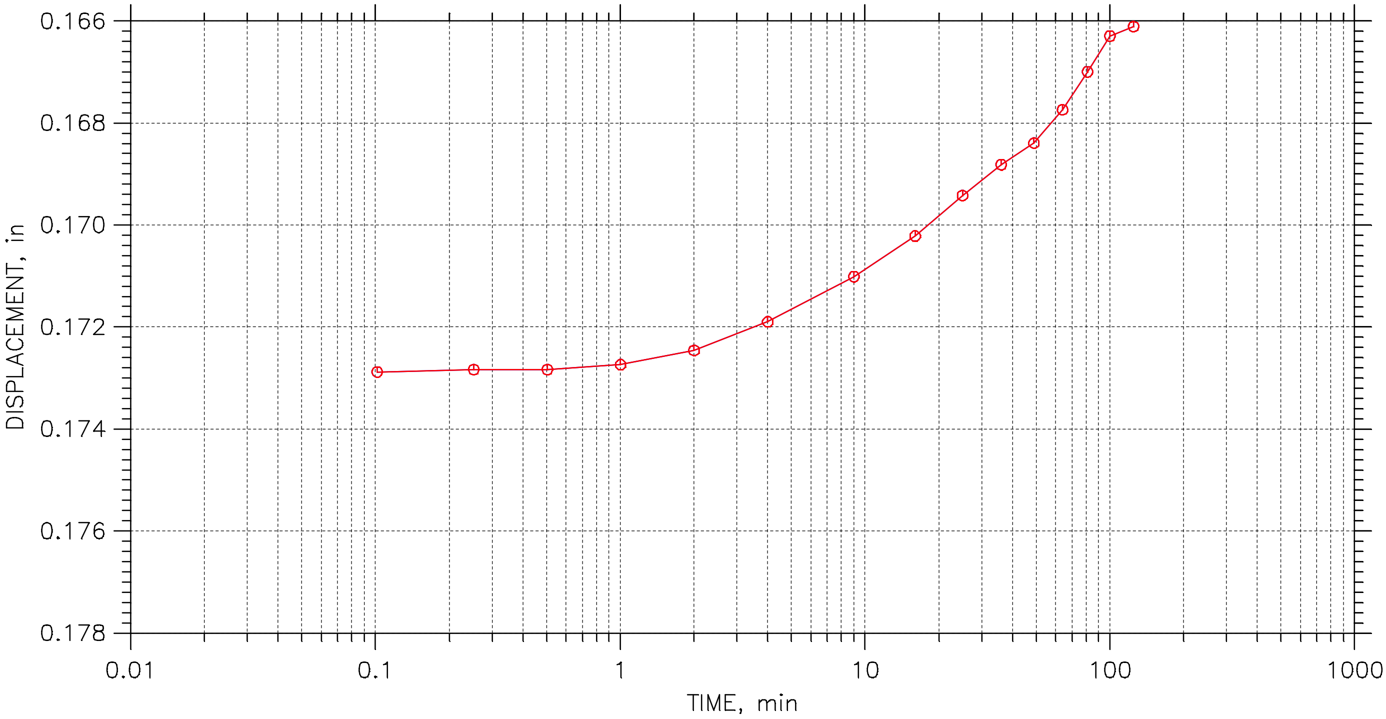
Mon, 16-NOV-2015 18:55:11

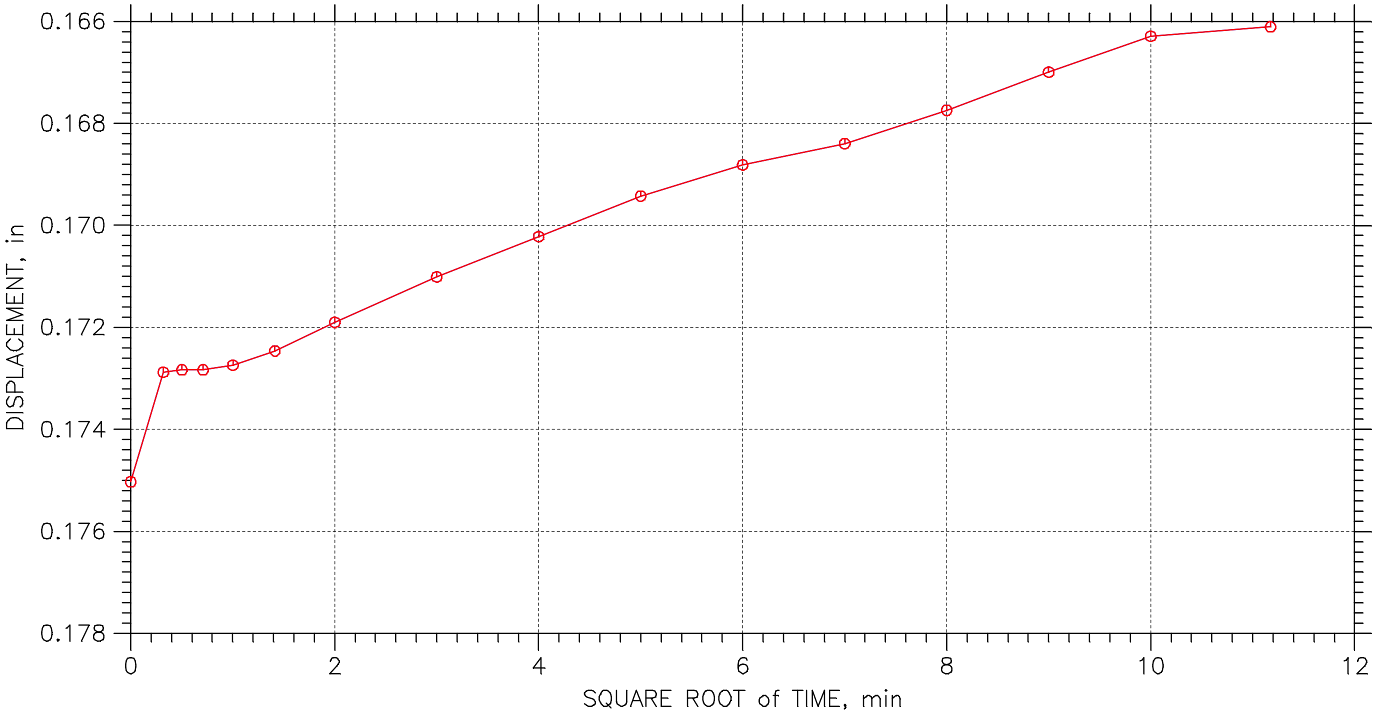
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf





Terracon
Consulting Engineers & Scientists

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

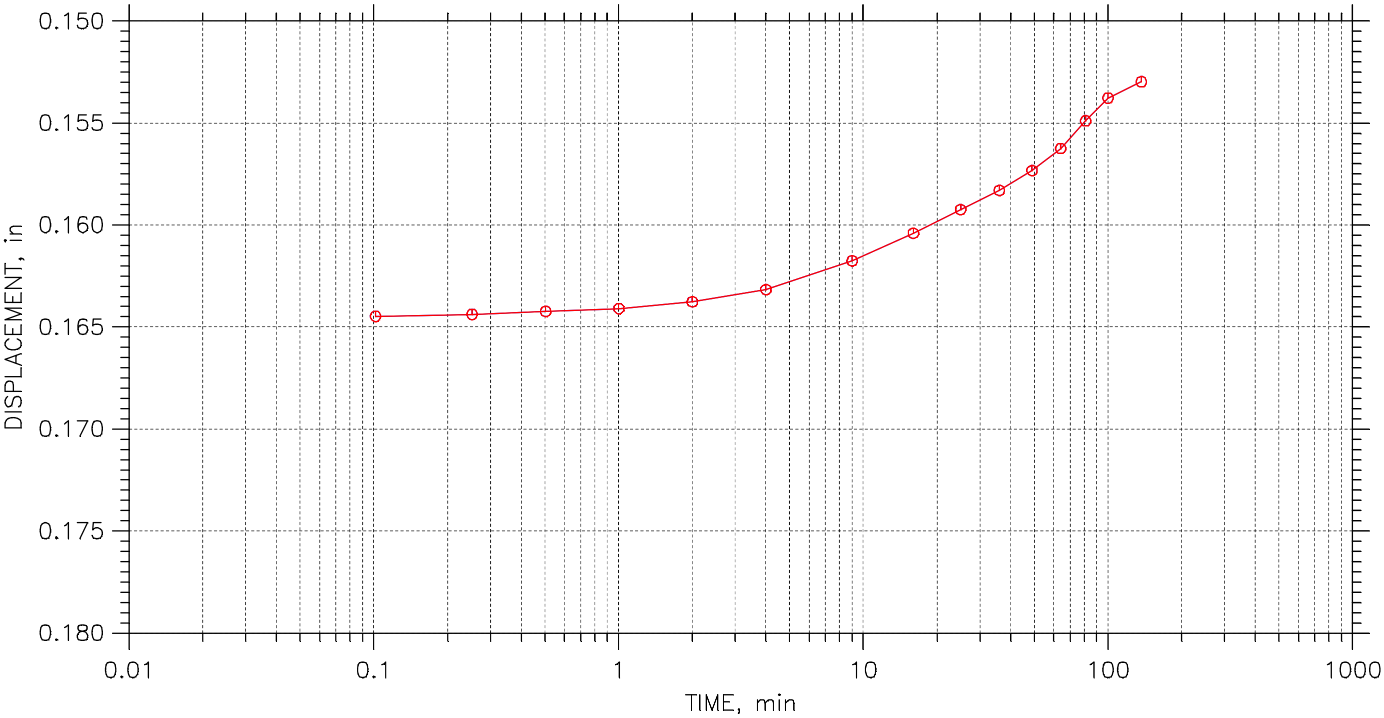
Mon, 16-NOV-2015 18:55:12

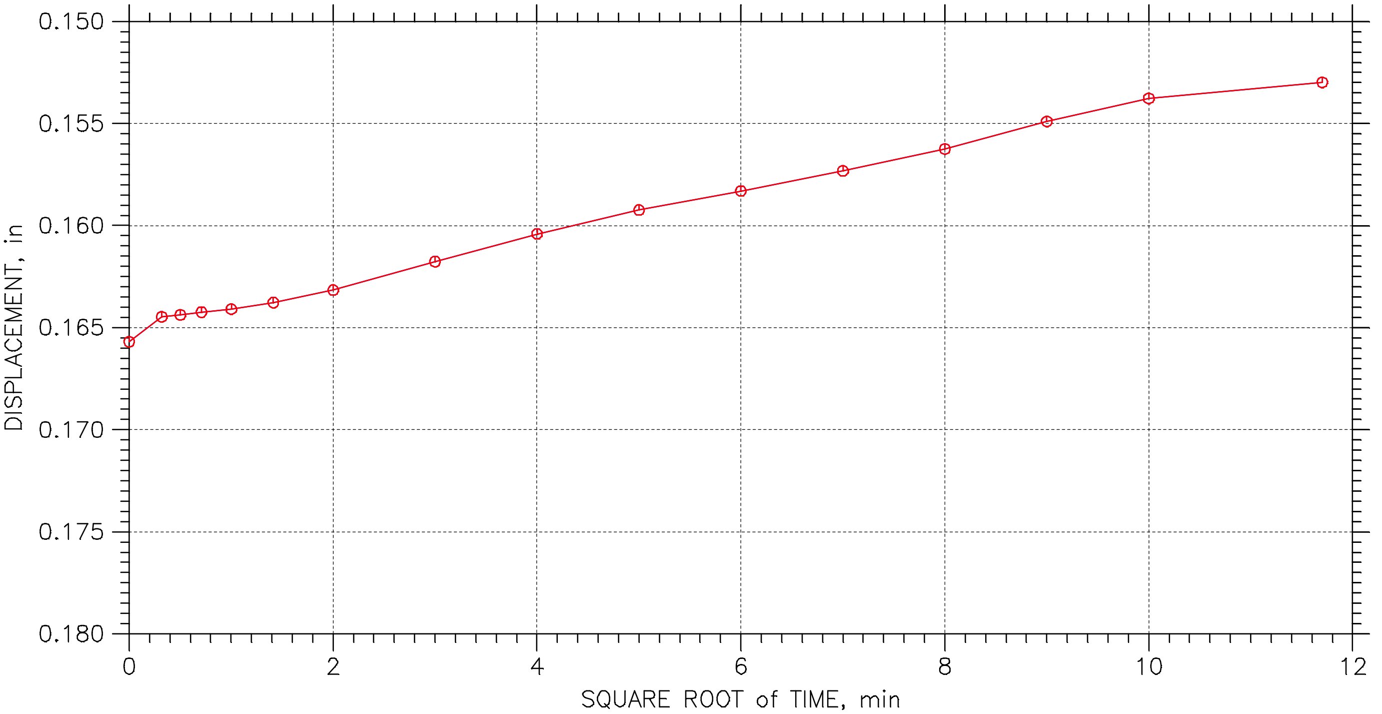
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



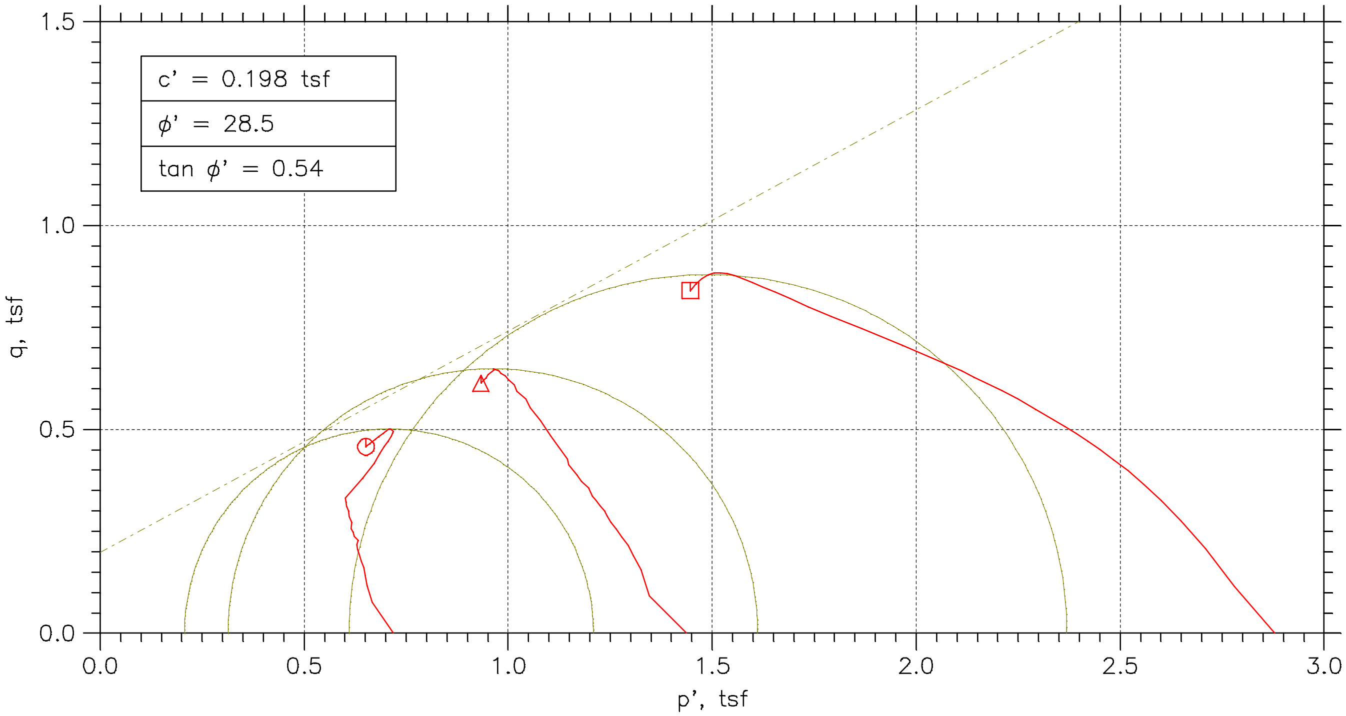


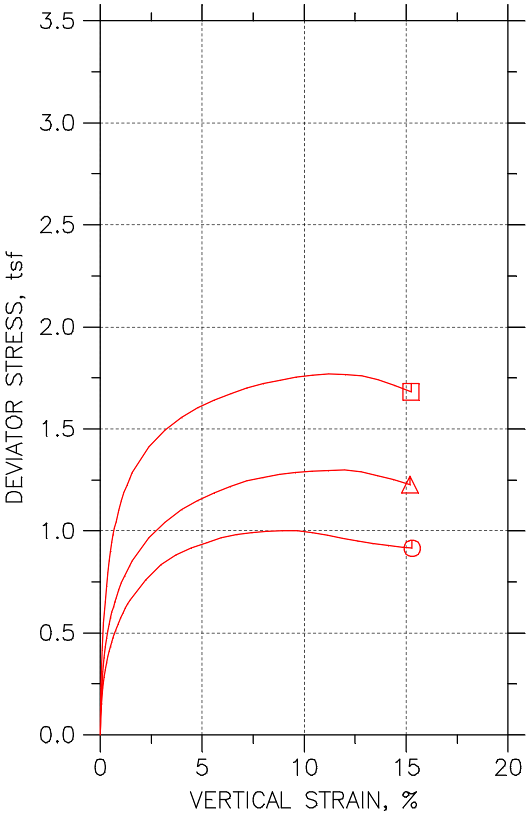
Terracon Consulting Engineers & Scientists	Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
	Boring No.: EDW-B008 S5	Tested By: HP	Checked By: BCM
	Sample No.: S-5	Test Date: 10/26/15	Depth: 11.0'-13.0'
	Test No.: EDWB008S5	Sample Type: 3.0'' ST	Elevation: -----
	Description: BROWN AND GRAY FAT CLAY WITH SAND CH		
	Remarks: Pc = 0.93 tsf Cc = 0.292 Ccr = 0.037 TEST PERFORMED AS PER ASTM D2435		

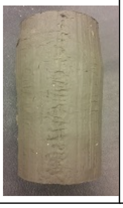
Mon, 16-NOV-2015 18:55:14

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

Terracon
Consulting Engineers & Scientists





Symbol		○	△	□	
Test No.		10.0 PSI	20.0 PSI	40.0 PSI	
Initial	Diameter, in	2.8213	2.8323	2.8173	
	Height, in	6.3035	6.2161	6.1913	
	Water Content, %	75.11	79.41	77.79	
	Dry Density, pcf	54.95	52.86	53.58	
	Saturation, %	99.96	99.73	99.68	
	Void Ratio	1.9536	2.0704	2.0291	
Before Shear	Water Content, %	68.95	65.19	53.75	
	Dry Density, pcf	58.12	60.23	67.7	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	1.7926	1.6948	1.3974	
	Back Press., tsf	5.0417	5.0434	5.0421	
Minor Prin. Stress, tsf		0.71831	1.4366	2.8779	
Max. Dev. Stress, tsf		1.0023	1.2984	1.7688	
Time to Failure, min		780	900	840	
Strain Rate, %/min		0.02	0.02	0.02	
B-Value		0.96	0.99	0.95	
Estimated Specific Gravity		2.60	2.60	2.60	
Liquid Limit		72	72	72	
Plastic Limit		37	37	37	
Plasticity Index		35	35	35	
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW006 S9

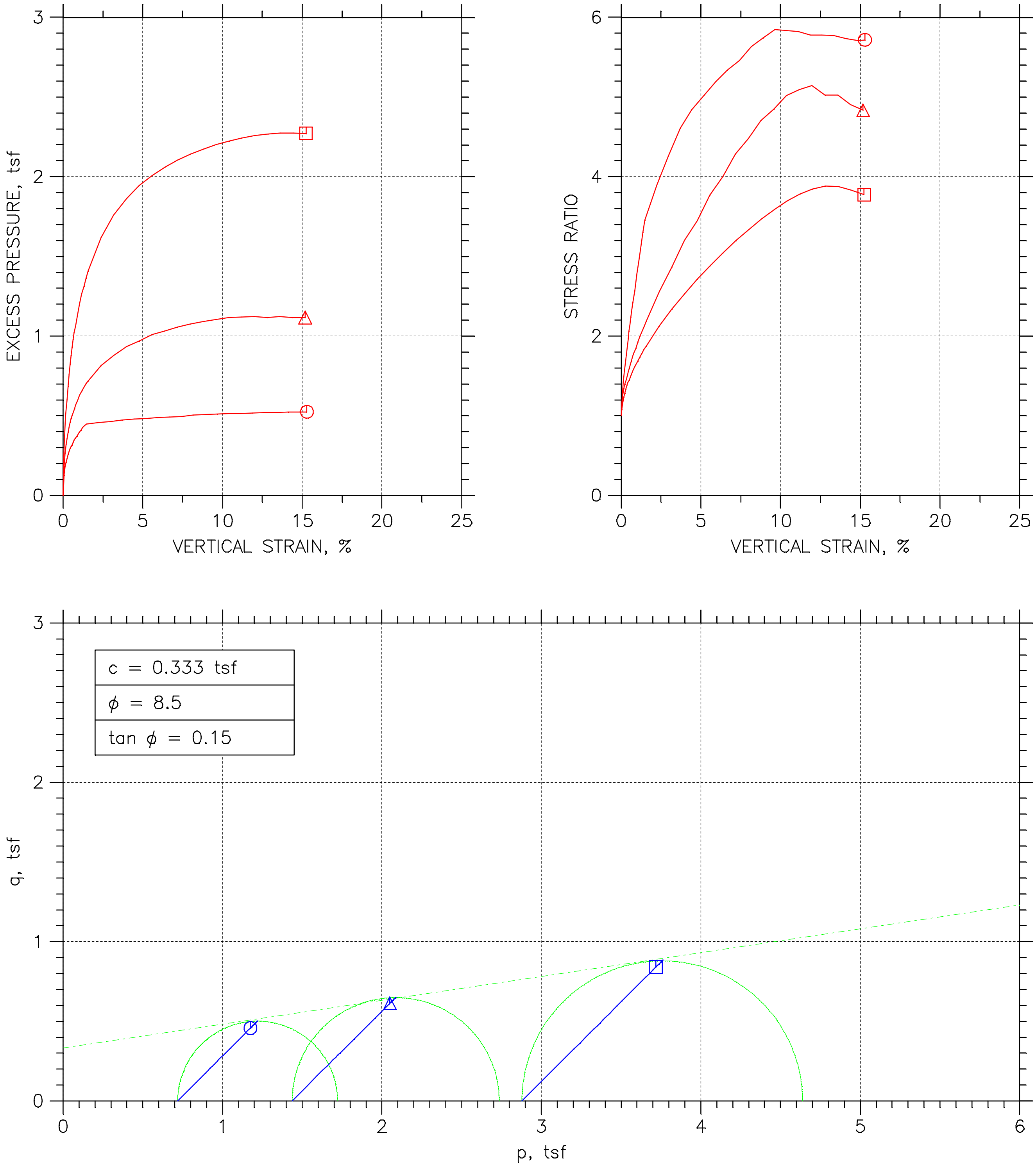
Sample Type: 3.0'' ST

Description: DARK GRAY ORGANIC SILT OH SHELL NOTED

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Mon, 16-NOV-2015 19:59:37

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767



c = 0.333 tsf

ϕ = 8.5

tan ϕ = 0.15

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW006 S9	Tested By: BCM	Checked By: WPQ
Sample No.: S-9	Test Date: 10/29/15	Depth: 26.0'-28.0'
Test No.: EDW006 S9	Sample Type: 3.0'' ST	Elevation: ----
Description: DARK GRAY ORGANIC SILT OH SHELL NOTED		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.		

Mon, 16-NOV-2015 20:00:32

TRIAXIAL TEST

Terracon
Consulting Engineers & Scientists

Project: DYNEGY EDWARDS
Boring No.: EDW006 S9
Sample No.: S-9
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.30 in
Specimen Area: 6.25 in^2
Specimen Volume: 39.41 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2514	0	0	5.0417	5.76	5.76
2	5.0001	0.062925	6.2553	13.244	0.15244	5.17	5.76	5.9124
3	10	0.12448	6.2592	20.256	0.233	5.2217	5.76	5.993
4	15	0.18877	6.2632	24.54	0.28211	5.2513	5.76	6.0421
5	20	0.2517	6.2672	27.823	0.31965	5.2728	5.76	6.0796
6	25	0.31326	6.271	30.773	0.35331	5.2966	5.76	6.1133
7	30	0.37618	6.275	33.555	0.38502	5.3169	5.76	6.145
8	35	0.43911	6.279	35.892	0.41157	5.3355	5.76	6.1716
9	40	0.4993	6.2828	37.896	0.43428	5.3483	5.76	6.1943
10	45	0.56085	6.2866	39.843	0.45632	5.3564	5.76	6.2163
11	50	0.62241	6.2905	41.568	0.47578	5.375	5.76	6.2358
12	55	0.68534	6.2945	43.405	0.49649	5.3878	5.76	6.2565
13	60	0.74689	6.2984	44.74	0.51144	5.4	5.76	6.2714
14	70	0.87137	6.3063	47.578	0.5432	5.4145	5.76	6.3032
15	80.001	0.99586	6.3143	50.305	0.57361	5.4371	5.76	6.3336
16	90.001	1.119	6.3221	52.698	0.60015	5.4511	5.76	6.3602
17	100	1.2393	6.3298	54.645	0.62158	5.4662	5.76	6.3816
18	110	1.3625	6.3377	56.704	0.64419	5.4795	5.76	6.4042
19	120	1.4856	6.3457	58.429	0.66296	5.49	5.76	6.423
20	180	2.2256	6.3937	67.5	0.76012	5.4975	5.76	6.5201
21	240	2.9766	6.4432	74.567	0.83326	5.5045	5.76	6.5933
22	300	3.7112	6.4923	79.52	0.88187	5.5155	5.76	6.6419
23	360	4.4485	6.5424	83.304	0.91676	5.5214	5.76	6.6768
24	420	5.2009	6.5943	86.308	0.94235	5.5254	5.76	6.7024
25	480	5.9368	6.6459	89.202	0.96639	5.5295	5.76	6.7264
26	540	6.6769	6.6986	91.372	0.98211	5.5335	5.76	6.7421
27	600	7.4293	6.7531	92.93	0.99081	5.5376	5.76	6.7508
28	660	8.1638	6.8071	94.322	0.99766	5.5446	5.76	6.7577
29	720	8.9039	6.8624	95.435	1.0013	5.5486	5.76	6.7613
30	780	9.6562	6.9196	96.325	1.0023	5.5533	5.76	6.7623
31	840	10.394	6.9765	96.047	0.99124	5.555	5.76	6.7512
32	900	11.131	7.0344	95.768	0.98023	5.5568	5.76	6.7402
33	960	11.883	7.0944	94.878	0.9629	5.5585	5.76	6.7229
34	1020	12.607	7.1532	94.489	0.95107	5.5608	5.76	6.7111
35	1080	13.351	7.2146	94.043	0.93853	5.5632	5.76	6.6985
36	1140	14.11	7.2784	93.876	0.92866	5.5637	5.76	6.6887
37	1200	14.841	7.3408	93.71	0.91912	5.5649	5.76	6.6791
38	1236.6	15.291	7.3798	93.765	0.91481	5.5661	5.76	6.6748

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW006 S9
Sample No.: S-9
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.30 in
Specimen Area: 6.25 in^2
Specimen Volume: 39.41 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.76	5.76	0	0.000	0.71831	0.71831	1.000	0.71831	0
2	0.06	5.9124	5.76	0.12834	0.842	0.74242	0.58998	1.258	0.6662	0.07622
3	0.12	5.993	5.76	0.18002	0.773	0.77129	0.53829	1.433	0.65479	0.1165
4	0.19	6.0421	5.76	0.20963	0.743	0.79079	0.50868	1.555	0.64973	0.14105
5	0.25	6.0796	5.76	0.23112	0.723	0.80684	0.48719	1.656	0.64702	0.15982
6	0.31	6.1133	5.76	0.25493	0.722	0.8167	0.46338	1.762	0.64004	0.17666
7	0.38	6.145	5.76	0.27525	0.715	0.82807	0.44306	1.869	0.63556	0.19251
8	0.44	6.1716	5.76	0.29384	0.714	0.83605	0.42447	1.970	0.63026	0.20579
9	0.50	6.1943	5.76	0.30661	0.706	0.84598	0.4117	2.055	0.62884	0.21714
10	0.56	6.2163	5.76	0.31474	0.690	0.85989	0.40357	2.131	0.63173	0.22816
11	0.62	6.2358	5.76	0.33333	0.701	0.86077	0.38499	2.236	0.62288	0.23789
12	0.69	6.2565	5.76	0.3461	0.697	0.8687	0.37221	2.334	0.62045	0.24824
13	0.75	6.2714	5.76	0.3583	0.701	0.87146	0.36002	2.421	0.61574	0.25572
14	0.87	6.3032	5.76	0.37281	0.686	0.8887	0.3455	2.572	0.6171	0.2716
15	1.00	6.3336	5.76	0.39546	0.689	0.89647	0.32285	2.777	0.60966	0.28681
16	1.12	6.3602	5.76	0.4094	0.682	0.90907	0.30891	2.943	0.60899	0.30008
17	1.24	6.3816	5.76	0.4245	0.683	0.91539	0.29382	3.116	0.6046	0.31079
18	1.36	6.4042	5.76	0.43785	0.680	0.92465	0.28046	3.297	0.60255	0.3221
19	1.49	6.423	5.76	0.4483	0.676	0.93297	0.27001	3.455	0.60149	0.33148
20	2.23	6.5201	5.76	0.45585	0.600	1.0226	0.26246	3.896	0.64252	0.38006
21	2.98	6.5933	5.76	0.46282	0.555	1.0887	0.25549	4.261	0.67212	0.41663
22	3.71	6.6419	5.76	0.47386	0.537	1.1263	0.24446	4.608	0.68539	0.44094
23	4.45	6.6768	5.76	0.47966	0.523	1.1554	0.23865	4.841	0.69703	0.45838
24	5.20	6.7024	5.76	0.48373	0.513	1.1769	0.23458	5.017	0.70576	0.47118
25	5.94	6.7264	5.76	0.48779	0.505	1.1969	0.23052	5.192	0.71371	0.48319
26	6.68	6.7421	5.76	0.49186	0.501	1.2086	0.22645	5.337	0.71751	0.49106
27	7.43	6.7508	5.76	0.49592	0.501	1.2132	0.22239	5.455	0.71779	0.4954
28	8.16	6.7577	5.76	0.50289	0.504	1.2131	0.21542	5.631	0.71425	0.49883
29	8.90	6.7613	5.76	0.50696	0.506	1.2127	0.21136	5.738	0.712	0.50065
30	9.66	6.7623	5.76	0.5116	0.510	1.209	0.20671	5.849	0.70785	0.50114
31	10.39	6.7512	5.76	0.51334	0.518	1.1962	0.20497	5.836	0.70059	0.49562
32	11.13	6.7402	5.76	0.51509	0.525	1.1835	0.20323	5.823	0.69334	0.49012
33	11.88	6.7229	5.76	0.51683	0.537	1.1644	0.20148	5.779	0.68293	0.48145
34	12.61	6.7111	5.76	0.51915	0.546	1.1502	0.19916	5.775	0.6747	0.47554
35	13.35	6.6985	5.76	0.52147	0.556	1.1354	0.19684	5.768	0.6661	0.46927
36	14.11	6.6887	5.76	0.52205	0.562	1.1249	0.19626	5.732	0.66058	0.46433
37	14.84	6.6791	5.76	0.52322	0.569	1.1142	0.1951	5.711	0.65466	0.45956
38	15.29	6.6748	5.76	0.52438	0.573	1.1087	0.19393	5.717	0.65134	0.4574

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW006 S9
Sample No.: S-9
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.22 in
Specimen Area: 6.30 in^2
Specimen Volume: 39.16 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3003	0	0	5.0434	6.48	6.48
2	5.0002	0.053874	6.3037	16.056	0.18339	5.2253	6.48	6.6634
3	10	0.11698	6.3077	27.272	0.3113	5.3105	6.48	6.7913
4	15	0.18163	6.3118	33.307	0.37994	5.363	6.48	6.8599
5	20	0.24782	6.316	37.862	0.43162	5.4014	6.48	6.9116
6	25	0.31247	6.3201	41.506	0.47285	5.4382	6.48	6.9528
7	30	0.3802	6.3244	44.922	0.51142	5.4714	6.48	6.9914
8	35	0.44639	6.3286	47.826	0.54411	5.5006	6.48	7.0241
9	40	0.51412	6.3329	50.502	0.57417	5.5245	6.48	7.0542
10	45	0.57876	6.337	52.95	0.60161	5.5449	6.48	7.0816
11	50	0.64649	6.3413	55.228	0.62706	5.5682	6.48	7.1071
12	55	0.71268	6.3456	57.391	0.65119	5.5898	6.48	7.1312
13	60	0.77887	6.3498	59.327	0.67271	5.6102	6.48	7.1527
14	70	0.91279	6.3584	62.857	0.71177	5.6382	6.48	7.1918
15	80.001	1.0467	6.367	65.988	0.74622	5.6732	6.48	7.2262
16	90.001	1.1791	6.3755	68.778	0.77673	5.7	6.48	7.2567
17	110	1.4485	6.3929	73.504	0.82783	5.7449	6.48	7.3078
18	120	1.5824	6.4016	75.895	0.8536	5.7619	6.48	7.3336
19	180	2.3828	6.4541	86.713	0.96734	5.8598	6.48	7.4473
20	240	3.1817	6.5074	94.171	1.0419	5.9216	6.48	7.5219
21	300	3.9805	6.5615	100.66	1.1046	5.9782	6.48	7.5846
22	360	4.7763	6.6164	105.5	1.1481	6.0115	6.48	7.6281
23	420	5.5721	6.6721	109.89	1.1858	6.0517	6.48	7.6658
24	480	6.371	6.729	113.87	1.2184	6.0739	6.48	7.6984
25	540	7.1745	6.7873	117.29	1.2442	6.1013	6.48	7.7242
26	600	7.978	6.8465	119.96	1.2616	6.1176	6.48	7.7416
27	660	8.7738	6.9063	122.35	1.2756	6.1357	6.48	7.7556
28	720	9.5758	6.9675	124.58	1.2873	6.1456	6.48	7.7673
29	780	10.378	7.0299	126.17	1.2922	6.1584	6.48	7.7722
30	840	11.177	7.0931	127.76	1.2969	6.1631	6.48	7.7769
31	900	11.976	7.1575	129.07	1.2984	6.1666	6.48	7.7784
32	960	12.787	7.224	129.36	1.2893	6.1596	6.48	7.7693
33	1020	13.584	7.2907	128.62	1.2702	6.1643	6.48	7.7502
34	1080	14.381	7.3586	127.93	1.2518	6.1596	6.48	7.7318
35	1140	15.18	7.4279	126.51	1.2263	6.1602	6.48	7.7063

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW006 S9
Sample No.: S-9
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.22 in
Specimen Area: 6.30 in^2
Specimen Volume: 39.16 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.4366	1.4366	1.000	1.4366	0
2	0.05	6.6634	6.48	0.18195	0.992	1.4381	1.2547	1.146	1.3464	0.091693
3	0.12	6.7913	6.48	0.2671	0.858	1.4808	1.1695	1.266	1.3252	0.15565
4	0.18	6.8599	6.48	0.31958	0.841	1.497	1.117	1.340	1.307	0.18997
5	0.25	6.9116	6.48	0.35807	0.830	1.5102	1.0786	1.400	1.2944	0.21581
6	0.31	6.9528	6.48	0.39482	0.835	1.5147	1.0418	1.454	1.2782	0.23642
7	0.38	6.9914	6.48	0.42806	0.837	1.52	1.0086	1.507	1.2643	0.25571
8	0.45	7.0241	6.48	0.45722	0.840	1.5235	0.97941	1.556	1.2515	0.27206
9	0.51	7.0542	6.48	0.48113	0.838	1.5297	0.9555	1.601	1.2426	0.28708
10	0.58	7.0816	6.48	0.50154	0.834	1.5367	0.93509	1.643	1.2359	0.30081
11	0.65	7.1071	6.48	0.52487	0.837	1.5388	0.91176	1.688	1.2253	0.31353
12	0.71	7.1312	6.48	0.54644	0.839	1.5414	0.89018	1.732	1.2158	0.32559
13	0.78	7.1527	6.48	0.56685	0.843	1.5425	0.86977	1.773	1.2061	0.33635
14	0.91	7.1918	6.48	0.59485	0.836	1.5535	0.84178	1.846	1.1977	0.35589
15	1.05	7.2262	6.48	0.62984	0.844	1.553	0.80679	1.925	1.1799	0.37311
16	1.18	7.2567	6.48	0.65666	0.845	1.5567	0.77996	1.996	1.1683	0.38836
17	1.45	7.3078	6.48	0.70157	0.847	1.5629	0.73506	2.126	1.149	0.41392
18	1.58	7.3336	6.48	0.71848	0.842	1.5717	0.71814	2.189	1.1449	0.4268
19	2.38	7.4473	6.48	0.81646	0.844	1.5875	0.62017	2.560	1.1038	0.48367
20	3.18	7.5219	6.48	0.87827	0.843	1.6003	0.55835	2.866	1.0793	0.52097
21	3.98	7.5846	6.48	0.93484	0.846	1.6064	0.50178	3.201	1.0541	0.55229
22	4.78	7.6281	6.48	0.96809	0.843	1.6166	0.46854	3.450	1.0426	0.57404
23	5.57	7.6658	6.48	1.0083	0.850	1.6141	0.4283	3.769	1.0212	0.5929
24	6.37	7.6984	6.48	1.0305	0.846	1.6246	0.40614	4.000	1.0153	0.6092
25	7.17	7.7242	6.48	1.0579	0.850	1.6229	0.37873	4.285	1.0008	0.6221
26	7.98	7.7416	6.48	1.0742	0.852	1.624	0.3624	4.481	0.99318	0.63078
27	8.77	7.7556	6.48	1.0923	0.856	1.6199	0.34432	4.705	0.98212	0.63779
28	9.58	7.7673	6.48	1.1022	0.856	1.6217	0.33441	4.850	0.97807	0.64366
29	10.38	7.7722	6.48	1.115	0.863	1.6138	0.32158	5.018	0.96769	0.64611
30	11.18	7.7769	6.48	1.1197	0.863	1.6138	0.31691	5.092	0.96536	0.64845
31	11.98	7.7784	6.48	1.1232	0.865	1.6118	0.31341	5.143	0.96261	0.6492
32	12.79	7.7693	6.48	1.1162	0.866	1.6097	0.32041	5.024	0.96505	0.64464
33	13.58	7.7502	6.48	1.1209	0.882	1.5859	0.31575	5.023	0.95083	0.63509
34	14.38	7.7318	6.48	1.1162	0.892	1.5722	0.32041	4.907	0.9463	0.62588
35	15.18	7.7063	6.48	1.1168	0.911	1.5461	0.31983	4.834	0.93298	0.61315

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-006 S9
Sample No.: S-9
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767.

Specimen Height: 6.19 in
Specimen Area: 6.23 in^2
Specimen Volume: 38.60 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2339	0	0	5.0421	7.92	7.92
2	5.0041	0.048386	6.237	20.074	0.23173	5.2556	7.92	8.1517
3	10.004	0.10997	6.2408	35.922	0.41443	5.4179	7.92	8.3344
4	15	0.17448	6.2448	47.727	0.55027	5.5452	7.92	8.4703
5	20	0.239	6.2489	56.501	0.65101	5.6441	7.92	8.571
6	25	0.30498	6.253	63.345	0.72938	5.7261	7.92	8.6494
7	30	0.37096	6.2572	69.271	0.79709	5.7994	7.92	8.7171
8	35	0.43547	6.2612	74.094	0.85204	5.8628	7.92	8.772
9	40	0.50292	6.2655	78.366	0.90055	5.9192	7.92	8.8206
10	45	0.57036	6.2697	82.179	0.94372	5.971	7.92	8.8637
11	50	0.63781	6.274	85.44	0.98051	6.0187	7.92	8.9005
12	55	0.70379	6.2781	88.426	1.0141	6.0629	7.92	8.9341
13	60	0.77124	6.2824	91.274	1.0461	6.1059	7.92	8.9661
14	70	0.90613	6.291	96.097	1.0998	6.1781	7.92	9.0198
15	80	1.0381	6.2993	100.51	1.1488	6.2449	7.92	9.0688
16	90	1.173	6.3079	104.27	1.1902	6.3054	7.92	9.1102
17	100	1.3079	6.3166	107.4	1.2242	6.3572	7.92	9.1442
18	110	1.4398	6.325	110.34	1.256	6.4072	7.92	9.176
19	120	1.5747	6.3337	113.19	1.2867	6.4514	7.92	9.2067
20	180	2.3709	6.3853	125.22	1.412	6.6602	7.92	9.332
21	240	3.1832	6.4389	133.67	1.4947	6.801	7.92	9.4147
22	300	3.9838	6.4926	140.24	1.5552	6.9063	7.92	9.4752
23	360	4.7858	6.5473	145.66	1.6018	6.9854	7.92	9.5218
24	420	5.5951	6.6034	150.49	1.6408	7.0493	7.92	9.5608
25	480	6.3957	6.6599	154.71	1.6726	7.1017	7.92	9.5926
26	540	7.1948	6.7172	158.57	1.6997	7.1459	7.92	9.6197
27	600	8.0027	6.7762	162.01	1.7215	7.1825	7.92	9.6415
28	660	8.8047	6.8358	165.09	1.7389	7.2151	7.92	9.6589
29	720	9.6009	6.896	167.99	1.7539	7.2424	7.92	9.6739
30	780	10.406	6.958	170.42	1.7635	7.2651	7.92	9.6835
31	840	11.211	7.0211	172.49	1.7688	7.2843	7.92	9.6888
32	900	12.013	7.0851	173.91	1.7673	7.2989	7.92	9.6873
33	960	12.824	7.151	174.74	1.7594	7.3099	7.92	9.6794
34	1020	13.618	7.2167	174.37	1.7397	7.3151	7.92	9.6597
35	1080	14.419	7.2843	173.27	1.7126	7.3157	7.92	9.6326
36	1140	15.24	7.3548	171.71	1.6809	7.314	7.92	9.6009

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-006 S9
Sample No.: S-9
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 26.0'-28.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY ORGANIC SILT OH SHELL NOTED
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767.

Specimen Height: 6.19 in
Specimen Area: 6.23 in^2
Specimen Volume: 38.60 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 72

Plastic Limit: 37

Estimated Specific Gravity: 2.60

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.92	7.92	0	0.000	2.8779	2.8779	1.000	2.8779	0
2	0.05	8.1517	7.92	0.21346	0.921	2.8961	2.6644	1.087	2.7803	0.11587
3	0.11	8.3344	7.92	0.37573	0.907	2.9166	2.5021	1.166	2.7093	0.20721
4	0.17	8.4703	7.92	0.50311	0.914	2.925	2.3748	1.232	2.6499	0.27514
5	0.24	8.571	7.92	0.60199	0.925	2.9269	2.2759	1.286	2.6014	0.3255
6	0.30	8.6494	7.92	0.68399	0.938	2.9233	2.1939	1.332	2.5586	0.36469
7	0.37	8.7171	7.92	0.75728	0.950	2.9177	2.1206	1.376	2.5191	0.39854
8	0.44	8.772	7.92	0.82068	0.963	2.9092	2.0572	1.414	2.4832	0.42602
9	0.50	8.8206	7.92	0.8771	0.974	2.9013	2.0008	1.450	2.451	0.45028
10	0.57	8.8637	7.92	0.92886	0.984	2.8927	1.949	1.484	2.4209	0.47186
11	0.64	8.9005	7.92	0.97655	0.996	2.8818	1.9013	1.516	2.3916	0.49026
12	0.70	8.9341	7.92	1.0208	1.007	2.8712	1.8571	1.546	2.3642	0.50705
13	0.77	8.9661	7.92	1.0638	1.017	2.8601	1.8141	1.577	2.3371	0.52303
14	0.91	9.0198	7.92	1.1359	1.033	2.8418	1.7419	1.631	2.2919	0.54992
15	1.04	9.0688	7.92	1.2028	1.047	2.8238	1.6751	1.686	2.2494	0.57439
16	1.17	9.1102	7.92	1.2633	1.061	2.8048	1.6146	1.737	2.2097	0.5951
17	1.31	9.1442	7.92	1.3151	1.074	2.787	1.5628	1.783	2.1749	0.61209
18	1.44	9.176	7.92	1.3651	1.087	2.7688	1.5128	1.830	2.1408	0.62801
19	1.57	9.2067	7.92	1.4093	1.095	2.7552	1.4686	1.876	2.1119	0.64333
20	2.37	9.332	7.92	1.6181	1.146	2.6717	1.2598	2.121	1.9658	0.70598
21	3.18	9.4147	7.92	1.7588	1.177	2.6137	1.119	2.336	1.8664	0.74736
22	3.98	9.4752	7.92	1.8641	1.199	2.569	1.0137	2.534	1.7914	0.77761
23	4.79	9.5218	7.92	1.9432	1.213	2.5365	0.93464	2.714	1.7356	0.80092
24	5.60	9.5608	7.92	2.0072	1.223	2.5115	0.87066	2.885	1.6911	0.8204
25	6.40	9.5926	7.92	2.0595	1.231	2.4909	0.81832	3.044	1.6546	0.83629
26	7.19	9.6197	7.92	2.1037	1.238	2.4738	0.77411	3.196	1.6239	0.84983
27	8.00	9.6415	7.92	2.1404	1.243	2.4589	0.73747	3.334	1.5982	0.86073
28	8.80	9.6589	7.92	2.173	1.250	2.4438	0.7049	3.467	1.5743	0.86944
29	9.60	9.6739	7.92	2.2003	1.255	2.4315	0.67756	3.589	1.5545	0.87696
30	10.41	9.6835	7.92	2.223	1.261	2.4184	0.65488	3.693	1.5366	0.88174
31	11.21	9.6888	7.92	2.2422	1.268	2.4045	0.63569	3.783	1.5201	0.88442
32	12.01	9.6873	7.92	2.2567	1.277	2.3885	0.62115	3.845	1.5048	0.88367
33	12.82	9.6794	7.92	2.2678	1.289	2.3695	0.61009	3.884	1.4898	0.87969
34	13.62	9.6597	7.92	2.273	1.307	2.3445	0.60486	3.876	1.4747	0.86983
35	14.42	9.6326	7.92	2.2736	1.328	2.3169	0.60428	3.834	1.4606	0.85632
36	15.24	9.6009	7.92	2.2718	1.352	2.287	0.60602	3.774	1.4465	0.84046

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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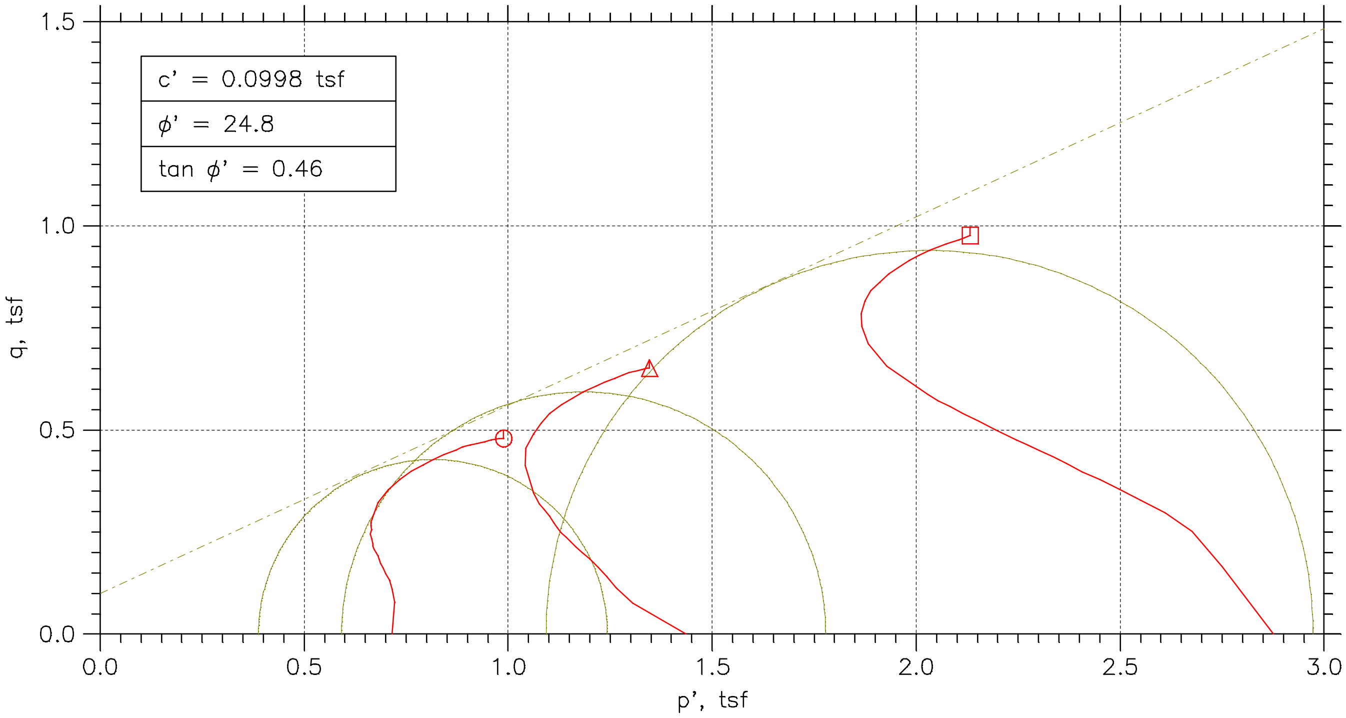

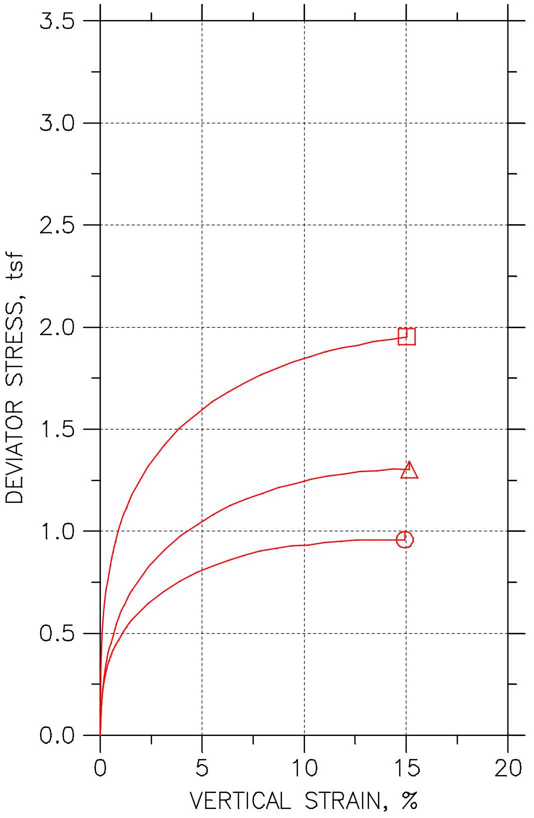

Symbol		○	△	□	
Test No.		10.0 PSI	20.0 PSI	40.0 PSI	
Initial	Diameter, in	2.8094	2.8291	2.8406	
	Height, in	5.9575	6.2256	6.276	
	Water Content, %	27.95	28.58	25.69	
	Dry Density, pcf	95.83	93.77	96.62	
	Saturation, %	98.51	95.87	92.26	
	Void Ratio	0.77188	0.81092	0.75748	
Before Shear	Water Content, %	27.39	26.71	23.87	
	Dry Density, pcf	97.31	98.35	103.	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.74495	0.72649	0.64936	
	Back Press., tsf	5.0452	5.044	5.045	
Minor Prin. Stress, tsf		0.71483	1.436	2.875	
Max. Dev. Stress, tsf		0.95795	1.304	1.9522	
Time to Failure, min		1140	1080	1140	
Strain Rate, %/min		0.02	0.02	0.02	
B-Value		0.95	0.97	0.95	
Estimated Specific Gravity		2.72	2.72	2.72	
Liquid Limit		48	48	48	
Plastic Limit		18	18	18	
Plasticity Index		30	30	30	
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW010 S-7

Sample Type: 3.0'' ST

Description: BROWN AND GRAY MOTTLED LEAN CLAY CL

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

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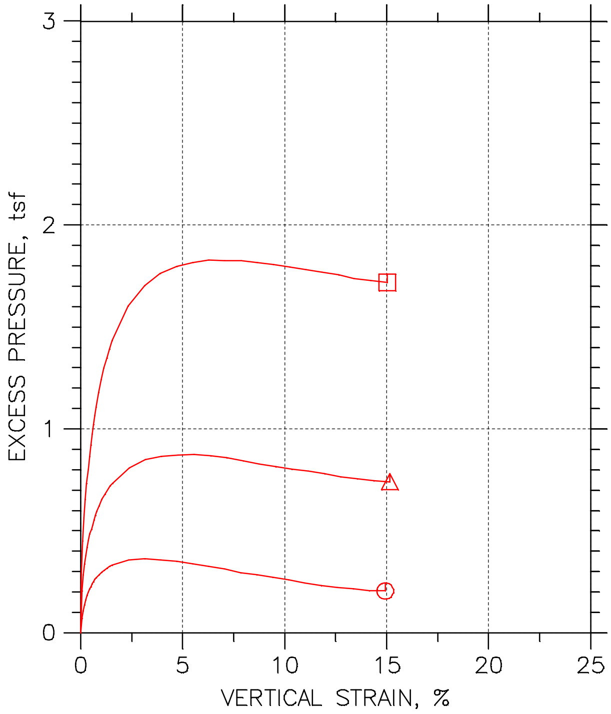
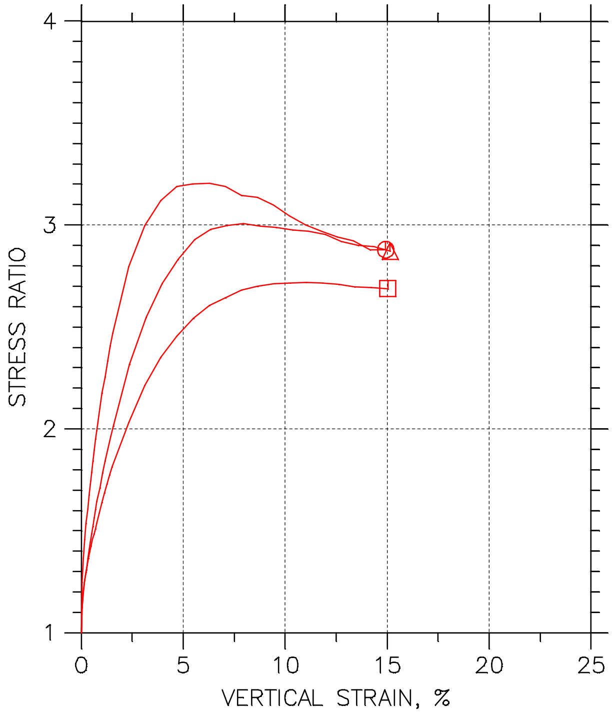
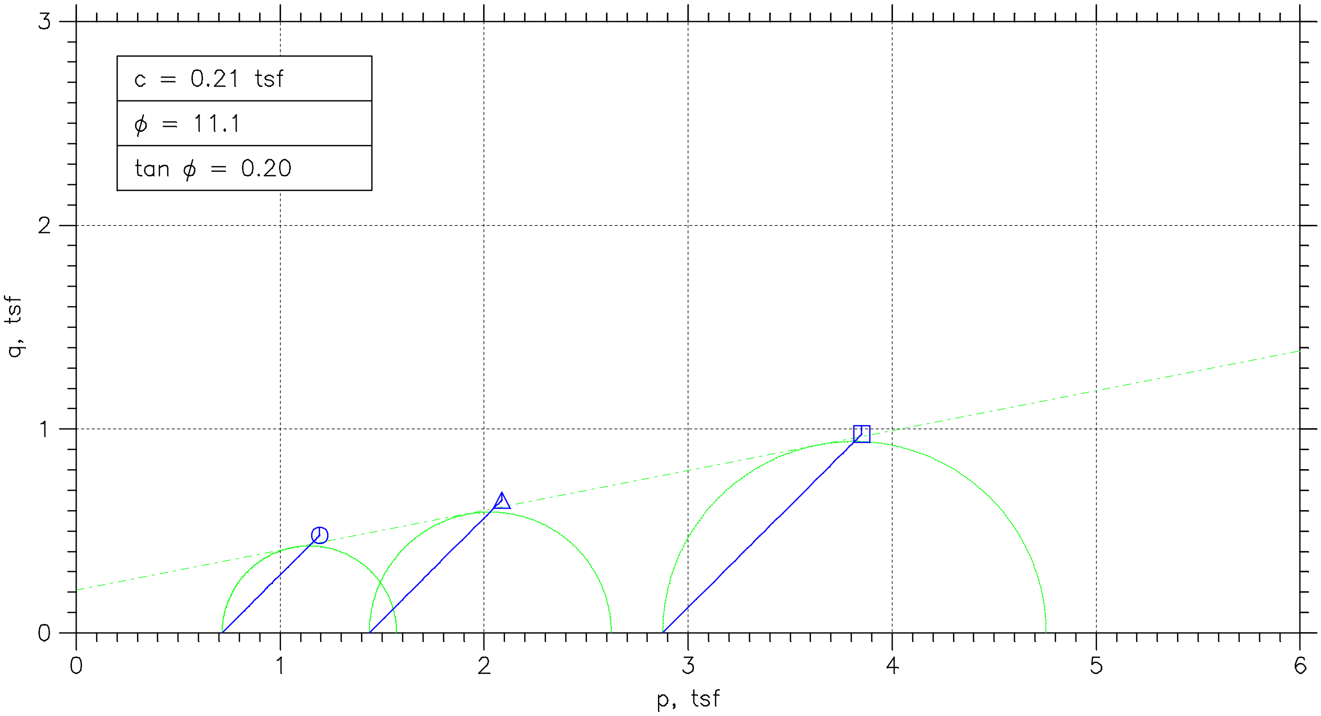
CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767







Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-010 S-7	Tested By: BCM	Checked By: WPQ
Sample No.: S-7	Test Date: 10/29/15	Depth: 15.0'-17.0'
Test No.: EDW-010 S-7	Sample Type: 3.0" ST	Elevation: ----
Description: BROWN AND GRAY MOTTLED LEAN CLAY CL		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.		

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TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-010 S-7
Sample No.: S-7
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

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Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 5.96 in
Specimen Area: 6.20 in^2
Specimen Volume: 36.93 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.1991	0	0	5.0452	5.76	5.76
2	5.0041	0.056448	6.2027	13.621	0.15811	5.1172	5.76	5.9181
3	10.004	0.12013	6.2066	19.07	0.22122	5.1549	5.76	5.9812
4	15.004	0.18382	6.2106	22.767	0.26394	5.1834	5.76	6.0239
5	20	0.24895	6.2146	25.54	0.29589	5.2078	5.76	6.0559
6	25	0.31408	6.2187	27.923	0.3233	5.2287	5.76	6.0833
7	30	0.37922	6.2227	29.967	0.34673	5.2467	5.76	6.1067
8	35	0.4429	6.2267	31.669	0.36619	5.2595	5.76	6.1262
9	40	0.50948	6.2309	33.275	0.3845	5.2716	5.76	6.1445
10	45	0.57462	6.235	34.734	0.4011	5.285	5.76	6.1611
11	50	0.63975	6.2391	36.047	0.41599	5.296	5.76	6.176
12	55	0.70488	6.2432	37.312	0.43031	5.3065	5.76	6.1903
13	60	0.77001	6.2473	38.48	0.44348	5.314	5.76	6.2035
14	70	0.90028	6.2555	40.669	0.4681	5.3286	5.76	6.2281
15	80	1.032	6.2638	42.663	0.4904	5.3431	5.76	6.2504
16	90	1.1608	6.272	44.609	0.5121	5.3512	5.76	6.2721
17	100	1.2925	6.2803	46.263	0.53038	5.3622	5.76	6.2904
18	110	1.4213	6.2885	47.869	0.54807	5.3704	5.76	6.3081
19	120	1.5516	6.2969	49.377	0.56459	5.3762	5.76	6.3246
20	180	2.3404	6.3477	56.868	0.64504	5.4011	5.76	6.405
21	240	3.1249	6.3991	62.706	0.70554	5.407	5.76	6.4655
22	300	3.908	6.4513	67.717	0.75576	5.4035	5.76	6.5158
23	360	4.7026	6.5051	72.046	0.79743	5.3959	5.76	6.5574
24	420	5.4871	6.5591	75.549	0.82931	5.3831	5.76	6.5893
25	480	6.2774	6.6144	78.565	0.85521	5.3721	5.76	6.6152
26	540	7.0676	6.6706	81.63	0.88108	5.3576	5.76	6.6411
27	600	7.8492	6.7272	84.305	0.90231	5.3396	5.76	6.6623
28	660	8.6337	6.7849	86.446	0.91734	5.3303	5.76	6.6773
29	720	9.424	6.8441	88.197	0.92783	5.3175	5.76	6.6878
30	780	10.213	6.9043	89.462	0.93294	5.3036	5.76	6.6929
31	840	10.997	6.9651	91.213	0.94289	5.2891	5.76	6.7029
32	900	11.786	7.0274	92.818	0.95098	5.2769	5.76	6.711
33	960	12.572	7.0906	94.083	0.95535	5.2682	5.76	6.7154
34	1020	13.361	7.1551	95.105	0.95701	5.2618	5.76	6.717
35	1080	14.148	7.2208	95.981	0.95705	5.2502	5.76	6.717
36	1140	14.93	7.2871	96.953	0.95795	5.2502	5.76	6.7179

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-010 S-7
Sample No.: S-7
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

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Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 5.96 in
Specimen Area: 6.20 in^2
Specimen Volume: 36.93 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.76	5.76	0	0.000	0.71483	0.71483	1.000	0.71483	0
2	0.06	5.9181	5.76	0.072008	0.455	0.80093	0.64282	1.246	0.72188	0.079057
3	0.12	5.9812	5.76	0.10975	0.496	0.82629	0.60507	1.366	0.71568	0.11061
4	0.18	6.0239	5.76	0.13821	0.524	0.84056	0.57662	1.458	0.70859	0.13197
5	0.25	6.0559	5.76	0.1626	0.550	0.84812	0.55223	1.536	0.70018	0.14795
6	0.31	6.0833	5.76	0.1835	0.568	0.85462	0.53132	1.608	0.69297	0.16165
7	0.38	6.1067	5.76	0.2015	0.581	0.86005	0.51332	1.675	0.68669	0.17336
8	0.44	6.1262	5.76	0.21428	0.585	0.86674	0.50055	1.732	0.68364	0.1831
9	0.51	6.1445	5.76	0.22648	0.589	0.87285	0.48835	1.787	0.6806	0.19225
10	0.57	6.1611	5.76	0.23983	0.598	0.87609	0.475	1.844	0.67555	0.20055
11	0.64	6.176	5.76	0.25086	0.603	0.87996	0.46396	1.897	0.67196	0.208
12	0.70	6.1903	5.76	0.26132	0.607	0.88382	0.45351	1.949	0.66866	0.21515
13	0.77	6.2035	5.76	0.26887	0.606	0.88944	0.44596	1.994	0.6677	0.22174
14	0.90	6.2281	5.76	0.28338	0.605	0.89954	0.43144	2.085	0.66549	0.23405
15	1.03	6.2504	5.76	0.2979	0.607	0.90733	0.41693	2.176	0.66213	0.2452
16	1.16	6.2721	5.76	0.30603	0.598	0.9209	0.4088	2.253	0.66485	0.25605
17	1.29	6.2904	5.76	0.31707	0.598	0.92814	0.39776	2.333	0.66295	0.26519
18	1.42	6.3081	5.76	0.3252	0.593	0.9377	0.38963	2.407	0.66367	0.27403
19	1.55	6.3246	5.76	0.331	0.586	0.94841	0.38382	2.471	0.66612	0.28229
20	2.34	6.405	5.76	0.35597	0.552	1.0039	0.35885	2.797	0.68137	0.32252
21	3.12	6.4655	5.76	0.36178	0.513	1.0586	0.35305	2.998	0.70582	0.35277
22	3.91	6.5158	5.76	0.3583	0.474	1.1123	0.35653	3.120	0.73441	0.37788
23	4.70	6.5574	5.76	0.35075	0.440	1.1615	0.36408	3.190	0.7628	0.39872
24	5.49	6.5893	5.76	0.33797	0.408	1.2062	0.37686	3.201	0.79151	0.41466
25	6.28	6.6152	5.76	0.32694	0.382	1.2431	0.38789	3.205	0.8155	0.42761
26	7.07	6.6411	5.76	0.31242	0.355	1.2835	0.40241	3.190	0.84295	0.44054
27	7.85	6.6623	5.76	0.29442	0.326	1.3227	0.42041	3.146	0.87156	0.45115
28	8.63	6.6773	5.76	0.28513	0.311	1.347	0.4297	3.135	0.88837	0.45867
29	9.42	6.6878	5.76	0.27235	0.294	1.3703	0.44248	3.097	0.90639	0.46391
30	10.21	6.6929	5.76	0.25841	0.277	1.3894	0.45641	3.044	0.92288	0.46647
31	11.00	6.7029	5.76	0.2439	0.259	1.4138	0.47093	3.002	0.94238	0.47144
32	11.79	6.711	5.76	0.2317	0.244	1.4341	0.48313	2.968	0.95862	0.47549
33	12.57	6.7154	5.76	0.22299	0.233	1.4472	0.49184	2.942	0.96951	0.47768
34	13.36	6.717	5.76	0.2166	0.226	1.4552	0.49822	2.921	0.97673	0.47851
35	14.15	6.717	5.76	0.20499	0.214	1.4669	0.50984	2.877	0.98836	0.47852
36	14.93	6.7179	5.76	0.20499	0.214	1.4678	0.50984	2.879	0.98881	0.47897

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW010 S-7
Sample No.: S-7
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

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Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.23 in
Specimen Area: 6.29 in^2
Specimen Volume: 39.14 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2863	0	0	5.044	6.48	6.48
2	5.0041	0.05533	6.2898	13.126	0.15025	5.2498	6.48	6.6303
3	10.004	0.11988	6.2939	19.719	0.22558	5.328	6.48	6.7056
4	15.004	0.18597	6.298	24.693	0.2823	5.381	6.48	6.7623
5	20.004	0.25206	6.3022	28.769	0.32867	5.4242	6.48	6.8087
6	25.004	0.31968	6.3065	32.245	0.36814	5.4644	6.48	6.8481
7	30.004	0.38731	6.3108	35.122	0.40071	5.4988	6.48	6.8807
8	35.004	0.45339	6.315	37.46	0.4271	5.5286	6.48	6.9071
9	40.004	0.52256	6.3193	39.617	0.45138	5.5525	6.48	6.9314
10	45.004	0.58557	6.3234	41.595	0.47362	5.5747	6.48	6.9536
11	50.004	0.65166	6.3276	43.633	0.49649	5.5991	6.48	6.9765
12	55.004	0.71775	6.3318	45.791	0.5207	5.6207	6.48	7.0007
13	60.004	0.7823	6.3359	47.769	0.54284	5.6394	6.48	7.0228
14	70.004	0.91601	6.3444	50.885	0.57747	5.6668	6.48	7.0575
15	80	1.0497	6.353	54.002	0.61202	5.6983	6.48	7.092
16	90	1.1834	6.3616	56.459	0.639	5.7228	6.48	7.119
17	110	1.4493	6.3788	61.314	0.69208	5.7642	6.48	7.1721
18	120	1.583	6.3874	63.292	0.71343	5.7776	6.48	7.1934
19	180	2.3746	6.4392	73.961	0.82699	5.8522	6.48	7.307
20	240	3.1676	6.492	82.052	0.91001	5.8919	6.48	7.39
21	300	3.9653	6.5459	89.124	0.9803	5.9077	6.48	7.4603
22	360	4.766	6.6009	94.698	1.0329	5.9158	6.48	7.5129
23	420	5.5652	6.6568	100.03	1.082	5.9193	6.48	7.562
24	480	6.366	6.7137	104.89	1.1248	5.9117	6.48	7.6048
25	540	7.1682	6.7717	108.78	1.1566	5.9012	6.48	7.6366
26	600	7.9582	6.8299	112.56	1.1866	5.8884	6.48	7.6666
27	660	8.7559	6.8896	116.22	1.2145	5.8709	6.48	7.6945
28	720	9.5582	6.9507	119.03	1.233	5.8598	6.48	7.713
29	780	10.356	7.0125	122.09	1.2535	5.8453	6.48	7.7335
30	840	11.16	7.076	124.79	1.2697	5.8353	6.48	7.7497
31	900	11.954	7.1398	127	1.2807	5.8248	6.48	7.7607
32	960	12.753	7.2052	129.22	1.2913	5.8073	6.48	7.7713
33	1020	13.56	7.2725	130.84	1.2954	5.7986	6.48	7.7754
34	1080	14.358	7.3402	132.94	1.304	5.791	6.48	7.784
35	1140	15.15	7.4087	134.02	1.3024	5.7846	6.48	7.7824

TRIAXIAL TEST

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Consulting Engineers & Scientists

Project: DYNEGY EDWARDS
Boring No.: EDW010 S-7
Sample No.: S-7
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.23 in
Specimen Area: 6.29 in^2
Specimen Volume: 39.14 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.436	1.436	1.000	1.436	0
2	0.06	6.6303	6.48	0.20586	1.370	1.3804	1.2302	1.122	1.3053	0.075127
3	0.12	6.7056	6.48	0.28401	1.259	1.3776	1.152	1.196	1.2648	0.11279
4	0.19	6.7623	6.48	0.33708	1.194	1.3813	1.099	1.257	1.2401	0.14115
5	0.25	6.8087	6.48	0.38024	1.157	1.3845	1.0558	1.311	1.2201	0.16434
6	0.32	6.8481	6.48	0.42048	1.142	1.3837	1.0156	1.362	1.1996	0.18407
7	0.39	6.8807	6.48	0.45488	1.135	1.3819	0.98116	1.408	1.1815	0.20036
8	0.45	6.9071	6.48	0.48463	1.135	1.3785	0.95142	1.449	1.165	0.21355
9	0.52	6.9314	6.48	0.50854	1.127	1.3789	0.92751	1.487	1.1532	0.22569
10	0.59	6.9536	6.48	0.5307	1.121	1.379	0.90535	1.523	1.1422	0.23681
11	0.65	6.9765	6.48	0.55519	1.118	1.3773	0.88085	1.564	1.1291	0.24825
12	0.72	7.0007	6.48	0.57677	1.108	1.38	0.85927	1.606	1.1196	0.26035
13	0.78	7.0228	6.48	0.59543	1.097	1.3834	0.84061	1.646	1.112	0.27142
14	0.92	7.0575	6.48	0.62284	1.079	1.3907	0.8132	1.710	1.1019	0.28874
15	1.05	7.092	6.48	0.65433	1.069	1.3937	0.78171	1.783	1.0877	0.30601
16	1.18	7.119	6.48	0.67883	1.062	1.3962	0.75722	1.844	1.0767	0.3195
17	1.45	7.1721	6.48	0.72023	1.041	1.4079	0.71581	1.967	1.0619	0.34604
18	1.58	7.1934	6.48	0.73365	1.028	1.4158	0.7024	2.016	1.0591	0.35672
19	2.37	7.307	6.48	0.80829	0.977	1.4547	0.62775	2.317	1.0412	0.41349
20	3.17	7.39	6.48	0.84795	0.932	1.4981	0.58809	2.547	1.0431	0.455
21	3.97	7.4603	6.48	0.8637	0.881	1.5526	0.57235	2.713	1.0625	0.49015
22	4.77	7.5129	6.48	0.87186	0.844	1.5971	0.56418	2.831	1.0806	0.51646
23	5.57	7.562	6.48	0.87536	0.809	1.6426	0.56068	2.930	1.1017	0.54098
24	6.37	7.6048	6.48	0.86778	0.771	1.6931	0.56827	2.979	1.1307	0.56242
25	7.17	7.6366	6.48	0.85728	0.741	1.7354	0.57876	2.998	1.1571	0.57831
26	7.96	7.6666	6.48	0.84445	0.712	1.7782	0.59159	3.006	1.1849	0.5933
27	8.76	7.6945	6.48	0.82695	0.681	1.8236	0.60909	2.994	1.2163	0.60726
28	9.56	7.713	6.48	0.81587	0.662	1.8532	0.62017	2.988	1.2367	0.61651
29	10.36	7.7335	6.48	0.80129	0.639	1.8883	0.63475	2.975	1.2615	0.62676
30	11.16	7.7497	6.48	0.79138	0.623	1.9144	0.64466	2.970	1.2795	0.63487
31	11.95	7.7607	6.48	0.78088	0.610	1.9359	0.65516	2.955	1.2955	0.64037
32	12.75	7.7713	6.48	0.76339	0.591	1.9639	0.67266	2.920	1.3183	0.64564
33	13.56	7.7754	6.48	0.75464	0.583	1.9768	0.6814	2.901	1.3291	0.64768
34	14.36	7.784	6.48	0.74706	0.573	1.993	0.68899	2.893	1.341	0.65199
35	15.15	7.7824	6.48	0.74064	0.569	1.9978	0.6954	2.873	1.3466	0.6512

TRIAXIAL TEST

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Project: DYNEGY EDWARDS
Boring No.: EDW-010 S7
Sample No.: S-7
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.28 in
Specimen Area: 6.34 in^2
Specimen Volume: 39.77 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3372	0	0	5.045	7.92	7.92
2	5.0034	0.036161	6.3395	29.009	0.32946	5.3353	7.92	8.2495
3	10.003	0.10125	6.3436	44.36	0.50349	5.4952	7.92	8.4235
4	15.003	0.16634	6.3477	52.512	0.59563	5.6081	7.92	8.5156
5	20.003	0.23288	6.352	58.07	0.65823	5.6994	7.92	8.5782
6	25.003	0.29942	6.3562	62.835	0.71176	5.7779	7.92	8.6318
7	30.003	0.36451	6.3604	66.964	0.75804	5.8489	7.92	8.678
8	35.003	0.43104	6.3646	70.351	0.79586	5.9111	7.92	8.7159
9	40.003	0.49758	6.3689	73.792	0.83422	5.9681	7.92	8.7542
10	45.003	0.56122	6.3729	76.915	0.86897	6.0199	7.92	8.789
11	50.003	0.62632	6.3771	79.509	0.89769	6.0658	7.92	8.8177
12	55.003	0.69141	6.3813	82.103	0.92637	6.11	7.92	8.8464
13	60.003	0.7565	6.3855	84.432	0.95202	6.1513	7.92	8.872
14	70.003	0.88523	6.3938	88.826	1.0003	6.2246	7.92	8.9203
15	80.003	1.0154	6.4022	92.637	1.0418	6.2874	7.92	8.9618
16	90.003	1.1441	6.4105	96.078	1.0791	6.3444	7.92	8.9991
17	100	1.2743	6.419	99.307	1.1139	6.3944	7.92	9.0339
18	110	1.4031	6.4273	102.17	1.1445	6.4386	7.92	9.0645
19	120	1.5318	6.4357	105.08	1.1756	6.4788	7.92	9.0956
20	180	2.3245	6.488	118.31	1.313	6.648	7.92	9.233
21	240	3.1243	6.5415	129.11	1.4211	6.7475	7.92	9.3411
22	300	3.8982	6.5942	137.9	1.5057	6.8062	7.92	9.4257
23	360	4.6923	6.6492	145.04	1.5706	6.8405	7.92	9.4906
24	420	5.4951	6.7056	152.14	1.6335	6.8615	7.92	9.5535
25	480	6.2791	6.7617	157.91	1.6814	6.8719	7.92	9.6014
26	540	7.0746	6.8196	163.31	1.7241	6.8714	7.92	9.6441
27	600	7.8702	6.8785	168.65	1.7654	6.8702	7.92	9.6854
28	660	8.6498	6.9372	173.1	1.7966	6.8621	7.92	9.7166
29	720	9.454	6.9988	177.86	1.8298	6.8516	7.92	9.7498
30	780	10.257	7.0614	181.83	1.854	6.8399	7.92	9.774
31	840	11.038	7.1234	185.96	1.8796	6.8272	7.92	9.7996
32	900	11.839	7.1882	189.4	1.8971	6.8149	7.92	9.8171
33	960	12.632	7.2534	192.47	1.9106	6.8021	7.92	9.8306
34	1020	13.412	7.3187	196.23	1.9305	6.7824	7.92	9.8505
35	1080	14.223	7.388	199.09	1.9403	6.7742	7.92	9.8603
36	1140	15.029	7.458	202.21	1.9522	6.7638	7.92	9.8722

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-010 S7
Sample No.: S-7
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

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Soil Description: BROWN AND GRAY MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.28 in
Specimen Area: 6.34 in^2
Specimen Volume: 39.77 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 18

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.92	7.92	0	0.000	2.875	2.875	1.000	2.875	0
2	0.04	8.2495	7.92	0.29023	0.881	2.9142	2.5847	1.127	2.7495	0.16473
3	0.10	8.4235	7.92	0.45018	0.894	2.9283	2.4248	1.208	2.6765	0.25174
4	0.17	8.5156	7.92	0.56302	0.945	2.9076	2.3119	1.258	2.6098	0.29781
5	0.23	8.5782	7.92	0.65433	0.994	2.8789	2.2206	1.296	2.5497	0.32912
6	0.30	8.6318	7.92	0.73285	1.030	2.8539	2.1421	1.332	2.498	0.35588
7	0.36	8.678	7.92	0.80381	1.060	2.8292	2.0711	1.366	2.4502	0.37902
8	0.43	8.7159	7.92	0.86604	1.088	2.8048	2.0089	1.396	2.4068	0.39793
9	0.50	8.7542	7.92	0.92304	1.106	2.7861	1.9519	1.427	2.369	0.41711
10	0.56	8.789	7.92	0.97481	1.122	2.7691	1.9001	1.457	2.3346	0.43449
11	0.63	8.8177	7.92	1.0208	1.137	2.7519	1.8542	1.484	2.303	0.44885
12	0.69	8.8464	7.92	1.065	1.150	2.7364	1.81	1.512	2.2732	0.46318
13	0.76	8.872	7.92	1.1063	1.162	2.7207	1.7687	1.538	2.2447	0.47601
14	0.89	8.9203	7.92	1.1795	1.179	2.6957	1.6954	1.590	2.1955	0.50013
15	1.02	8.9618	7.92	1.2424	1.192	2.6744	1.6326	1.638	2.1535	0.52091
16	1.14	8.9991	7.92	1.2994	1.204	2.6547	1.5756	1.685	2.1152	0.53955
17	1.27	9.0339	7.92	1.3494	1.211	2.6395	1.5256	1.730	2.0825	0.55695
18	1.40	9.0645	7.92	1.3936	1.218	2.6258	1.4814	1.773	2.0536	0.57224
19	1.53	9.0956	7.92	1.4337	1.220	2.6168	1.4412	1.816	2.029	0.58778
20	2.32	9.233	7.92	1.603	1.221	2.5849	1.272	2.032	1.9285	0.65648
21	3.12	9.3411	7.92	1.7024	1.198	2.5936	1.1725	2.212	1.8831	0.71053
22	3.90	9.4257	7.92	1.7612	1.170	2.6194	1.1138	2.352	1.8666	0.75283
23	4.69	9.4906	7.92	1.7955	1.143	2.6501	1.0795	2.455	1.8648	0.7853
24	5.50	9.5535	7.92	1.8164	1.112	2.6921	1.0585	2.543	1.8753	0.81676
25	6.28	9.6014	7.92	1.8269	1.087	2.7295	1.0481	2.604	1.8888	0.84071
26	7.07	9.6441	7.92	1.8263	1.059	2.7728	1.0486	2.644	1.9107	0.86207
27	7.87	9.6854	7.92	1.8251	1.034	2.8152	1.0498	2.682	1.9325	0.88268
28	8.65	9.7166	7.92	1.817	1.011	2.8545	1.0579	2.698	1.9562	0.89828
29	9.45	9.7498	7.92	1.8065	0.987	2.8982	1.0684	2.713	1.9833	0.91488
30	10.26	9.774	7.92	1.7949	0.968	2.9341	1.0801	2.717	2.0071	0.92701
31	11.04	9.7996	7.92	1.7821	0.948	2.9725	1.0928	2.720	2.0327	0.93981
32	11.84	9.8171	7.92	1.7699	0.933	3.0022	1.1051	2.717	2.0536	0.94857
33	12.63	9.8306	7.92	1.7571	0.920	3.0284	1.1179	2.709	2.0731	0.95528
34	13.41	9.8505	7.92	1.7373	0.900	3.0681	1.1376	2.697	2.1029	0.96525
35	14.22	9.8603	7.92	1.7292	0.891	3.086	1.1458	2.693	2.1159	0.97013
36	15.03	9.8722	7.92	1.7187	0.880	3.1084	1.1562	2.688	2.1323	0.97609

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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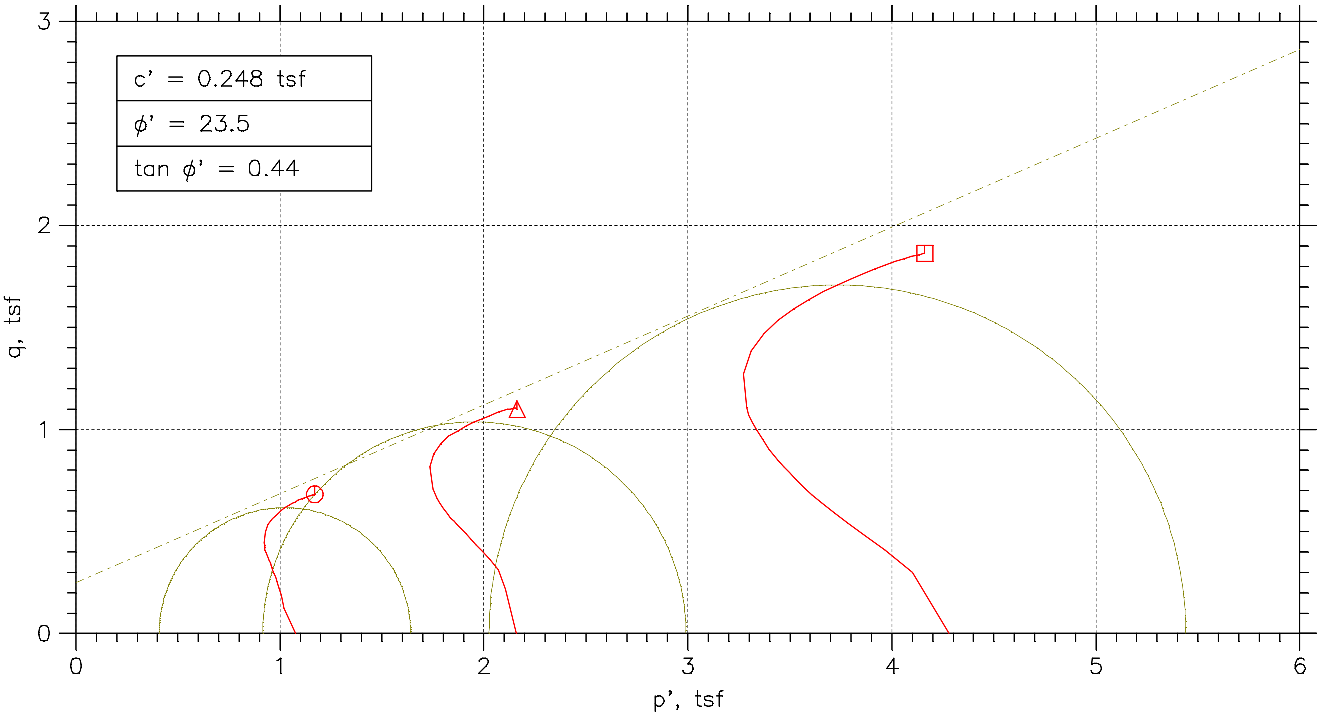

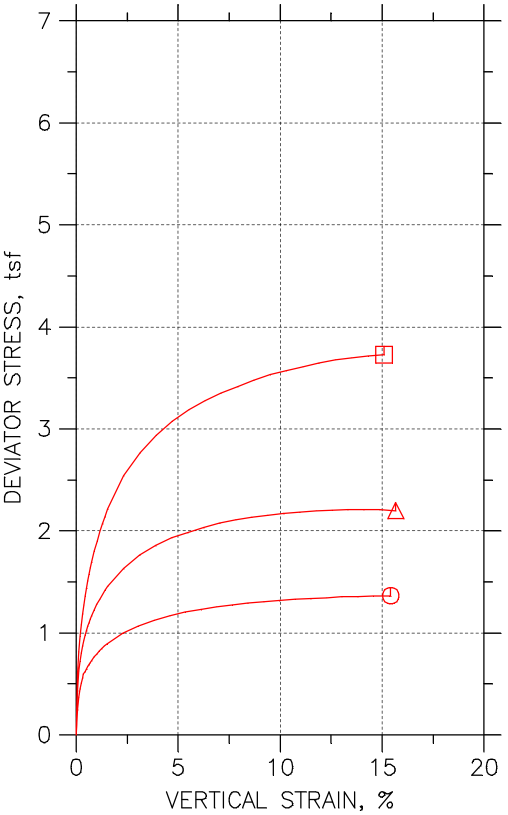

	Symbol	○	△	□	
	Test No.	15.0 PSI	30.0 PSI	60.0 PSI	
Initial	Diameter, in	2.8382	2.8134	2.8295	
	Height, in	6.3996	6.3425	6.2551	
	Water Content, %	31.54	29.27	28.87	
	Dry Density, pcf	87.92	91.94	94.81	
	Saturation, %	92.13	94.02	99.28	
	Void Ratio	0.93126	0.84681	0.791	
Before Shear	Water Content, %	31.86	27.59	24.62	
	Dry Density, pcf	90.97	97.01	101.7	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.86663	0.75044	0.66973	
	Back Press., tsf	5.0434	5.0422	5.0794	
	Minor Prin. Stress, tsf	1.0766	2.1578	4.2806	
	Max. Dev. Stress, tsf	1.3642	2.2082	3.7265	
	Time to Failure, min	1205.9	1080	1140	
	Strain Rate, %/min	0.02	0.02	0.02	
	B-Value	0.97	0.98	0.96	
	Estimated Specific Gravity	2.72	2.72	2.72	
	Liquid Limit	48	48	48	
	Plastic Limit	19	19	19	
	Plasticity Index	29	29	29	
	Failure Sketch				

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW-012 S-7
Sample Type: 3.0'' ST
Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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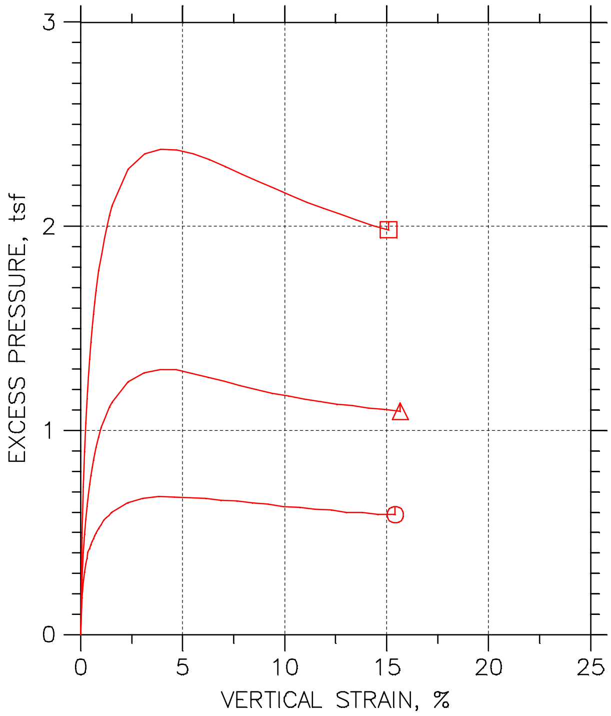

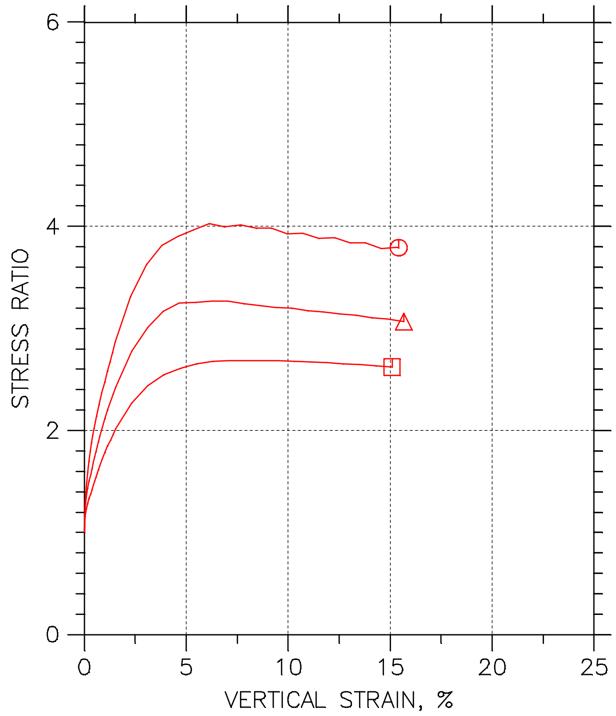

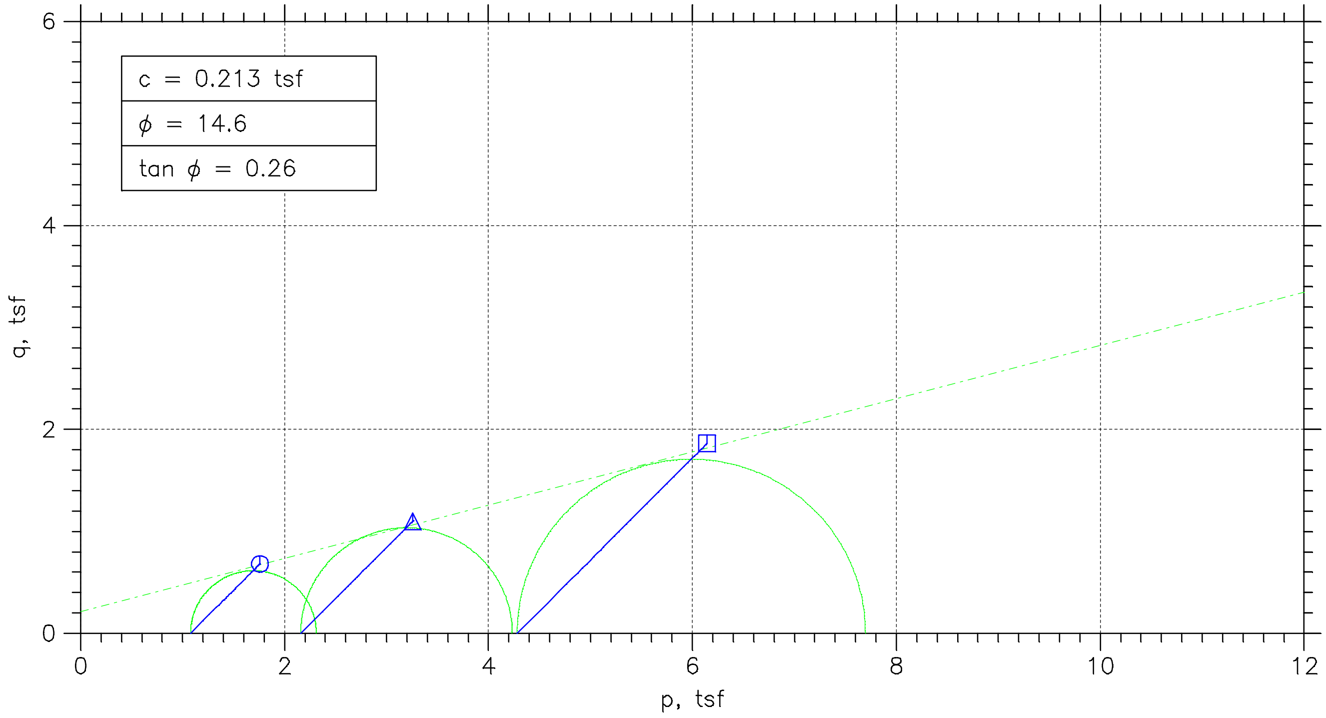

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-012 S-7	Tested By: BCM	Checked By: WPQ
Sample No.: S-7	Test Date: 11/5/15	Depth: 15.0'-17.0'
Test No.: EDW-012 S-7	Sample Type: 3.0" ST	Elevation: ----
Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.		

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TRIAXIAL TEST

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Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 15.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.40 in
Specimen Area: 6.33 in^2
Specimen Volume: 40.49 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3266	0	0	5.0434	6.12	6.12
2	5.0003	0.05234	6.3299	21.743	0.24732	5.2234	6.12	6.3673
3	10	0.11458	6.3339	32.694	0.37164	5.2995	6.12	6.4916
4	15	0.17541	6.3377	39.538	0.44917	5.3506	6.12	6.5692
5	20	0.23765	6.3417	44.908	0.50986	5.3907	6.12	6.6299
6	25	0.30131	6.3458	49.067	0.55672	5.4203	6.12	6.6767
7	30	0.36214	6.3496	52.331	0.5934	5.4476	6.12	6.7134
8	35	0.42579	6.3537	54.963	0.62285	5.4673	6.12	6.7428
9	40	0.48945	6.3577	57.122	0.64689	5.4848	6.12	6.7669
10	45	0.55452	6.3619	59.175	0.66971	5.4993	6.12	6.7897
11	50.001	0.61818	6.366	61.228	0.6925	5.5132	6.12	6.8125
12	55.001	0.68183	6.3701	62.966	0.71169	5.5283	6.12	6.8317
13	60.001	0.74549	6.3741	64.545	0.72908	5.5399	6.12	6.8491
14	70.001	0.87563	6.3825	67.599	0.76257	5.5632	6.12	6.8826
15	80.001	1.0029	6.3907	70.284	0.79184	5.5829	6.12	6.9118
16	90.001	1.1303	6.399	72.863	0.81985	5.6032	6.12	6.9398
17	100	1.259	6.4073	75.18	0.84481	5.6154	6.12	6.9648
18	110	1.3863	6.4156	77.444	0.86913	5.6276	6.12	6.9891
19	120	1.5136	6.4239	79.392	0.88984	5.6427	6.12	7.0098
20	180	2.2832	6.4745	89.553	0.99588	5.6886	6.12	7.1159
21	240	3.0499	6.5257	96.923	1.0694	5.7124	6.12	7.1894
22	300	3.8194	6.5779	102.87	1.126	5.7194	6.12	7.246
23	360	4.5847	6.6306	107.72	1.1697	5.7165	6.12	7.2897
24	420	5.35	6.6842	111.77	1.2039	5.7141	6.12	7.3239
25	480	6.1238	6.7393	115.4	1.2329	5.7124	6.12	7.3529
26	540	6.8848	6.7944	118.4	1.2547	5.7014	6.12	7.3747
27	600	7.6572	6.8512	121.14	1.2731	5.6973	6.12	7.3931
28	660	8.4239	6.9086	123.83	1.2905	5.6874	6.12	7.4105
29	720	9.1878	6.9667	126.25	1.3047	5.6822	6.12	7.4247
30	780	9.9587	7.0264	128.56	1.3174	5.67	6.12	7.4374
31	840	10.721	7.0864	130.72	1.3282	5.6671	6.12	7.4482
32	900	11.496	7.1484	132.83	1.3379	5.6561	6.12	7.4579
33	960	12.266	7.2111	134.78	1.3457	5.6538	6.12	7.4657
34	1020	13.031	7.2746	136.78	1.3537	5.6433	6.12	7.4737
35	1080	13.799	7.3394	138.3	1.3568	5.6416	6.12	7.4768
36	1140	14.57	7.4057	139.88	1.36	5.6317	6.12	7.48
37	1200	15.338	7.4728	141.57	1.364	5.6317	6.12	7.484
38	1205.9	15.418	7.4798	141.73	1.3642	5.6311	6.12	7.4842

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 15.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-17.0'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.40 in
Specimen Area: 6.33 in^2
Specimen Volume: 40.49 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.12	6.12	0	0.000	1.0766	1.0766	1.000	1.0766	0
2	0.05	6.3673	6.12	0.18002	0.728	1.1439	0.89655	1.276	1.0202	0.12366
3	0.11	6.4916	6.12	0.25609	0.689	1.1921	0.82048	1.453	1.0063	0.18582
4	0.18	6.5692	6.12	0.30719	0.684	1.2185	0.76938	1.584	0.99396	0.22459
5	0.24	6.6299	6.12	0.34726	0.681	1.2392	0.72931	1.699	0.98424	0.25493
6	0.30	6.6767	6.12	0.37688	0.677	1.2564	0.69969	1.796	0.97805	0.27836
7	0.36	6.7134	6.12	0.40417	0.681	1.2658	0.6724	1.883	0.9691	0.2967
8	0.43	6.7428	6.12	0.42392	0.681	1.2755	0.65265	1.954	0.96408	0.31142
9	0.49	6.7669	6.12	0.44134	0.682	1.2821	0.63523	2.018	0.95868	0.32345
10	0.55	6.7897	6.12	0.45585	0.681	1.2904	0.62072	2.079	0.95557	0.33485
11	0.62	6.8125	6.12	0.46979	0.678	1.2993	0.60678	2.141	0.95303	0.34625
12	0.68	6.8317	6.12	0.48489	0.681	1.3034	0.59168	2.203	0.94753	0.35585
13	0.75	6.8491	6.12	0.4965	0.681	1.3091	0.58007	2.257	0.94461	0.36454
14	0.88	6.8826	6.12	0.51973	0.682	1.3194	0.55684	2.369	0.93812	0.38128
15	1.00	6.9118	6.12	0.53948	0.681	1.3289	0.53709	2.474	0.93301	0.39592
16	1.13	6.9398	6.12	0.5598	0.683	1.3366	0.51677	2.586	0.92669	0.40992
17	1.26	6.9648	6.12	0.572	0.677	1.3494	0.50457	2.674	0.92698	0.42241
18	1.39	6.9891	6.12	0.58419	0.672	1.3615	0.49238	2.765	0.92694	0.43456
19	1.51	7.0098	6.12	0.59929	0.673	1.3671	0.47728	2.864	0.9222	0.44492
20	2.28	7.1159	6.12	0.64516	0.648	1.4273	0.43141	3.308	0.92935	0.49794
21	3.05	7.1894	6.12	0.66897	0.626	1.477	0.4076	3.624	0.94229	0.53469
22	3.82	7.246	6.12	0.67594	0.600	1.5266	0.40063	3.811	0.96364	0.56301
23	4.58	7.2897	6.12	0.67304	0.575	1.5732	0.40353	3.899	0.98836	0.58483
24	5.35	7.3239	6.12	0.67072	0.557	1.6098	0.40585	3.966	1.0078	0.60197
25	6.12	7.3529	6.12	0.66897	0.543	1.6405	0.4076	4.025	1.024	0.61645
26	6.88	7.3747	6.12	0.65794	0.524	1.6733	0.41863	3.997	1.046	0.62736
27	7.66	7.3931	6.12	0.65387	0.514	1.6958	0.42269	4.012	1.0592	0.63654
28	8.42	7.4105	6.12	0.644	0.499	1.7231	0.43257	3.983	1.0778	0.64524
29	9.19	7.4247	6.12	0.63878	0.490	1.7425	0.43779	3.980	1.0902	0.65237
30	9.96	7.4374	6.12	0.62658	0.476	1.7674	0.44999	3.928	1.1087	0.6587
31	10.72	7.4482	6.12	0.62368	0.470	1.7811	0.45289	3.933	1.117	0.66409
32	11.50	7.4579	6.12	0.61264	0.458	1.8018	0.46392	3.884	1.1329	0.66893
33	12.27	7.4657	6.12	0.61032	0.454	1.8119	0.46625	3.886	1.1391	0.67284
34	13.03	7.4737	6.12	0.59987	0.443	1.8304	0.4767	3.840	1.1536	0.67687
35	13.80	7.4768	6.12	0.59813	0.441	1.8352	0.47844	3.836	1.1568	0.67838
36	14.57	7.48	6.12	0.58826	0.433	1.8483	0.48831	3.785	1.1683	0.67999
37	15.34	7.484	6.12	0.58826	0.431	1.8523	0.48831	3.793	1.1703	0.68199
38	15.42	7.4842	6.12	0.58767	0.431	1.8531	0.48889	3.790	1.171	0.68212

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 30.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-16.5'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.34 in
Specimen Area: 6.22 in^2
Specimen Volume: 39.43 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2165	0	0	5.0422	7.2	7.2
2	5	0.057327	6.2201	37.373	0.4326	5.3099	7.2	7.6326
3	10	0.11918	6.224	53.994	0.62462	5.4417	7.2	7.8246
4	15	0.18405	6.228	62.676	0.72458	5.5332	7.2	7.9246
5	20	0.24892	6.232	69.557	0.80361	5.6096	7.2	8.0036
6	25	0.31228	6.236	75.327	0.86972	5.6726	7.2	8.0697
7	30	0.37564	6.24	80.356	0.92719	5.728	7.2	8.1272
8	35	0.44202	6.2441	85.068	0.9809	5.7788	7.2	8.1809
9	40	0.50689	6.2482	88.985	1.0254	5.8225	7.2	8.2254
10	45	0.57025	6.2522	92.478	1.065	5.8616	7.2	8.265
11	50	0.6321	6.2561	95.602	1.1003	5.8972	7.2	8.3003
12	55	0.69697	6.2602	98.513	1.133	5.9298	7.2	8.333
13	60	0.76033	6.2642	101.53	1.167	5.9607	7.2	8.367
14	70	0.88856	6.2723	106.72	1.225	6.0115	7.2	8.425
15	80	1.0198	6.2806	111.69	1.2804	6.0569	7.2	8.4804
16	90	1.1496	6.2888	115.93	1.3273	6.0949	7.2	8.5273
17	110	1.412	6.3056	123.92	1.415	6.1573	7.2	8.615
18	120	1.5403	6.3138	127.47	1.4536	6.1806	7.2	8.6536
19	180	2.3247	6.3645	144.14	1.6307	6.2815	7.2	8.8307
20	240	3.1062	6.4158	156.9	1.7608	6.3252	7.2	8.9608
21	300	3.8877	6.468	167.01	1.8591	6.3415	7.2	9.0591
22	360	4.6691	6.521	175.01	1.9323	6.3398	7.2	9.1323
23	420	5.4611	6.5756	181.3	1.9852	6.32	7.2	9.1852
24	480	6.2516	6.6311	187.18	2.0324	6.3025	7.2	9.2324
25	540	7.0361	6.687	192.69	2.0747	6.2844	7.2	9.2747
26	600	7.8221	6.7441	197.24	2.1057	6.2616	7.2	9.3057
27	660	8.6005	6.8015	201.31	2.1311	6.2418	7.2	9.3311
28	720	9.391	6.8608	205.13	2.1527	6.2237	7.2	9.3527
29	780	10.177	6.9209	208.78	2.172	6.2109	7.2	9.372
30	840	10.96	6.9817	211.85	2.1847	6.1957	7.2	9.3847
31	900	11.752	7.0444	214.97	2.1972	6.1841	7.2	9.3972
32	960	12.536	7.1076	217.25	2.2007	6.1713	7.2	9.4007
33	1020	13.315	7.1714	219.79	2.2067	6.1631	7.2	9.4067
34	1080	14.104	7.2373	221.96	2.2082	6.1514	7.2	9.4082
35	1140	14.884	7.3036	223.76	2.2059	6.145	7.2	9.4059
36	1200	15.665	7.3713	225.14	2.199	6.1363	7.2	9.399

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 30.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-16.5'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.34 in
Specimen Area: 6.22 in^2
Specimen Volume: 39.43 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.2	7.2	0	0.000	2.1578	2.1578	1.000	2.1578	0
2	0.06	7.6326	7.2	0.26768	0.619	2.3227	1.8901	1.229	2.1064	0.2163
3	0.12	7.8246	7.2	0.39948	0.640	2.3829	1.7583	1.355	2.0706	0.31231
4	0.18	7.9246	7.2	0.49104	0.678	2.3913	1.6668	1.435	2.029	0.36229
5	0.25	8.0036	7.2	0.56744	0.706	2.394	1.5904	1.505	1.9922	0.4018
6	0.31	8.0697	7.2	0.63042	0.725	2.3971	1.5274	1.569	1.9622	0.43486
7	0.38	8.1272	7.2	0.68582	0.740	2.3992	1.472	1.630	1.9356	0.4636
8	0.44	8.1809	7.2	0.73656	0.751	2.4021	1.4212	1.690	1.9117	0.49045
9	0.51	8.2254	7.2	0.7803	0.761	2.4029	1.3775	1.744	1.8902	0.5127
10	0.57	8.265	7.2	0.81937	0.769	2.4034	1.3384	1.796	1.8709	0.53249
11	0.63	8.3003	7.2	0.85495	0.777	2.4031	1.3028	1.845	1.853	0.55013
12	0.70	8.333	7.2	0.88761	0.783	2.4032	1.2702	1.892	1.8367	0.56651
13	0.76	8.367	7.2	0.91851	0.787	2.4063	1.2393	1.942	1.8228	0.58349
14	0.89	8.425	7.2	0.96925	0.791	2.4136	1.1885	2.031	1.8011	0.61251
15	1.02	8.4804	7.2	1.0147	0.792	2.4235	1.1431	2.120	1.7833	0.64022
16	1.15	8.5273	7.2	1.0526	0.793	2.4324	1.1051	2.201	1.7688	0.66363
17	1.41	8.615	7.2	1.115	0.788	2.4577	1.0427	2.357	1.7502	0.7075
18	1.54	8.6536	7.2	1.1384	0.783	2.473	1.0194	2.426	1.7462	0.7268
19	2.32	8.8307	7.2	1.2393	0.760	2.5492	0.91853	2.775	1.7339	0.81533
20	3.11	8.9608	7.2	1.283	0.729	2.6356	0.87479	3.013	1.7552	0.88039
21	3.89	9.0591	7.2	1.2993	0.699	2.7176	0.85846	3.166	1.788	0.92957
22	4.67	9.1323	7.2	1.2976	0.672	2.7925	0.86021	3.246	1.8263	0.96614
23	5.46	9.1852	7.2	1.2778	0.644	2.8652	0.88004	3.256	1.8726	0.9926
24	6.25	9.2324	7.2	1.2603	0.620	2.9299	0.89753	3.264	1.9137	1.0162
25	7.04	9.2747	7.2	1.2422	0.599	2.9903	0.91561	3.266	1.9529	1.0373
26	7.82	9.3057	7.2	1.2194	0.579	3.0441	0.93836	3.244	1.9912	1.0529
27	8.60	9.3311	7.2	1.1996	0.563	3.0893	0.95818	3.224	2.0237	1.0655
28	9.39	9.3527	7.2	1.1815	0.549	3.1289	0.97626	3.205	2.0526	1.0763
29	10.18	9.372	7.2	1.1687	0.538	3.1611	0.98909	3.196	2.0751	1.086
30	10.96	9.3847	7.2	1.1535	0.528	3.189	1.0043	3.175	2.0966	1.0924
31	11.75	9.3972	7.2	1.1419	0.520	3.2131	1.0159	3.163	2.1145	1.0986
32	12.54	9.4007	7.2	1.129	0.513	3.2295	1.0287	3.139	2.1291	1.1004
33	13.31	9.4067	7.2	1.1209	0.508	3.2436	1.0369	3.128	2.1402	1.1033
34	14.10	9.4082	7.2	1.1092	0.502	3.2567	1.0486	3.106	2.1527	1.1041
35	14.88	9.4059	7.2	1.1028	0.500	3.2608	1.055	3.091	2.1579	1.1029
36	15.67	9.399	7.2	1.0941	0.498	3.2628	1.0637	3.067	2.1633	1.0995

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 60.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-16.5'
Elevation: ----

Terracon
Consulting Engineers & Scientists

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767.

Specimen Height: 6.26 in
Specimen Area: 6.29 in^2
Specimen Volume: 39.33 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2881	0	0	5.0794	9.36	9.36
2	5	0.055149	6.2915	52.036	0.59549	5.5563	9.36	9.9555
3	10	0.11755	6.2955	71.569	0.81852	5.8035	9.36	10.179
4	15	0.18141	6.2995	84.326	0.96381	5.9774	9.36	10.324
5	20	0.24672	6.3036	94.702	1.0817	6.1181	9.36	10.442
6	25	0.31203	6.3078	103.75	1.1843	6.2356	9.36	10.544
7	30	0.37733	6.3119	111.85	1.2759	6.3392	9.36	10.636
8	35	0.44119	6.3159	119.26	1.3596	6.4305	9.36	10.72
9	40	0.5065	6.3201	125.99	1.4353	6.5113	9.36	10.795
10	45	0.5718	6.3242	132.6	1.5097	6.5858	9.36	10.87
11	50	0.63566	6.3283	138.48	1.5755	6.6503	9.36	10.936
12	55	0.70097	6.3325	143.88	1.6359	6.7091	9.36	10.996
13	60	0.76628	6.3366	149.33	1.6968	6.7667	9.36	11.057
14	70	0.89544	6.3449	158.97	1.8039	6.8626	9.36	11.164
15	80	1.0261	6.3533	167.86	1.9023	6.9446	9.36	11.262
16	90	1.1567	6.3617	176.06	1.9927	7.0185	9.36	11.353
17	100	1.2873	6.3701	183	2.0684	7.0773	9.36	11.428
18	110	1.4165	6.3784	189.56	2.1398	7.1325	9.36	11.5
19	120	1.5471	6.3869	196.55	2.2157	7.1802	9.36	11.576
20	180	2.3351	6.4384	227.25	2.5413	7.3582	9.36	11.901
21	240	3.1261	6.491	249.54	2.768	7.4332	9.36	12.128
22	300	3.9156	6.5443	267.01	2.9376	7.4565	9.36	12.298
23	360	4.7123	6.599	281.56	3.0721	7.453	9.36	12.432
24	420	5.5149	6.6551	294.48	3.1859	7.4338	9.36	12.546
25	480	6.3087	6.7115	305.17	3.2739	7.4059	9.36	12.634
26	540	7.1069	6.7692	315.07	3.3513	7.3716	9.36	12.711
27	600	7.9066	6.8279	323.91	3.4156	7.3349	9.36	12.776
28	660	8.699	6.8872	332.28	3.4737	7.2994	9.36	12.834
29	720	9.5044	6.9485	340.75	3.5308	7.2645	9.36	12.891
30	780	10.304	7.0104	347.84	3.5725	7.2302	9.36	12.932
31	840	11.102	7.0734	354.51	3.6086	7.1977	9.36	12.969
32	900	11.898	7.1372	361.34	3.6452	7.1668	9.36	13.005
33	960	12.697	7.2026	367.64	3.675	7.1383	9.36	13.035
34	1020	13.49	7.2686	373.2	3.6967	7.1104	9.36	13.057
35	1080	14.297	7.337	378.28	3.7121	7.0837	9.36	13.072
36	1140	15.095	7.406	383.31	3.7265	7.0621	9.36	13.086

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-012 S-7
Sample No.: S-7
Test No.: 60.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 15.0'-16.5'
Elevation: ----

Soil Description: BROWN AND RUST BROWN MOTTLED LEAN CLAY CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D 4767.

Specimen Height: 6.26 in
Specimen Area: 6.29 in^2
Specimen Volume: 39.33 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 48

Plastic Limit: 19

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	9.36	9.36	0	0.000	4.2806	4.2806	1.000	4.2806	0
2	0.06	9.9555	9.36	0.47694	0.801	4.3992	3.8037	1.157	4.1015	0.29775
3	0.12	10.179	9.36	0.72413	0.885	4.375	3.5565	1.230	3.9658	0.40926
4	0.18	10.324	9.36	0.89803	0.932	4.3464	3.3826	1.285	3.8645	0.4819
5	0.25	10.442	9.36	1.0388	0.960	4.3235	3.2419	1.334	3.7827	0.54084
6	0.31	10.544	9.36	1.1563	0.976	4.3087	3.1244	1.379	3.7165	0.59215
7	0.38	10.636	9.36	1.2598	0.987	4.2967	3.0208	1.422	3.6588	0.63796
8	0.44	10.72	9.36	1.3511	0.994	4.2891	2.9295	1.464	3.6093	0.67979
9	0.51	10.795	9.36	1.432	0.998	4.2839	2.8487	1.504	3.5663	0.71764
10	0.57	10.87	9.36	1.5064	0.998	4.2839	2.7742	1.544	3.5291	0.75483
11	0.64	10.936	9.36	1.571	0.997	4.2852	2.7097	1.581	3.4974	0.78777
12	0.70	10.996	9.36	1.6297	0.996	4.2868	2.6509	1.617	3.4689	0.81795
13	0.77	11.057	9.36	1.6873	0.994	4.2901	2.5933	1.654	3.4417	0.84839
14	0.90	11.164	9.36	1.7833	0.989	4.3013	2.4974	1.722	3.3993	0.90195
15	1.03	11.262	9.36	1.8653	0.981	4.3177	2.4154	1.788	3.3665	0.95115
16	1.16	11.353	9.36	1.9391	0.973	4.3341	2.3415	1.851	3.3378	0.99633
17	1.29	11.428	9.36	1.9979	0.966	4.3511	2.2827	1.906	3.3169	1.0342
18	1.42	11.5	9.36	2.0531	0.960	4.3673	2.2275	1.961	3.2974	1.0699
19	1.55	11.576	9.36	2.1008	0.948	4.3955	2.1798	2.016	3.2877	1.1079
20	2.34	11.901	9.36	2.2788	0.897	4.5432	2.0018	2.270	3.2725	1.2707
21	3.13	12.128	9.36	2.3539	0.850	4.6947	1.9268	2.437	3.3108	1.384
22	3.92	12.298	9.36	2.3771	0.809	4.8411	1.9035	2.543	3.3723	1.4688
23	4.71	12.432	9.36	2.3736	0.773	4.9791	1.907	2.611	3.443	1.536
24	5.51	12.546	9.36	2.3544	0.739	5.1121	1.9262	2.654	3.5192	1.593
25	6.31	12.634	9.36	2.3265	0.711	5.228	1.9541	2.675	3.5911	1.6369
26	7.11	12.711	9.36	2.2922	0.684	5.3397	1.9884	2.685	3.6641	1.6756
27	7.91	12.776	9.36	2.2556	0.660	5.4407	2.0251	2.687	3.7329	1.7078
28	8.70	12.834	9.36	2.2201	0.639	5.5342	2.0606	2.686	3.7974	1.7368
29	9.50	12.891	9.36	2.1852	0.619	5.6263	2.0955	2.685	3.8609	1.7654
30	10.30	12.932	9.36	2.1509	0.602	5.7022	2.1298	2.677	3.916	1.7862
31	11.10	12.969	9.36	2.1183	0.587	5.7709	2.1623	2.669	3.9666	1.8043
32	11.90	13.005	9.36	2.0875	0.573	5.8383	2.1932	2.662	4.0158	1.8226
33	12.70	13.035	9.36	2.059	0.560	5.8967	2.2217	2.654	4.0592	1.8375
34	13.49	13.057	9.36	2.031	0.549	5.9463	2.2496	2.643	4.098	1.8484
35	14.30	13.072	9.36	2.0043	0.540	5.9885	2.2763	2.631	4.1324	1.8561
36	15.09	13.086	9.36	1.9828	0.532	6.0243	2.2979	2.622	4.1611	1.8632

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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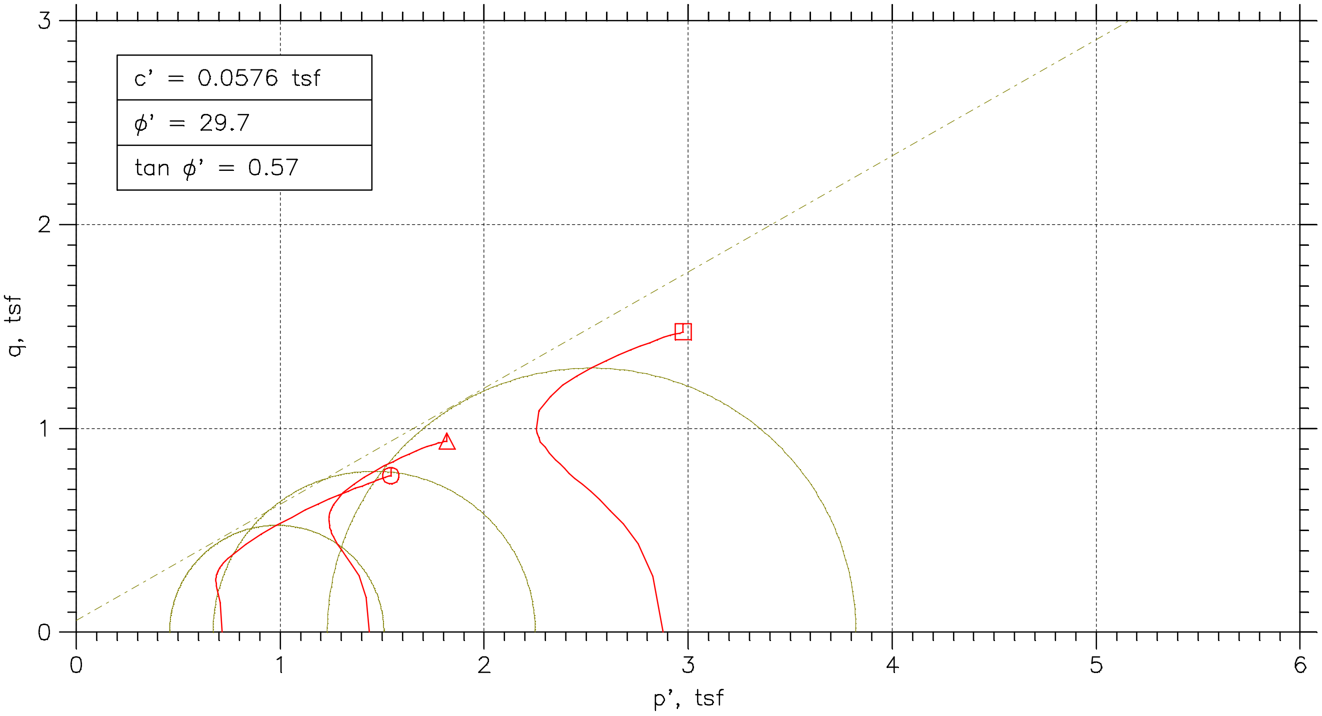

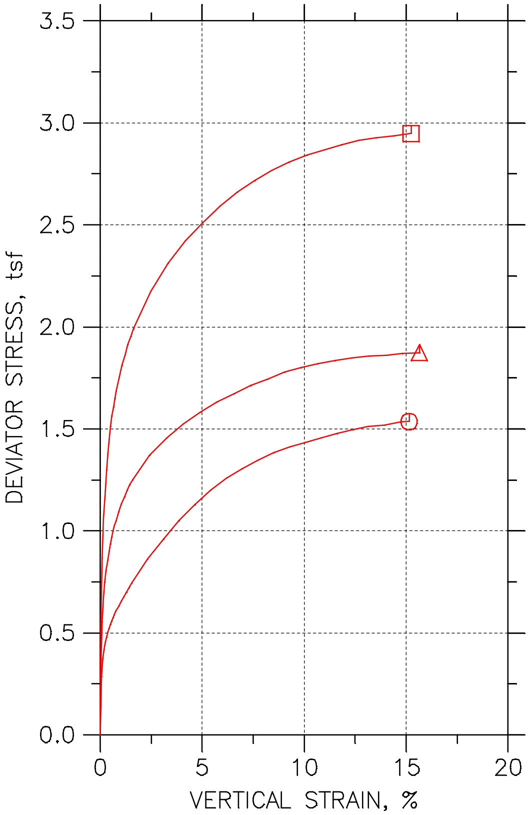

	Symbol	○	△	□	
	Test No.	10.0 PSI	20.0 PSI	40.0 PSI	
Initial	Diameter, in	2.8386	2.8571	2.8543	
	Height, in	6.0421	6.0181	5.878	
	Water Content, %	19.07	19.02	18.95	
	Dry Density, pcf	111.5	111.3	111.5	
	Saturation, %	99.28	98.47	98.47	
	Void Ratio	0.52245	0.52554	0.52343	
Before Shear	Water Content, %	18.80	18.40	16.50	
	Dry Density, pcf	112.4	113.2	117.2	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.51129	0.50044	0.4489	
	Back Press., tsf	5.0445	5.044	5.0432	
	Minor Prin. Stress, tsf	0.71549	1.436	2.8768	
	Max. Dev. Stress, tsf	1.536	1.8745	2.9478	
	Time to Failure, min	1174.7	1140	1080	
	Strain Rate, %/min	0.02	0.02	0.02	
	B-Value	0.95	0.97	0.97	
	Estimated Specific Gravity	2.72	2.72	2.72	
	Liquid Limit	49	49	49	
	Plastic Limit	21	21	21	
	Plasticity Index	28	28	28	
	Failure Sketch				

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW-013 S3
Sample Type: 3.0'' ST

Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

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CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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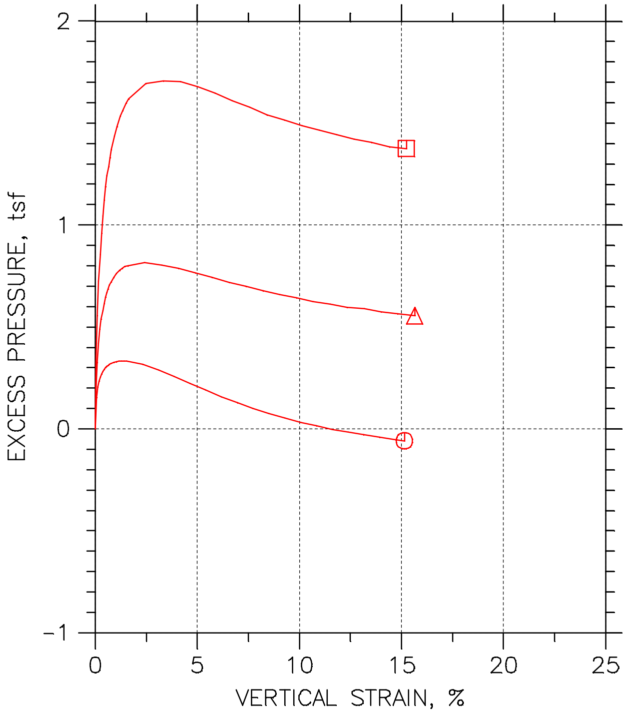

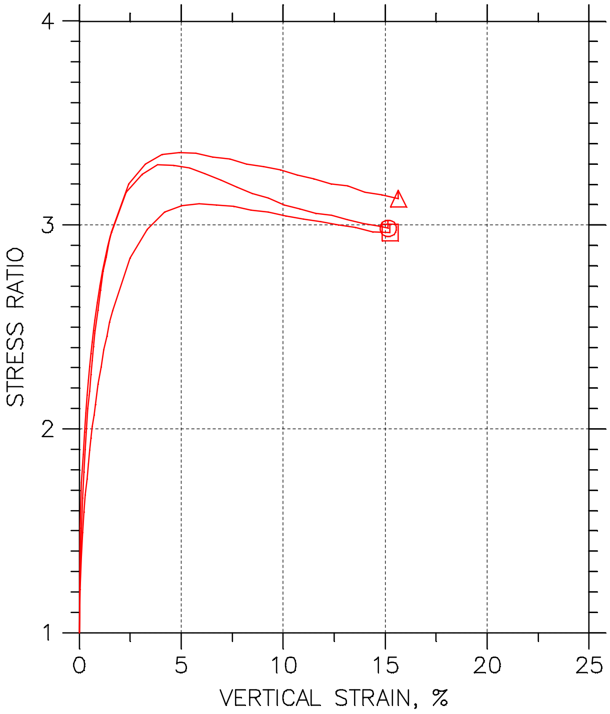

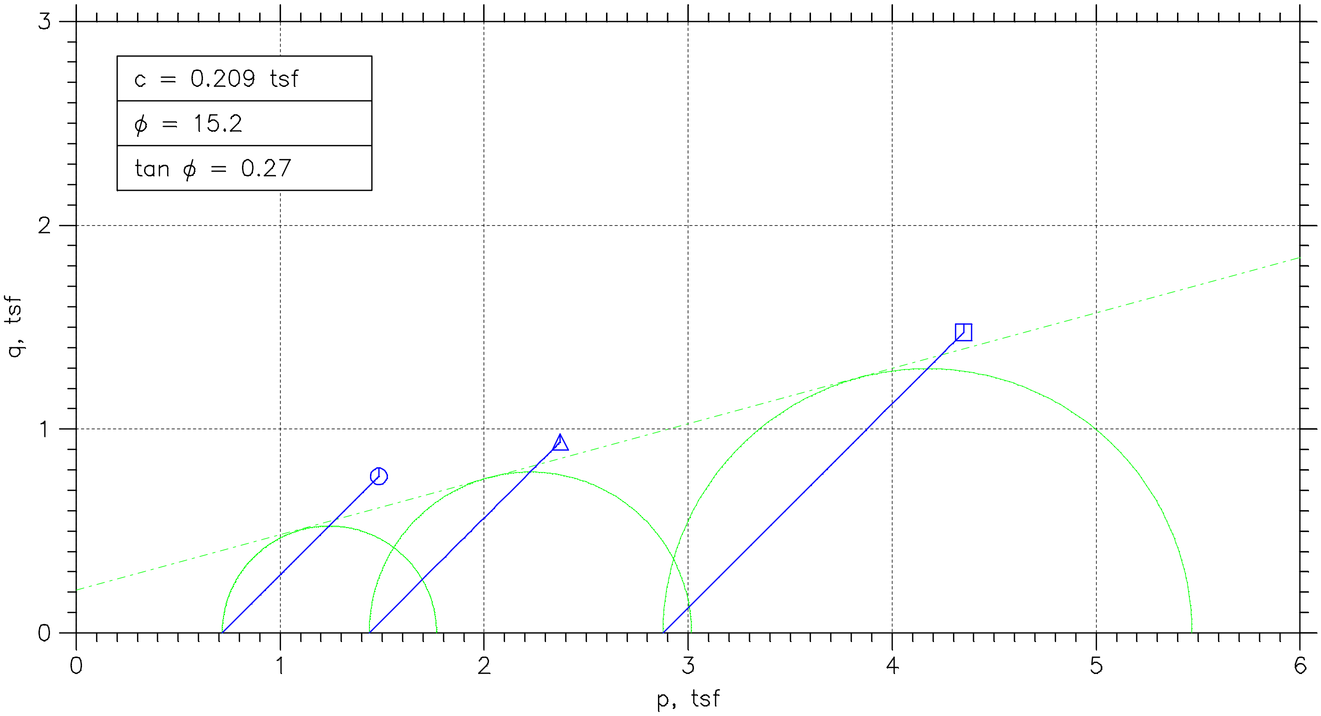

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-013 S3	Tested By: BCM	Checked By: WPQ
Sample No.: S-3	Test Date: 11/4/15	Depth: 6.0'-8.0'
Test No.: EDW-013 S3	Sample Type: 3.0" ST	Elevation: -----
Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767		

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TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: S-3
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: -----

Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.04 in
Specimen Area: 6.33 in^2
Specimen Volume: 38.24 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3284	0	0	5.0445	5.76	5.76
2	5.0002	0.058512	6.3321	25.429	0.28914	5.1976	5.76	6.0491
3	10	0.12273	6.3362	32.957	0.3745	5.2511	5.76	6.1345
4	15	0.18695	6.3402	36.958	0.4197	5.2802	5.76	6.1797
5	20	0.25117	6.3443	39.959	0.45348	5.3	5.76	6.2135
6	25	0.31682	6.3485	42.381	0.48065	5.3139	5.76	6.2407
7	30	0.38104	6.3526	44.539	0.50481	5.3273	5.76	6.2648
8	35	0.44526	6.3567	46.277	0.52416	5.3372	5.76	6.2842
9	40	0.50948	6.3608	47.909	0.5423	5.3454	5.76	6.3023
10	45	0.5737	6.3649	49.488	0.55981	5.3512	5.76	6.3198
11	50	0.63935	6.3691	50.91	0.57551	5.3564	5.76	6.3355
12	55	0.70357	6.3732	52.278	0.5906	5.3617	5.76	6.3506
13	60	0.76922	6.3774	53.542	0.60448	5.3657	5.76	6.3645
14	70.001	0.89623	6.3856	55.911	0.63042	5.371	5.76	6.3904
15	80.001	1.0232	6.3938	58.175	0.6551	5.375	5.76	6.4151
16	90.001	1.1503	6.402	60.386	0.67913	5.3774	5.76	6.4391
17	100	1.2787	6.4104	62.387	0.70072	5.3779	5.76	6.4607
18	110	1.4043	6.4185	64.387	0.72227	5.3785	5.76	6.4823
19	120	1.5342	6.427	66.493	0.74491	5.3768	5.76	6.5049
20	180	2.3134	6.4783	77.602	0.86247	5.3611	5.76	6.6225
21	240	3.0926	6.5303	87.078	0.96008	5.3331	5.76	6.7201
22	300	3.8561	6.5822	96.028	1.0504	5.3023	5.76	6.8104
23	360	4.6339	6.6359	103.98	1.1282	5.268	5.76	6.8882
24	420	5.4102	6.6903	111.3	1.1977	5.2348	5.76	6.9577
25	480	6.1766	6.745	117.72	1.2566	5.2016	5.76	7.0166
26	540	6.9544	6.8014	123.3	1.3053	5.172	5.76	7.0653
27	600	7.7321	6.8587	128.09	1.3446	5.1446	5.76	7.1046
28	660	8.4985	6.9162	132.78	1.3822	5.1184	5.76	7.1422
29	720	9.2777	6.9756	136.88	1.4129	5.0975	5.76	7.1729
30	780	10.057	7.036	140.2	1.4347	5.0759	5.76	7.1947
31	840	10.819	7.0961	143.62	1.4572	5.0591	5.76	7.2172
32	900	11.602	7.159	146.99	1.4783	5.0416	5.76	7.2383
33	960	12.382	7.2227	150.1	1.4963	5.0288	5.76	7.2563
34	1020	13.151	7.2866	152.89	1.5107	5.0148	5.76	7.2707
35	1080	13.932	7.3527	155.15	1.5193	5.0032	5.76	7.2793
36	1140	14.706	7.4195	157.94	1.5327	4.9921	5.76	7.2927
37	1174.7	15.146	7.458	159.1	1.536	4.9857	5.76	7.296

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: S-3
Test No.: 10.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: -----

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Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.04 in
Specimen Area: 6.33 in^2
Specimen Volume: 38.24 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.76	5.76	0	0.000	0.71549	0.71549	1.000	0.71549	0
2	0.06	6.0491	5.76	0.15304	0.529	0.85158	0.56245	1.514	0.70701	0.14457
3	0.12	6.1345	5.76	0.20658	0.552	0.88341	0.50891	1.736	0.69616	0.18725
4	0.19	6.1797	5.76	0.23567	0.562	0.89951	0.47981	1.875	0.68966	0.20985
5	0.25	6.2135	5.76	0.25546	0.563	0.91352	0.46003	1.986	0.68677	0.22674
6	0.32	6.2407	5.76	0.26942	0.561	0.92672	0.44606	2.078	0.68639	0.24033
7	0.38	6.2648	5.76	0.2828	0.560	0.93749	0.43268	2.167	0.68508	0.2524
8	0.45	6.2842	5.76	0.2927	0.558	0.94695	0.42279	2.240	0.68487	0.26208
9	0.51	6.3023	5.76	0.30084	0.555	0.95694	0.41464	2.308	0.68579	0.27115
10	0.57	6.3198	5.76	0.30666	0.548	0.96863	0.40882	2.369	0.68873	0.27991
11	0.64	6.3355	5.76	0.3119	0.542	0.9791	0.40359	2.426	0.69134	0.28776
12	0.70	6.3506	5.76	0.31714	0.537	0.98895	0.39835	2.483	0.69365	0.2953
13	0.77	6.3645	5.76	0.32121	0.531	0.99875	0.39428	2.533	0.69651	0.30224
14	0.90	6.3904	5.76	0.32645	0.518	1.0195	0.38904	2.620	0.70425	0.31521
15	1.02	6.4151	5.76	0.33052	0.505	1.0401	0.38496	2.702	0.71252	0.32755
16	1.15	6.4391	5.76	0.33285	0.490	1.0618	0.38264	2.775	0.7222	0.33956
17	1.28	6.4607	5.76	0.33343	0.476	1.0828	0.38206	2.834	0.73241	0.35036
18	1.40	6.4823	5.76	0.33401	0.462	1.1037	0.38147	2.893	0.74261	0.36113
19	1.53	6.5049	5.76	0.33227	0.446	1.1281	0.38322	2.944	0.75567	0.37245
20	2.31	6.6225	5.76	0.31656	0.367	1.2614	0.39893	3.162	0.83017	0.43124
21	3.09	6.7201	5.76	0.28862	0.301	1.3869	0.42686	3.249	0.9069	0.48004
22	3.86	6.8104	5.76	0.25778	0.245	1.5081	0.4577	3.295	0.98291	0.52521
23	4.63	6.8882	5.76	0.22345	0.198	1.6202	0.49203	3.293	1.0561	0.56408
24	5.41	6.9577	5.76	0.19028	0.159	1.7229	0.5252	3.281	1.1241	0.59887
25	6.18	7.0166	5.76	0.15711	0.125	1.815	0.55837	3.250	1.1867	0.6283
26	6.95	7.0653	5.76	0.12744	0.098	1.8933	0.58805	3.220	1.2407	0.65263
27	7.73	7.1046	5.76	0.10009	0.074	1.96	0.6154	3.185	1.2877	0.67232
28	8.50	7.1422	5.76	0.073902	0.053	2.0238	0.64158	3.154	1.3327	0.69112
29	9.28	7.1729	5.76	0.052953	0.037	2.0754	0.66253	3.133	1.369	0.70643
30	10.06	7.1947	5.76	0.031423	0.022	2.1187	0.68406	3.097	1.4014	0.71734
31	10.82	7.2172	5.76	0.014548	0.010	2.1582	0.70094	3.079	1.4296	0.72862
32	11.60	7.2383	5.76	-0.0029095	-0.002	2.1967	0.7184	3.058	1.4576	0.73916
33	12.38	7.2563	5.76	-0.015711	-0.011	2.2275	0.7312	3.046	1.4793	0.74813
34	13.15	7.2707	5.76	-0.029677	-0.020	2.2559	0.74516	3.027	1.5005	0.75534
35	13.93	7.2793	5.76	-0.041315	-0.027	2.2761	0.7568	3.008	1.5164	0.75964
36	14.71	7.2927	5.76	-0.052371	-0.034	2.3005	0.76786	2.996	1.5342	0.76634
37	15.15	7.296	5.76	-0.058772	-0.038	2.3102	0.77426	2.984	1.5422	0.76798

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: ----
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: ----

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Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.02 in
Specimen Area: 6.41 in^2
Specimen Volume: 38.58 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.4112	0	0	5.044	6.48	6.48
2	5.0001	0.036568	6.4135	30.226	0.33933	5.2282	6.48	6.8193
3	10	0.095395	6.4173	49.495	0.55532	5.3711	6.48	7.0353
4	15	0.16217	6.4216	59.764	0.67009	5.4644	6.48	7.1501
5	20	0.22895	6.4259	66.858	0.74912	5.5321	6.48	7.2291
6	25	0.29572	6.4302	72.098	0.8073	5.5828	6.48	7.2873
7	30	0.36409	6.4346	76.704	0.85828	5.6254	6.48	7.3383
8	35	0.43405	6.4391	80.568	0.90088	5.6604	6.48	7.3809
9	40	0.50082	6.4434	83.903	0.93755	5.689	6.48	7.4175
10	45	0.57078	6.448	86.92	0.97058	5.7129	6.48	7.4506
11	50	0.63756	6.4523	89.62	1.0001	5.7309	6.48	7.4801
12	55	0.70433	6.4566	92.002	1.0259	5.7496	6.48	7.5059
13	60	0.77429	6.4612	94.384	1.0518	5.7642	6.48	7.5318
14	70	0.91261	6.4702	98.513	1.0962	5.7881	6.48	7.5762
15	80.001	1.0478	6.479	101.9	1.1324	5.8068	6.48	7.6124
16	90.001	1.1861	6.4881	105.29	1.1684	5.8219	6.48	7.6484
17	100	1.3212	6.497	108.15	1.1985	5.8301	6.48	7.6785
18	110	1.4595	6.5061	110.79	1.2261	5.8394	6.48	7.7061
19	120	1.5947	6.5151	113.28	1.2519	5.8435	6.48	7.7319
20	180	2.423	6.5704	125.03	1.3702	5.8581	6.48	7.8502
21	240	3.2498	6.6265	133.87	1.4546	5.847	6.48	7.9346
22	300	4.0702	6.6832	141.44	1.5238	5.8307	6.48	8.0038
23	360	4.8969	6.7413	147.9	1.5797	5.8091	6.48	8.0597
24	420	5.7253	6.8005	154.2	1.6326	5.7863	6.48	8.1126
25	480	6.5521	6.8607	159.44	1.6733	5.763	6.48	8.1533
26	540	7.3804	6.922	164.79	1.7141	5.742	6.48	8.1941
27	600	8.2072	6.9844	169.34	1.7457	5.7204	6.48	8.2257
28	660	9.0339	7.0479	174.05	1.7781	5.7024	6.48	8.2581
29	720	9.8591	7.1124	177.97	1.8016	5.686	6.48	8.2816
30	780	10.684	7.1781	181.41	1.8196	5.6697	6.48	8.2996
31	840	11.508	7.2449	184.64	1.835	5.6563	6.48	8.315
32	900	12.335	7.3132	187.76	1.8486	5.6406	6.48	8.3286
33	960	13.166	7.3832	190.52	1.8579	5.633	6.48	8.3379
34	1020	13.991	7.4541	192.74	1.8617	5.619	6.48	8.3417
35	1080	14.821	7.5267	195.44	1.8695	5.6096	6.48	8.3495
36	1140	15.646	7.6003	197.87	1.8745	5.5997	6.48	8.3545

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: ----
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: ----

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Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.02 in
Specimen Area: 6.41 in^2
Specimen Volume: 38.58 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.436	1.436	1.000	1.436	0
2	0.04	6.8193	6.48	0.18429	0.543	1.5911	1.2518	1.271	1.4214	0.16966
3	0.10	7.0353	6.48	0.32717	0.589	1.6642	1.1089	1.501	1.3865	0.27766
4	0.16	7.1501	6.48	0.42048	0.627	1.6857	1.0156	1.660	1.3506	0.33504
5	0.23	7.2291	6.48	0.48812	0.652	1.697	0.94792	1.790	1.3225	0.37456
6	0.30	7.2873	6.48	0.53886	0.667	1.7045	0.89718	1.900	1.3008	0.40365
7	0.36	7.3383	6.48	0.58143	0.677	1.7129	0.85461	2.004	1.2837	0.42914
8	0.43	7.3809	6.48	0.61643	0.684	1.7205	0.81962	2.099	1.2701	0.45044
9	0.50	7.4175	6.48	0.645	0.688	1.7286	0.79104	2.185	1.2598	0.46877
10	0.57	7.4506	6.48	0.66891	0.689	1.7377	0.76713	2.265	1.2524	0.48529
11	0.64	7.4801	6.48	0.68699	0.687	1.7491	0.74905	2.335	1.2491	0.50003
12	0.70	7.5059	6.48	0.70565	0.688	1.7563	0.73039	2.405	1.2434	0.51297
13	0.77	7.5318	6.48	0.72023	0.685	1.7676	0.71581	2.469	1.2417	0.52588
14	0.91	7.5762	6.48	0.74414	0.679	1.7881	0.6919	2.584	1.24	0.54812
15	1.05	7.6124	6.48	0.7628	0.674	1.8056	0.67324	2.682	1.2394	0.5662
16	1.19	7.6484	6.48	0.77797	0.666	1.8265	0.65808	2.775	1.2423	0.58421
17	1.32	7.6785	6.48	0.78613	0.656	1.8484	0.64991	2.844	1.2492	0.59925
18	1.46	7.7061	6.48	0.79546	0.649	1.8667	0.64058	2.914	1.2536	0.61305
19	1.59	7.7319	6.48	0.79954	0.639	1.8884	0.6365	2.967	1.2625	0.62596
20	2.42	7.8502	6.48	0.81412	0.594	1.9921	0.62192	3.203	1.307	0.68508
21	3.25	7.9346	6.48	0.80304	0.552	2.0876	0.633	3.298	1.3603	0.7273
22	4.07	8.0038	6.48	0.78671	0.516	2.1731	0.64933	3.347	1.4112	0.76191
23	4.90	8.0597	6.48	0.76514	0.484	2.2506	0.67091	3.355	1.4607	0.78983
24	5.73	8.1126	6.48	0.74239	0.455	2.3262	0.69365	3.354	1.5099	0.8163
25	6.55	8.1533	6.48	0.71907	0.430	2.3903	0.71698	3.334	1.5536	0.83664
26	7.38	8.1941	6.48	0.69807	0.407	2.452	0.73797	3.323	1.595	0.85703
27	8.21	8.2257	6.48	0.67649	0.388	2.5052	0.75955	3.298	1.6324	0.87284
28	9.03	8.2581	6.48	0.65841	0.370	2.5557	0.77763	3.287	1.6667	0.88905
29	9.86	8.2816	6.48	0.64209	0.356	2.5956	0.79396	3.269	1.6948	0.90081
30	10.68	8.2996	6.48	0.62576	0.344	2.6299	0.81029	3.246	1.7201	0.90982
31	11.51	8.315	6.48	0.61234	0.334	2.6587	0.8237	3.228	1.7412	0.91748
32	12.33	8.3286	6.48	0.5966	0.323	2.688	0.83945	3.202	1.7637	0.92428
33	13.17	8.3379	6.48	0.58902	0.317	2.7049	0.84703	3.193	1.776	0.92893
34	13.99	8.3417	6.48	0.57502	0.309	2.7227	0.86102	3.162	1.7919	0.93084
35	14.82	8.3495	6.48	0.56569	0.303	2.7399	0.87036	3.148	1.8051	0.93477
36	15.65	8.3545	6.48	0.55577	0.296	2.7548	0.88027	3.129	1.8175	0.93725

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: S-3
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: ----

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Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 5.88 in
Specimen Area: 6.40 in^2
Specimen Volume: 37.61 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3988	0	0	5.0432	7.92	7.92
2	5.0041	0.048179	6.4019	48.62	0.54682	5.3658	7.92	8.4668
3	10.004	0.10879	6.4058	77.205	0.86778	5.6	7.92	8.7878
4	15.004	0.17407	6.41	94.356	1.0599	5.7689	7.92	8.9799
5	20.004	0.23934	6.4142	106.47	1.1952	5.9005	7.92	9.1152
6	25.004	0.30772	6.4186	115.76	1.2985	6.0036	7.92	9.2185
7	30	0.37611	6.423	123.2	1.3811	6.0892	7.92	9.3011
8	35	0.44449	6.4274	129.5	1.4506	6.1649	7.92	9.3706
9	40	0.51287	6.4318	135	1.5113	6.2313	7.92	9.4313
10	45	0.58125	6.4362	139.57	1.5613	6.2855	7.92	9.4813
11	50	0.65119	6.4407	143.87	1.6083	6.3309	7.92	9.5283
12	55	0.72113	6.4453	147.8	1.6511	6.3746	7.92	9.5711
13	60	0.78951	6.4497	151.16	1.6874	6.413	7.92	9.6074
14	70	0.93094	6.4589	157.56	1.7563	6.4788	7.92	9.6763
15	80	1.0724	6.4682	162.96	1.814	6.5278	7.92	9.734
16	90	1.2138	6.4774	167.78	1.865	6.5767	7.92	9.785
17	100	1.3568	6.4868	172.3	1.9124	6.607	7.92	9.8324
18	110	1.4982	6.4961	176.23	1.9532	6.639	7.92	9.8732
19	120	1.6381	6.5054	179.9	1.9911	6.6605	7.92	9.9111
20	180	2.4804	6.5616	198.15	2.1743	6.7374	7.92	10.094
21	240	3.3274	6.619	212.42	2.3106	6.7514	7.92	10.231
22	300	4.176	6.6777	224.69	2.4227	6.7467	7.92	10.343
23	360	5.0277	6.7375	234.87	2.5099	6.7217	7.92	10.43
24	420	5.8747	6.7982	244.73	2.5919	6.6891	7.92	10.512
25	480	6.7264	6.8602	253.49	2.6604	6.6512	7.92	10.58
26	540	7.5718	6.923	261.25	2.717	6.6209	7.92	10.637
27	600	8.4204	6.9871	268.49	2.7667	6.5848	7.92	10.687
28	660	9.2674	7.0524	275.04	2.808	6.5598	7.92	10.728
29	720	10.122	7.1194	280.92	2.841	6.5301	7.92	10.761
30	780	10.979	7.1879	286.37	2.8685	6.5068	7.92	10.789
31	840	11.838	7.258	291.67	2.8934	6.4858	7.92	10.813
32	900	12.685	7.3284	296.55	2.9135	6.4643	7.92	10.834
33	960	13.532	7.4002	300.74	2.9261	6.4474	7.92	10.846
34	1020	14.391	7.4745	304.73	2.9354	6.4276	7.92	10.855
35	1080	15.24	7.5493	309.08	2.9478	6.4183	7.92	10.868

TRIAXIAL TEST

Terracon
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Project: DYNEGY EDWARDS
Boring No.: EDW-013 S3
Sample No.: S-3
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 6.0'-8.0'
Elevation: ----

Soil Description: BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 5.88 in
Specimen Area: 6.40 in^2
Specimen Volume: 37.61 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 49

Plastic Limit: 21

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.92	7.92	0	0.000	2.8768	2.8768	1.000	2.8768	0
2	0.05	8.4668	7.92	0.32266	0.590	3.101	2.5542	1.214	2.8276	0.27341
3	0.11	8.7878	7.92	0.55679	0.642	3.1878	2.32	1.374	2.7539	0.43389
4	0.17	8.9799	7.92	0.72569	0.685	3.211	2.1511	1.493	2.6811	0.52993
5	0.24	9.1152	7.92	0.85732	0.717	3.2147	2.0195	1.592	2.6171	0.59758
6	0.31	9.2185	7.92	0.96041	0.740	3.2149	1.9164	1.678	2.5657	0.64924
7	0.38	9.3011	7.92	1.046	0.757	3.2119	1.8308	1.754	2.5213	0.69054
8	0.44	9.3706	7.92	1.1217	0.773	3.2057	1.7551	1.827	2.4804	0.72532
9	0.51	9.4313	7.92	1.1881	0.786	3.2	1.6887	1.895	2.4443	0.75564
10	0.58	9.4813	7.92	1.2423	0.796	3.1958	1.6345	1.955	2.4152	0.78065
11	0.65	9.5283	7.92	1.2877	0.801	3.1974	1.5891	2.012	2.3932	0.80414
12	0.72	9.5711	7.92	1.3314	0.806	3.1965	1.5454	2.068	2.371	0.82554
13	0.79	9.6074	7.92	1.3698	0.812	3.1944	1.507	2.120	2.3507	0.84371
14	0.93	9.6763	7.92	1.4357	0.817	3.1975	1.4412	2.219	2.3193	0.87817
15	1.07	9.734	7.92	1.4846	0.818	3.2062	1.3922	2.303	2.2992	0.90699
16	1.21	9.785	7.92	1.5335	0.822	3.2083	1.3433	2.388	2.2758	0.93251
17	1.36	9.8324	7.92	1.5638	0.818	3.2254	1.313	2.456	2.2692	0.95619
18	1.50	9.8732	7.92	1.5958	0.817	3.2342	1.281	2.525	2.2576	0.97662
19	1.64	9.9111	7.92	1.6174	0.812	3.2506	1.2595	2.581	2.255	0.99555
20	2.48	10.094	7.92	1.6943	0.779	3.3569	1.1826	2.839	2.2697	1.0872
21	3.33	10.231	7.92	1.7082	0.739	3.4792	1.1686	2.977	2.3239	1.1553
22	4.18	10.343	7.92	1.7036	0.703	3.5959	1.1733	3.065	2.3846	1.2113
23	5.03	10.43	7.92	1.6785	0.669	3.7082	1.1983	3.095	2.4532	1.2549
24	5.87	10.512	7.92	1.6459	0.635	3.8228	1.2309	3.106	2.5269	1.296
25	6.73	10.58	7.92	1.6081	0.604	3.9292	1.2688	3.097	2.599	1.3302
26	7.57	10.637	7.92	1.5778	0.581	4.0161	1.2991	3.092	2.6576	1.3585
27	8.42	10.687	7.92	1.5417	0.557	4.1018	1.3352	3.072	2.7185	1.3833
28	9.27	10.728	7.92	1.5166	0.540	4.1682	1.3602	3.064	2.7642	1.404
29	10.12	10.761	7.92	1.4869	0.523	4.2309	1.3899	3.044	2.8104	1.4205
30	10.98	10.789	7.92	1.4636	0.510	4.2817	1.4132	3.030	2.8475	1.4343
31	11.84	10.813	7.92	1.4427	0.499	4.3276	1.4342	3.017	2.8809	1.4467
32	12.69	10.834	7.92	1.4211	0.488	4.3692	1.4557	3.001	2.9125	1.4568
33	13.53	10.846	7.92	1.4042	0.480	4.3987	1.4726	2.987	2.9357	1.463
34	14.39	10.855	7.92	1.3844	0.472	4.4278	1.4924	2.967	2.9601	1.4677
35	15.24	10.868	7.92	1.3751	0.466	4.4495	1.5017	2.963	2.9756	1.4739

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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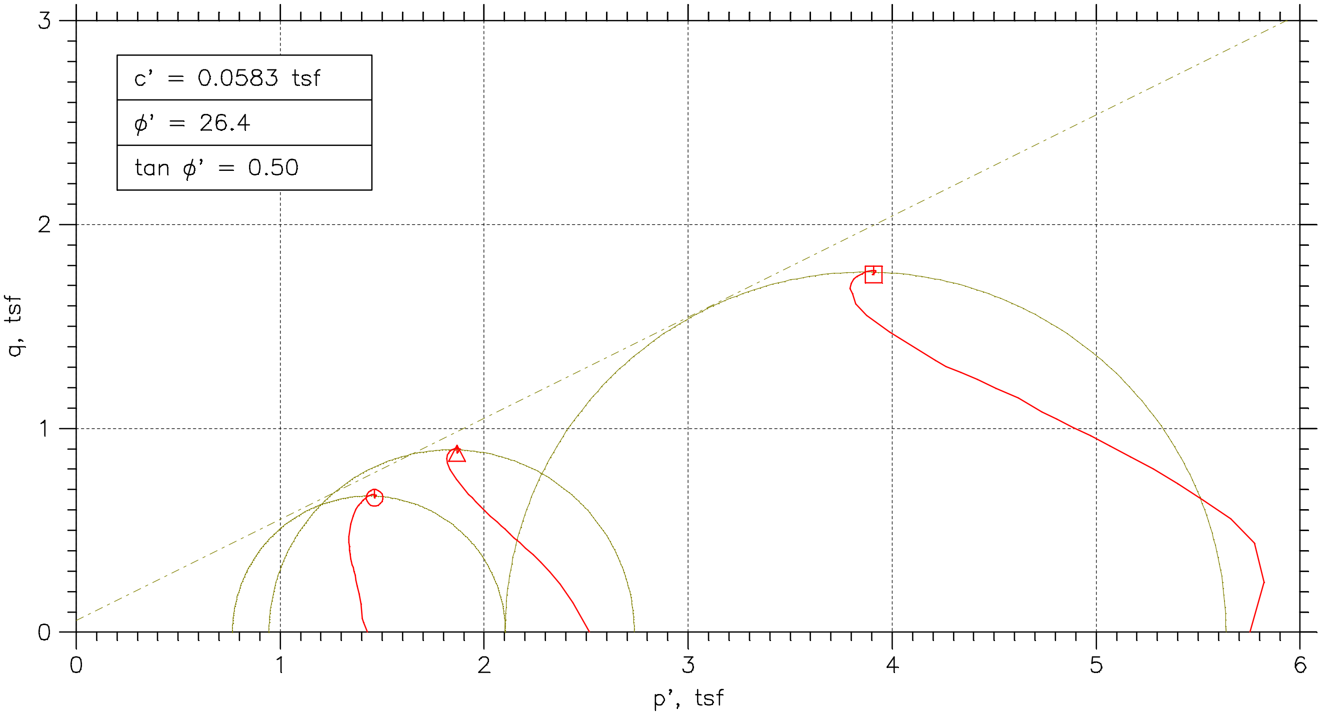
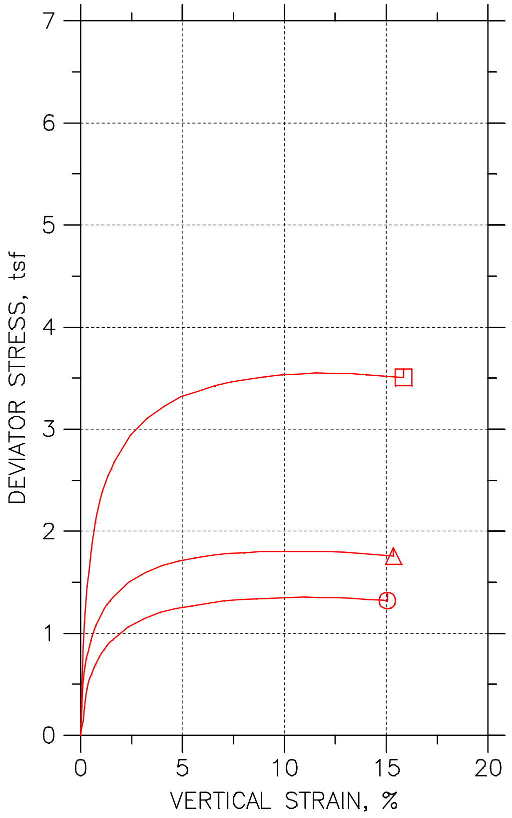
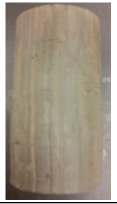




Symbol		○	△	□	
Test No.		20.0 PSI	40.0 PSI	80.0 PSI	
Initial	Diameter, in	2.8323	2.8394	2.8232	
	Height, in	5.9835	6.1287	6.0461	
	Water Content, %	35.45	32.69	30.23	
	Dry Density, pcf	84.39	88.44	92.32	
	Saturation, %	95.27	96.65	97.97	
	Void Ratio	1.0122	0.91997	0.83931	
Before Shear	Water Content, %	27.91	28.32	23.10	
	Dry Density, pcf	96.52	95.92	104.3	
	Saturation, %	100.00	100.00	100.00	
	Void Ratio	0.75927	0.7702	0.62821	
	Back Press., tsf	5.0509	5.0422	1.4473	
Minor Prin. Stress, tsf		1.4291	2.5178	5.7527	
Max. Dev. Stress, tsf		1.3524	1.8029	3.5485	
Time to Failure, min		840	780	840	
Strain Rate, %/min		0.02	0.02	0.02	
B-Value		0.98	0.99	0.96	
Estimated Specific Gravity		2.72	2.72	2.72	
Liquid Limit		42	42	42	
Plastic Limit		23	23	23	
Plasticity Index		19	19	19	
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW-013 S10

Sample Type: 3.0'' ST

Description: GRAY AND BROWN LEAN CLAY WITH SAND CL

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Mon, 16-NOV-2015 21:28:16

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST
ASTM D4767

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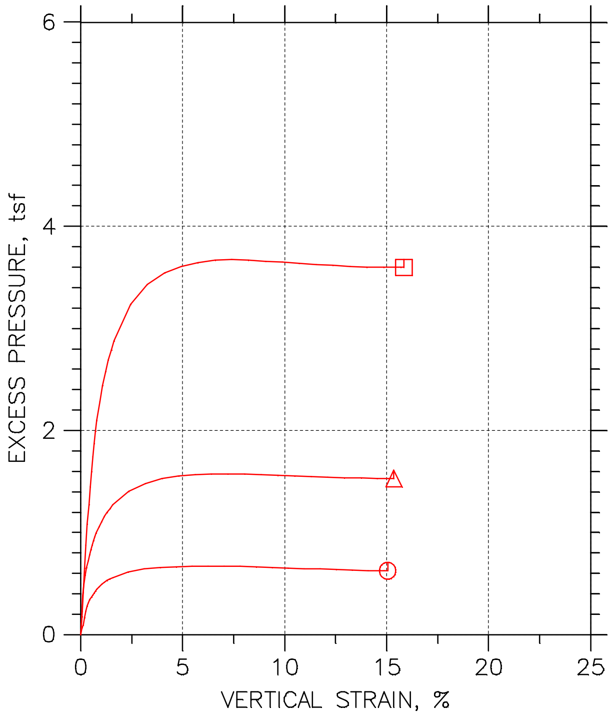

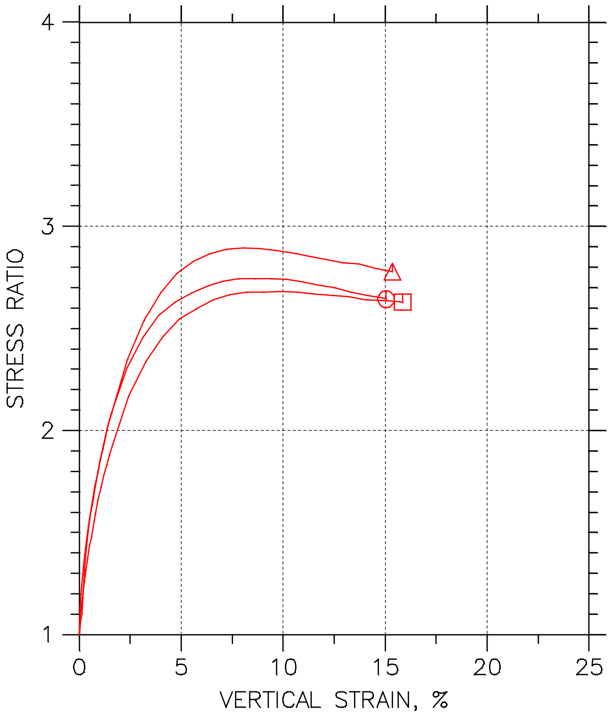

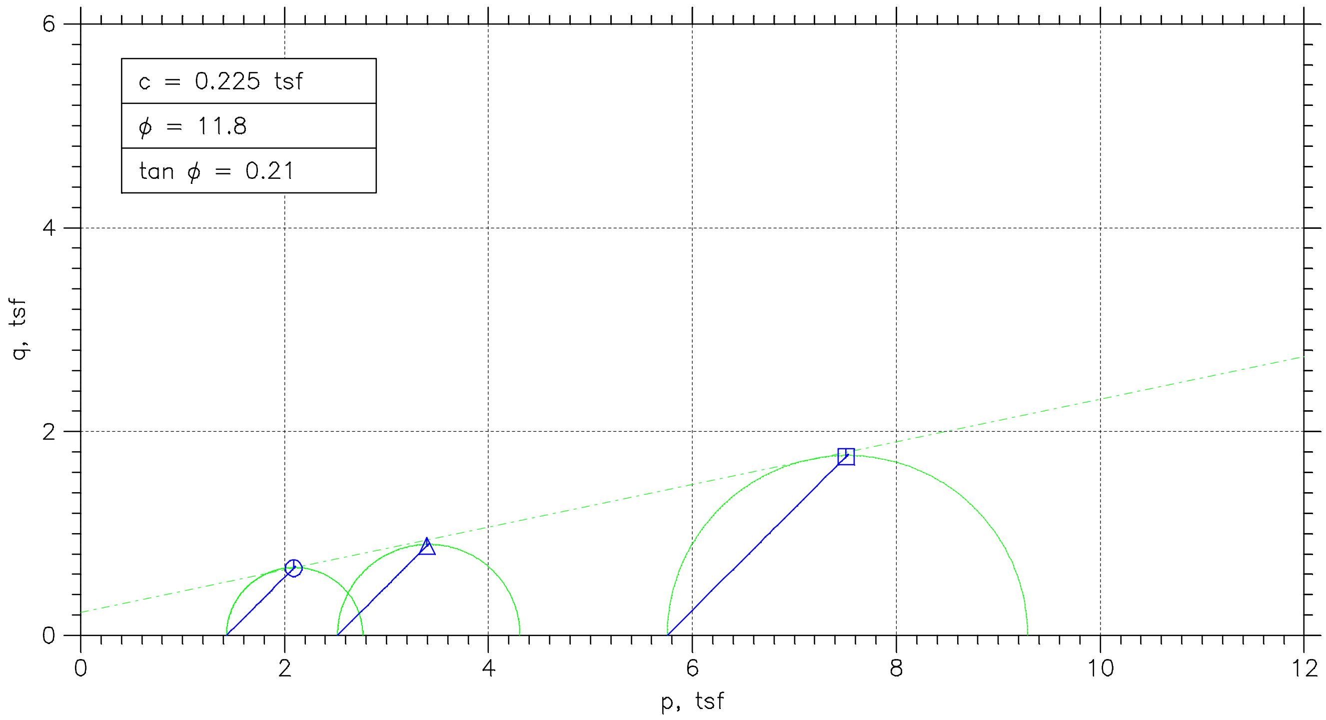

Project: DYNEGY EDWARDS	Location: BARTONVILLE, IL	Project No.: MR155218
Boring No.: EDW-013 S10	Tested By: BCM	Checked By: WPQ
Sample No.: S-10	Test Date: 10/29/15	Depth: 32.0'-34.0'
Test No.: EDW-013 S10	Sample Type: 3.0" ST	Elevation: -----
Description: GRAY AND BROWN LEAN CLAY WITH SAND CL		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767		

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TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: -----

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Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.98 in
Specimen Area: 6.30 in^2
Specimen Volume: 37.70 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3003	0	0	5.0509	6.48	6.48
2	5.0003	0.070614	6.3048	8.4452	0.096443	5.1202	6.48	6.5764
3	10	0.13546	6.3089	11.964	0.13654	5.1458	6.48	6.6165
4	15	0.19743	6.3128	24.163	0.27558	5.2208	6.48	6.7556
5	20	0.26228	6.3169	33.487	0.38169	5.2837	6.48	6.8617
6	25	0.32713	6.321	40.115	0.45693	5.3296	6.48	6.9369
7	30	0.39054	6.325	45.041	0.51272	5.364	6.48	6.9927
8	35	0.45539	6.3292	49.088	0.55842	5.3925	6.48	7.0384
9	40	0.52024	6.3333	52.665	0.59872	5.4169	6.48	7.0787
10	45	0.58653	6.3375	55.773	0.63364	5.4396	6.48	7.1136
11	50	0.6485	6.3415	58.412	0.66321	5.4594	6.48	7.1432
12	55	0.71335	6.3456	61.052	0.69272	5.4775	6.48	7.1727
13	60.001	0.7782	6.3497	63.339	0.7182	5.4932	6.48	7.1982
14	70.001	0.9079	6.3581	67.62	0.76574	5.5199	6.48	7.2457
15	80.001	1.039	6.3665	71.315	0.80652	5.5438	6.48	7.2865
16	90.001	1.1687	6.3748	74.716	0.84388	5.5636	6.48	7.3239
17	100	1.297	6.3831	77.825	0.87784	5.5816	6.48	7.3578
18	110	1.4281	6.3916	80.698	0.90905	5.5979	6.48	7.389
19	120	1.5593	6.4001	83.161	0.93555	5.6095	6.48	7.4155
20	180	2.3332	6.4508	95.243	1.063	5.6642	6.48	7.543
21	240	3.1229	6.5034	103.34	1.144	5.6945	6.48	7.624
22	300	3.904	6.5563	109.67	1.2044	5.7102	6.48	7.6844
23	360	4.6807	6.6097	114.07	1.2426	5.7172	6.48	7.7226
24	420	5.469	6.6648	117.59	1.2703	5.7201	6.48	7.7503
25	480	6.2544	6.7207	120.81	1.2943	5.7218	6.48	7.7743
26	540	7.0312	6.7768	123.8	1.3153	5.7207	6.48	7.7953
27	600	7.8223	6.835	126.21	1.3295	5.7178	6.48	7.8095
28	660	8.6063	6.8936	128.03	1.3372	5.7137	6.48	7.8172
29	720	9.3787	6.9524	129.79	1.3441	5.709	6.48	7.8241
30	780	10.17	7.0136	131.6	1.351	5.7044	6.48	7.831
31	840	10.952	7.0752	132.89	1.3524	5.6974	6.48	7.8324
32	900	11.731	7.1376	133.72	1.3488	5.6928	6.48	7.8288
33	960	12.525	7.2024	134.83	1.3478	5.6875	6.48	7.8278
34	1020	13.309	7.2675	135.53	1.3427	5.68	6.48	7.8227
35	1080	14.091	7.3337	135.65	1.3318	5.6794	6.48	7.8118
36	1140	14.882	7.4019	135.94	1.3224	5.6776	6.48	7.8024
37	1152.3	15.045	7.4161	135.89	1.3193	5.677	6.48	7.7993

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 20.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: -----

Terracon
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Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.98 in
Specimen Area: 6.30 in^2
Specimen Volume: 37.70 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.4291	1.4291	1.000	1.4291	0
2	0.07	6.5764	6.48	0.069246	0.718	1.4563	1.3598	1.071	1.4081	0.048221
3	0.14	6.6165	6.48	0.09485	0.695	1.4708	1.3342	1.102	1.4025	0.068269
4	0.20	6.7556	6.48	0.16992	0.617	1.5348	1.2592	1.219	1.397	0.13779
5	0.26	6.8617	6.48	0.23276	0.610	1.578	1.1963	1.319	1.3872	0.19084
6	0.33	6.9369	6.48	0.27873	0.610	1.6073	1.1504	1.397	1.3788	0.22846
7	0.39	6.9927	6.48	0.31306	0.611	1.6287	1.116	1.459	1.3724	0.25636
8	0.46	7.0384	6.48	0.34158	0.612	1.6459	1.0875	1.513	1.3667	0.27921
9	0.52	7.0787	6.48	0.36602	0.611	1.6618	1.0631	1.563	1.3624	0.29936
10	0.59	7.1136	6.48	0.38871	0.613	1.674	1.0404	1.609	1.3572	0.31682
11	0.65	7.1432	6.48	0.4085	0.616	1.6838	1.0206	1.650	1.3522	0.3316
12	0.71	7.1727	6.48	0.42653	0.616	1.6953	1.0025	1.691	1.3489	0.34636
13	0.78	7.1982	6.48	0.44225	0.616	1.705	0.98684	1.728	1.3459	0.3591
14	0.91	7.2457	6.48	0.46901	0.612	1.7258	0.96007	1.798	1.3429	0.38287
15	1.04	7.2865	6.48	0.49287	0.611	1.7427	0.93621	1.861	1.3395	0.40326
16	1.17	7.3239	6.48	0.51266	0.608	1.7603	0.91643	1.921	1.3384	0.42194
17	1.30	7.3578	6.48	0.5307	0.605	1.7762	0.89839	1.977	1.3373	0.43892
18	1.43	7.389	6.48	0.54699	0.602	1.7911	0.8821	2.031	1.3366	0.45452
19	1.56	7.4155	6.48	0.55863	0.597	1.806	0.87046	2.075	1.3382	0.46777
20	2.33	7.543	6.48	0.61333	0.577	1.8788	0.81576	2.303	1.3473	0.53152
21	3.12	7.624	6.48	0.64358	0.563	1.9295	0.7855	2.456	1.3575	0.57202
22	3.90	7.6844	6.48	0.6593	0.547	1.9742	0.76979	2.565	1.372	0.60219
23	4.68	7.7226	6.48	0.66628	0.536	2.0054	0.76281	2.629	1.3841	0.62128
24	5.47	7.7503	6.48	0.66919	0.527	2.0302	0.7599	2.672	1.395	0.63515
25	6.25	7.7743	6.48	0.67093	0.518	2.0524	0.75815	2.707	1.4053	0.64715
26	7.03	7.7953	6.48	0.66977	0.509	2.0747	0.75931	2.732	1.417	0.65767
27	7.82	7.8095	6.48	0.66686	0.502	2.0917	0.76222	2.744	1.427	0.66474
28	8.61	7.8172	6.48	0.66279	0.496	2.1035	0.7663	2.745	1.4349	0.66858
29	9.38	7.8241	6.48	0.65813	0.490	2.115	0.77095	2.743	1.443	0.67204
30	10.17	7.831	6.48	0.65348	0.484	2.1266	0.77561	2.742	1.4511	0.67551
31	10.95	7.8324	6.48	0.64649	0.478	2.135	0.78259	2.728	1.4588	0.67619
32	11.73	7.8288	6.48	0.64184	0.476	2.1361	0.78725	2.713	1.4617	0.67442
33	12.52	7.8278	6.48	0.6366	0.472	2.1403	0.79248	2.701	1.4664	0.67392
34	13.31	7.8227	6.48	0.62904	0.468	2.1428	0.80005	2.678	1.4714	0.67137
35	14.09	7.8118	6.48	0.62845	0.472	2.1324	0.80063	2.663	1.4665	0.66588
36	14.88	7.8024	6.48	0.62671	0.474	2.1247	0.80238	2.648	1.4636	0.66118
37	15.05	7.7993	6.48	0.62613	0.475	2.1222	0.80296	2.643	1.4626	0.65963

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: ----

Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.13 in
Specimen Area: 6.33 in^2
Specimen Volume: 38.81 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3319	0	0	5.0422	7.56	7.56
2	5.0001	0.049959	6.3351	25.547	0.29035	5.2708	7.56	7.8503
3	10.004	0.10929	6.3388	41.648	0.47306	5.4236	7.56	8.0331
4	15.004	0.17017	6.3427	52.381	0.59462	5.5356	7.56	8.1546
5	20.004	0.23262	6.3467	60.539	0.68679	5.6242	7.56	8.2468
6	25.004	0.29975	6.3509	67.151	0.76129	5.7006	7.56	8.3213
7	30.004	0.36533	6.3551	72.647	0.82305	5.7683	7.56	8.3831
8	35.004	0.4309	6.3593	77.585	0.87841	5.8248	7.56	8.4384
9	40.004	0.49803	6.3636	81.878	0.9264	5.8756	7.56	8.4864
10	45.004	0.56204	6.3677	85.914	0.97144	5.9211	7.56	8.5314
11	50.004	0.62761	6.3719	89.435	1.0106	5.9619	7.56	8.5706
12	55.004	0.6963	6.3763	92.698	1.0467	6.001	7.56	8.6067
13	60.004	0.76187	6.3805	95.875	1.0819	6.0371	7.56	8.6419
14	70.004	0.89614	6.3892	101.2	1.1404	6.1001	7.56	8.7004
15	80.004	1.0304	6.3978	105.97	1.1925	6.1538	7.56	8.7525
16	90.004	1.1631	6.4064	110.34	1.2401	6.201	7.56	8.8001
17	100	1.3005	6.4153	114.08	1.2803	6.2412	7.56	8.8403
18	110	1.4332	6.424	117.56	1.3176	6.2774	7.56	8.8776
19	120	1.569	6.4328	120.69	1.3509	6.3118	7.56	8.9109
20	180	2.3684	6.4855	135.2	1.501	6.4477	7.56	9.061
21	240	3.1786	6.5398	144.78	1.594	6.5241	7.56	9.154
22	300	3.9889	6.595	152.03	1.6598	6.569	7.56	9.2198
23	360	4.7976	6.651	157.53	1.7053	6.5952	7.56	9.2653
24	420	5.6095	6.7082	162	1.7387	6.6086	7.56	9.2987
25	480	6.4166	6.766	165.6	1.7622	6.6151	7.56	9.3222
26	540	7.2316	6.8255	168.65	1.779	6.6174	7.56	9.339
27	600	8.0434	6.8857	171.18	1.79	6.6145	7.56	9.35
28	660	8.8506	6.9467	173.55	1.7987	6.6092	7.56	9.3587
29	720	9.6608	7.009	175.35	1.8013	6.6022	7.56	9.3613
30	780	10.477	7.073	177.11	1.8029	6.5958	7.56	9.3629
31	840	11.286	7.1374	178.61	1.8018	6.5882	7.56	9.3618
32	900	12.099	7.2035	180.03	1.7994	6.5812	7.56	9.3594
33	960	12.914	7.2709	181.32	1.7955	6.5748	7.56	9.3555
34	1020	13.732	7.3398	181.88	1.7841	6.5766	7.56	9.3441
35	1080	14.54	7.4092	182.18	1.7703	6.5725	7.56	9.3303
36	1140	15.353	7.4804	182.61	1.7576	6.5719	7.56	9.3176

TRIAXIAL TEST

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Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 40.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: ----

Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.13 in
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Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.56	7.56	0	0.000	2.5178	2.5178	1.000	2.5178	0
2	0.05	7.8503	7.56	0.22861	0.787	2.5795	2.2892	1.127	2.4344	0.14517
3	0.11	8.0331	7.56	0.3814	0.806	2.6094	2.1364	1.221	2.3729	0.23653
4	0.17	8.1546	7.56	0.49337	0.830	2.619	2.0244	1.294	2.3217	0.29731
5	0.23	8.2468	7.56	0.58202	0.847	2.6226	1.9358	1.355	2.2792	0.34339
6	0.30	8.3213	7.56	0.65841	0.865	2.6207	1.8594	1.409	2.24	0.38064
7	0.37	8.3831	7.56	0.72606	0.882	2.6148	1.7917	1.459	2.2033	0.41153
8	0.43	8.4384	7.56	0.78263	0.891	2.6136	1.7352	1.506	2.1744	0.43921
9	0.50	8.4864	7.56	0.83337	0.900	2.6108	1.6844	1.550	2.1476	0.4632
10	0.56	8.5314	7.56	0.87886	0.905	2.6104	1.6389	1.593	2.1247	0.48572
11	0.63	8.5706	7.56	0.91968	0.910	2.6087	1.5981	1.632	2.1034	0.50529
12	0.70	8.6067	7.56	0.95875	0.916	2.6058	1.559	1.671	2.0824	0.52336
13	0.76	8.6419	7.56	0.99491	0.920	2.6048	1.5229	1.710	2.0638	0.54095
14	0.90	8.7004	7.56	1.0579	0.928	2.6003	1.4599	1.781	2.0301	0.57021
15	1.03	8.7525	7.56	1.1115	0.932	2.5988	1.4062	1.848	2.0025	0.59626
16	1.16	8.8001	7.56	1.1588	0.934	2.5991	1.359	1.913	1.9791	0.62007
17	1.30	8.8403	7.56	1.199	0.936	2.5991	1.3188	1.971	1.9589	0.64017
18	1.43	8.8776	7.56	1.2352	0.937	2.6002	1.2826	2.027	1.9414	0.65879
19	1.57	8.9109	7.56	1.2696	0.940	2.5991	1.2482	2.082	1.9236	0.67543
20	2.37	9.061	7.56	1.4055	0.936	2.6133	1.1123	2.349	1.8628	0.7505
21	3.18	9.154	7.56	1.4819	0.930	2.6299	1.0359	2.539	1.8329	0.79698
22	3.99	9.2198	7.56	1.5268	0.920	2.6508	0.99102	2.675	1.8209	0.82991
23	4.80	9.2653	7.56	1.553	0.911	2.6701	0.96477	2.768	1.8174	0.85267
24	5.61	9.2987	7.56	1.5664	0.901	2.6901	0.95136	2.828	1.8207	0.86936
25	6.42	9.3222	7.56	1.5728	0.893	2.7072	0.94495	2.865	1.8261	0.88112
26	7.23	9.339	7.56	1.5752	0.885	2.7217	0.94261	2.887	1.8321	0.88952
27	8.04	9.35	7.56	1.5723	0.878	2.7355	0.94553	2.893	1.8405	0.89498
28	8.85	9.3587	7.56	1.567	0.871	2.7495	0.95078	2.892	1.8501	0.89937
29	9.66	9.3613	7.56	1.56	0.866	2.759	0.95778	2.881	1.8584	0.90063
30	10.48	9.3629	7.56	1.5536	0.862	2.7671	0.96419	2.870	1.8656	0.90145
31	11.29	9.3618	7.56	1.546	0.858	2.7736	0.97177	2.854	1.8727	0.90089
32	12.10	9.3594	7.56	1.539	0.855	2.7782	0.97877	2.838	1.8785	0.89971
33	12.91	9.3555	7.56	1.5326	0.854	2.7807	0.98519	2.822	1.8829	0.89775
34	13.73	9.3441	7.56	1.5344	0.860	2.7675	0.98344	2.814	1.8755	0.89205
35	14.54	9.3303	7.56	1.5303	0.864	2.7578	0.98752	2.793	1.8727	0.88516
36	15.35	9.3176	7.56	1.5297	0.870	2.7457	0.9881	2.779	1.8669	0.87881

TRIAXIAL TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 80.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: ----

Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.05 in
Specimen Area: 6.26 in^2
Specimen Volume: 37.85 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in^2	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2601	0	0	1.4473	7.2	7.2
2	5.0002	0.057416	6.2637	42.956	0.49377	1.6232	7.2	7.6938
3	10	0.12843	6.2682	75.999	0.87297	1.8591	7.2	8.073
4	15	0.19491	6.2723	96.821	1.1114	2.0973	7.2	8.3114
5	20	0.26139	6.2765	112.87	1.2948	2.3215	7.2	8.4948
6	25	0.32939	6.2808	127.24	1.4586	2.53	7.2	8.6586
7	30	0.39436	6.2849	139.93	1.6031	2.7199	7.2	8.8031
8	35	0.46084	6.2891	150.32	1.7209	2.8923	7.2	8.9209
9	40	0.52581	6.2932	159.97	1.8302	3.0478	7.2	9.0302
10	45	0.59531	6.2976	168.57	1.9273	3.1905	7.2	9.1273
11	50	0.6633	6.3019	175.7	2.0074	3.3198	7.2	9.2074
12	55	0.7313	6.3062	183.2	2.0917	3.438	7.2	9.2917
13	60	0.79929	6.3105	189.45	2.1615	3.5452	7.2	9.3615
14	70	0.9383	6.3194	201.61	2.2971	3.7298	7.2	9.4971
15	80	1.0758	6.3282	210.37	2.3936	3.8876	7.2	9.5936
16	90.001	1.2163	6.3372	218.14	2.4784	4.0228	7.2	9.6784
17	100	1.3538	6.346	224.69	2.5493	4.1375	7.2	9.7493
18	110	1.4928	6.355	230.15	2.6075	4.2388	7.2	9.8075
19	120	1.6303	6.3639	236.18	2.6721	4.3262	7.2	9.8721
20	180	2.4432	6.4169	262.25	2.9425	4.685	7.2	10.142
21	240	3.2787	6.4723	279.34	3.1075	4.8801	7.2	10.308
22	300	4.1067	6.5282	292.25	3.2232	4.9907	7.2	10.423
23	360	4.9136	6.5836	303.47	3.3188	5.0548	7.2	10.519
24	420	5.7506	6.6421	310.87	3.3698	5.0903	7.2	10.57
25	480	6.5802	6.701	318.68	3.4241	5.1136	7.2	10.624
26	540	7.4006	6.7604	325.24	3.4638	5.1206	7.2	10.664
27	600	8.2346	6.8219	330.8	3.4913	5.1171	7.2	10.691
28	660	9.0626	6.884	336.15	3.5158	5.1061	7.2	10.716
29	720	9.877	6.9462	340.92	3.5338	5.0973	7.2	10.734
30	780	10.714	7.0113	344.8	3.5408	5.088	7.2	10.741
31	840	11.542	7.0769	348.79	3.5485	5.0746	7.2	10.749
32	900	12.361	7.1431	351.99	3.5479	5.0647	7.2	10.748
33	960	13.204	7.2124	355.4	3.5478	5.0566	7.2	10.748
34	1020	14.025	7.2813	357.18	3.5319	5.0478	7.2	10.732
35	1080	14.848	7.3517	359.59	3.5217	5.0496	7.2	10.722
36	1140	15.696	7.4256	361.69	3.507	5.049	7.2	10.707
37	1151.2	15.853	7.4395	362.53	3.5086	5.0455	7.2	10.709

TRIAXIAL TEST

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Consulting Engineers & Scientists

Project: DYNEGY EDWARDS
Boring No.: EDW-013 S10
Sample No.: S-10
Test No.: 80.0 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/29/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 32.0'-34.0'
Elevation: ----

Soil Description: GRAY AND BROWN LEAN CLAY WITH SAND CL
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.05 in
Specimen Area: 6.26 in^2
Specimen Volume: 37.85 in^3

Piston Area: 0.00 in^2
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 42

Plastic Limit: 23

Estimated Specific Gravity: 2.72

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	7.2	7.2	0	0.000	5.7527	5.7527	1.000	5.7527	0
2	0.06	7.6938	7.2	0.17589	0.356	6.0706	5.5768	1.089	5.8237	0.24688
3	0.13	8.073	7.2	0.41177	0.472	6.2139	5.3409	1.163	5.7774	0.43648
4	0.19	8.3114	7.2	0.64998	0.585	6.2141	5.1027	1.218	5.6584	0.5557
5	0.26	8.4948	7.2	0.87421	0.675	6.1733	4.8785	1.265	5.5259	0.64739
6	0.33	8.6586	7.2	1.0827	0.742	6.1286	4.67	1.312	5.3993	0.72932
7	0.39	8.8031	7.2	1.2726	0.794	6.0832	4.4801	1.358	5.2816	0.80155
8	0.46	8.9209	7.2	1.445	0.840	6.0286	4.3077	1.399	5.1682	0.86046
9	0.53	9.0302	7.2	1.6005	0.874	5.9824	4.1522	1.441	5.0673	0.9151
10	0.60	9.1273	7.2	1.7432	0.904	5.9368	4.0095	1.481	4.9731	0.96363
11	0.66	9.2074	7.2	1.8725	0.933	5.8877	3.8802	1.517	4.8839	1.0037
12	0.73	9.2917	7.2	1.9907	0.952	5.8537	3.762	1.556	4.8078	1.0459
13	0.80	9.3615	7.2	2.0979	0.971	5.8163	3.6548	1.591	4.7356	1.0807
14	0.94	9.4971	7.2	2.2825	0.994	5.7673	3.4702	1.662	4.6187	1.1485
15	1.08	9.5936	7.2	2.4403	1.020	5.7059	3.3124	1.723	4.5091	1.1968
16	1.22	9.6784	7.2	2.5755	1.039	5.6556	3.1772	1.780	4.4164	1.2392
17	1.35	9.7493	7.2	2.6902	1.055	5.6118	3.0625	1.832	4.3371	1.2746
18	1.49	9.8075	7.2	2.7915	1.071	5.5686	2.9612	1.881	4.2649	1.3037
19	1.63	9.8721	7.2	2.8789	1.077	5.5459	2.8738	1.930	4.2098	1.336
20	2.44	10.142	7.2	3.2377	1.100	5.4575	2.515	2.170	3.9863	1.4712
21	3.28	10.308	7.2	3.4328	1.105	5.4274	2.3199	2.339	3.8737	1.5538
22	4.11	10.423	7.2	3.5434	1.099	5.4325	2.2093	2.459	3.8209	1.6116
23	4.91	10.519	7.2	3.6075	1.087	5.464	2.1452	2.547	3.8046	1.6594
24	5.75	10.57	7.2	3.643	1.081	5.4794	2.1097	2.597	3.7945	1.6849
25	6.58	10.624	7.2	3.6663	1.071	5.5105	2.0864	2.641	3.7984	1.712
26	7.40	10.664	7.2	3.6733	1.060	5.5432	2.0794	2.666	3.8113	1.7319
27	8.23	10.691	7.2	3.6698	1.051	5.5742	2.0829	2.676	3.8285	1.7457
28	9.06	10.716	7.2	3.6588	1.041	5.6097	2.0939	2.679	3.8518	1.7579
29	9.88	10.734	7.2	3.65	1.033	5.6364	2.1027	2.681	3.8695	1.7669
30	10.71	10.741	7.2	3.6407	1.028	5.6528	2.112	2.677	3.8824	1.7704
31	11.54	10.749	7.2	3.6273	1.022	5.6739	2.1254	2.670	3.8996	1.7743
32	12.36	10.748	7.2	3.6174	1.020	5.6832	2.1353	2.662	3.9092	1.774
33	13.20	10.748	7.2	3.6093	1.017	5.6913	2.1434	2.655	3.9173	1.7739
34	14.02	10.732	7.2	3.6005	1.019	5.6841	2.1522	2.641	3.9181	1.766
35	14.85	10.722	7.2	3.6023	1.023	5.6721	2.1504	2.638	3.9113	1.7609
36	15.70	10.707	7.2	3.6017	1.027	5.658	2.151	2.630	3.9045	1.7535
37	15.85	10.709	7.2	3.5982	1.026	5.6631	2.1545	2.628	3.9088	1.7543

DIRECT SHEAR TEST REPORT

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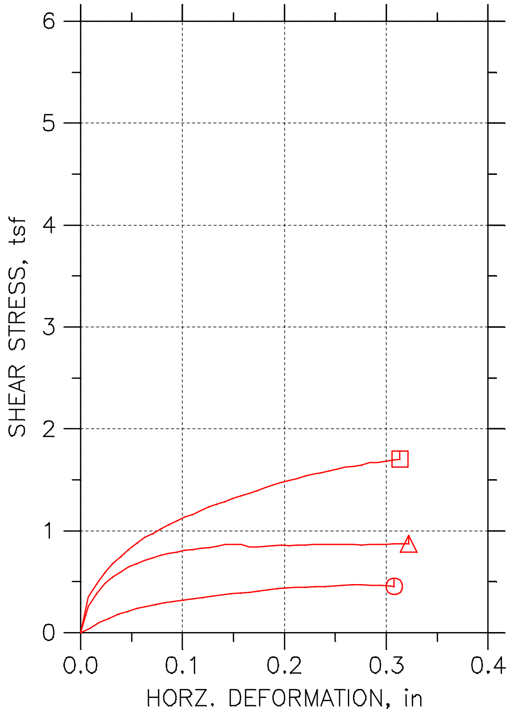

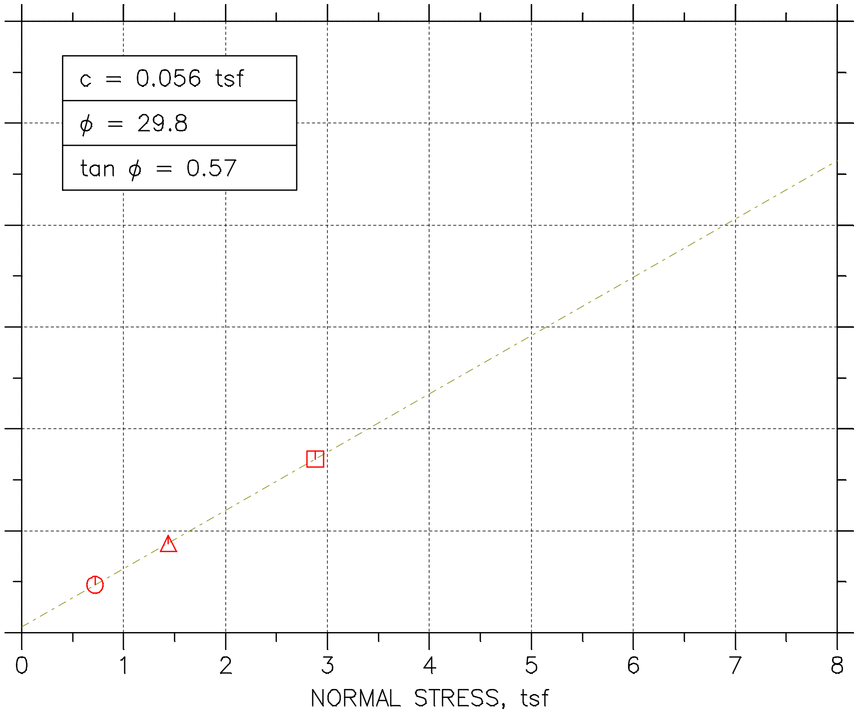

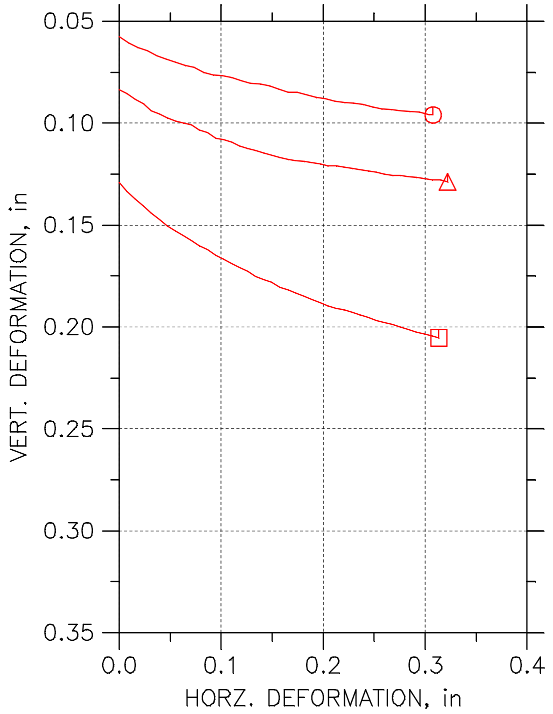

Symbol		○	△	□	
Test No.		10 PSI	20 PSI	40 PSI	
Sample No.		S-5	S-5	S-5	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.502	2.5016	2.5035	
	Area, in^2	4.9165	4.9149	4.9227	
	Height, in	1.0098	1.0087	1.0067	
	Water Content, %	75.08	66.70	67.21	
	Dry Density, pcf	51.869	56.572	54.543	
	Saturation, %	97.66	99.74	94.70	
	Void Ratio	1.7682	1.5381	1.6325	
Consol. Height, in		0.955	0.93155	0.88124	
Consol. Void Ratio		1.6179	1.344	1.3044	
Final	Water Content, %	64.90	53.10	47.20	
	Dry Density, pcf	57.319	64.848	68.523	
	Saturation, %	99.18	100.59	99.10	
	Void Ratio	1.505	1.2142	1.0954	
Normal Stress, tsf		0.71991	1.4387	2.88	
Max. Shear Stress, tsf		0.47008	0.87498	1.7039	
Ult. Shear Stress, tsf		0.45479	0.87367	1.7039	
Time to Failure, min		3678.3	1181.7	1190.6	
Disp. Rate, in/min		6.49e-005	0.000267	0.000267	
Estimated Specific Gravity		2.30	2.30	2.30	
Liquid Limit		NP	NP	NP	
Plastic Limit		NP	NP	NP	
Plasticity Index		NP	NP	NP	

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW-B002 S5
Sample Type: 3.0'' ST

Description: GRAY TO DARK GRAY VARVED FLY ASH

Remarks: TEST PERFORMED AS PER ASTM D3080.

Tue, 17-NOV-2015 14:27:49

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B002 S5
Sample No.: S-5
Test No.: 10 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 10.0'-12.0'
Elevation: ----

Soil Description: GRAY TO DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	0.7191	0.05749	0	0
2	156.95	0.7199	0.06058	0.04248	0.009199
3	277.29	0.7199	0.06298	0.1019	0.0184
4	393.34	0.7199	0.06449	0.1405	0.0276
5	521.67	0.7199	0.06689	0.1795	0.03679
6	638.11	0.7191	0.06852	0.2096	0.04599
7	753.57	0.7199	0.07016	0.2362	0.05519
8	865.04	0.7199	0.07168	0.2577	0.06439
9	981.73	0.7199	0.07275	0.2764	0.07359
10	1096.66	0.7199	0.07502	0.2939	0.08279
11	1214.45	0.7199	0.07628	0.3104	0.09199
12	1328.38	0.7199	0.07678	0.3228	0.1012
13	1454.83	0.7199	0.07767	0.3353	0.1104
14	1573.59	0.7199	0.0793	0.3472	0.1196
15	1688.63	0.7199	0.08044	0.3596	0.1288
16	1817.30	0.7199	0.08094	0.3721	0.138
17	1955.96	0.7199	0.08183	0.3817	0.1472
18	2070.95	0.7199	0.08321	0.3902	0.1564
19	2203.51	0.7199	0.08473	0.3965	0.1656
20	2323.62	0.7199	0.08485	0.4072	0.1748
21	2452.80	0.7199	0.08599	0.4191	0.184
22	2580.16	0.7199	0.08731	0.431	0.1932
23	2700.75	0.7199	0.08813	0.4401	0.2024
24	2823.89	0.7199	0.08933	0.4463	0.2116
25	2950.56	0.7199	0.09002	0.4486	0.2208
26	3070.17	0.7199	0.09027	0.4491	0.23
27	3194.72	0.7199	0.09078	0.4514	0.2392
28	3328.14	0.7199	0.09217	0.4588	0.2483
29	3443.95	0.7191	0.09292	0.4655	0.2575
30	3554.17	0.7191	0.09343	0.4695	0.2667
31	3678.32	0.7199	0.09393	0.4701	0.2759
32	3812.79	0.7199	0.09443	0.4678	0.2851
33	3932.15	0.7199	0.09475	0.4633	0.2943
34	4054.51	0.7199	0.09576	0.4571	0.3035
35	4102.88	0.7199	0.09601	0.4548	0.3078

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B002 S5
Sample No.: S-5
Test No.: 20 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 10.0'-12.0'
Elevation: ----

Soil Description: GRAY TO DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	1.438	0.08377	0	0
2	33.66	1.439	0.08551	0.2598	0.007876
3	62.53	1.439	0.08828	0.3842	0.01575
4	94.03	1.439	0.09063	0.4817	0.02363
5	123.61	1.439	0.09391	0.5451	0.0315
6	153.40	1.439	0.09565	0.5982	0.03938
7	184.06	1.439	0.09749	0.644	0.04725
8	213.02	1.439	0.09903	0.6793	0.05513
9	241.92	1.439	0.09985	0.7094	0.06301
10	271.68	1.439	0.101	0.7362	0.07088
11	302.17	1.439	0.1033	0.7611	0.07876
12	330.34	1.439	0.1047	0.7781	0.08663
13	360.65	1.439	0.1073	0.7886	0.09451
14	392.06	1.439	0.1082	0.8089	0.1024
15	421.40	1.439	0.1095	0.818	0.1103
16	448.87	1.439	0.1113	0.8259	0.1181
17	477.79	1.439	0.1125	0.8351	0.126
18	506.84	1.439	0.1134	0.8495	0.1339
19	537.40	1.439	0.1148	0.8632	0.1418
20	593.97	1.439	0.1167	0.8652	0.1575
21	623.57	1.439	0.1179	0.8429	0.1654
22	655.08	1.439	0.1184	0.8423	0.1733
23	684.47	1.439	0.1188	0.8481	0.1811
24	712.80	1.439	0.1195	0.8521	0.189
25	740.02	1.439	0.1199	0.8573	0.1969
26	771.65	1.439	0.1208	0.8567	0.2048
27	801.16	1.439	0.121	0.858	0.2126
28	830.38	1.439	0.1215	0.8625	0.2205
29	861.82	1.439	0.1222	0.8645	0.2284
30	891.86	1.439	0.1228	0.8665	0.2362
31	920.33	1.439	0.1234	0.8678	0.2441
32	947.61	1.439	0.124	0.8645	0.252
33	978.79	1.439	0.1249	0.8645	0.2599
34	1008.02	1.439	0.1256	0.8645	0.2677
35	1036.49	1.439	0.1257	0.8625	0.2756
36	1067.92	1.439	0.1262	0.8652	0.2835
37	1095.86	1.439	0.1267	0.8652	0.2914
38	1124.42	1.439	0.1273	0.8691	0.2992
39	1152.92	1.439	0.1277	0.8704	0.3071
40	1181.69	1.439	0.128	0.875	0.315
41	1207.99	1.439	0.1287	0.8737	0.322

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B002 S5
Sample No.: S-5
Test No.: 40 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 10.0'-12.0'
Elevation: ----

Soil Description: GRAY TO DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	2.879	0.1292	0	0
2	34.66	2.879	0.1336	0.3516	0.007876
3	65.95	2.879	0.1374	0.4772	0.01575
4	98.49	2.879	0.1406	0.5912	0.02363
5	128.04	2.879	0.1442	0.6779	0.0315
6	157.00	2.879	0.1474	0.7496	0.03938
7	188.14	2.88	0.1504	0.8151	0.04725
8	217.44	2.88	0.1529	0.8772	0.05513
9	247.88	2.879	0.1551	0.9339	0.06301
10	276.45	2.879	0.1577	0.9701	0.07088
11	306.20	2.879	0.1601	1.017	0.07876
12	336.36	2.879	0.162	1.06	0.08663
13	366.50	2.879	0.1648	1.096	0.09451
14	397.75	2.879	0.1667	1.135	0.1024
15	427.67	2.88	0.169	1.161	0.1103
16	455.53	2.88	0.171	1.197	0.1181
17	485.04	2.879	0.1726	1.234	0.126
18	515.15	2.879	0.1753	1.262	0.1339
19	546.34	2.879	0.1769	1.285	0.1418
20	576.29	2.879	0.1782	1.317	0.1496
21	605.44	2.879	0.1806	1.346	0.1575
22	631.71	2.879	0.1819	1.367	0.1654
23	663.92	2.879	0.1834	1.395	0.1733
24	693.09	2.879	0.1851	1.423	0.1811
25	722.31	2.879	0.1865	1.447	0.189
26	753.49	2.88	0.1881	1.472	0.1969
27	783.68	2.879	0.1898	1.494	0.2048
28	812.56	2.879	0.1911	1.515	0.2126
29	840.21	2.879	0.1916	1.537	0.2205
30	873.07	2.879	0.1927	1.556	0.2284
31	901.78	2.88	0.194	1.57	0.2362
32	929.62	2.88	0.1952	1.589	0.2441
33	960.88	2.88	0.1967	1.608	0.252
34	990.19	2.88	0.1979	1.625	0.2599
35	1019.61	2.88	0.1986	1.632	0.2677
36	1048.80	2.879	0.1999	1.647	0.2756
37	1076.60	2.88	0.2013	1.668	0.2835
38	1109.68	2.88	0.2026	1.67	0.2914
39	1138.55	2.88	0.2036	1.681	0.2992
40	1167.91	2.879	0.2044	1.694	0.3071
41	1190.59	2.88	0.2054	1.704	0.3133

DIRECT SHEAR TEST REPORT

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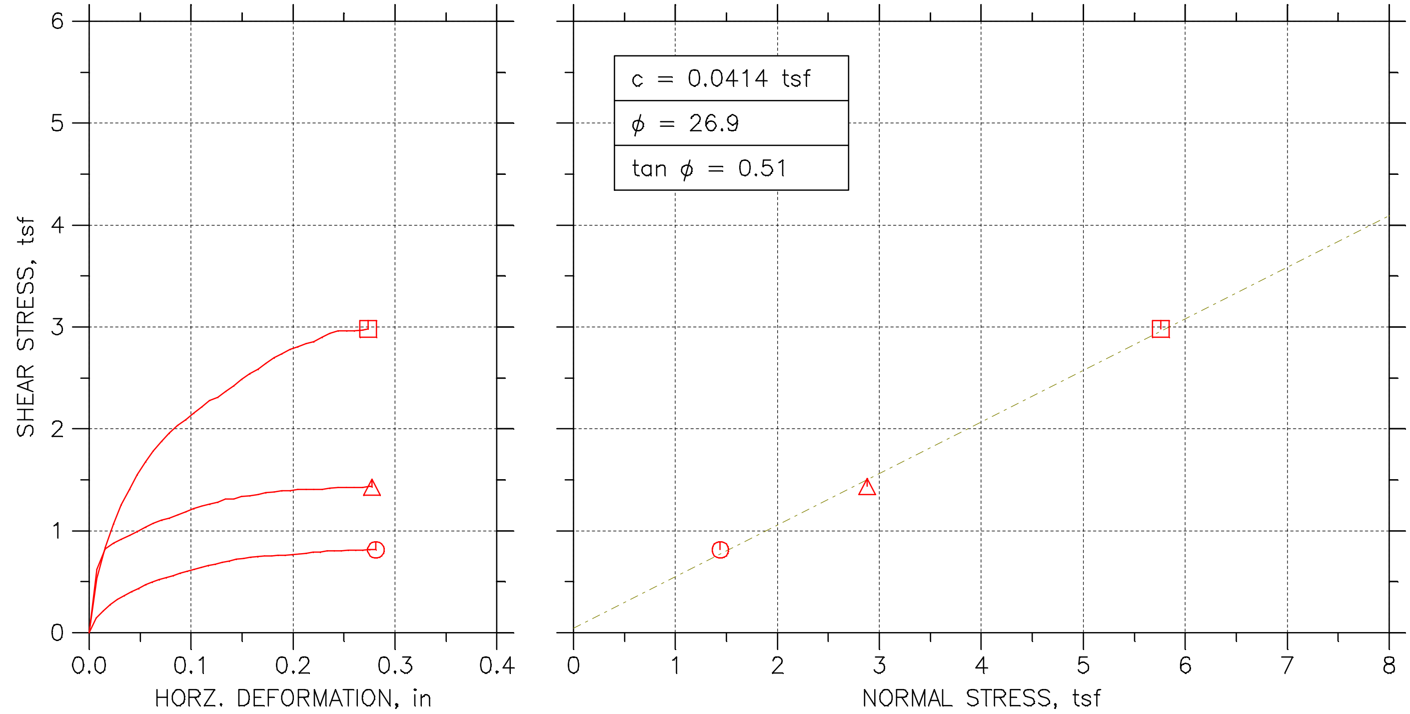
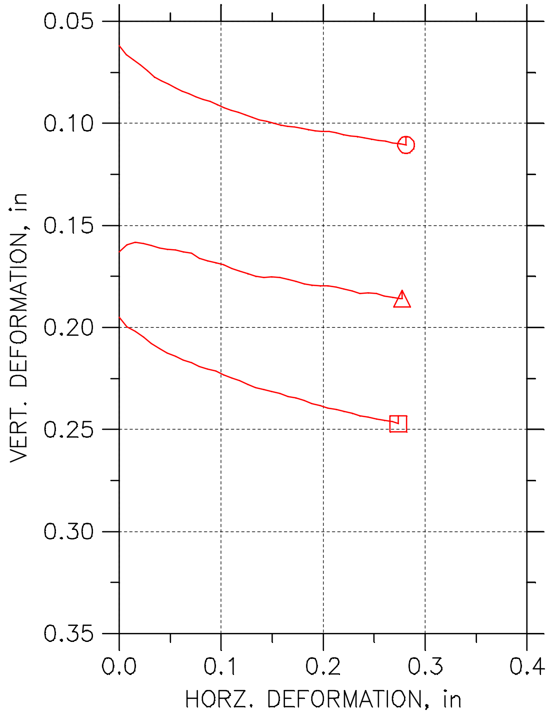
Consulting Engineers & Scientists





Symbol		○	△	□	
Test No.		20 PSI	40 PSI	80 PSI	
Sample No.		S-9	S-9	S-9	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.5035	2.4988	2.4921	
	Area, in^2	4.9227	4.9041	4.8779	
	Height, in	1.0067	0.98937	0.99213	
	Water Content, %	71.70	70.21	69.53	
	Dry Density, pcf	53.119	54.563	54.248	
	Saturation, %	96.83	98.97	97.11	
	Void Ratio	1.7031	1.6315	1.6468	
Consol. Height, in		0.95172	0.83719	0.8042	
Consol. Void Ratio		1.5555	1.2268	1.1454	
Final	Water Content, %	60.80	49.80	42.70	
	Dry Density, pcf	59.677	67.193	72.249	
	Saturation, %	99.46	100.75	99.47	
	Void Ratio	1.406	1.1369	0.98736	
Normal Stress, tsf		1.4396	2.8798	5.7593	
Max. Shear Stress, tsf		0.81396	1.4353	2.9807	
Ult. Shear Stress, tsf		0.81396	1.4289	2.9807	
Time to Failure, min		1202.3	4163.3	1353.2	
Disp. Rate, in/min		0.000267	6.69e-005	0.000207	
Estimated Specific Gravity		2.30	2.30	2.30	
Liquid Limit		NP	NP	NP	
Plastic Limit		NP	NP	NP	
Plasticity Index		NP	NP	NP	

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW-B003 S9
Sample Type: 3.0'' ST
Description: VERY DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080

Tue, 17-NOV-2015 15:28:11

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B003 S9
Sample No.: S-9
Test No.: 20 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: VERY DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	1.438	0.06197	0	0
2	29.97	1.439	0.06626	0.1471	0.006868
3	57.78	1.439	0.06903	0.2144	0.01374
4	88.56	1.439	0.07142	0.2734	0.0206
5	120.00	1.439	0.0742	0.3261	0.02747
6	147.42	1.439	0.07741	0.3658	0.03434
7	177.07	1.44	0.07918	0.4002	0.04121
8	208.08	1.439	0.08094	0.4362	0.04807
9	237.87	1.439	0.08258	0.468	0.05494
10	268.15	1.44	0.08422	0.4952	0.06181
11	297.24	1.44	0.08555	0.5181	0.06868
12	327.37	1.439	0.08693	0.5374	0.07555
13	354.52	1.44	0.08832	0.5599	0.08241
14	388.81	1.439	0.08933	0.5859	0.08928
15	414.34	1.439	0.0909	0.6053	0.09615
16	443.05	1.44	0.09235	0.6214	0.103
17	475.44	1.44	0.09362	0.6428	0.1099
18	503.04	1.439	0.09456	0.6569	0.1168
19	531.73	1.44	0.09576	0.672	0.1236
20	563.76	1.44	0.09708	0.6908	0.1305
21	590.20	1.44	0.09841	0.7049	0.1374
22	620.48	1.439	0.09897	0.719	0.1442
23	648.48	1.44	0.09992	0.7268	0.1511
24	679.58	1.44	0.1007	0.7399	0.158
25	707.75	1.44	0.1014	0.7493	0.1648
26	736.66	1.44	0.1019	0.7503	0.1717
27	766.24	1.44	0.1026	0.754	0.1786
28	796.15	1.44	0.1031	0.7592	0.1854
29	823.23	1.439	0.1038	0.7618	0.1923
30	851.40	1.44	0.104	0.767	0.1991
31	883.03	1.44	0.1041	0.7727	0.206
32	911.21	1.44	0.1047	0.7764	0.2129
33	944.16	1.44	0.1056	0.7879	0.2197
34	971.55	1.44	0.1061	0.7936	0.2266
35	1000.34	1.44	0.1065	0.802	0.2335
36	1031.20	1.44	0.1073	0.803	0.2403
37	1059.90	1.439	0.1079	0.8067	0.2472
38	1088.96	1.44	0.1084	0.8113	0.2541
39	1119.26	1.44	0.1087	0.8108	0.2609
40	1145.99	1.44	0.1097	0.8098	0.2678
41	1177.16	1.44	0.1101	0.814	0.2747
42	1202.27	1.44	0.1106	0.814	0.2812

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW-B003 S9
Sample No.: S-9
Test No.: 40 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: VERY DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080

	Elapsed	Vertical	Vertical	Horizontal	Horizontal
	Time	Stress	Displacement	Stress	Displacement
	min	tsf	in	tsf	in
1	0.00	4.541	0.1631	0	0
2	165.26	2.88	0.1594	0.623	0.007876
3	285.62	2.88	0.1584	0.8242	0.01575
4	408.00	2.88	0.1589	0.8772	0.02363
5	528.28	2.88	0.1597	0.9172	0.0315
6	644.59	2.88	0.161	0.9573	0.03938
7	763.78	2.88	0.1618	0.994	0.04725
8	884.32	2.88	0.1622	1.033	0.05513
9	993.76	2.88	0.163	1.072	0.06301
10	1117.20	2.88	0.1637	1.102	0.07088
11	1235.24	2.88	0.166	1.124	0.07876
12	1344.93	2.88	0.1672	1.154	0.08663
13	1464.24	2.88	0.1684	1.183	0.09451
14	1587.75	2.88	0.1694	1.219	0.1024
15	1704.16	2.879	0.171	1.241	0.1103
16	1806.00	2.879	0.1724	1.26	0.1181
17	1919.53	2.88	0.1737	1.281	0.126
18	2040.50	2.88	0.1748	1.31	0.1339
19	2161.06	2.88	0.1757	1.312	0.1418
20	2270.85	2.88	0.1753	1.338	0.1496
21	2391.12	2.88	0.1755	1.346	0.1575
22	2509.07	2.88	0.1764	1.356	0.1654
23	2633.81	2.88	0.1773	1.373	0.1733
24	2755.77	2.88	0.1787	1.382	0.1811
25	2871.20	2.88	0.1792	1.392	0.189
26	2977.15	2.88	0.1795	1.392	0.1969
27	3107.25	2.88	0.1796	1.405	0.2048
28	3223.67	2.88	0.1804	1.408	0.2126
29	3336.47	2.88	0.1812	1.406	0.2205
30	3458.59	2.88	0.1821	1.403	0.2284
31	3580.72	2.88	0.1833	1.418	0.2362
32	3695.22	2.879	0.1829	1.425	0.2441
33	3803.01	2.88	0.1834	1.426	0.252
34	3924.20	2.88	0.1847	1.426	0.2599
35	4048.11	2.88	0.1853	1.428	0.2677
36	4163.33	2.88	0.1858	1.435	0.2756
37	4182.96	2.88	0.186	1.429	0.2775

DIRECT SHEAR TEST DATA

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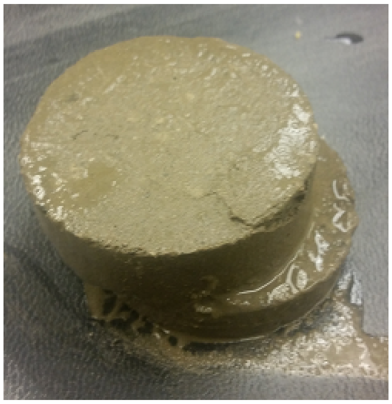
Project: DYNEGY EDWARDS
Boring No.: EDW-B003 S9
Sample No.: S-9
Test No.: 80 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 10/23/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: VERY DARK GRAY VARVED FLY ASH
Remarks: TEST PERFORMED AS PER ASTM D3080

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	5.757	0.195	0	0
2	58.95	5.759	0.1996	0.5335	0.007876
3	100.20	5.759	0.2019	0.8357	0.01575
4	140.38	5.759	0.2048	1.069	0.02363
5	178.98	5.759	0.2079	1.257	0.0315
6	214.75	5.759	0.2102	1.405	0.03938
7	256.36	5.759	0.2126	1.554	0.04725
8	295.19	5.759	0.2142	1.68	0.05513
9	332.54	5.759	0.216	1.784	0.06301
10	373.08	5.759	0.2174	1.879	0.07088
11	411.52	5.759	0.219	1.962	0.07876
12	450.22	5.759	0.2203	2.034	0.08663
13	487.04	5.759	0.2214	2.089	0.09451
14	524.30	5.759	0.2232	2.152	0.1024
15	562.81	5.759	0.2247	2.215	0.1103
16	600.83	5.759	0.2262	2.277	0.1181
17	638.96	5.759	0.2278	2.314	0.126
18	681.52	5.759	0.2295	2.365	0.1339
19	716.24	5.759	0.2303	2.426	0.1418
20	755.33	5.76	0.2315	2.489	0.1496
21	791.66	5.759	0.2324	2.542	0.1575
22	830.85	5.759	0.2338	2.587	0.1654
23	870.20	5.759	0.2346	2.643	0.1733
24	908.45	5.759	0.2356	2.697	0.1811
25	944.85	5.759	0.2372	2.738	0.189
26	983.52	5.759	0.2383	2.779	0.1969
27	1022.76	5.759	0.2395	2.809	0.2048
28	1059.45	5.759	0.2401	2.838	0.2126
29	1096.13	5.759	0.2411	2.858	0.2205
30	1136.62	5.759	0.2421	2.903	0.2284
31	1174.43	5.759	0.2433	2.936	0.2362
32	1210.69	5.759	0.244	2.961	0.2441
33	1248.49	5.759	0.2448	2.964	0.252
34	1288.45	5.759	0.2456	2.966	0.2599
35	1323.77	5.759	0.2462	2.967	0.2677
36	1353.20	5.759	0.2472	2.982	0.2737



DIRECT SHEAR TEST REPORT

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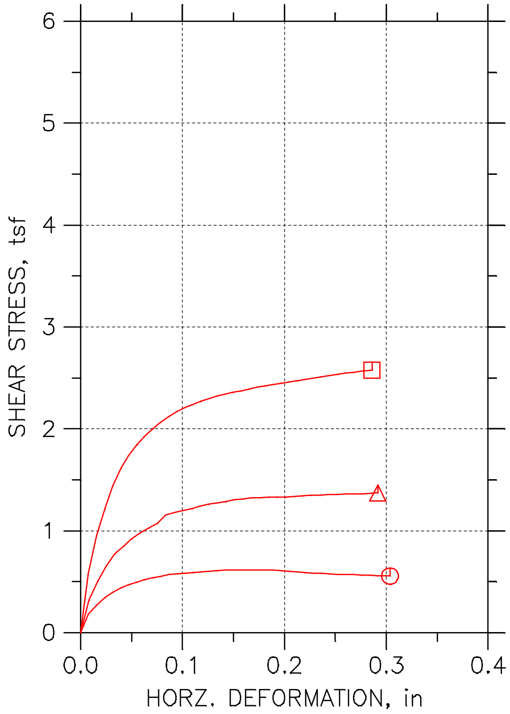

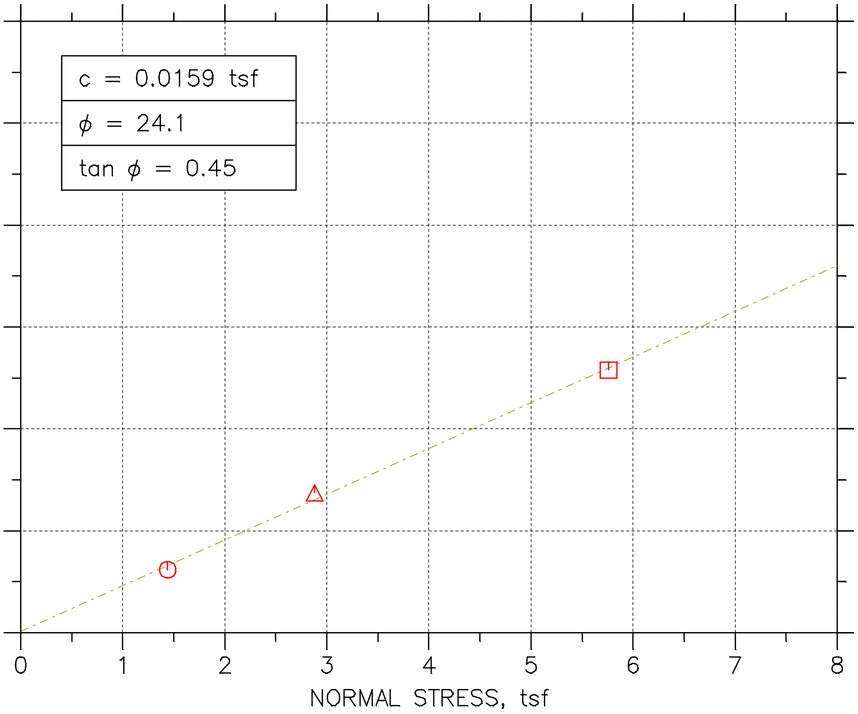

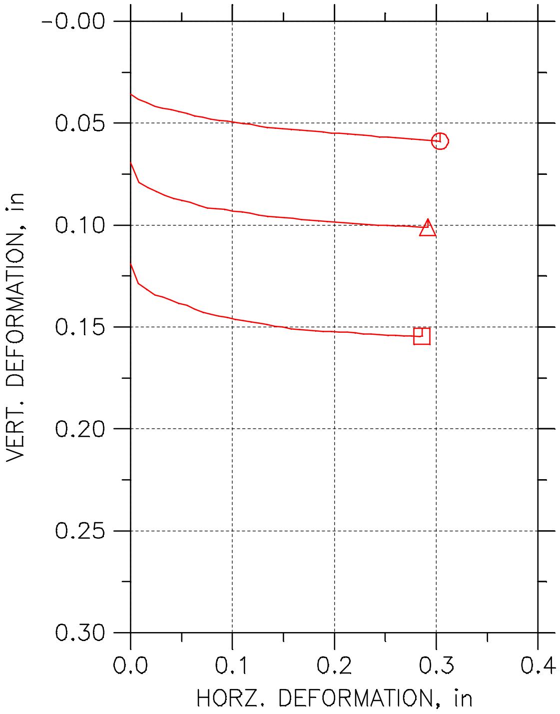

Symbol		○	△	□	
Test No.		20 PSI	40 PSI	80 PSI	
Sample No.		S-10	S-10	S-10	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.4921	2.4996	2.4976	
	Area, in^2	4.8779	4.9072	4.8995	
	Height, in	0.99606	0.98583	0.98858	
	Water Content, %	29.91	28.99	29.10	
	Dry Density, pcf	90.515	92.188	91.834	
	Saturation, %	92.88	93.65	93.21	
	Void Ratio	0.87597	0.84192	0.84903	
Consol. Height, in		0.96227	0.91945	0.88312	
Consol. Void Ratio		0.81233	0.71789	0.65176	
Final	Water Content, %	28.10	23.40	19.70	
	Dry Density, pcf	96.208	102.73	108.85	
	Saturation, %	99.92	97.47	95.68	
	Void Ratio	0.76496	0.653	0.56003	
Normal Stress, tsf		1.4392	2.8795	5.7594	
Max. Shear Stress, tsf		0.61821	1.3715	2.5767	
Ult. Shear Stress, tsf		0.55697	1.3715	2.5767	
Time to Failure, min		793.54	1341	1400	
Disp. Rate, in/min		0.000207	0.000207	0.000207	
Estimated Specific Gravity		2.72	2.72	2.72	
Liquid Limit		40	40	40	
Plastic Limit		15	15	15	
Plasticity Index		25	25	25	

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW010 S10
Sample Type: 3.0'' ST
Description: BLUISH GRAY LEAN CLAY CL
Remarks: TEST PERFORMED AS PER ASTM D3080

Tue, 17-NOV-2015 16:39:52

DIRECT SHEAR TEST DATA

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Consulting Engineers & Scientists

Project: DYNEGY EDWARDS
Boring No.: EDW010 S10
Sample No.: S-10
Test No.: 20 PSI

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: BLUISH GRAY LEAN CLAY CL
Remarks: TEST PERFORMED AS PER ASTM D3080

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	1.438	0.03587	0	0
2	39.39	1.439	0.03845	0.185	0.007876
3	76.42	1.439	0.0399	0.2733	0.01575
4	116.70	1.439	0.04167	0.343	0.02363
5	155.57	1.439	0.04274	0.3971	0.0315
6	194.59	1.439	0.04325	0.439	0.03938
7	231.17	1.439	0.04419	0.4699	0.04725
8	266.54	1.439	0.04514	0.4951	0.05513
9	305.27	1.439	0.0464	0.5183	0.06301
10	340.94	1.439	0.04709	0.537	0.07088
11	379.25	1.439	0.04797	0.555	0.07876
12	423.04	1.439	0.04873	0.5699	0.08663
13	457.67	1.439	0.04905	0.5782	0.09451
14	495.80	1.439	0.04968	0.586	0.1024
15	531.98	1.439	0.05012	0.5924	0.1103
16	571.20	1.439	0.05068	0.5989	0.1181
17	608.83	1.439	0.0515	0.604	0.126
18	647.29	1.439	0.05207	0.6079	0.1339
19	683.43	1.438	0.05239	0.6124	0.1418
20	721.04	1.438	0.0527	0.615	0.1496
21	758.83	1.439	0.05295	0.6169	0.1575
22	793.54	1.439	0.05327	0.6182	0.1654
23	830.97	1.439	0.05365	0.6176	0.1733
24	869.12	1.439	0.05396	0.615	0.1811
25	906.41	1.439	0.0544	0.6124	0.189
26	945.26	1.439	0.05491	0.6073	0.1969
27	982.69	1.439	0.0551	0.6021	0.2048
28	1020.06	1.439	0.05529	0.5957	0.2126
29	1059.90	1.439	0.0556	0.5905	0.2205
30	1095.28	1.439	0.05585	0.586	0.2284
31	1131.23	1.439	0.05617	0.5821	0.2362
32	1169.64	1.439	0.05674	0.5776	0.2441
33	1209.10	1.439	0.05699	0.5731	0.252
34	1244.59	1.439	0.0573	0.5718	0.2599
35	1283.36	1.439	0.05762	0.5705	0.2677
36	1319.90	1.439	0.05775	0.5679	0.2756
37	1357.90	1.439	0.05806	0.5641	0.2835
38	1393.69	1.438	0.05838	0.5615	0.2914
39	1434.20	1.44	0.05875	0.5589	0.2992
40	1455.26	1.439	0.05894	0.557	0.3036

DIRECT SHEAR TEST DATA

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Project: DYNEGY EDWARDS
Boring No.: EDW010 S10
Sample No.: S-10
Test No.: 40 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/4/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: BLUISH GRAY LEAN CLAY CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	2.879	0.06953	0	0
2	66.92	2.879	0.07899	0.3222	0.00838
3	104.04	2.88	0.0817	0.5099	0.01676
4	142.82	2.879	0.08347	0.6542	0.02514
5	185.18	2.88	0.08542	0.7741	0.03352
6	219.73	2.88	0.08681	0.8505	0.0419
7	257.69	2.88	0.08794	0.9202	0.05028
8	298.10	2.88	0.08882	0.982	0.05866
9	333.83	2.88	0.09046	1.029	0.06704
10	369.75	2.88	0.0916	1.072	0.07542
11	413.04	2.88	0.09204	1.152	0.0838
12	445.97	2.88	0.09229	1.18	0.09218
13	485.62	2.88	0.09317	1.197	0.1006
14	521.13	2.88	0.09368	1.22	0.1089
15	559.14	2.88	0.09418	1.241	0.1173
16	595.57	2.879	0.095	1.261	0.1257
17	634.46	2.88	0.09563	1.272	0.1341
18	671.61	2.88	0.0962	1.289	0.1425
19	707.68	2.88	0.09645	1.303	0.1508
20	746.34	2.88	0.0967	1.312	0.1592
21	785.27	2.879	0.09727	1.321	0.1676
22	821.12	2.88	0.09778	1.327	0.176
23	858.67	2.88	0.09796	1.33	0.1844
24	895.38	2.88	0.09834	1.334	0.1927
25	934.75	2.88	0.09866	1.333	0.2011
26	971.24	2.88	0.09891	1.337	0.2095
27	1007.72	2.88	0.09916	1.342	0.2179
28	1045.96	2.88	0.09941	1.346	0.2262
29	1084.53	2.88	0.09992	1.351	0.2346
30	1120.37	2.88	0.1001	1.354	0.243
31	1156.63	2.88	0.1002	1.357	0.2513
32	1197.77	2.88	0.1003	1.36	0.2597
33	1233.68	2.88	0.1004	1.362	0.2681
34	1272.09	2.88	0.1006	1.364	0.2765
35	1311.64	2.88	0.1009	1.369	0.2849
36	1340.99	2.88	0.1011	1.371	0.2916

DIRECT SHEAR TEST DATA

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Project: DYNEGY EDWARDS
Boring No.: EDW010 S10
Sample No.: S-10
Test No.: 80 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 30.0'-32.0'
Elevation: ----

Soil Description: BLUISH GRAY LEAN CLAY CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	5.757	0.1189	0	0
2	53.81	5.759	0.1286	0.586	0.007876
3	93.90	5.759	0.1315	0.9544	0.01575
4	132.06	5.759	0.1342	1.218	0.02363
5	171.21	5.759	0.1354	1.435	0.0315
6	211.15	5.759	0.1367	1.61	0.03938
7	250.46	5.759	0.1385	1.74	0.04725
8	288.21	5.759	0.1395	1.844	0.05513
9	324.71	5.759	0.1411	1.926	0.06301
10	364.16	5.759	0.1428	2.004	0.07088
11	401.96	5.759	0.1437	2.067	0.07876
12	438.83	5.759	0.1446	2.119	0.08663
13	478.24	5.759	0.1452	2.171	0.09451
14	515.94	5.759	0.1461	2.207	0.1024
15	554.42	5.759	0.1469	2.242	0.1103
16	590.30	5.759	0.1476	2.272	0.1181
17	626.52	5.759	0.1482	2.294	0.126
18	663.24	5.759	0.1488	2.321	0.1339
19	700.05	5.759	0.1496	2.34	0.1418
20	741.31	5.759	0.15	2.362	0.1496
21	780.69	5.759	0.1509	2.374	0.1575
22	817.38	5.759	0.1512	2.393	0.1654
23	854.69	5.759	0.1515	2.407	0.1733
24	892.50	5.759	0.1519	2.423	0.1811
25	930.62	5.759	0.1523	2.434	0.189
26	969.48	5.759	0.1523	2.444	0.1969
27	1008.12	5.759	0.1525	2.457	0.2048
28	1045.34	5.759	0.1527	2.471	0.2126
29	1083.92	5.759	0.1529	2.484	0.2205
30	1123.76	5.759	0.1533	2.499	0.2284
31	1160.12	5.759	0.1535	2.512	0.2362
32	1197.88	5.759	0.1537	2.526	0.2441
33	1240.24	5.759	0.1541	2.536	0.252
34	1277.15	5.759	0.1541	2.545	0.2599
35	1312.34	5.759	0.1543	2.556	0.2677
36	1351.46	5.759	0.1543	2.566	0.2756
37	1391.74	5.759	0.1546	2.576	0.2835
38	1399.98	5.759	0.1545	2.577	0.2859

DIRECT SHEAR TEST REPORT

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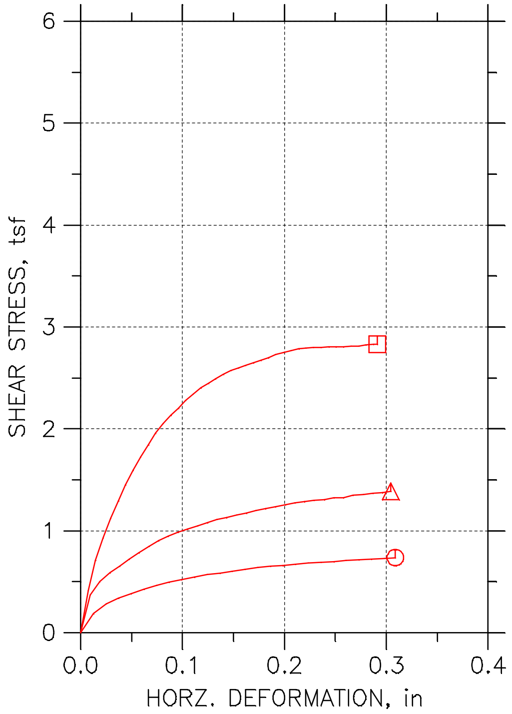

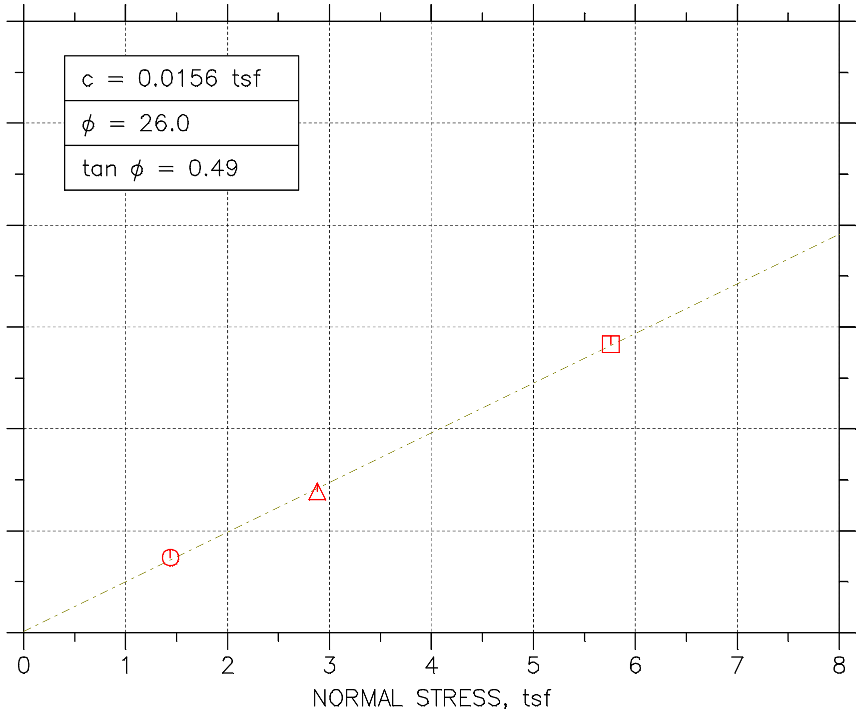

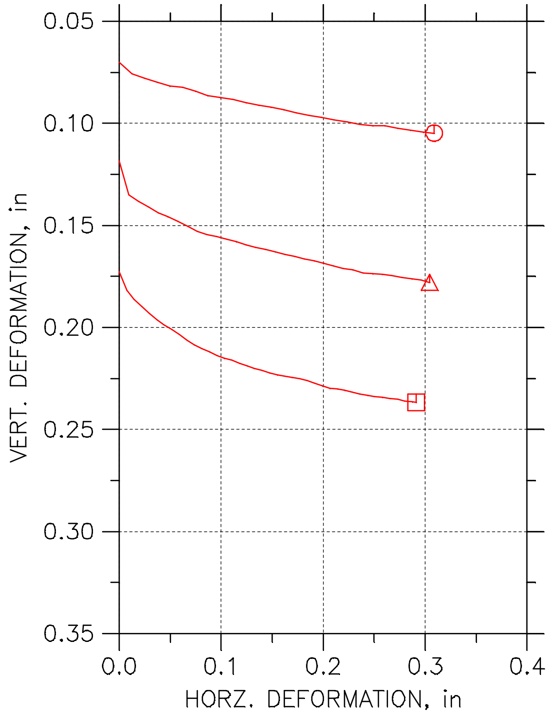

Symbol		○	△	□	
Test No.		20 PSI	40 PSI	80 PSI	
Sample No.		S-14	S-14	S-14	
Shape		Circular	Circular	Circular	
Initial	Dimension, in	2.5087	2.5067	2.502	
	Area, in^2	4.9428	4.9351	4.9165	
	Height, in	0.99961	1.0098	0.99646	
	Water Content, %	50.80	50.19	50.11	
	Dry Density, pcf	69.233	69.813	69.282	
	Saturation, %	95.13	95.32	93.94	
	Void Ratio	1.4527	1.4323	1.4509	
Consol. Height, in		0.93203	0.8987	0.83564	
Consol. Void Ratio		1.2868	1.1646	1.0554	
Final	Water Content, %	44.10	36.30	31.60	
	Dry Density, pcf	77.344	84.748	90.862	
	Saturation, %	100.34	98.38	98.93	
	Void Ratio	1.1954	1.0036	0.86882	
Normal Stress, tsf		1.4393	2.8799	5.7593	
Max. Shear Stress, tsf		0.73733	1.3874	2.8312	
Ult. Shear Stress, tsf		0.73733	1.3874	2.8312	
Time to Failure, min		961	3164.9	1365.2	
Disp. Rate, in/min		0.000207	8.85e-005	0.000232	
Estimated Specific Gravity		2.72	2.72	2.72	
Liquid Limit		54	54	54	
Plastic Limit		20	20	20	
Plasticity Index		34	34	34	

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW012 S14

Sample Type: 3.0'' ST

Description: DARK GRAY FAT CLAY CH SHELL NOTED

Remarks: TEST PERFORMED AS PER ASTM D3080.

Tue, 17-NOV-2015 17:00:29

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW012 S14
Sample No.: S-14
Test No.: 20 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/5/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 47.0'-49.0'
Elevation: ----

Soil Description: DARK GRAY FAT CLAY CH SHELL NOTED
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	1.438	0.07004	0	0
2	47.30	1.438	0.0759	0.1909	0.01241
3	86.02	1.439	0.07811	0.2818	0.02482
4	124.31	1.439	0.07994	0.3416	0.03724
5	160.06	1.438	0.08176	0.3855	0.04965
6	200.31	1.439	0.08246	0.4281	0.06206
7	238.78	1.438	0.08441	0.4644	0.07447
8	275.86	1.439	0.08649	0.4949	0.08688
9	314.97	1.439	0.08737	0.5229	0.09929
10	355.17	1.439	0.08832	0.5477	0.1117
11	393.92	1.439	0.08977	0.5706	0.1241
12	429.38	1.439	0.09128	0.5859	0.1365
13	468.43	1.439	0.09223	0.6056	0.1489
14	506.02	1.439	0.09336	0.6215	0.1614
15	542.62	1.439	0.09481	0.6381	0.1738
16	586.75	1.439	0.09614	0.6521	0.1862
17	618.29	1.439	0.09721	0.6616	0.1986
18	656.28	1.438	0.09828	0.6718	0.211
19	696.76	1.439	0.09935	0.682	0.2234
20	732.98	1.439	0.1005	0.6915	0.2358
21	769.67	1.439	0.1012	0.6998	0.2482
22	812.59	1.439	0.1013	0.7093	0.2606
23	848.00	1.439	0.1026	0.7151	0.2731
24	887.83	1.438	0.1033	0.724	0.2855
25	924.52	1.438	0.1043	0.731	0.2979
26	961.00	1.439	0.1048	0.7373	0.3088

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW012 S14
Sample No.: S-14
Test No.: 40 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/7/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 47.0'-49.0'
Elevation: ----

Soil Description: DARK GRAY FAT CLAY CH SHELL NOTED
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	2.879	0.1185	0	0
2	372.53	2.88	0.1351	0.3735	0.009556
3	468.99	2.88	0.1381	0.5003	0.01911
4	564.01	2.88	0.141	0.5902	0.02867
5	651.75	2.88	0.144	0.656	0.03822
6	744.20	2.88	0.1459	0.7228	0.04778
7	835.68	2.879	0.1481	0.7865	0.05733
8	925.97	2.88	0.1505	0.8454	0.06689
9	1018.05	2.88	0.1529	0.9026	0.07645
10	1104.25	2.88	0.1545	0.9476	0.086
11	1195.15	2.88	0.1556	0.9882	0.09556
12	1289.11	2.88	0.1568	1.019	0.1051
13	1376.20	2.88	0.158	1.049	0.1147
14	1467.76	2.88	0.1596	1.082	0.1242
15	1560.82	2.88	0.1608	1.11	0.1338
16	1648.67	2.88	0.1618	1.132	0.1433
17	1734.35	2.88	0.1631	1.153	0.1529
18	1827.14	2.88	0.1642	1.177	0.1624
19	1925.93	2.88	0.1651	1.202	0.172
20	2006.92	2.88	0.1663	1.219	0.1816
21	2105.98	2.88	0.1673	1.236	0.1911
22	2191.37	2.88	0.1688	1.253	0.2007
23	2278.65	2.88	0.1698	1.274	0.2102
24	2368.36	2.88	0.1711	1.289	0.2198
25	2452.94	2.88	0.1719	1.301	0.2293
26	2544.63	2.88	0.1735	1.308	0.2389
27	2629.18	2.88	0.1737	1.323	0.2485
28	2720.25	2.88	0.1741	1.327	0.2579
29	2813.74	2.88	0.1747	1.347	0.2675
30	2902.90	2.88	0.1755	1.353	0.2771
31	2995.72	2.88	0.1763	1.367	0.2866
32	3085.70	2.879	0.177	1.376	0.2962
33	3164.86	2.88	0.178	1.387	0.3043

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DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW012 S14
Sample No.: S-14
Test No.: 80 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/9/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 47.0'-49.0'
Elevation: ----

Soil Description: DARK GRAY FAT CLAY CH SHELL NOTED
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	5.758	0.1729	0	0
2	39.55	5.758	0.1819	0.4139	0.007372
3	77.10	5.759	0.1863	0.7122	0.01474
4	112.99	5.759	0.1897	0.9304	0.02212
5	148.81	5.759	0.193	1.122	0.02949
6	184.76	5.759	0.1961	1.293	0.03686
7	219.25	5.759	0.1988	1.448	0.04423
8	256.03	5.759	0.2008	1.596	0.0516
9	290.21	5.759	0.2034	1.726	0.05897
10	325.35	5.759	0.2062	1.846	0.06635
11	362.78	5.759	0.2083	1.96	0.07372
12	397.12	5.759	0.2103	2.054	0.08109
13	429.34	5.759	0.2121	2.132	0.08846
14	462.52	5.759	0.2137	2.205	0.09583
15	499.06	5.759	0.215	2.279	0.1032
16	532.30	5.759	0.2162	2.34	0.1106
17	569.81	5.76	0.2177	2.403	0.1179
18	598.74	5.759	0.2187	2.447	0.1253
19	633.77	5.759	0.2199	2.494	0.1327
20	670.11	5.759	0.2209	2.537	0.1401
21	703.89	5.759	0.2224	2.574	0.1474
22	737.17	5.759	0.2233	2.6	0.1548
23	771.57	5.759	0.2238	2.622	0.1622
24	805.68	5.759	0.2246	2.647	0.1696
25	841.96	5.759	0.2251	2.675	0.1769
26	874.04	5.759	0.226	2.7	0.1843
27	910.30	5.759	0.2273	2.727	0.1917
28	942.84	5.759	0.2287	2.746	0.199
29	977.11	5.759	0.2297	2.769	0.2064
30	1011.86	5.759	0.2302	2.785	0.2137
31	1046.27	5.759	0.2307	2.794	0.2211
32	1078.57	5.759	0.2316	2.801	0.2285
33	1111.99	5.759	0.2326	2.8	0.2359
34	1147.40	5.759	0.2332	2.803	0.2432
35	1179.32	5.759	0.2338	2.804	0.2506
36	1216.60	5.759	0.2341	2.806	0.258
37	1246.79	5.759	0.2347	2.809	0.2653
38	1278.72	5.759	0.2353	2.814	0.2727
39	1316.44	5.759	0.236	2.823	0.2801
40	1349.92	5.759	0.2364	2.829	0.2875
41	1365.24	5.759	0.2367	2.831	0.2913

DIRECT SHEAR TEST REPORT

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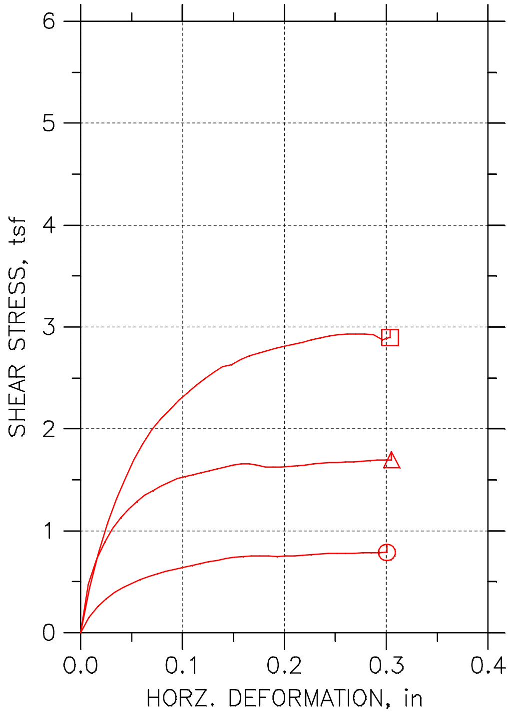
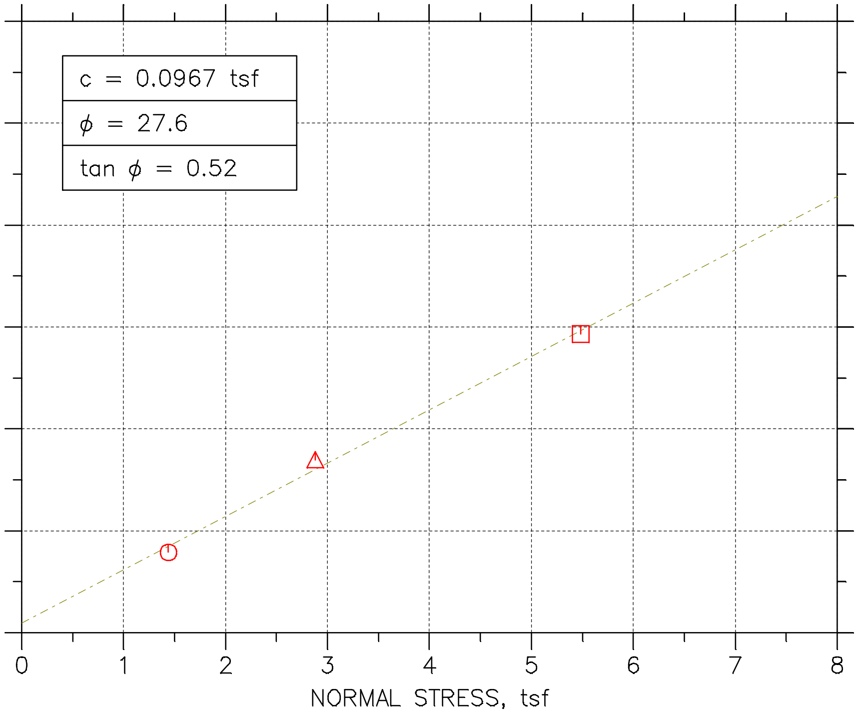
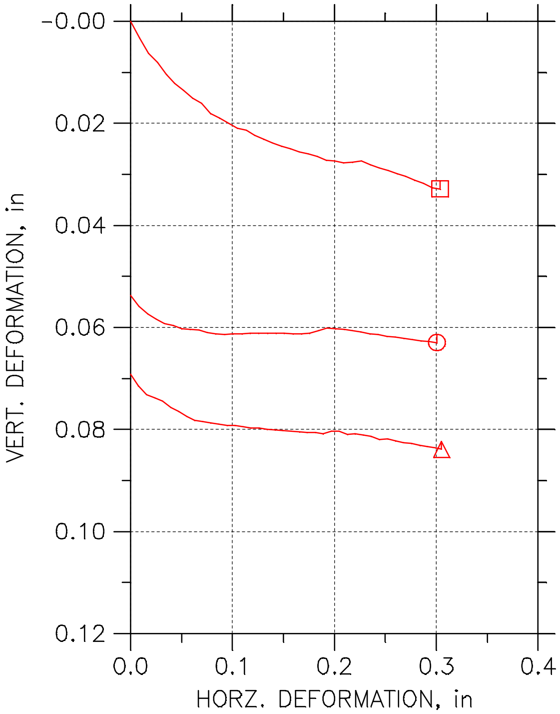
Consulting Engineers & Scientists







	Symbol	○	△	☐	
	Test No.	20 PSI	40 PSI	80 PSI	
	Sample No.	S-10	S-10	S-10	
	Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.498	2.5	2.5087	
	Area, in^2	4.901	4.9087	4.9431	
	Height, in	0.98898	0.99252	0.99606	
	Water Content, %	20.30	20.20	20.70	
	Dry Density, pcf	101.54	100.62	99.218	
	Saturation, %	85.50	83.10	82.20	
	Void Ratio	0.62921	0.64421	0.66738	
	Consol. Height, in	0.94144	0.9279	0.99606	
	Consol. Void Ratio	0.5509	0.53717	0.66738	
Final	Water Content, %	19.10	18.60	22.80	
	Dry Density, pcf	108.45	109.91	102.6	
	Saturation, %	96.32	97.56	98.66	
	Void Ratio	0.52546	0.50521	0.61241	
	Normal Stress, tsf	1.4396	2.8794	5.4854	
	Max. Shear Stress, tsf	0.78821	1.6963	2.9302	
	Ult. Shear Stress, tsf	0.78821	1.6963	2.8965	
	Time to Failure, min	1242.6	1357.2	1031.5	
	Disp. Rate, in/min	0.000232	0.000232	0.000232	
	Estimated Specific Gravity	2.65	2.65	2.65	
	Liquid Limit	24	24	24	
	Plastic Limit	13	13	13	
	Plasticity Index	11	11	11	

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW015 S10
Sample Type: 3.0'' ST
Description: BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

Tue, 17-NOV-2015 17:37:38

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Boring No.: EDW015 S10
Sample No.: S-10
Test No.: 20 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/10/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 31.0'-33.0'
Elevation: ----

Soil Description: BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	1.439	0.05371	0	0
2	53.95	1.44	0.05592	0.1498	0.00838
3	89.12	1.439	0.05743	0.2586	0.01676
4	121.56	1.439	0.05838	0.3313	0.02514
5	157.67	1.44	0.05919	0.3949	0.03352
6	194.41	1.44	0.05957	0.4472	0.0419
7	229.85	1.44	0.0602	0.4865	0.05028
8	262.66	1.44	0.06033	0.5204	0.05866
9	296.74	1.44	0.06052	0.5501	0.06704
10	331.66	1.44	0.06102	0.577	0.07542
11	364.35	1.44	0.06128	0.6007	0.0838
12	395.09	1.44	0.06134	0.6201	0.09218
13	431.13	1.44	0.06121	0.6417	0.1006
14	466.24	1.44	0.06121	0.6611	0.1089
15	499.12	1.44	0.06109	0.6772	0.1173
16	531.39	1.44	0.06109	0.6939	0.1257
17	565.38	1.44	0.06115	0.7106	0.1341
18	600.22	1.44	0.06115	0.7257	0.1425
19	633.76	1.44	0.06115	0.7381	0.1508
20	668.19	1.44	0.06121	0.7478	0.1592
21	702.22	1.44	0.06121	0.7543	0.1676
22	736.72	1.44	0.06115	0.7553	0.176
23	772.13	1.439	0.06058	0.7521	0.1844
24	804.93	1.44	0.06008	0.7494	0.1927
25	838.10	1.44	0.06027	0.751	0.2011
26	873.29	1.44	0.06033	0.7548	0.2095
27	907.96	1.44	0.06058	0.7613	0.2179
28	940.97	1.44	0.06083	0.7661	0.2262
29	974.96	1.44	0.06121	0.771	0.2346
30	1009.21	1.44	0.0614	0.7758	0.243
31	1042.51	1.44	0.06178	0.7769	0.2513
32	1073.94	1.439	0.06191	0.778	0.2597
33	1112.13	1.44	0.06216	0.7801	0.2681
34	1143.69	1.44	0.06241	0.7823	0.2765
35	1177.31	1.44	0.0626	0.785	0.2849
36	1213.76	1.44	0.06273	0.7861	0.2932
37	1242.60	1.44	0.06298	0.7882	0.3006

DIRECT SHEAR TEST DATA

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155218
Boring No.: EDW015 S10
Tested By: HP
Checked By: BCM
Sample No.: S-10
Test Date: 11/10/15
Depth: 31.0'-33.0'
Test No.: 40 PSI
Sample Type: 3.0" ST
Elevation: ----

Soil Description: BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	2.887	0.06916	0	0
2	81.09	2.879	0.07142	0.4785	0.007876
3	117.60	2.879	0.07313	0.7219	0.01575
4	151.97	2.879	0.07376	0.8898	0.02363
5	186.66	2.879	0.07439	1.023	0.0315
6	221.15	2.879	0.07571	1.129	0.03938
7	253.83	2.879	0.07647	1.211	0.04725
8	289.37	2.879	0.07741	1.288	0.05513
9	323.30	2.879	0.07823	1.347	0.06301
10	356.53	2.879	0.07849	1.394	0.07088
11	391.02	2.879	0.07867	1.439	0.07876
12	424.56	2.879	0.07893	1.477	0.08663
13	459.98	2.879	0.07918	1.51	0.09451
14	492.86	2.879	0.07924	1.534	0.1024
15	523.80	2.879	0.07943	1.552	0.1103
16	556.72	2.879	0.07968	1.571	0.1181
17	588.93	2.879	0.07975	1.588	0.126
18	622.51	2.879	0.08	1.607	0.1339
19	657.43	2.879	0.08006	1.626	0.1418
20	692.69	2.879	0.08025	1.644	0.1496
21	724.45	2.879	0.08031	1.655	0.1575
22	759.66	2.879	0.08044	1.658	0.1654
23	791.34	2.88	0.08057	1.646	0.1733
24	825.40	2.879	0.08063	1.628	0.1811
25	858.43	2.879	0.08082	1.623	0.189
26	892.73	2.879	0.08031	1.623	0.1969
27	926.40	2.879	0.08038	1.63	0.2048
28	958.76	2.879	0.08101	1.635	0.2126
29	993.58	2.879	0.08088	1.643	0.2205
30	1027.07	2.879	0.08113	1.655	0.2284
31	1059.32	2.88	0.08132	1.662	0.2362
32	1094.50	2.879	0.08195	1.667	0.2441
33	1128.29	2.879	0.08189	1.671	0.252
34	1161.15	2.879	0.08227	1.676	0.2599
35	1194.98	2.879	0.08258	1.676	0.2677
36	1230.64	2.879	0.08271	1.684	0.2756
37	1263.56	2.879	0.08315	1.688	0.2835
38	1294.95	2.879	0.0834	1.693	0.2914
39	1331.25	2.879	0.08365	1.694	0.2992
40	1357.24	2.879	0.08391	1.696	0.3052

DIRECT SHEAR TEST DATA

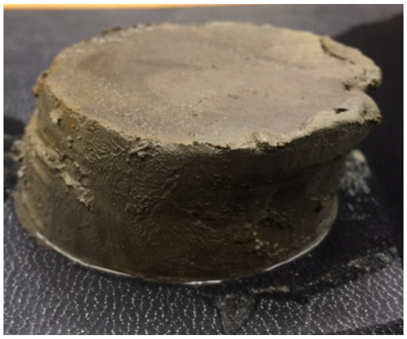
Project: DYNEGY EDWARDS
Boring No.: EDW015 S10
Sample No.: S-10
Test No.: 80 PSI

Location: BARTONVILLE, IL
Tested By: HP
Test Date: 11/12/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: BCM
Depth: 31.0'-33.0'
Elevation: ----

Soil Description: BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL CL
Remarks: TEST PERFORMED AS PER ASTM D3080.

	Elapsed Time min	Vertical Stress tsf	Vertical Displacement in	Horizontal Stress tsf	Horizontal Displacement in
1	0.00	5.485	0	0	0
2	36.40	5.485	0.003256	0.437	0.008716
3	71.32	5.485	0.006327	0.7826	0.01743
4	106.78	5.485	0.008001	1.076	0.02615
5	141.55	5.485	0.01042	1.313	0.03486
6	173.06	5.485	0.01219	1.499	0.04358
7	209.72	5.485	0.01358	1.693	0.05229
8	245.51	5.485	0.01507	1.854	0.06101
9	279.22	5.485	0.0161	1.987	0.06973
10	314.35	5.485	0.01805	2.098	0.07844
11	349.53	5.485	0.01898	2.187	0.08716
12	383.30	5.485	0.02	2.276	0.09587
13	415.59	5.485	0.02093	2.352	0.1046
14	449.70	5.485	0.0214	2.428	0.1133
15	485.17	5.485	0.02242	2.494	0.122
16	517.51	5.485	0.02317	2.551	0.1307
17	556.85	5.485	0.02382	2.612	0.1395
18	584.89	5.485	0.02447	2.627	0.1482
19	618.32	5.485	0.02503	2.678	0.1569
20	654.74	5.485	0.02568	2.719	0.1656
21	687.22	5.485	0.02596	2.742	0.1743
22	720.44	5.485	0.02652	2.766	0.183
23	755.56	5.485	0.02726	2.793	0.1917
24	788.89	5.485	0.02735	2.81	0.2005
25	823.96	5.485	0.02782	2.83	0.2092
26	856.37	5.485	0.02763	2.851	0.2179
27	893.08	5.485	0.02735	2.874	0.2266
28	925.58	5.485	0.02819	2.893	0.2353
29	960.00	5.485	0.02875	2.911	0.244
30	995.06	5.485	0.02931	2.924	0.2527
31	1031.53	5.485	0.02987	2.93	0.2614
32	1062.43	5.485	0.03042	2.929	0.2701
33	1097.75	5.486	0.03117	2.929	0.2789
34	1131.93	5.485	0.03182	2.926	0.2876
35	1165.06	5.485	0.03266	2.877	0.2963
36	1194.80	5.485	0.03284	2.897	0.3037



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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group 750 Corporate Woods Parkway Vernon Hills, Illinois 60061 Phone:(847) 793-0306 Fax:(847) 793-0309

TERRACON PROJECT NO.:	**MR155218**	**11/17/2015**
PROJECT NAME:	**DYNEGY - EDWARDS SITE**	
CLIENT:	**AECOM**	
LOCATION :	**BARTONVILLE, IL**	

SUMMARY OF TEST RESULTS

BORING NO.	EDW-B002
SAMPLE NO.	S-5
DEPTH:	10.0'-12.0'
CLASSIFICATION	GRAY TO DARK GRAY VARVED FLY ASH

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	55.9	59.7
WATER CONTENT (%)	66.4	60.8
DIAMETER (cm)	7.218	7.030
LENGTH (cm)	8.678	8.558
HYDRAULIC GRADIENT (MAXIMUM)	10.87	
PERCENT SATURATION	100.0	
HYDRAULIC CONDUCTIVITY k (cm/sec)	9.19E-05	

SAMPLE PHOTO

(Percent saturation calculation is based on final measurements and an estimated specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION

ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

TERRACON PROJECT NO.: **MR155218** **11/17/2015**
PROJECT NAME: **DYNEGY - EDWARDS SITE**
CLIENT: **AECOM**
LOCATION : **BARTONVILLE, IL**

SUMMARY OF TEST RESULTS

BORING NO. EDW-B003

SAMPLE NO. S-9

DEPTH: 30.0'-32.0'

CLASSIFICATION VERY DARK GRAY VARVED FLY ASH

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	53.2	59.3
WATER CONTENT (%)	71.2	61.7
DIAMETER (cm)	7.206	6.968
LENGTH (cm)	8.429	8.091
HYDRAULIC GRADIENT (MAXIMUM)	11.19	
PERCENT SATURATION	100.2	

SAMPLE PHOTO

(Percent saturation calculation is based on final measurements and an estimated specific gravity.)

HYDRAULIC CONDUCTIVITY k (cm/sec) 6.79E-05

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group 750 Corporate Woods Parkway Vernon Hills, Illinois 60061 Phone:(847) 793-0306 Fax:(847) 793-0309

TERRACON PROJECT NO.:	**MR155218**	**11/17/2015**
PROJECT NAME:	**DYNEGY - EDWARDS SITE**	
CLIENT:	**AECOM**	
LOCATION :	**BARTONVILLE, IL**	

SUMMARY OF TEST RESULTS

BORING NO.	EDW-B004
SAMPLE NO.	S-11
DEPTH:	36.0'-38.0'
CLASSIFICATION	BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND CL

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	111.1	113.9
WATER CONTENT (%)	19.3	18.0
DIAMETER (cm)	7.117	7.074
LENGTH (cm)	8.145	8.042

SAMPLE PHOTO

HYDRAULIC GRADIENT (MAXIMUM)	20.21
PERCENT SATURATION	100.5
HYDRAULIC CONDUCTIVITY k (cm/sec)	7.20E-07

(Percent saturation calculation is based on final measurements and an estimated specific gravity.)

Deaired water was used as the liquid permeant.

UNCONFINED COMPRESSION TEST REPORT

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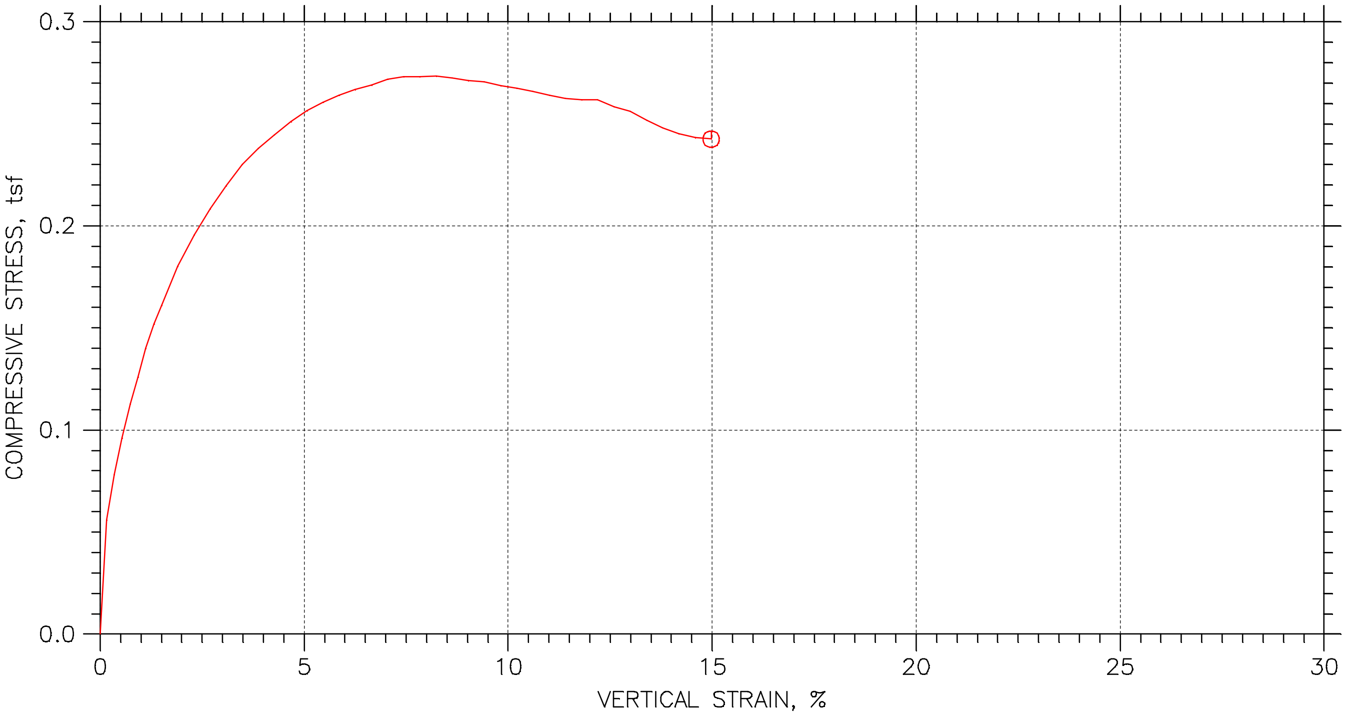
Consulting Engineers & Scientists



Symbol		⦶			
Test No.		EDW-002 S10			
Initial	Diameter, in	2.8118			
	Height, in	5.9587			
	Water Content, %	29.48			
	Dry Density, pcf	93.81			
	Saturation, %	98.98			
	Void Ratio	0.81002			
Unconfined Compressive Strength, tsf		0.27347			
Undrained Shear Strength, tsf		0.13673			
Time to Failure, min		10.5			
Strain Rate, %/min		1			
Estimated Specific Gravity		2.72			
Liquid Limit		36			
Plastic Limit		18			
Plasticity Index		18			
Failure Sketch					

Project: DYNEGY EDWARDS
Location: BARTONVILLE, IL
Project No.: MR155199
Boring No.: EDW-002 S10
Sample Type: 3.0'' ST
Description: GRAY LEAN CLAY WITH SAND CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Mon, 16-NOV-2015 21:50:26

UNCONFINED COMPRESSION TEST

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Project: DYNEGY EDWARDS
Boring No.: EDW-002 S10
Sample No.: S-10
Test No.: EDW-002 S10

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/17/15
Sample Type: 3.0" ST

Project No.: MR155199
Checked By: WPQ
Depth: 35.0'-37.0'
Elevation: -----

Soil Description: GRAY LEAN CLAY WITH SAND CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

Specimen Height: 5.96 in
Specimen Area: 6.21 in^2
Specimen Volume: 37.00 in^3

Liquid Limit: 36
Plastic Limit: 18
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2096	0	0
2	0.25007	0.0091325	0.15326	4.8253	6.2191	0.055864	0.027932
3	0.50007	0.020663	0.34678	6.7659	6.2312	0.078179	0.039089
4	0.75007	0.032286	0.54184	8.3394	6.2434	0.096171	0.048086
5	1.0001	0.043725	0.73381	9.808	6.2555	0.11289	0.056444
6	1.2501	0.055348	0.92887	10.962	6.2678	0.12592	0.062961
7	1.5001	0.066879	1.1224	12.221	6.2801	0.14011	0.070054
8	1.7501	0.078318	1.3144	13.27	6.2923	0.15184	0.075919
9	2.0001	0.089941	1.5094	14.109	6.3047	0.16112	0.080561
10	2.5001	0.11346	1.9042	15.84	6.3301	0.18016	0.090082
11	3.0001	0.13708	2.3005	17.256	6.3558	0.19548	0.097739
12	3.5001	0.1606	2.6953	18.462	6.3816	0.2083	0.10415
13	4.0001	0.18413	3.09	19.564	6.4076	0.21983	0.10991
14	4.5001	0.20756	3.4833	20.56	6.4337	0.23009	0.11504
15	5.0001	0.23108	3.878	21.347	6.4601	0.23792	0.11896
16	5.5001	0.2546	4.2728	22.029	6.4867	0.24451	0.12225
17	6.0001	0.27822	4.6691	22.71	6.5137	0.25103	0.12552
18	6.5001	0.30183	5.0654	23.287	6.5409	0.25634	0.12817
19	7.0001	0.32536	5.4602	23.759	6.5682	0.26045	0.13022
20	7.5001	0.34897	5.8565	24.179	6.5959	0.26394	0.13197
21	8.0001	0.37249	6.2513	24.546	6.6236	0.26682	0.13341
22	8.5001	0.39602	6.6461	24.861	6.6517	0.2691	0.13455
23	9.0001	0.41972	7.0439	25.228	6.6801	0.27191	0.13596
24	9.5001	0.44343	7.4418	25.438	6.7088	0.273	0.1365
25	10	0.46686	7.835	25.543	6.7375	0.27296	0.13648
26	10.5	0.49039	8.2298	25.7	6.7664	0.27347	0.13673
27	11	0.51372	8.6215	25.7	6.7954	0.2723	0.13615
28	11.5	0.53734	9.0178	25.7	6.825	0.27112	0.13556
29	12	0.56114	9.4172	25.753	6.8551	0.27048	0.13524
30	12.5	0.58503	9.8182	25.7	6.8856	0.26873	0.13437
31	13	0.60874	10.216	25.7	6.9161	0.26755	0.13377
32	13.5	0.63235	10.612	25.648	6.9468	0.26582	0.13291
33	14	0.65588	11.007	25.595	6.9776	0.26411	0.13205
34	14.5	0.67912	11.397	25.543	7.0083	0.26241	0.13121
35	15	0.70274	11.794	25.595	7.0398	0.26178	0.13089
36	15.5	0.72654	12.193	25.7	7.0718	0.26166	0.13083
37	16	0.75043	12.594	25.49	7.1043	0.25834	0.12917
38	16.5	0.77414	12.992	25.385	7.1368	0.2561	0.12805
39	17	0.79784	13.39	25.071	7.1696	0.25177	0.12589
40	17.5	0.82155	13.788	24.808	7.2026	0.24799	0.124
41	18	0.84517	14.184	24.651	7.2359	0.24529	0.12264
42	18.5	0.86887	14.582	24.546	7.2696	0.24311	0.12156
43	19	0.8924	14.976	24.599	7.3034	0.2425	0.12125

UNCONFINED COMPRESSION TEST REPORT

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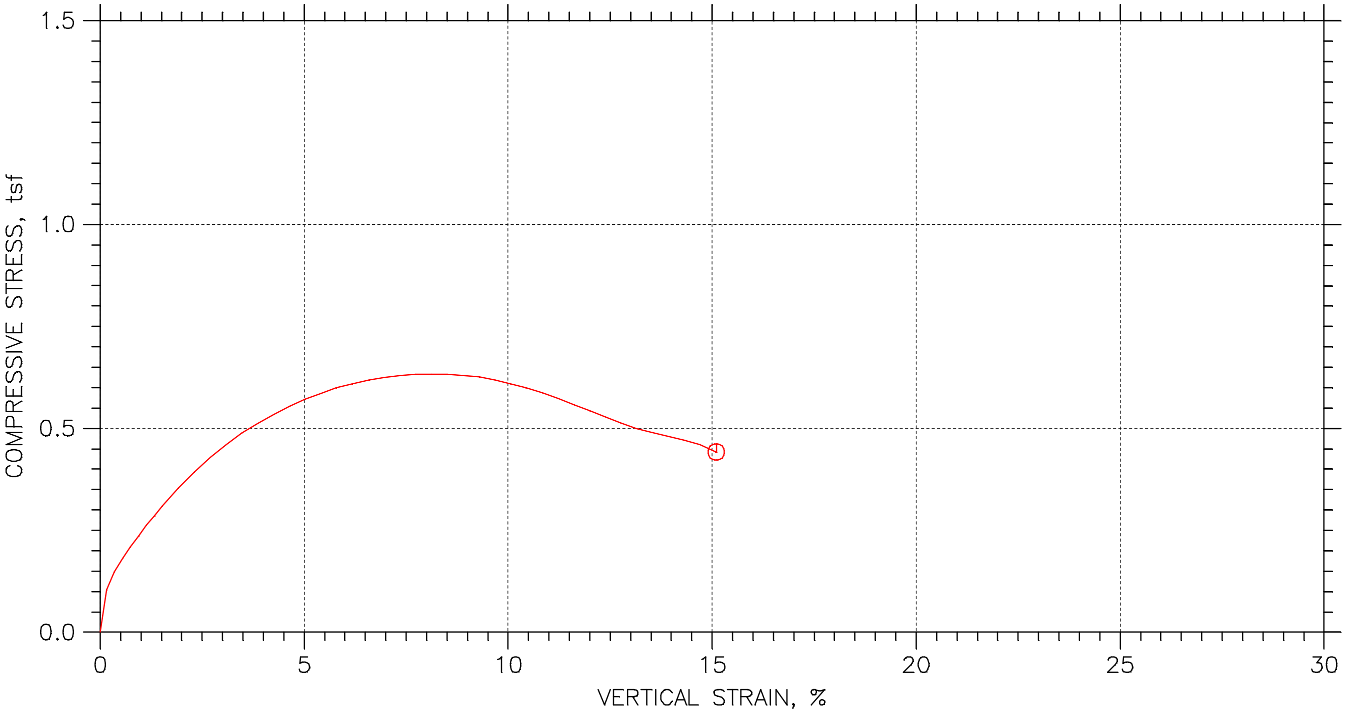

Symbol		⦶			
Test No.		EDWB003S12			
Initial	Diameter, in	2.8343			
	Height, in	6.0811			
	Water Content, %	41.57			
	Dry Density, pcf	79.31			
	Saturation, %	99.09			
	Void Ratio	1.141			
Unconfined Compressive Strength, tsf		0.63249			
Undrained Shear Strength, tsf		0.31624			
Time to Failure, min		10.504			
Strain Rate, %/min		1			
Estimated Specific Gravity		2.72			
Liquid Limit		51			
Plastic Limit		17			
Plasticity Index		34			
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW-003 S12

Sample Type: 3.0'' ST

Description: DARK GRAY FAT CLAY WITH SAND CH

Remarks: TEST PERFORMED AS PER ASTM D2166.

Mon, 16-NOV-2015 21:57:54

UNCONFINED COMPRESSION TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-003 S12
Sample No.: S-12
Test No.: EDWB003S12

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/13/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 45.0'-47.0'
Elevation: -----

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Consulting Engineers & Scientists

Soil Description: DARK GRAY FAT CLAY WITH SAND CH
Remarks: TEST PERFORMED AS PER ASTM D2166.

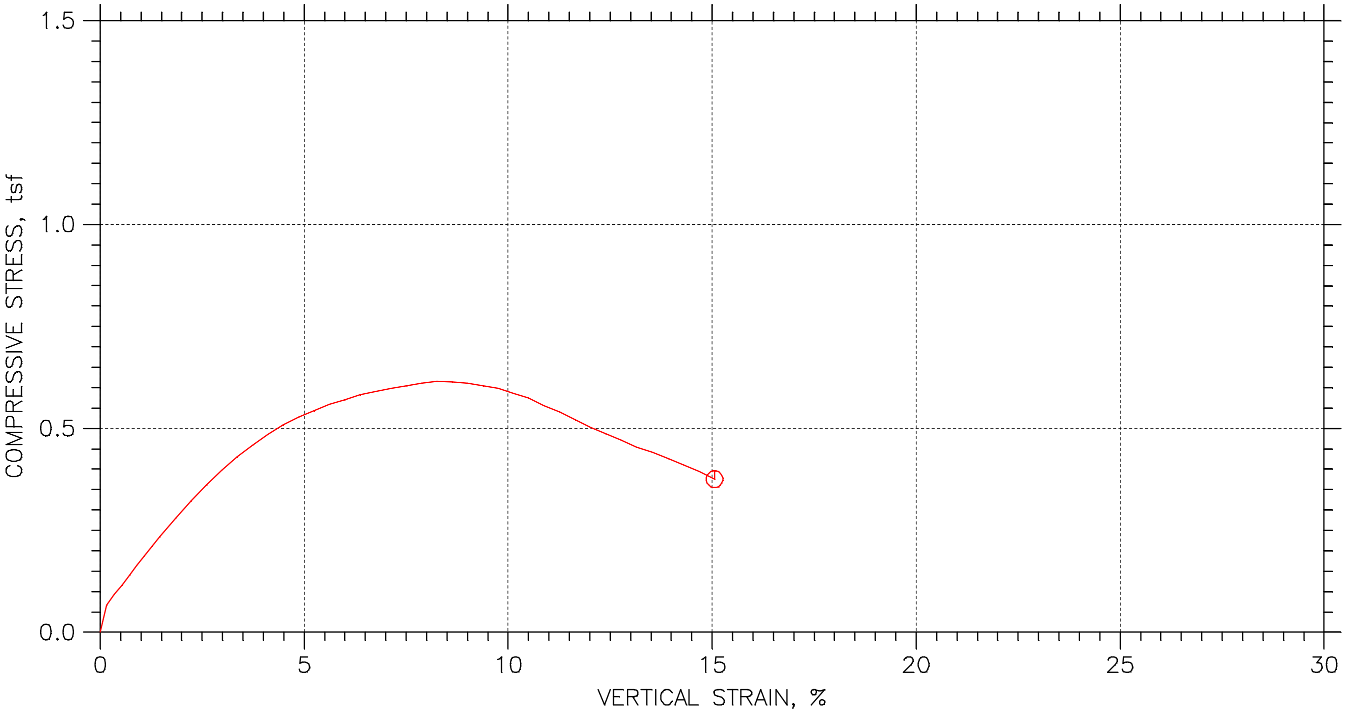
Specimen Height: 6.08 in
Specimen Area: 6.31 in^2
Specimen Volume: 38.37 in^3

Liquid Limit: 51
Plastic Limit: 17
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.3091	0	0
2	0.25402	0.0096859	0.15928	9.0737	6.3192	0.10339	0.051693
3	0.50402	0.021401	0.35193	13.007	6.3314	0.14792	0.07396
4	0.75402	0.033117	0.54458	15.945	6.3436	0.18097	0.090485
5	1.004	0.044924	0.73875	18.515	6.356	0.20973	0.10486
6	1.254	0.056824	0.93444	20.927	6.3686	0.23659	0.1183
7	1.504	0.068816	1.1316	23.235	6.3813	0.26216	0.13108
8	1.754	0.080808	1.3288	25.385	6.3941	0.28585	0.14293
9	2.004	0.092893	1.5276	27.536	6.407	0.30944	0.15472
10	2.504	0.11678	1.9205	31.522	6.4326	0.35282	0.17641
11	3.004	0.14058	2.3118	35.246	6.4584	0.39293	0.19646
12	3.504	0.1642	2.7002	38.55	6.4842	0.42806	0.21403
13	4.004	0.18754	3.084	41.592	6.5099	0.46002	0.23001
14	4.504	0.21115	3.4723	44.319	6.536	0.48822	0.24411
15	5.004	0.23505	3.8652	46.732	6.5628	0.5127	0.25635
16	5.504	0.25885	4.2565	48.935	6.5896	0.53468	0.26734
17	6.004	0.28246	4.6449	50.981	6.6164	0.55477	0.27739
18	6.504	0.30571	5.0272	52.764	6.643	0.57188	0.28594
19	7.004	0.32905	5.4109	54.285	6.67	0.58598	0.29299
20	7.504	0.35248	5.7962	55.753	6.6973	0.59938	0.29969
21	8.0041	0.37637	6.1891	56.96	6.7253	0.6098	0.3049
22	8.5041	0.40026	6.582	58.061	6.7536	0.61899	0.30949
23	9.0041	0.42388	6.9704	58.848	6.7818	0.62477	0.31238
24	9.5041	0.44721	7.3542	59.53	6.8099	0.6294	0.3147
25	10.004	0.47018	7.7319	60.054	6.8378	0.63235	0.31618
26	10.504	0.49343	8.1141	60.316	6.8662	0.63249	0.31624
27	11.004	0.51723	8.5055	60.526	6.8956	0.63198	0.31599
28	11.504	0.54121	8.8999	60.631	6.9255	0.63035	0.31517
29	12.004	0.56511	9.2928	60.474	6.9554	0.626	0.313
30	12.504	0.58835	9.6751	60.002	6.9849	0.6185	0.30925
31	13.004	0.61151	10.056	59.372	7.0145	0.60943	0.30471
32	13.504	0.63484	10.44	58.691	7.0445	0.59986	0.29993
33	14.004	0.65874	10.833	57.746	7.0756	0.58762	0.29381
34	14.504	0.68281	11.228	56.593	7.1071	0.57332	0.28666
35	15.004	0.70689	11.624	55.334	7.1389	0.55807	0.27904
36	15.504	0.73023	12.008	54.127	7.1701	0.54353	0.27177
37	16.004	0.7532	12.386	52.816	7.201	0.52809	0.26404
38	16.504	0.77598	12.761	51.505	7.2319	0.51278	0.25639
39	17.004	0.79904	13.14	50.456	7.2635	0.50015	0.25007
40	17.504	0.82266	13.528	49.669	7.2961	0.49015	0.24507
41	18.004	0.84637	13.918	48.987	7.3292	0.48124	0.24062
42	18.504	0.86998	14.306	48.201	7.3624	0.47138	0.23569
43	19.004	0.89341	14.692	47.257	7.3956	0.46007	0.23003
44	19.504	0.91666	15.074	45.736	7.4289	0.44326	0.22163
45	19.538	0.91823	15.1	45.631	7.4312	0.44211	0.22106

UNCONFINED COMPRESSION TEST REPORT



Symbol		①			
Test No.		EDWB004S11			
Initial	Diameter, in	2.8217			
	Height, in	6.2535			
	Water Content, %	19.25			
	Dry Density, pcf	111.4			
	Saturation, %	99.83			
	Void Ratio	0.52451			
Unconfined Compressive Strength, tsf		0.61504			
Undrained Shear Strength, tsf		0.30752			
Time to Failure, min		11.004			
Strain Rate, %/min		1			
Estimated Specific Gravity		2.72			
Liquid Limit		35			
Plastic Limit		17			
Plasticity Index		18			
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW-004 S11

Sample Type: 3.0'' ST

Description: BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND CL

Remarks: TEST PERFORMED AS PER ASTM D 2166.

UNCONFINED COMPRESSION TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-004 S11
Sample No.: S-11
Test No.: EDWB004S11

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/13/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 36.0'-38.0'
Elevation: -----

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Consulting Engineers & Scientists

Soil Description: BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND CL
Remarks: TEST PERFORMED AS PER ASTM D 2166.

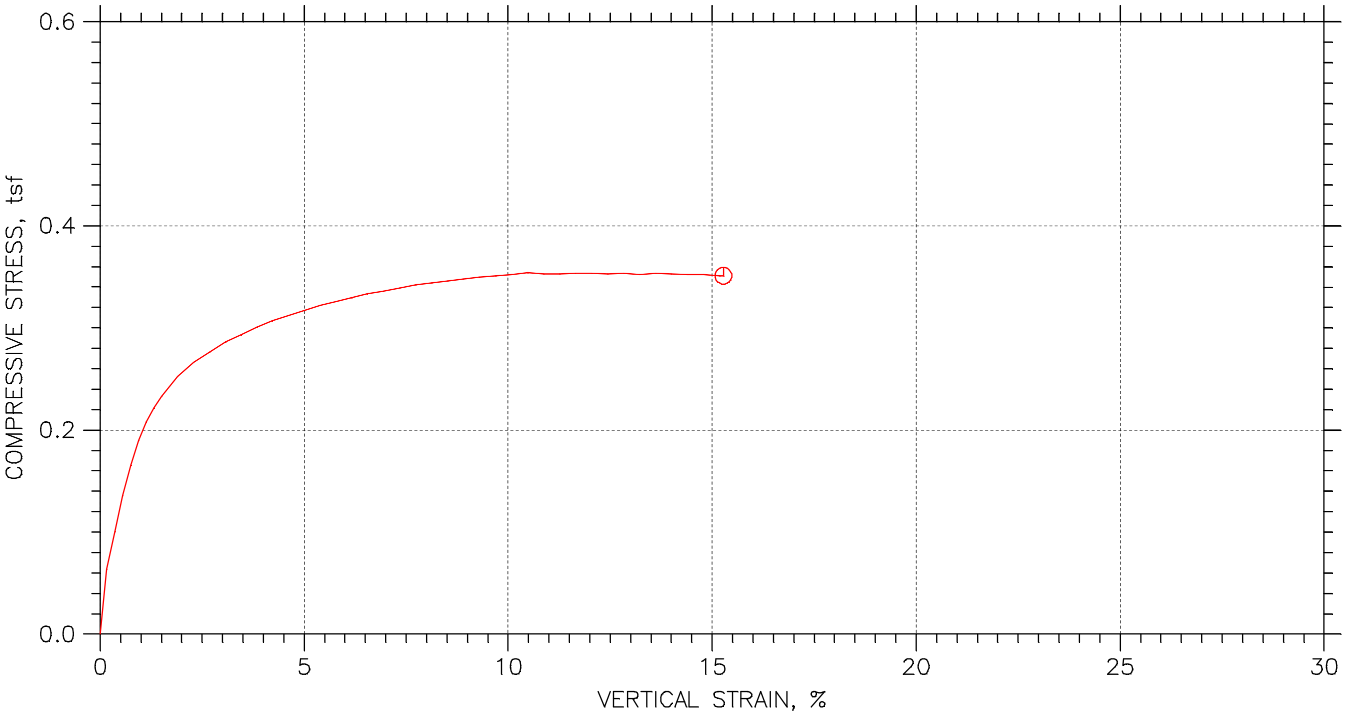
Specimen Height: 6.25 in
Specimen Area: 6.25 in^2
Specimen Volume: 39.10 in^3

Liquid Limit: 35
Plastic Limit: 17
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2531	0	0
2	0.25398	0.0096859	0.15489	5.717	6.2628	0.065724	0.032862
3	0.50398	0.021494	0.3437	8.0772	6.2747	0.092683	0.046341
4	0.75398	0.033117	0.52957	10.07	6.2864	0.11534	0.057668
5	1.004	0.04474	0.71543	12.221	6.2982	0.1397	0.069852
6	1.254	0.056363	0.9013	14.319	6.31	0.16338	0.081691
7	1.504	0.068078	1.0886	16.469	6.322	0.18756	0.093782
8	1.754	0.079701	1.2745	18.567	6.3339	0.21106	0.10553
9	2.004	0.091601	1.4648	20.665	6.3461	0.23446	0.11723
10	2.504	0.1154	1.8454	24.808	6.3707	0.28038	0.14019
11	3.004	0.13929	2.2274	28.637	6.3956	0.32239	0.1612
12	3.504	0.16291	2.6051	32.256	6.4204	0.36173	0.18087
13	4.004	0.18652	2.9827	35.56	6.4454	0.39724	0.19862
14	4.504	0.20977	3.3544	38.707	6.4702	0.43074	0.21537
15	5.004	0.2332	3.7291	41.382	6.4953	0.45872	0.22936
16	5.504	0.257	4.1097	43.952	6.5211	0.48528	0.24264
17	6.004	0.2808	4.4903	46.313	6.5471	0.50931	0.25465
18	6.504	0.30442	4.8679	48.201	6.5731	0.52798	0.26399
19	7.004	0.32794	5.244	49.827	6.5992	0.54363	0.27182
20	7.504	0.35128	5.6172	51.4	6.6253	0.55859	0.27929
21	8.004	0.37462	5.9904	52.606	6.6516	0.56944	0.28472
22	8.504	0.39832	6.3696	53.97	6.6785	0.58184	0.29092
23	9.004	0.42221	6.7516	55.019	6.7059	0.59073	0.29537
24	9.504	0.44601	7.1322	55.911	6.7334	0.59785	0.29893
25	10.004	0.46945	7.5069	56.802	6.7606	0.60494	0.30247
26	10.504	0.4926	7.8771	57.537	6.7878	0.61031	0.30515
27	11.004	0.51594	8.2503	58.219	6.8154	0.61504	0.30752
28	11.504	0.53928	8.6235	58.323	6.8433	0.61364	0.30682
29	12.004	0.56298	9.0026	58.323	6.8718	0.61109	0.30555
30	12.504	0.58678	9.3832	58.009	6.9006	0.60525	0.30263
31	13.004	0.6104	9.7608	57.537	6.9295	0.59783	0.29891
32	13.504	0.63355	10.131	56.593	6.9581	0.5856	0.2928
33	14.004	0.65671	10.501	55.701	6.9868	0.574	0.287
34	14.504	0.68014	10.876	54.18	7.0162	0.55599	0.278
35	15.004	0.70394	11.257	52.869	7.0463	0.54022	0.27011
36	15.504	0.72783	11.639	51.295	7.0768	0.52188	0.26094
37	16.004	0.75163	12.019	49.669	7.1074	0.50317	0.25158
38	16.504	0.77515	12.395	48.306	7.1379	0.48726	0.24363
39	17.004	0.79867	12.772	46.889	7.1687	0.47094	0.23547
40	17.504	0.82229	13.149	45.368	7.1998	0.45369	0.22685
41	18.004	0.84655	13.537	44.319	7.2322	0.44122	0.22061
42	18.504	0.87081	13.925	43.008	7.2648	0.42625	0.21312
43	19.004	0.89489	14.31	41.592	7.2974	0.41037	0.20519
44	19.504	0.91832	14.685	40.071	7.3294	0.39363	0.19682
45	20.004	0.94157	15.057	38.393	7.3615	0.3755	0.18775

UNCONFINED COMPRESSION TEST REPORT



Symbol		⦶			
Test No.		EDWB008S5			
Initial	Diameter, in	2.8047			
	Height, in	6.0665			
	Water Content, %	33.59			
	Dry Density, pcf	88.9			
	Saturation, %	100.40			
	Void Ratio	0.91009			
Unconfined Compressive Strength, tsf		0.35399			
Undrained Shear Strength, tsf		0.177			
Time to Failure, min		13.504			
Strain Rate, %/min		1			
Estimated Specific Gravity		2.72			
Liquid Limit		52			
Plastic Limit		19			
Plasticity Index		33			
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW-008 S5

Sample Type: 3.0'' ST

Description: BROWN AND GRAY FAT CLAY WITH SAND CH

Remarks: TEST PERFORMED AS PER ASTM D2166.

Mon, 16-NOV-2015 22:08:24

UNCONFINED COMPRESSION TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-008 S5
Sample No.: S-5
Test No.: EDWB008S5

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/13/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 11.0'-13.0'
Elevation: -----

Terracon
Consulting Engineers & Scientists

Soil Description: BROWN AND GRAY FAT CLAY WITH SAND CH
Remarks: TEST PERFORMED AS PER ASTM D2166.

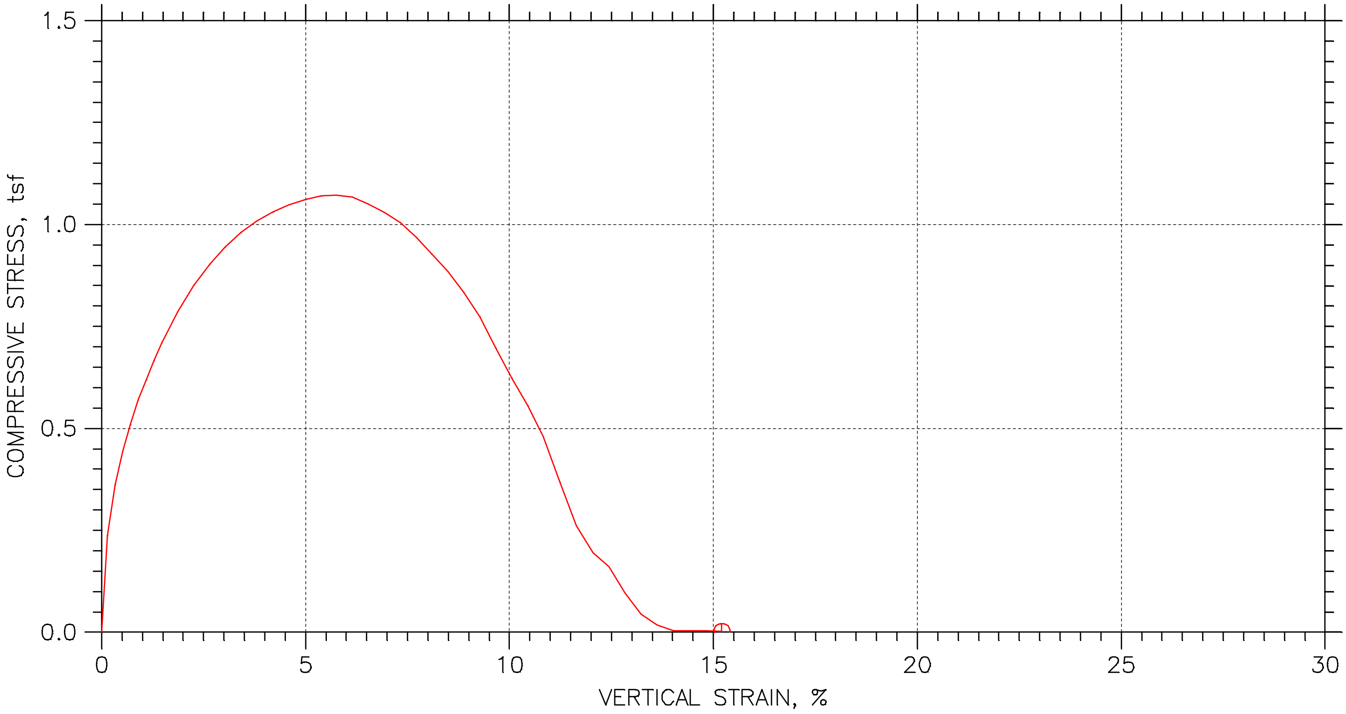
Specimen Height: 6.07 in
Specimen Area: 6.18 in^2
Specimen Volume: 37.48 in^3

Liquid Limit: 52
Plastic Limit: 19
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.1783	0	0
2	0.254	0.0097782	0.16118	5.4547	6.1883	0.063465	0.031732
3	0.504	0.021678	0.35734	8.6541	6.2005	0.10049	0.050246
4	0.754	0.033578	0.55349	11.696	6.2127	0.13555	0.067774
5	1.004	0.045293	0.74661	14.319	6.2248	0.16562	0.082809
6	1.254	0.057009	0.93972	16.417	6.2369	0.18952	0.094758
7	1.504	0.068632	1.1313	18.042	6.249	0.20788	0.10394
8	1.754	0.080255	1.3229	19.301	6.2611	0.22195	0.11098
9	2.004	0.091878	1.5145	20.298	6.2733	0.23296	0.11648
10	2.504	0.11512	1.8977	22.081	6.2978	0.25244	0.12622
11	3.004	0.13865	2.2854	23.392	6.3228	0.26638	0.13319
12	3.504	0.16245	2.6778	24.389	6.3483	0.27661	0.1383
13	4.004	0.18615	3.0685	25.333	6.3739	0.28616	0.14308
14	4.504	0.20949	3.4533	26.067	6.3993	0.29329	0.14664
15	5.004	0.23274	3.8364	26.854	6.4248	0.30094	0.15047
16	5.504	0.25608	4.2212	27.483	6.4506	0.30676	0.15338
17	6.004	0.27969	4.6104	28.06	6.4769	0.31193	0.15596
18	6.504	0.30368	5.0058	28.637	6.5039	0.31702	0.15851
19	7.004	0.32748	5.3981	29.214	6.5309	0.32207	0.16104
20	7.504	0.35091	5.7843	29.686	6.5576	0.32594	0.16297
21	8.004	0.37406	6.166	30.158	6.5843	0.32978	0.16489
22	8.504	0.39731	6.5492	30.63	6.6113	0.33358	0.16679
23	9.004	0.42092	6.9384	30.997	6.639	0.33617	0.16808
24	9.504	0.445	7.3353	31.417	6.6674	0.33927	0.16963
25	10.004	0.46917	7.7337	31.837	6.6962	0.34232	0.17116
26	10.504	0.49315	8.1291	32.151	6.725	0.34422	0.17211
27	11.004	0.51658	8.5153	32.466	6.7534	0.34613	0.17307
28	11.504	0.53992	8.9	32.781	6.7819	0.34802	0.17401
29	12.004	0.56363	9.2908	33.095	6.8111	0.34985	0.17492
30	12.504	0.5878	9.6892	33.358	6.8412	0.35107	0.17554
31	13.004	0.61206	10.089	33.62	6.8716	0.35227	0.17613
32	13.504	0.63614	10.486	33.935	6.9021	0.35399	0.177
33	14.004	0.65966	10.874	33.987	6.9321	0.35301	0.1765
34	14.504	0.68309	11.26	34.092	6.9623	0.35256	0.17628
35	15.004	0.70661	11.648	34.354	6.9928	0.35372	0.17686
36	15.504	0.7305	12.042	34.459	7.0241	0.35322	0.17661
37	16.004	0.75467	12.44	34.564	7.0561	0.35269	0.17634
38	16.504	0.77875	12.837	34.774	7.0882	0.35322	0.17661
39	17.004	0.80255	13.229	34.826	7.1203	0.35216	0.17608
40	17.504	0.8258	13.612	35.088	7.1518	0.35325	0.17662
41	18.004	0.84923	13.999	35.193	7.184	0.35272	0.17636
42	18.504	0.87293	14.389	35.298	7.2168	0.35216	0.17608
43	19.004	0.89719	14.789	35.456	7.2506	0.35208	0.17604
44	19.504	0.92127	15.186	35.508	7.2846	0.35096	0.17548
45	19.621	0.92671	15.276	35.56	7.2923	0.35111	0.17555

UNCONFINED COMPRESSION TEST REPORT



Symbol		⦶			
Test No.		EDWB015S12			
Initial	Diameter, in	2.8217			
	Height, in	6.061			
	Water Content, %	41.01			
	Dry Density, pcf	79.76			
	Saturation, %	98.82			
	Void Ratio	1.1289			
Unconfined Compressive Strength, tsf		1.0722			
Undrained Shear Strength, tsf		0.53609			
Time to Failure, min		7.5002			
Strain Rate, %/min		1			
Estimated Specific Gravity		2.72			
Liquid Limit		66			
Plastic Limit		23			
Plasticity Index		43			
Failure Sketch					

Project: DYNEGY EDWARDS

Location: BARTONVILLE, IL

Project No.: MR155218

Boring No.: EDW-015 S12

Sample Type: 3.0'' ST

Description: DARK GRAY FAT CLAY CH

Remarks: TEST PERFORMED AS PER ASTM D 2166.

Mon, 16-NOV-2015 22:13:27

UNCONFINED COMPRESSION TEST

Project: DYNEGY EDWARDS
Boring No.: EDW-015 S12
Sample No.: S-12
Test No.: EDWB015S12

Location: BARTONVILLE, IL
Tested By: BCM
Test Date: 11/13/15
Sample Type: 3.0" ST

Project No.: MR155218
Checked By: WPQ
Depth: 37.0'-39.0'
Elevation: -----

Terracon
Consulting Engineers & Scientists

Soil Description: DARK GRAY FAT CLAY CH
Remarks: TEST PERFORMED AS PER ASTM D 2166.

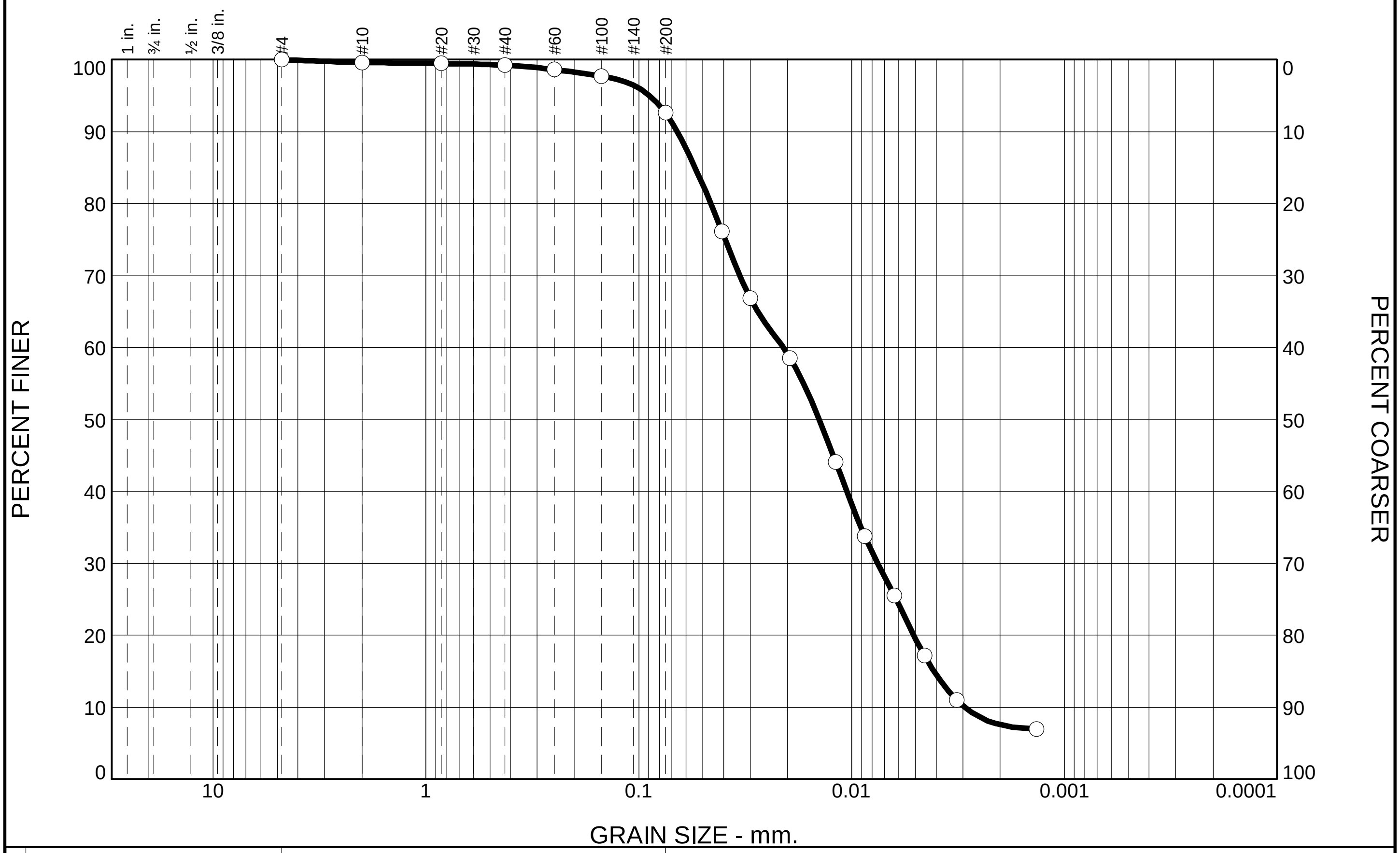
Specimen Height: 6.06 in
Specimen Area: 6.25 in^2
Specimen Volume: 37.90 in^3

Liquid Limit: 66
Plastic Limit: 23
Estimated Specific Gravity: 2.72

Cap Mass: 0 gm

	Time min	Axial Displacement in	Axial Strain %	Load lb	Corrected Area in^2	Vertical Stress tsf	Shear Stress tsf
1	0	0	0	0	6.2531	0	0
2	0.25015	0.0088557	0.14611	20.683	6.2623	0.2378	0.1189
3	0.50015	0.02011	0.33179	31.44	6.2739	0.3608	0.1804
4	0.75015	0.031548	0.52051	38.87	6.2858	0.44523	0.22261
5	1.0002	0.042987	0.70924	44.692	6.2978	0.51094	0.25547
6	1.2502	0.05461	0.90101	49.96	6.31	0.57006	0.28503
7	1.5002	0.066141	1.0913	54.506	6.3221	0.62075	0.31038
8	1.7502	0.077949	1.2861	58.665	6.3346	0.6668	0.3334
9	2.0002	0.089664	1.4794	62.547	6.347	0.70952	0.35476
10	2.5002	0.11346	1.872	69.644	6.3724	0.78689	0.39344
11	3.0002	0.13726	2.2647	75.633	6.398	0.85113	0.42556
12	3.5002	0.16069	2.6513	80.512	6.4234	0.90246	0.45123
13	4.0002	0.18385	3.0333	84.615	6.4487	0.94473	0.47236
14	4.5002	0.20728	3.4199	88.164	6.4745	0.98043	0.49021
15	5.0002	0.23089	3.8095	91.158	6.5008	1.0096	0.50482
16	5.5002	0.25497	4.2067	93.543	6.5277	1.0318	0.51588
17	6.0002	0.27905	4.604	95.428	6.5549	1.0482	0.5241
18	6.5002	0.30266	4.9936	96.98	6.5818	1.0609	0.53045
19	7.0002	0.32582	5.3756	98.2	6.6084	1.0699	0.53496
20	7.5002	0.34915	5.7607	98.81	6.6354	1.0722	0.53609
21	8.0002	0.37277	6.1503	98.755	6.6629	1.0672	0.53358
22	8.5002	0.39685	6.5475	97.535	6.6912	1.0495	0.52475
23	9.0002	0.42074	6.9417	96.149	6.7196	1.0302	0.51511
24	9.5002	0.44445	7.3329	94.097	6.7479	1.004	0.502
25	10	0.46769	7.7164	91.214	6.776	0.96922	0.48461
26	10.5	0.49085	8.0984	87.72	6.8042	0.92824	0.46412
27	11	0.51428	8.485	84.061	6.8329	0.88577	0.44289
28	11.5	0.53798	8.8761	79.514	6.8622	0.83428	0.41714
29	12	0.56215	9.2749	74.135	6.8924	0.77444	0.38722
30	12.5	0.58614	9.6706	67.093	6.9226	0.69782	0.34891
31	13	0.60966	10.059	60.162	6.9525	0.62304	0.31152
32	13.5	0.63291	10.442	53.897	6.9822	0.55578	0.27789
33	14	0.65652	10.832	46.854	7.0127	0.48106	0.24053
34	14.5	0.6806	11.229	36.153	7.0441	0.36953	0.18476
35	15	0.70532	11.637	25.617	7.0766	0.26064	0.13032
36	15.5	0.72986	12.042	19.296	7.1092	0.19543	0.097714
37	16	0.75366	12.435	15.969	7.1411	0.16101	0.080505
38	16.5	0.77773	12.832	9.5372	7.1736	0.095723	0.047862
39	17	0.80181	13.229	4.3805	7.2065	0.043765	0.021883
40	17.5	0.82543	13.619	1.7744	7.239	0.017648	0.0088241
41	18	0.8496	14.017	0.44359	7.2725	0.0043917	0.0021958
42	18.5	0.87404	14.421	0.38814	7.3068	0.0038247	0.0019123
43	19	0.89802	14.816	0.33269	7.3408	0.0032632	0.0016316
44	19.5	0.92164	15.206	0.16635	7.3745	0.0016241	0.00081206

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	0.4	6.6	73.1	19.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	99.5		
#40	99.2		
#60	98.6		
#100	97.7		
#200	92.6		

* (no specification provided)

DARK GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0659 D_{85}= 0.0543 D_{60}= 0.0210
D_{50}= 0.0142 D_{30}= 0.0075 D_{15}= 0.0041
D_{10}= 0.0029 C_u= 7.16 C_c= 0.92

Classification

USCS= AASHTO=

Remarks

F.M.=0.05

Source of Sample: EDW-B002 **Depth:** 7.5'-10.0'
Sample Number: S-4 **Date:** 11-5-15

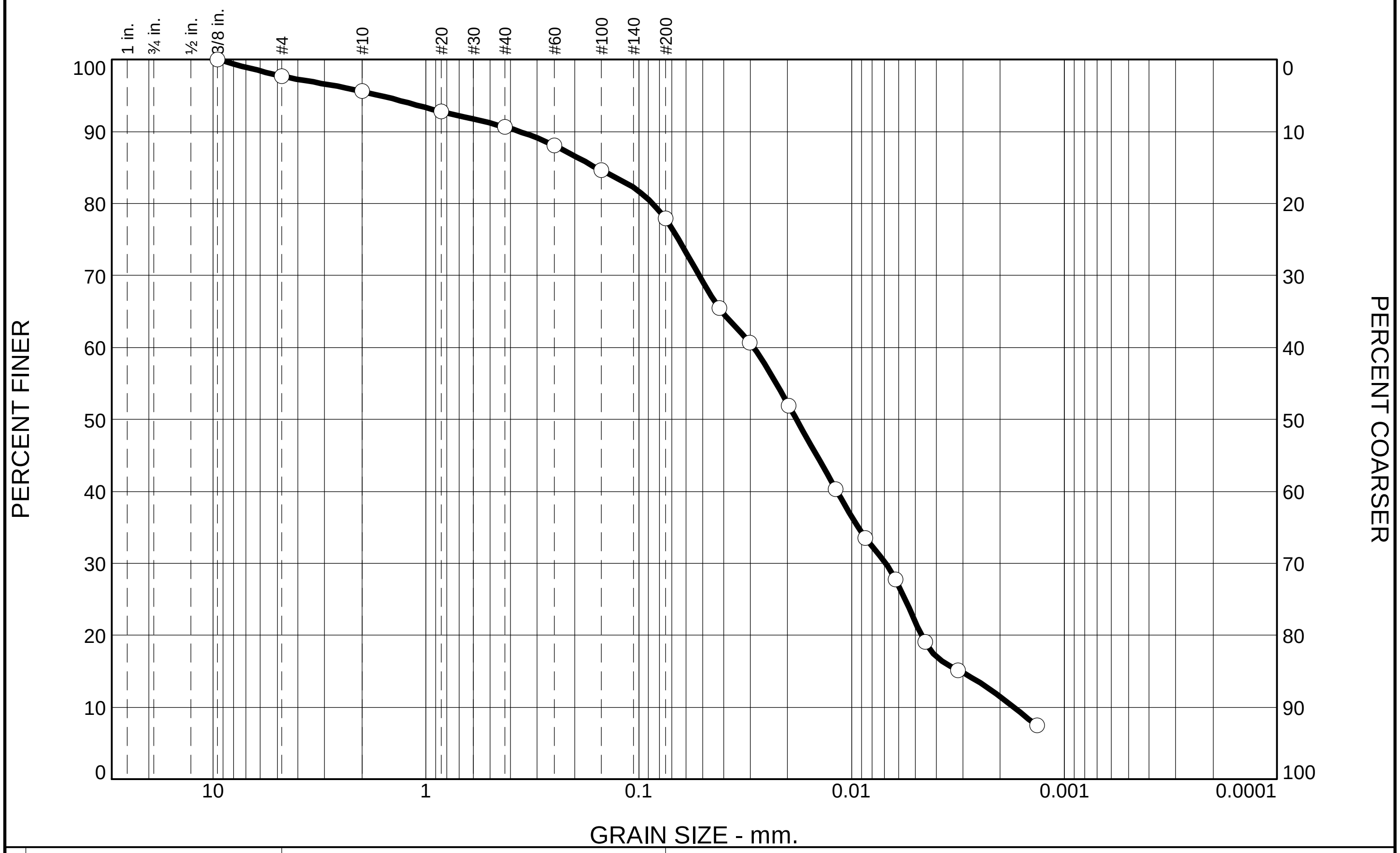
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.3	2.1	5.0	12.7	56.3	21.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	97.7		
#10	95.6		
#20	92.8		
#40	90.6		
#60	88.1		
#100	84.6		
#200	77.9		

* (no specification provided)

FILL: DARK GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3632 D_{85}= 0.1593 D_{60}= 0.0290

D_{50}= 0.0181 D_{30}= 0.0069 D_{15}= 0.0031

D_{10}= 0.0017 C_u= 16.81 C_c= 0.96

Classification

USCS= AASHTO=

Remarks

F.M.=0.47

Source of Sample: EDW-B003 **Depth:** 10.0'-11.5'
Sample Number: S-5

Date: 11-5-15

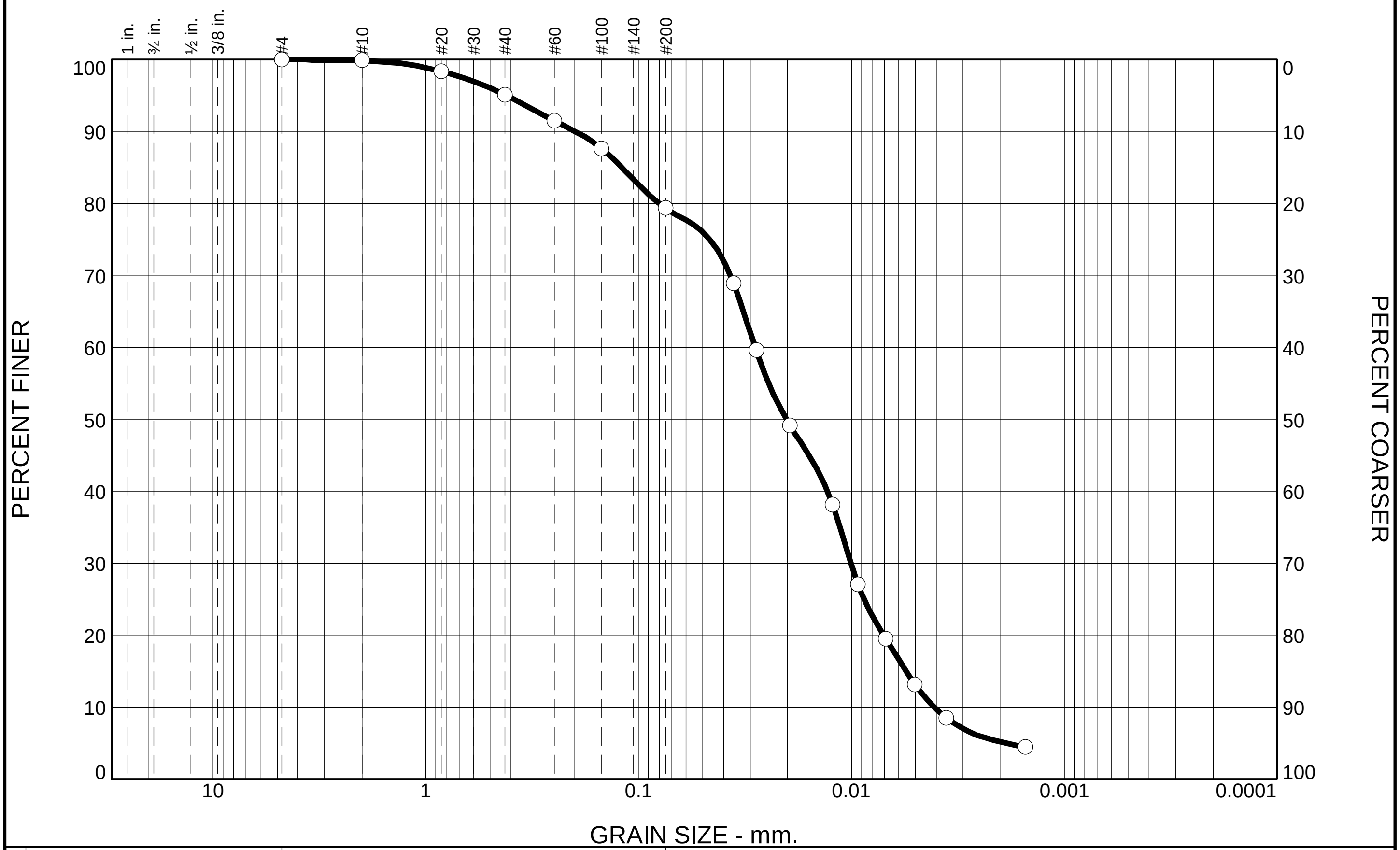
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	4.8	15.7	66.4	13.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	98.4		
#40	95.1		
#60	91.5		
#100	87.6		
#200	79.4		

* (no specification provided)

FILL: VERY DARK GRAY VARVED FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1981 D_{85}= 0.1202 D_{60}= 0.0284
D_{50}= 0.0203 D_{30}= 0.0101 D_{15}= 0.0056
D_{10}= 0.0041 C_u= 6.92 C_c= 0.87

Classification

USCS= AASHTO=

Remarks

F.M.=0.23

Source of Sample: EDW-B003 **Depth:** 30.0'-32.0'
Sample Number: S-9

Date: 11-5-15

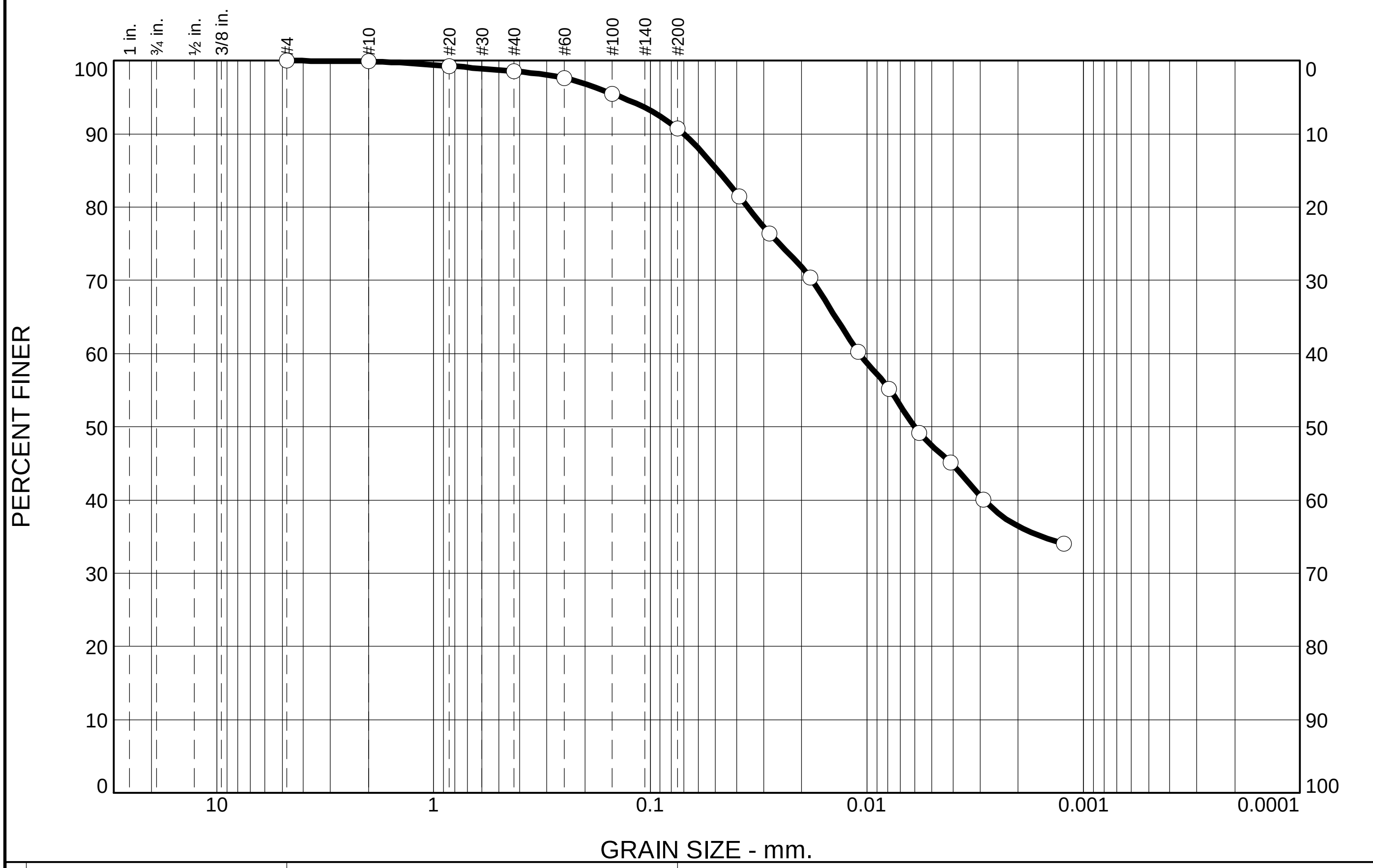
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.4	7.8	43.3	47.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.3		
#40	98.5		
#60	97.6		
#100	95.5		
#200	90.7		

* (no specification provided)

GRAY AND DARK GRAY LEAN CLAY WITH ORGANICS

Atterberg Limits

PL= 16 LL= 37 PI= 21

Coefficients

D_{90}= 0.0702 D_{85}= 0.0486 D_{60}= 0.0108
D_{50}= 0.0060 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(19)

Remarks

F.M.=0.08

Source of Sample: EDW-B004 **Depth:** 7.5'-9.0'
Sample Number: S-4

Date: 11-5-15

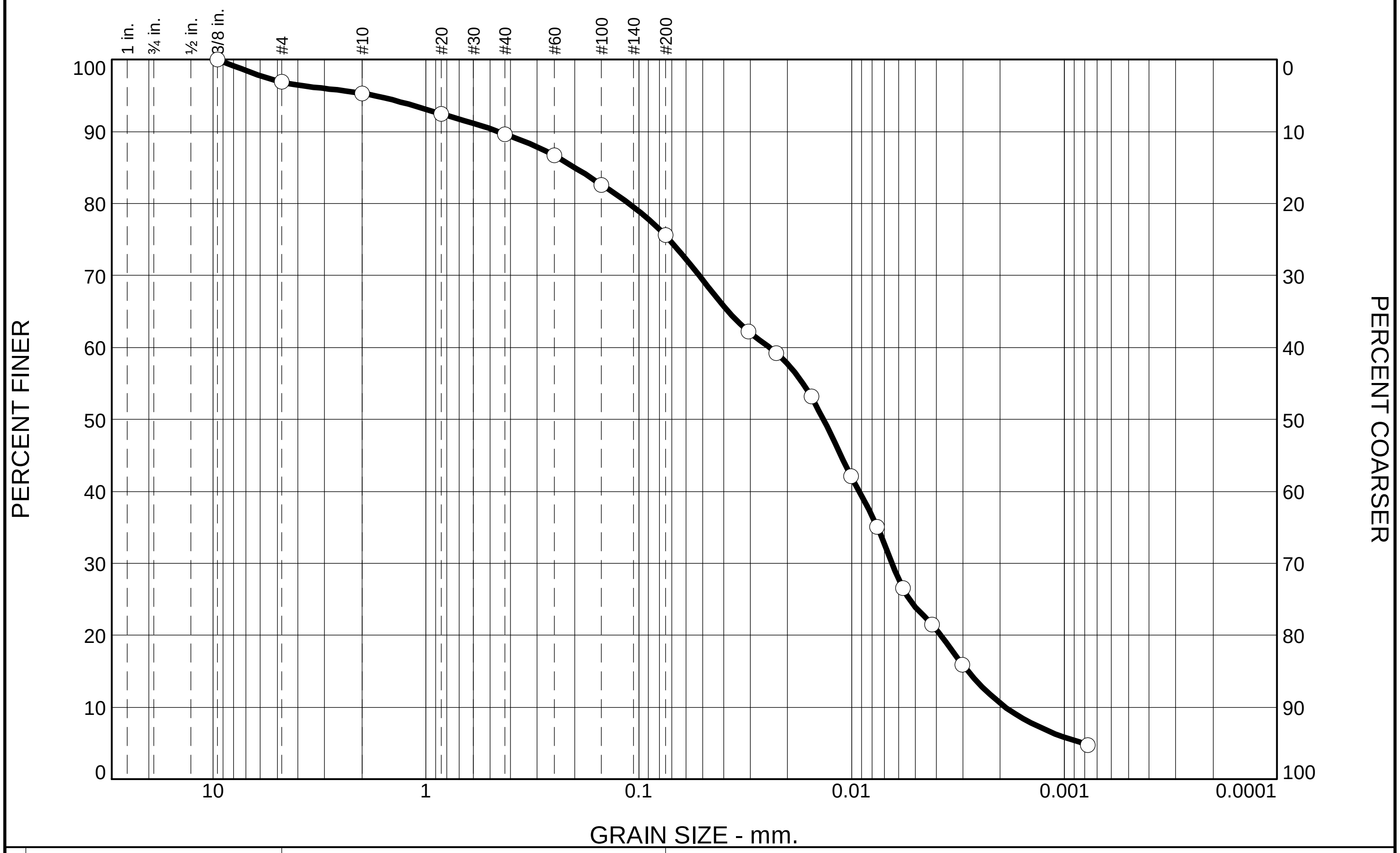
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	1.6	5.6	14.1	51.7	23.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	96.9		
#10	95.3		
#20	92.5		
#40	89.7		
#60	86.7		
#100	82.6		
#200	75.6		

* (no specification provided)

FILL: GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4580 D_{85}= 0.1999 D_{60}= 0.0244
D_{50}= 0.0136 D_{30}= 0.0065 D_{15}= 0.0028
D_{10}= 0.0019 C_u= 12.93 C_c= 0.91

Classification

USCS= AASHTO=

Remarks

F.M.=0.52

Source of Sample: EDW-B005 **Depth:** 20.0'-21.5'
Sample Number: S-7

Date: 11-13-15

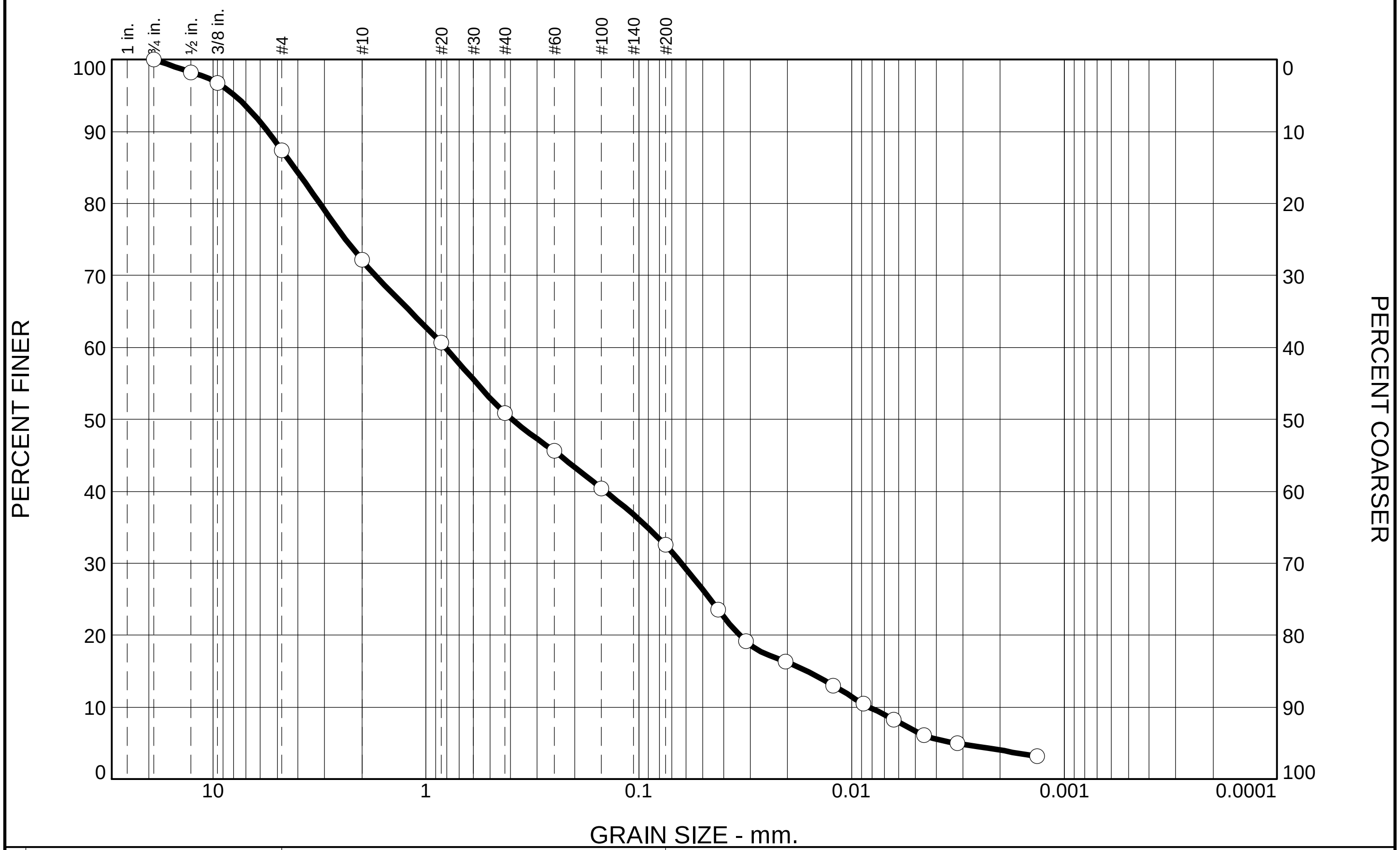
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.6	15.3	21.2	18.3	26.0	6.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.2		
.375	96.7		
#4	87.4		
#10	72.1		
#20	60.6		
#40	50.9		
#60	45.6		
#100	40.4		
#200	32.6		

* (no specification provided)

FILL: DARK BROWN AND DARK GRAY SAND WITH GRAVEL - FLY ASH NOTED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.5350 D_{85}= 4.1471 D_{60}= 0.8124
D_{50}= 0.3943 D_{30}= 0.0630 D_{15}= 0.0162
D_{10}= 0.0082 C_u= 98.50 C_c= 0.59

Classification

USCS= SP AASHTO=

Remarks

F.M.=2.33

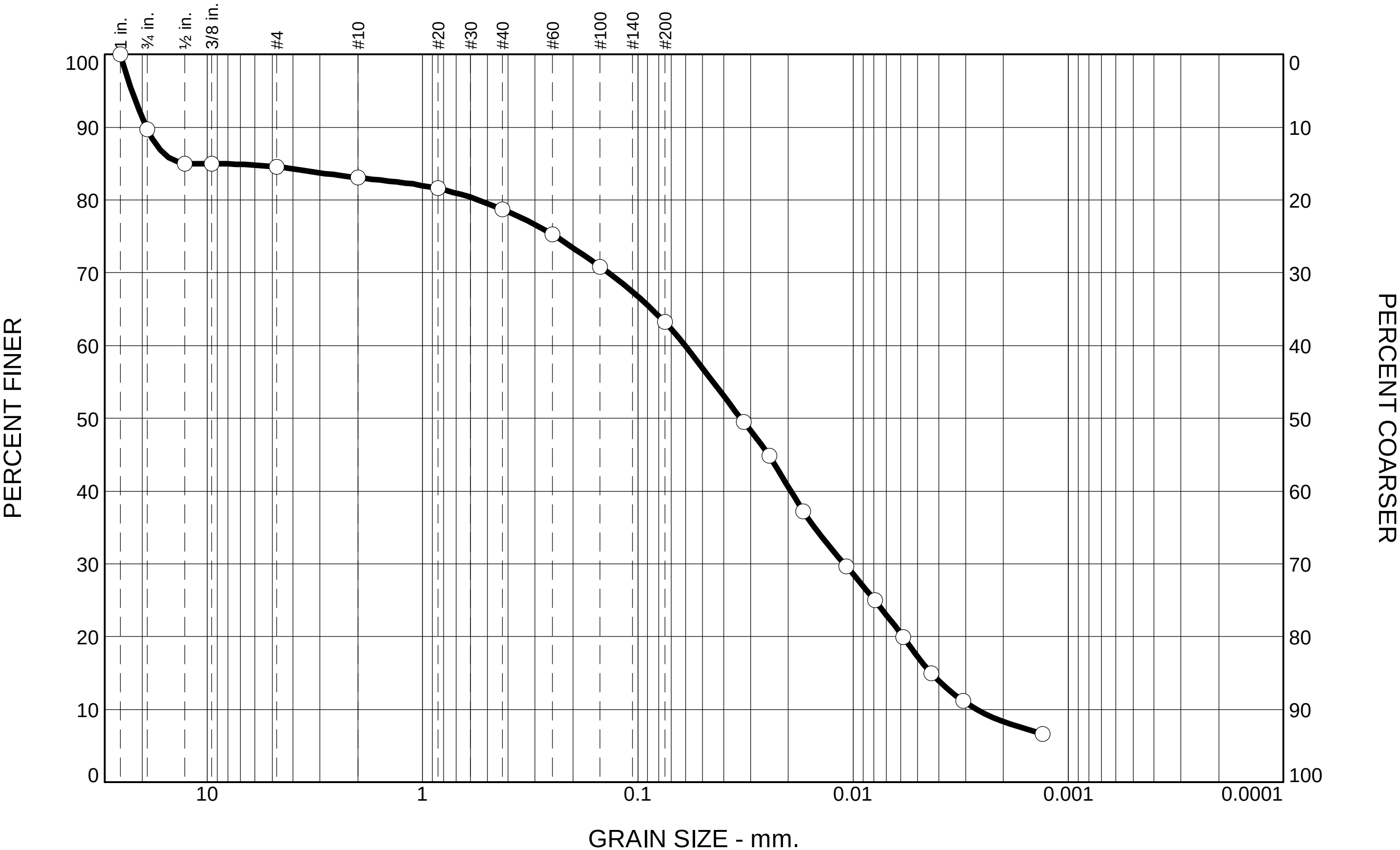
Source of Sample: EDW-B010 **Depth:** 5.0'-6.5'
Sample Number: S-3
Date: 11-5-15

Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE
Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.3	5.2	1.4	4.4	15.5	46.0	17.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	89.7		
.5	85.0		
.375	85.0		
#4	84.5		
#10	83.1		
#20	81.6		
#40	78.7		
#60	75.3		
#100	70.8		
#200	63.2		

* (no specification provided)

FILL: VERY DARK GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.2789 D_{85}= 8.9744 D_{60}= 0.0604
D_{50}= 0.0333 D_{30}= 0.0110 D_{15}= 0.0043
D_{10}= 0.0027 C_u= 22.70 C_c= 0.75

Classification

USCS= AASHTO=

Remarks

F.M.=1.47

Source of Sample: EDW-B011 **Depth:** 9.0'-11.0'
Sample Number: S-5

Date: 11-12-15

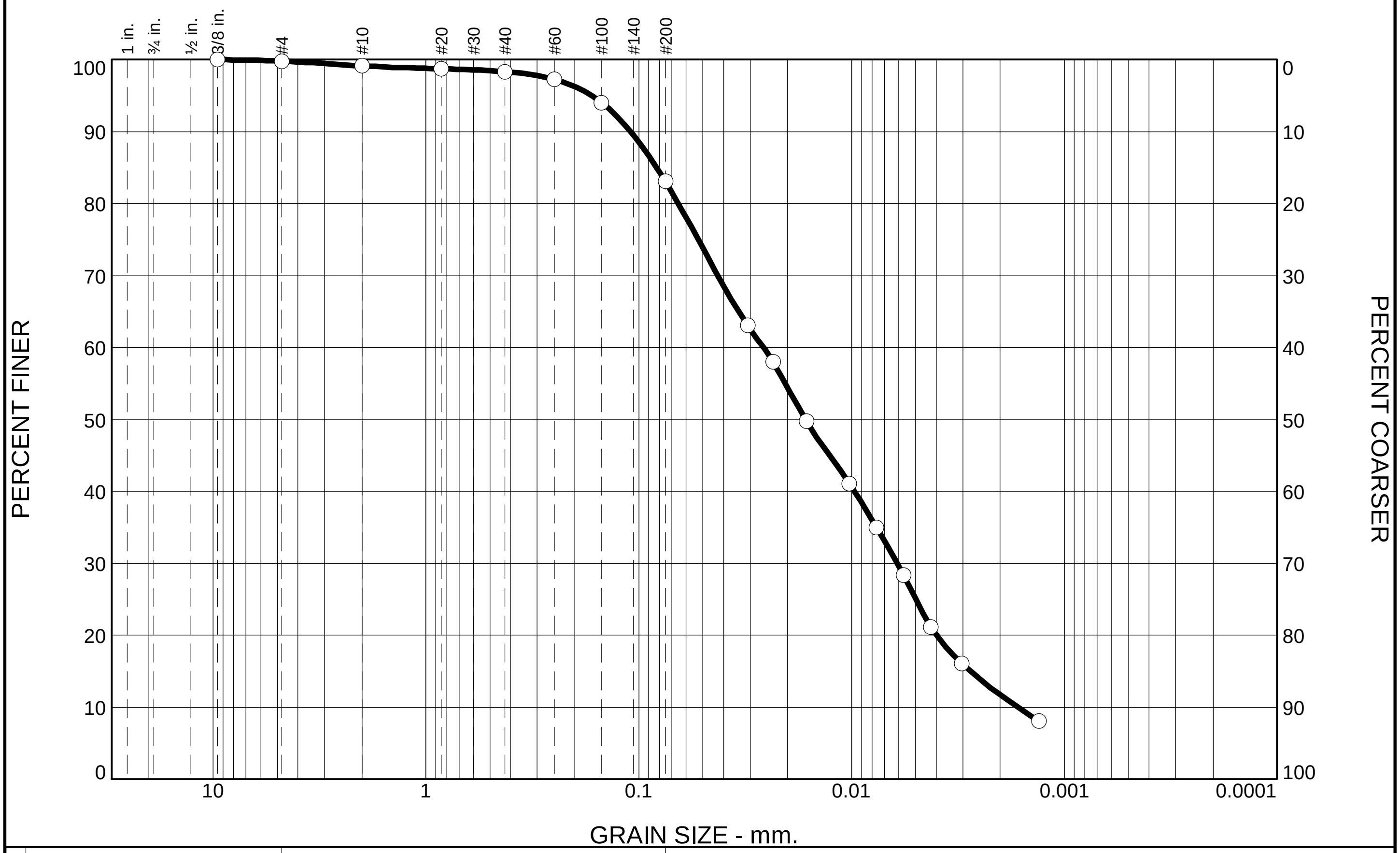
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



	% Gravel		% Sand			% Fines	
% +3"	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.7	0.8	15.2	58.0	25.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.8		
#10	99.1		
#20	98.7		
#40	98.3		
#60	97.3		
#100	94.0		
#200	83.1		

* (no specification provided)

FILL: GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1094 D_{85}= 0.0823 D_{60}= 0.0260
D_{50}= 0.0165 D_{30}= 0.0061 D_{15}= 0.0028
D_{10}= 0.0017 C_u= 15.75 C_c= 0.87

Classification

USCS= AASHTO=

Remarks

F.M.=0.12

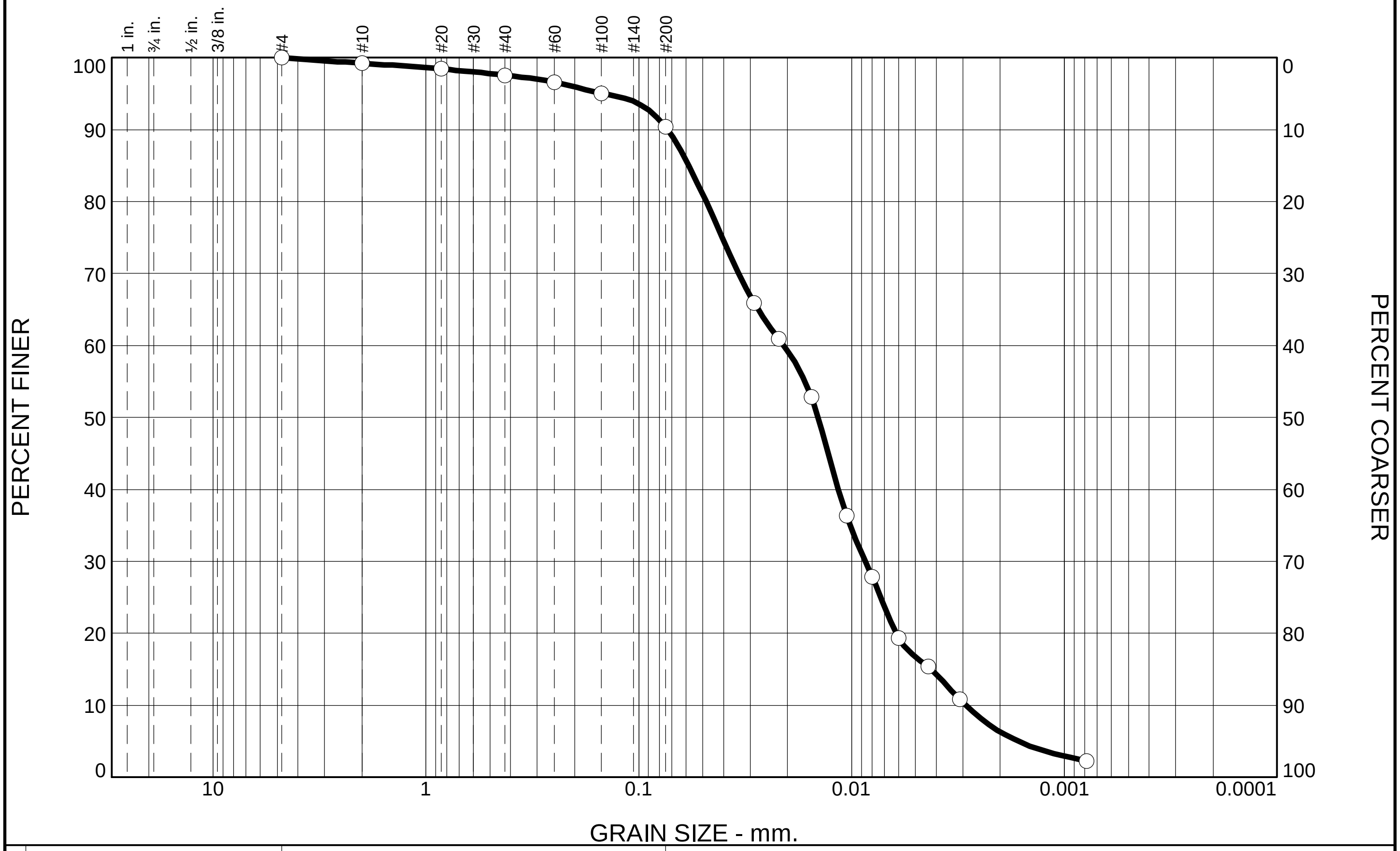
Source of Sample: EDW-B011 **Depth:** 19.5'-21.5'
Sample Number: S-7
Date: 11-11-15

Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE
Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	1.6	7.2	73.7	16.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.2		
#20	98.4		
#40	97.6		
#60	96.6		
#100	95.1		
#200	90.4		

* (no specification provided)

FILL: DARK GRAY FLY ASH

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0732	D_{85}= 0.0581	D_{60}= 0.0208
D_{50}= 0.0144	D_{30}= 0.0086	D_{15}= 0.0042
D_{10}= 0.0029	C_u= 7.17	C_c= 1.22

Classification

USCS= AASHTO=

Remarks

F.M.=0.12

Source of Sample: EDW-B012 **Depth:** 5.0'-6.5'
Sample Number: S-3

Date: 11-13-15

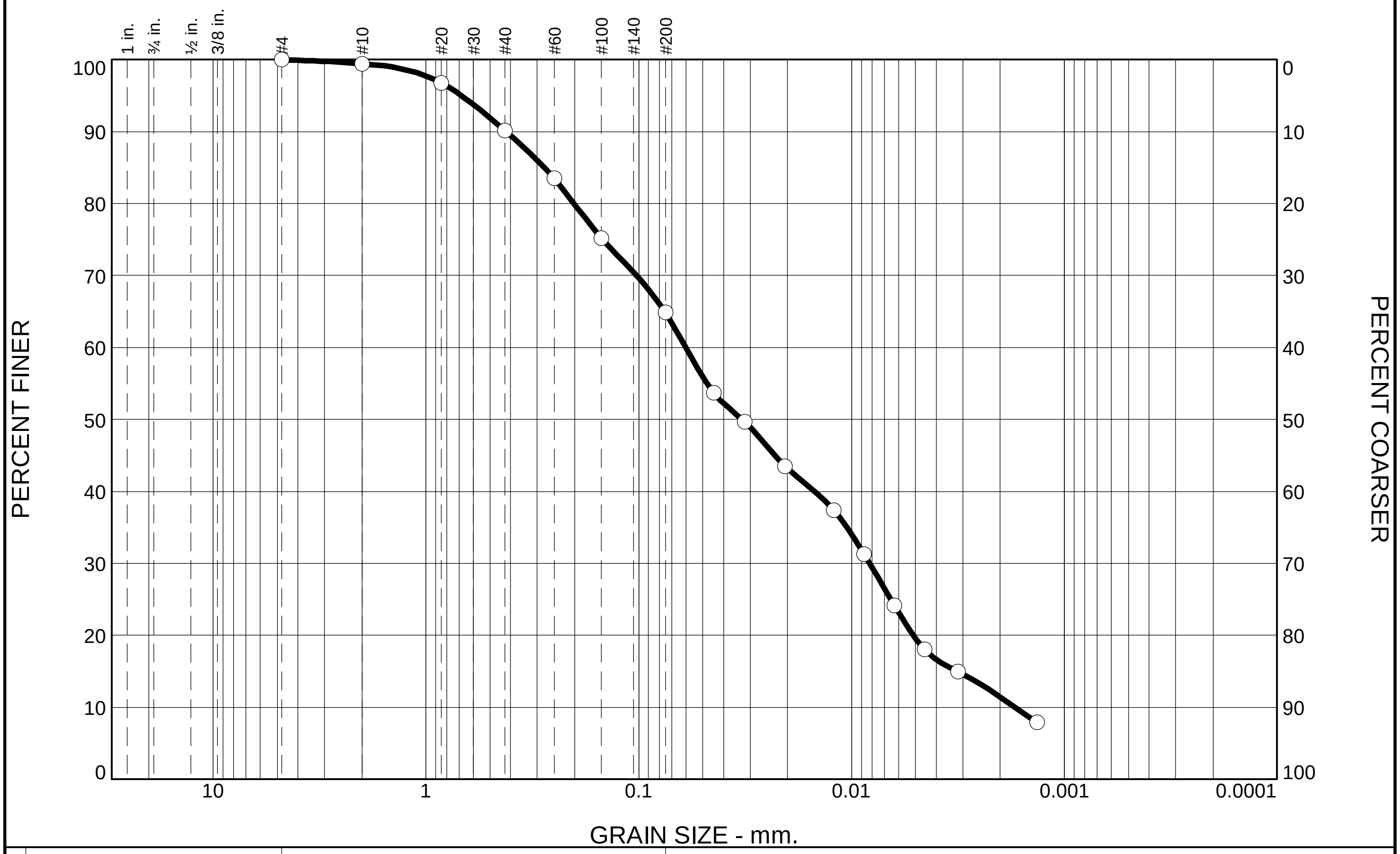
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE

Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	9.3	25.2	45.4	19.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.4		
#20	96.8		
#40	90.1		
#60	83.5		
#100	75.2		
#200	64.9		

* (no specification provided)

FILL: GRAY SILTY SAND WITH GRAVEL - FLY ASH NOTED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4213	D_{85}= 0.2775	D_{60}= 0.0602
D_{50}= 0.0328	D_{30}= 0.0082	D_{15}= 0.0032
D_{10}= 0.0017	C_u= 35.34	C_c= 0.66

Classification

USCS= SM AASHTO=

Remarks

F.M.=0.47

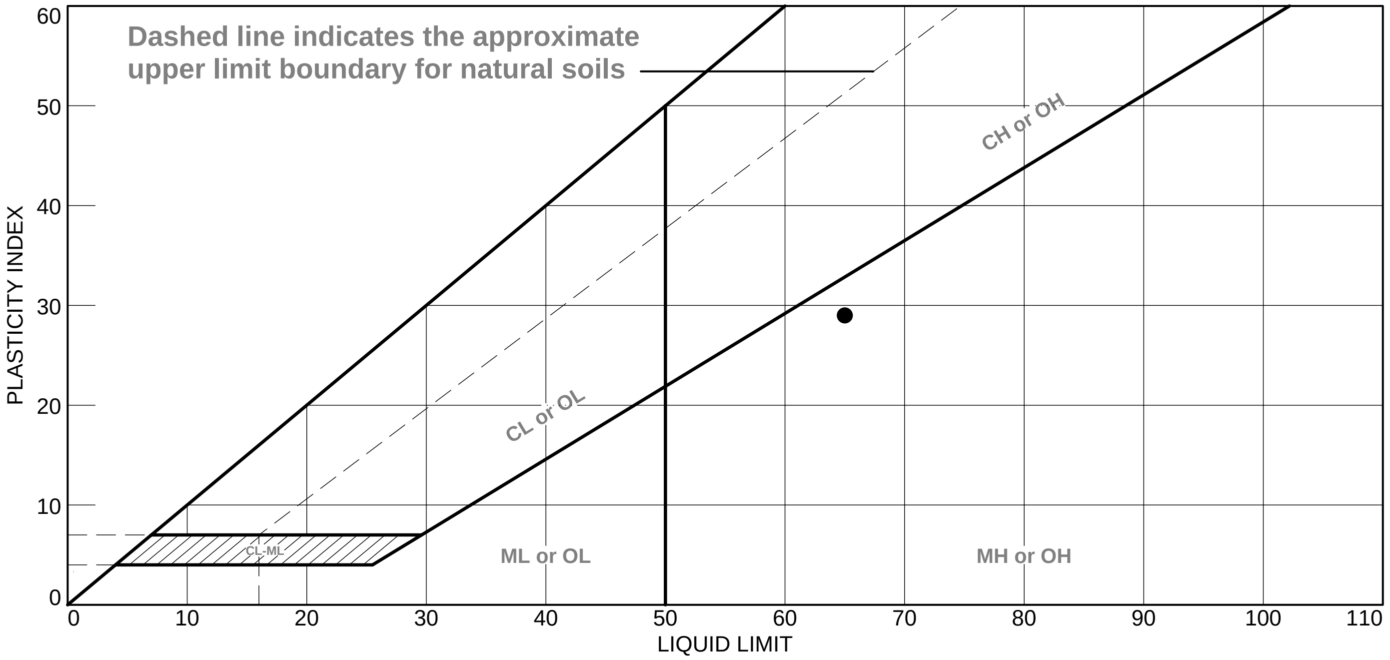
Source of Sample: EDW-B014 **Depth:** 7.0'-8.5'
Sample Number: S-4
Date: 11-5-15

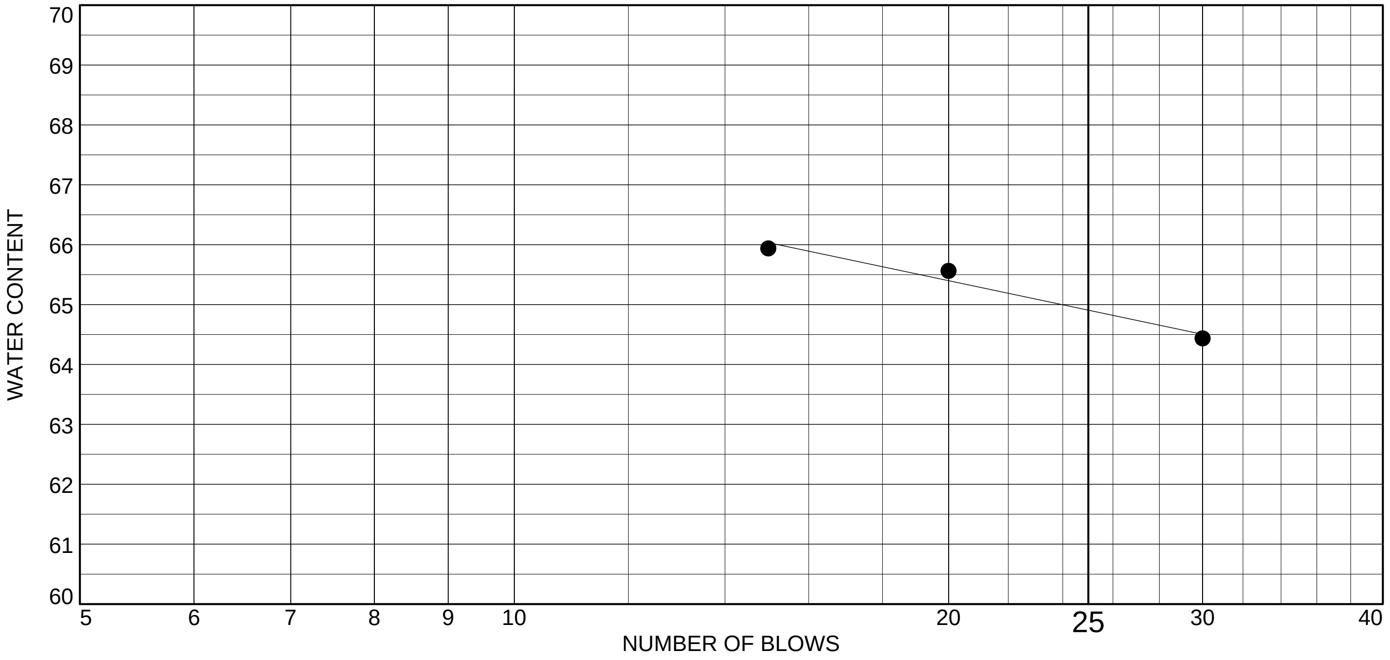
Terracon

Client: DYNEGY
Project: DYNEGY - EDWARDS SITE
Project No: MR155218 **Figure**

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GREENISH GRAY SANDY SILT	65	36	29			MH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B002 **Depth:** 5.0'-7.0'
Sample Number: S-3

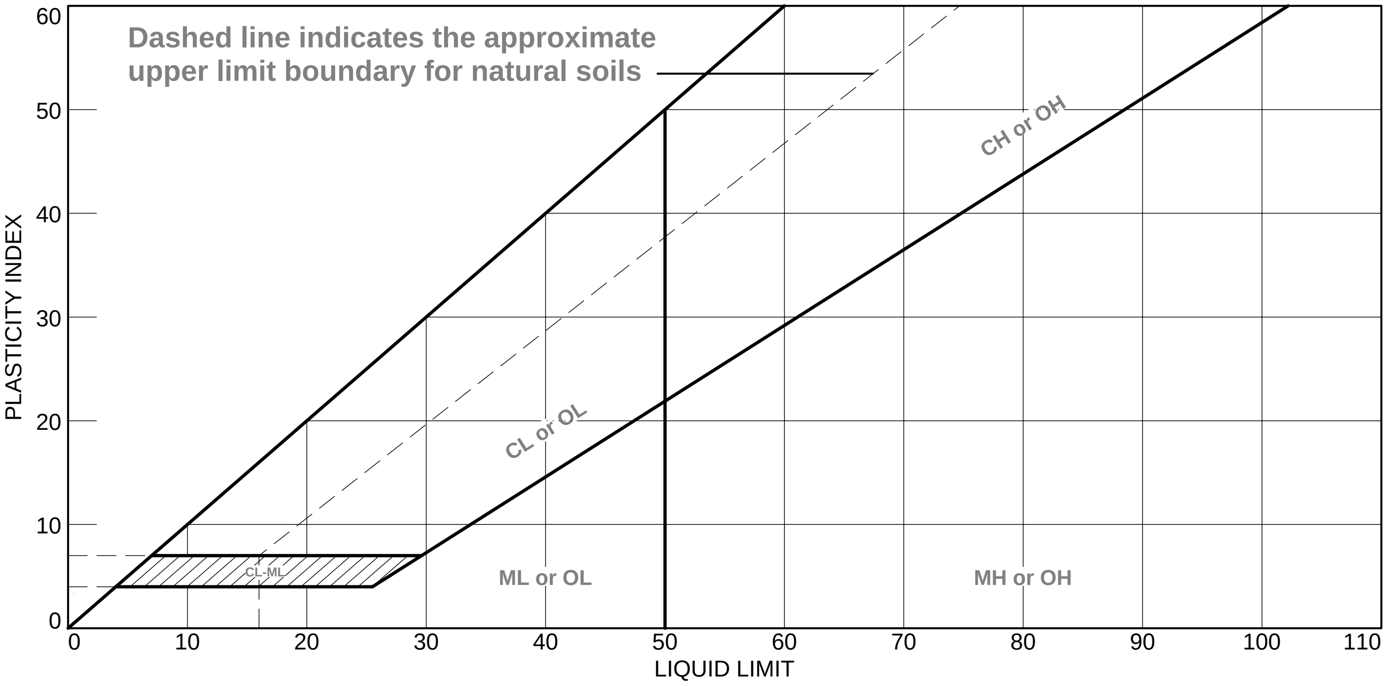
Terracon

Remarks:
● SHELL NOTED

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY TO DARK GRAY FLY ASH	17	27	NP			

Project No. MR155218 **Client:** DYNEGY

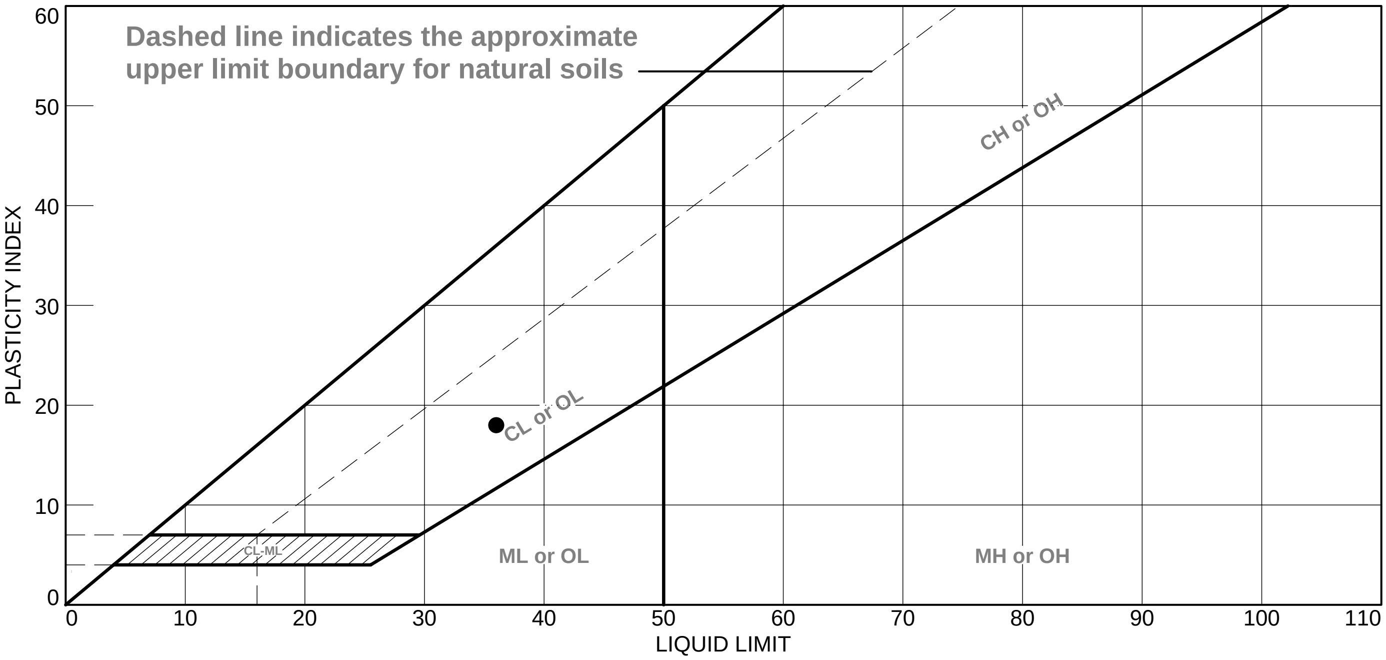
Project: DYNEGY - EDWARDS SITE

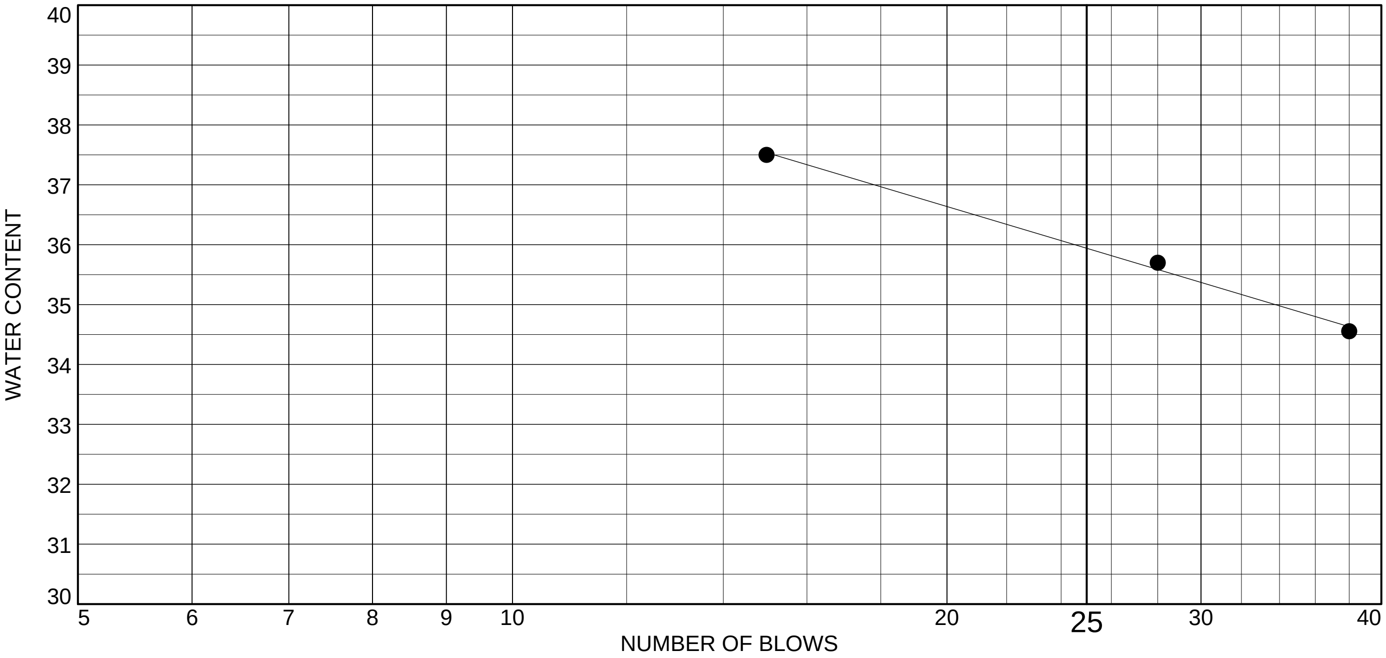
Source of Sample: EDW-B002 **Depth:** 10.0'-12.0'
Sample Number: S-5

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY LEAN CLAY WITH SAND	36	18	18			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

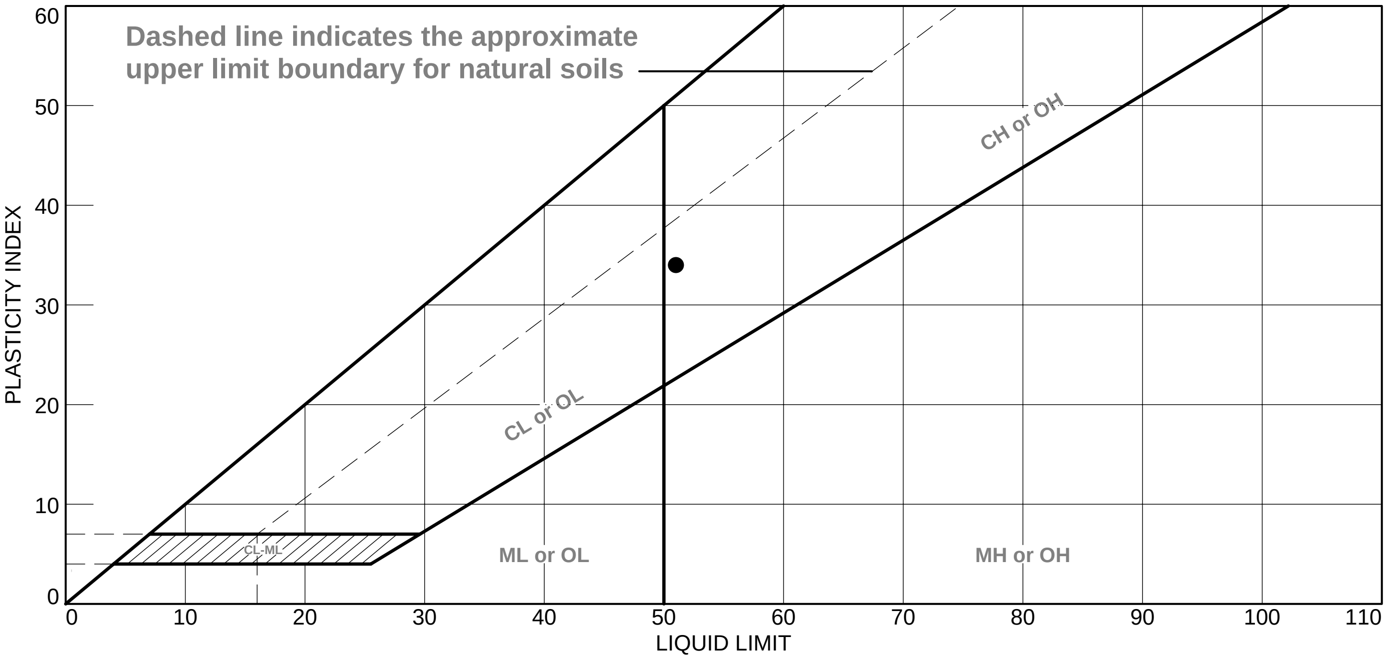
Source of Sample: EDW-B002 **Depth:** 35.0'-37.0'
Sample Number: S-10

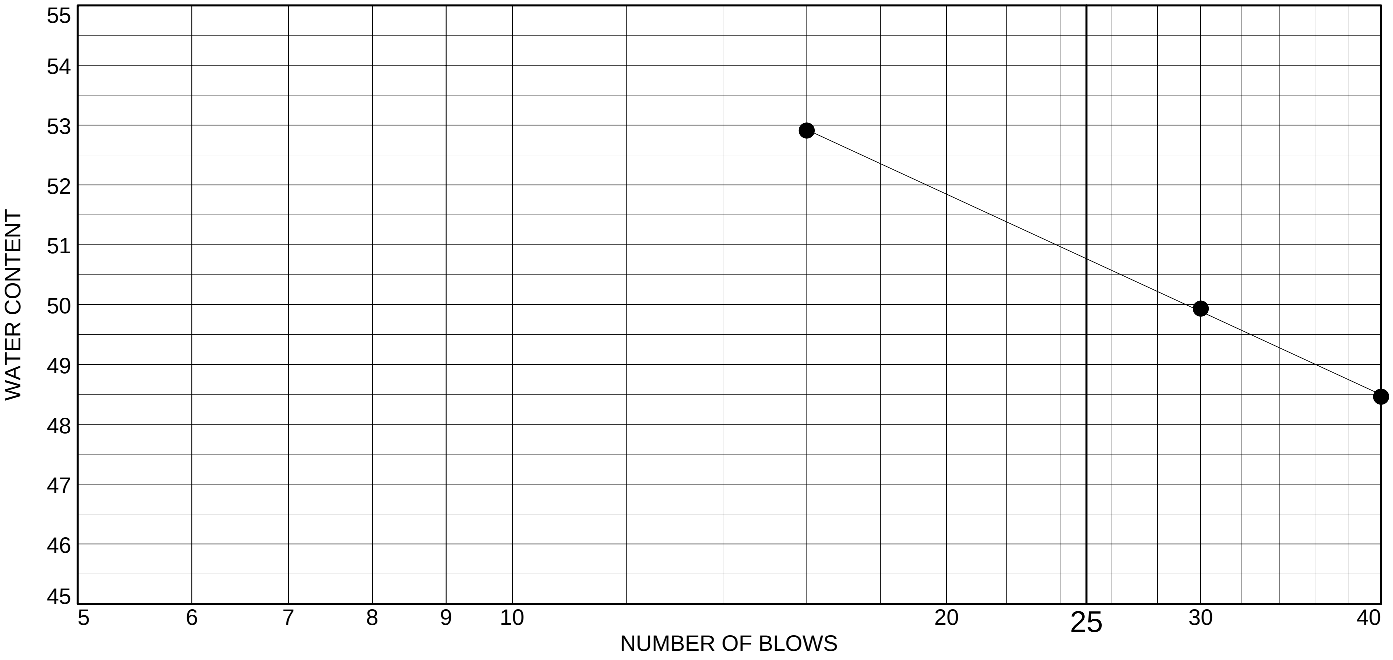
Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY FAT CLAY WITH SAND	51	17	34			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

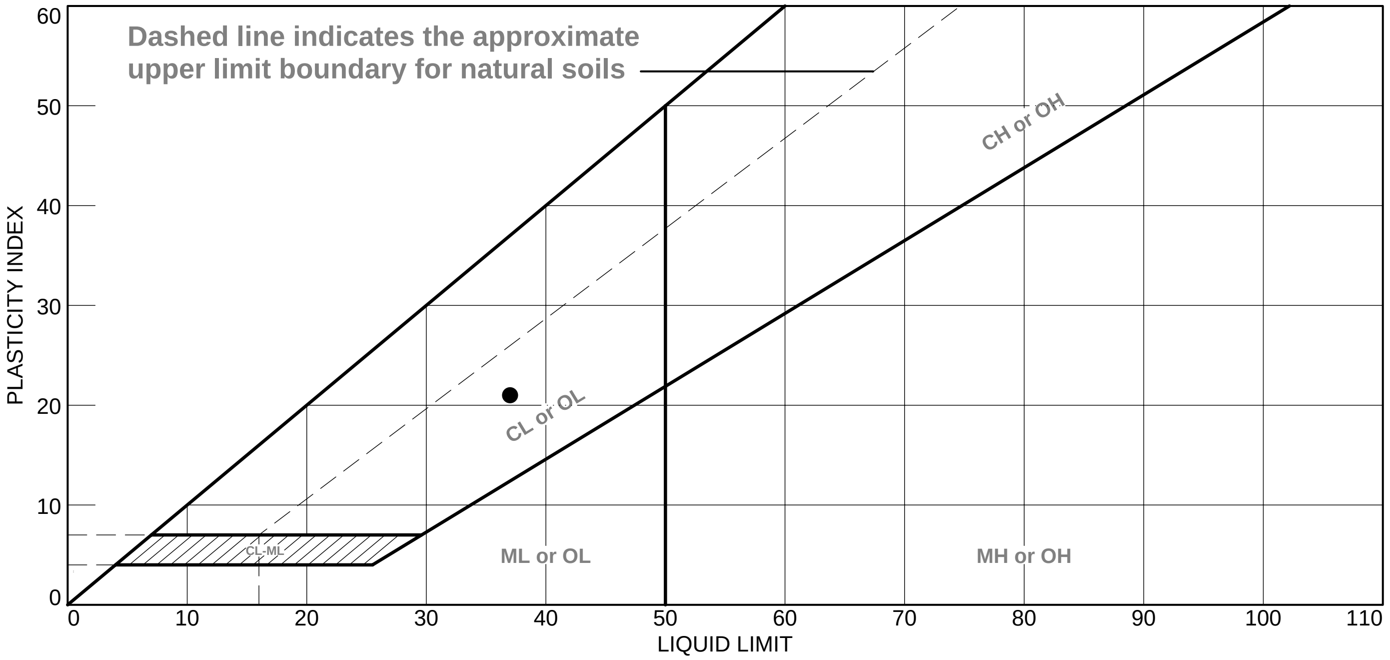
Source of Sample: EDW-B003 **Depth:** 45.0'-47.0'
Sample Number: S-12

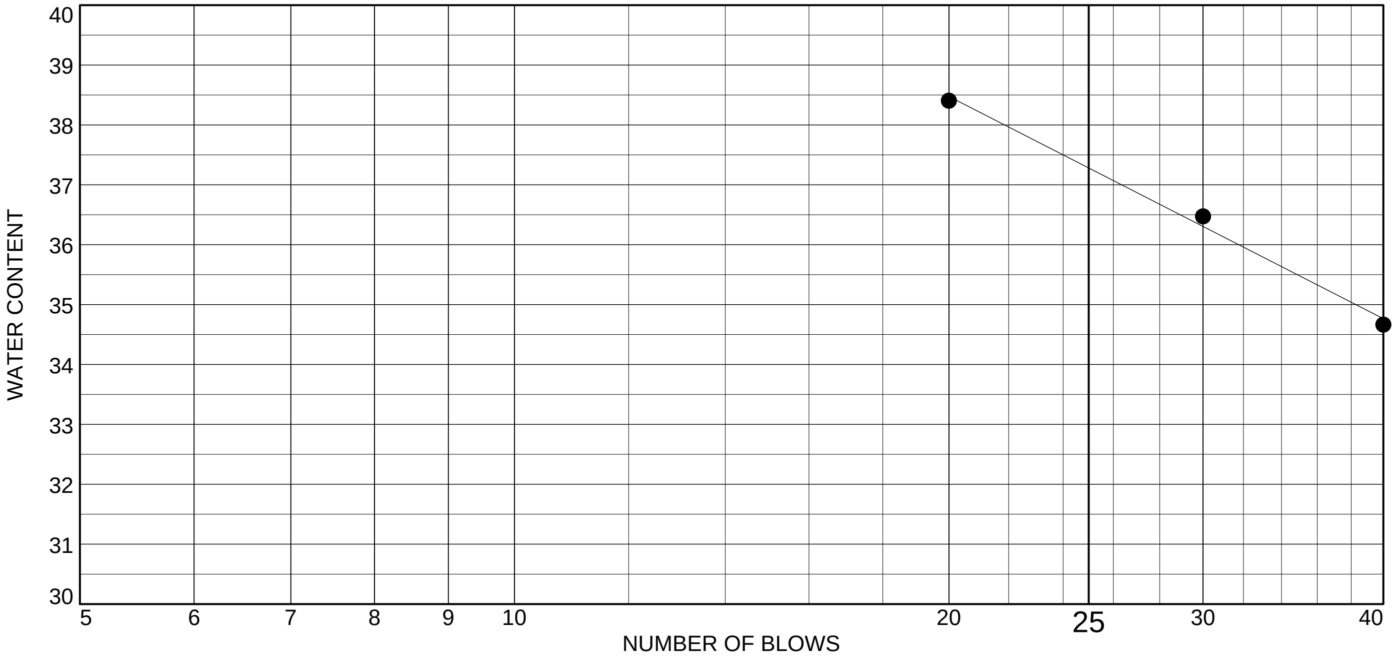
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND DARK GRAY LEAN CLAY WITH ORGANICS	37	16	21	98.5	90.7	CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B004 **Depth:** 7.5'-9.0'
Sample Number: S-4

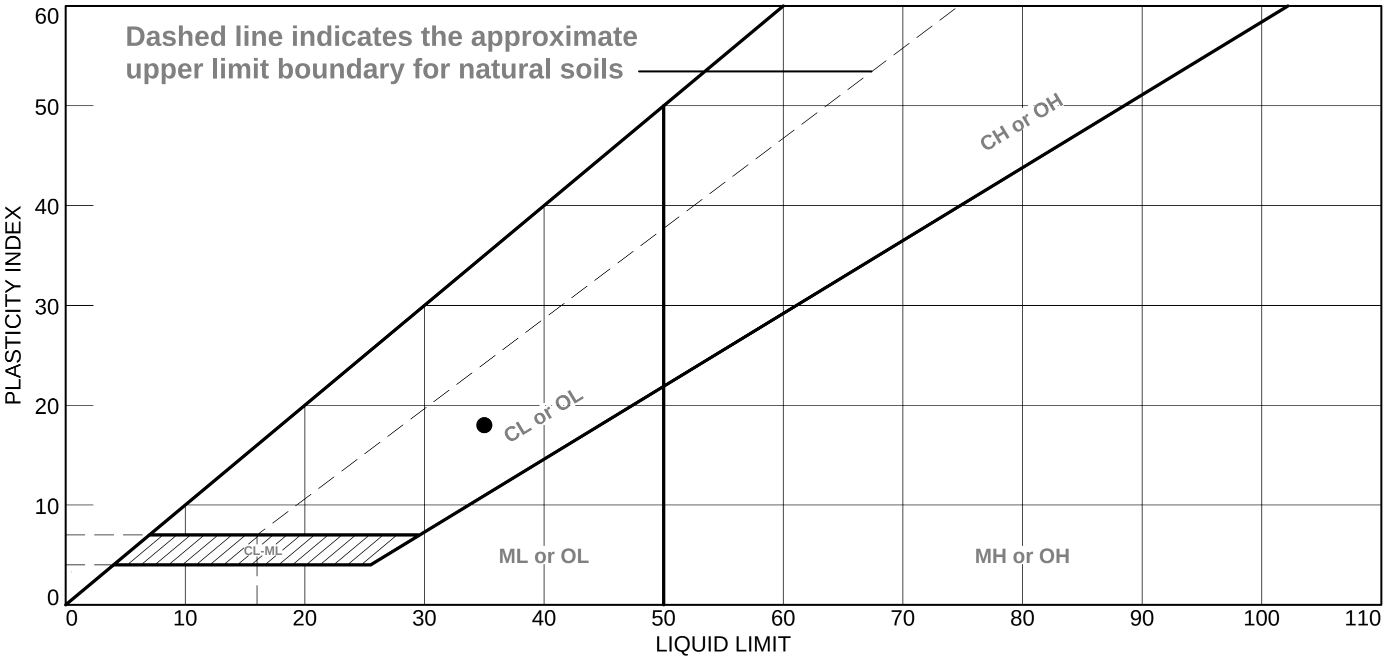
Terracon

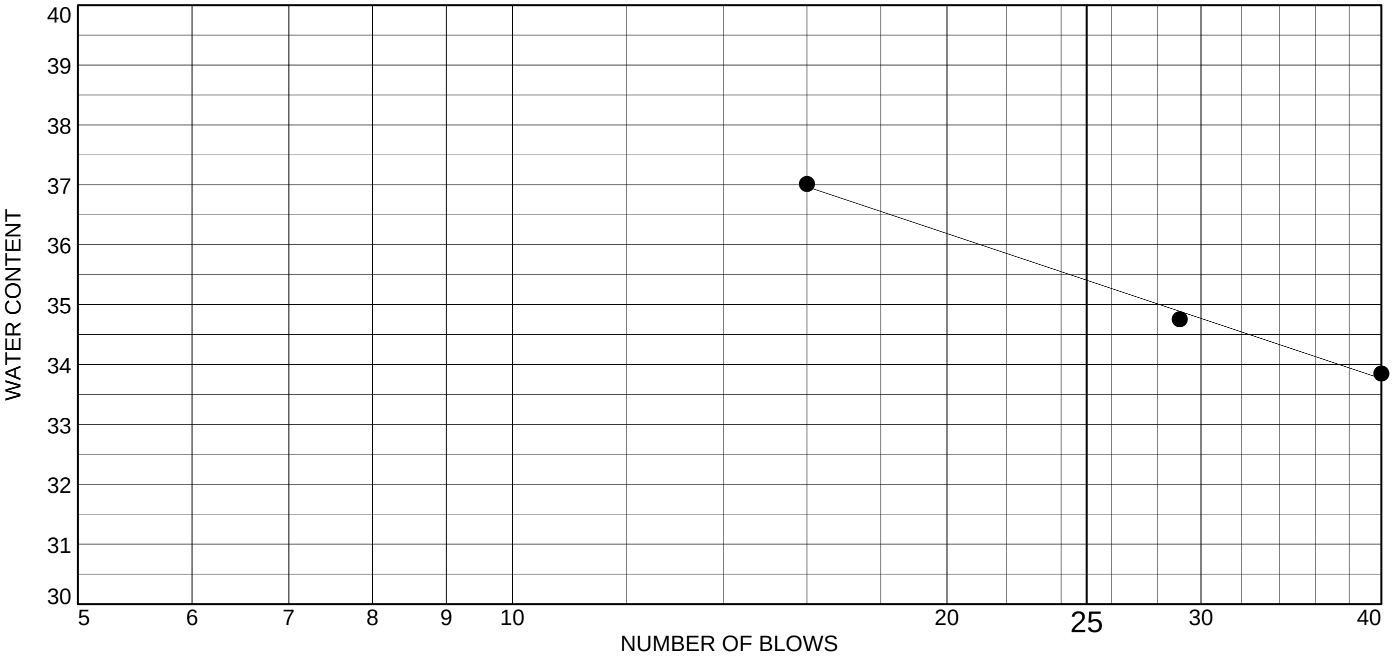
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND GRAYISH BROWN LEAN CLAY WITH SAND	35	17	18			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B004 **Depth:** 36.0'-38.0'
Sample Number: S-11

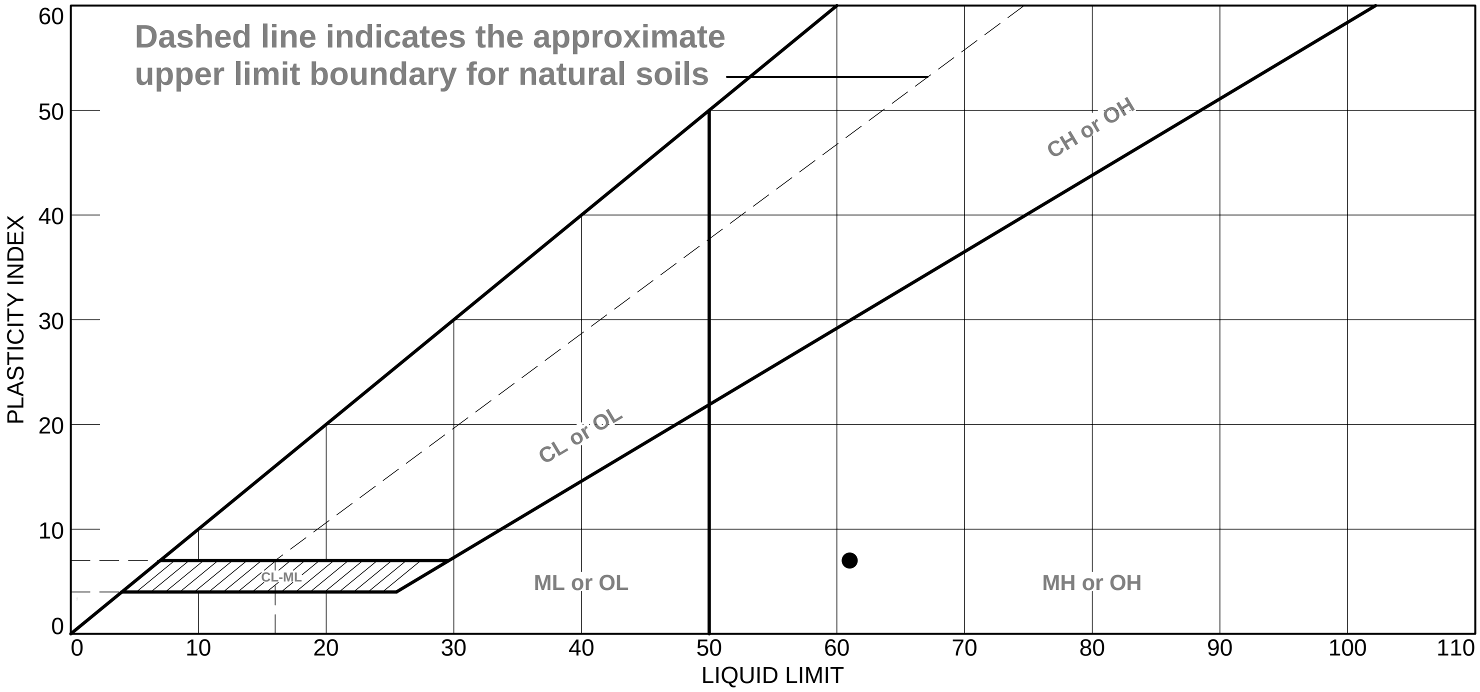
Terracon

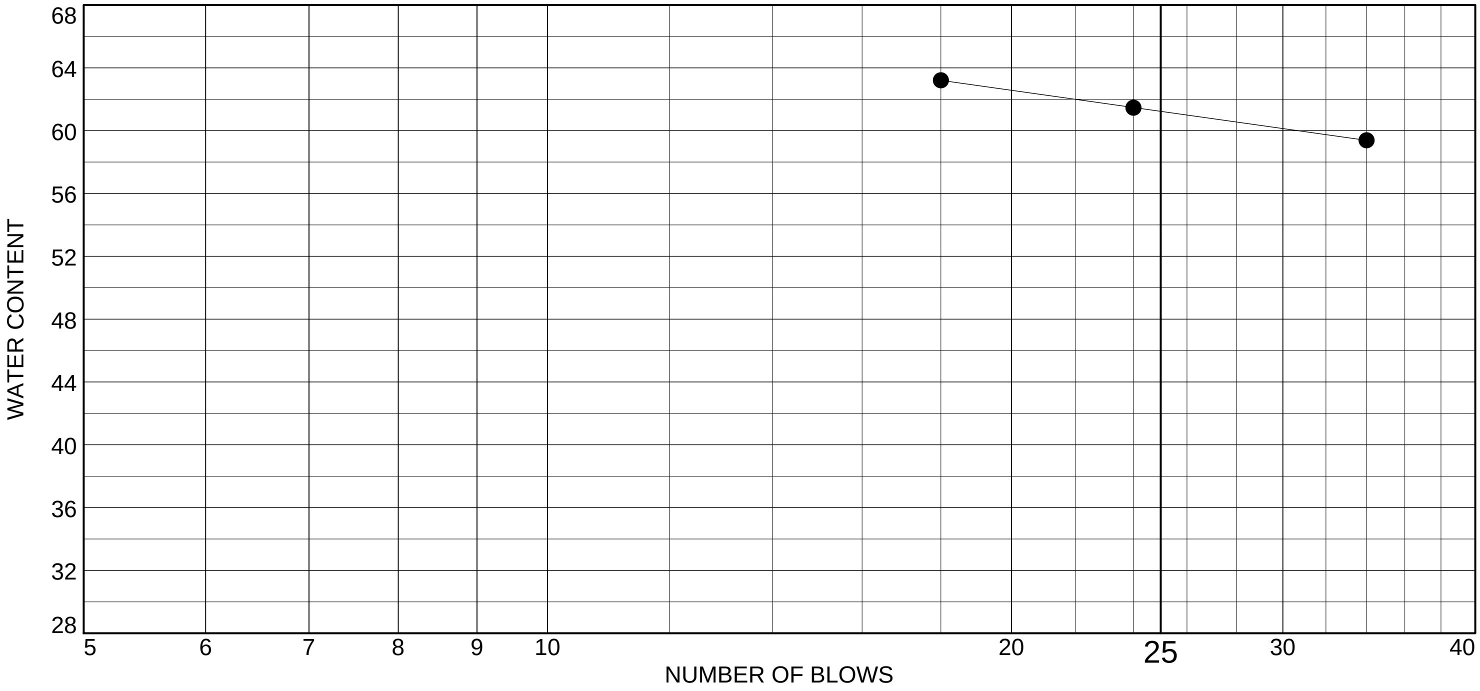
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	FILL: BROWN SANDY SILT WITH CLAY CHUNKS	61	54	7			MH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B005 **Depth:** 5.0'-6.5'
Sample Number: S-3

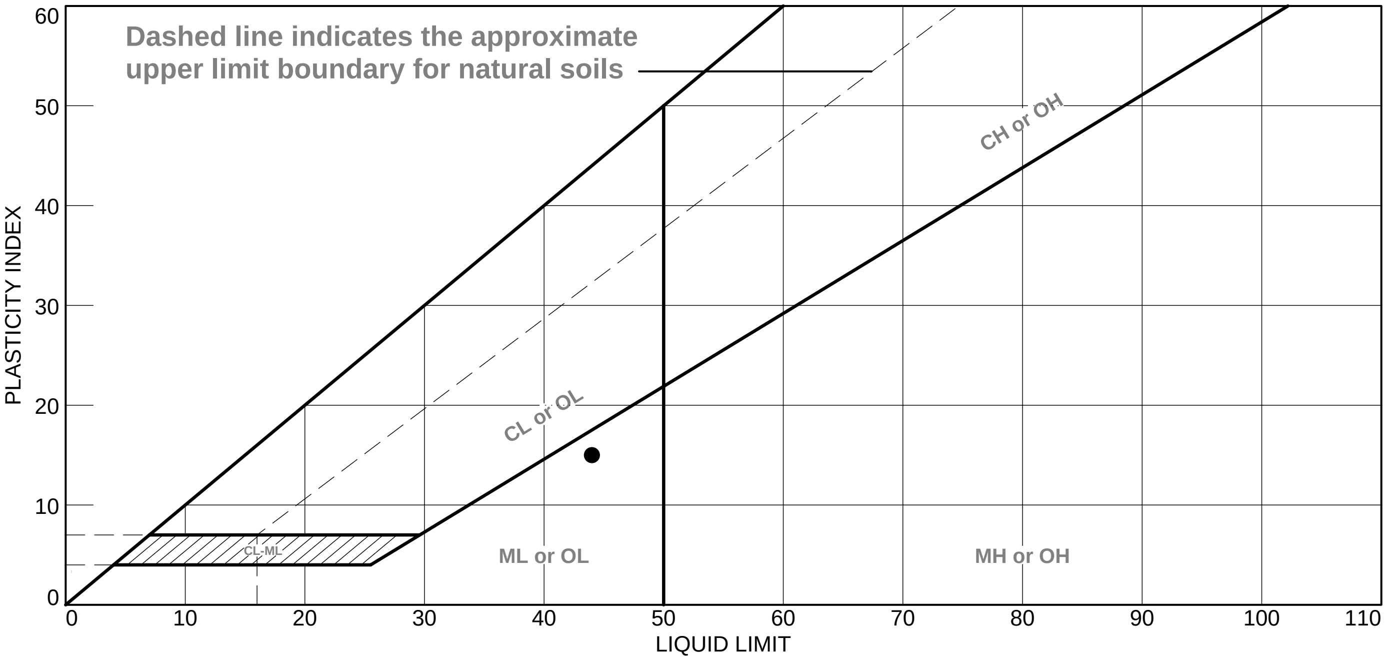
Terracon

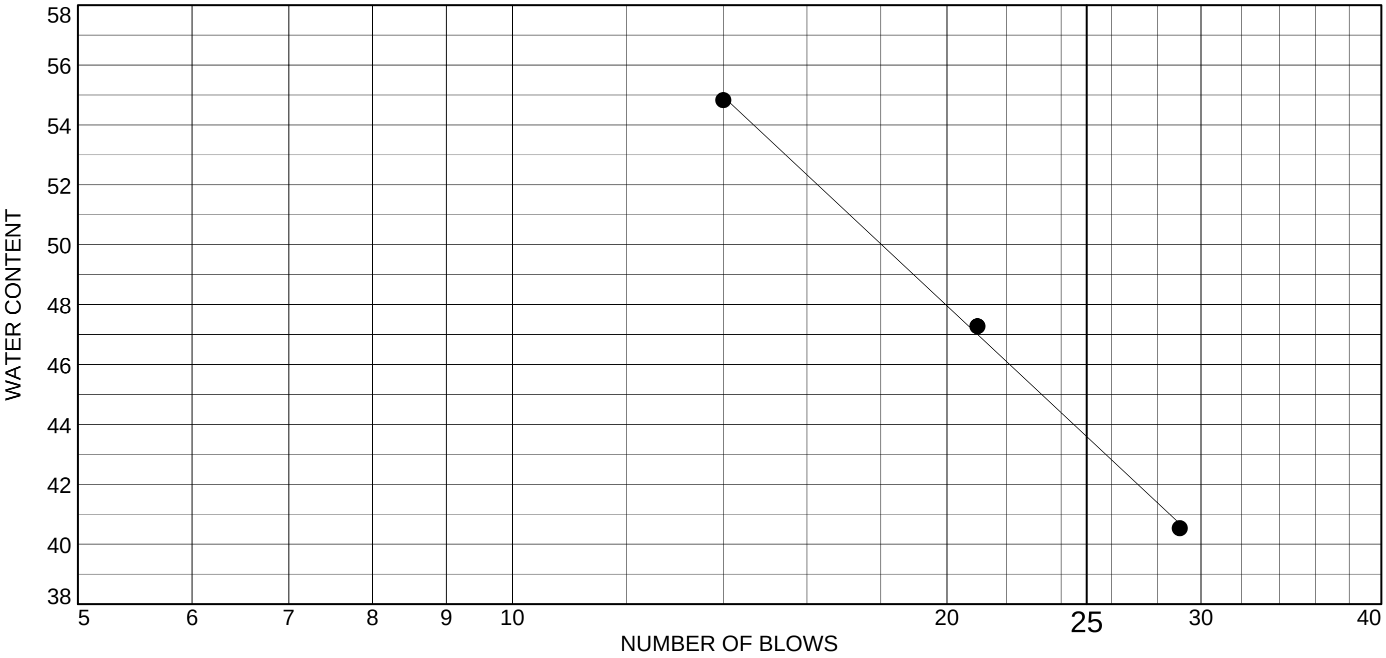
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	FILL: GRAY AND BLACK ORGANIC SILT	44	29	15			OL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B005 **Depth:** 26.0'-27.0'
Sample Number: S-8A

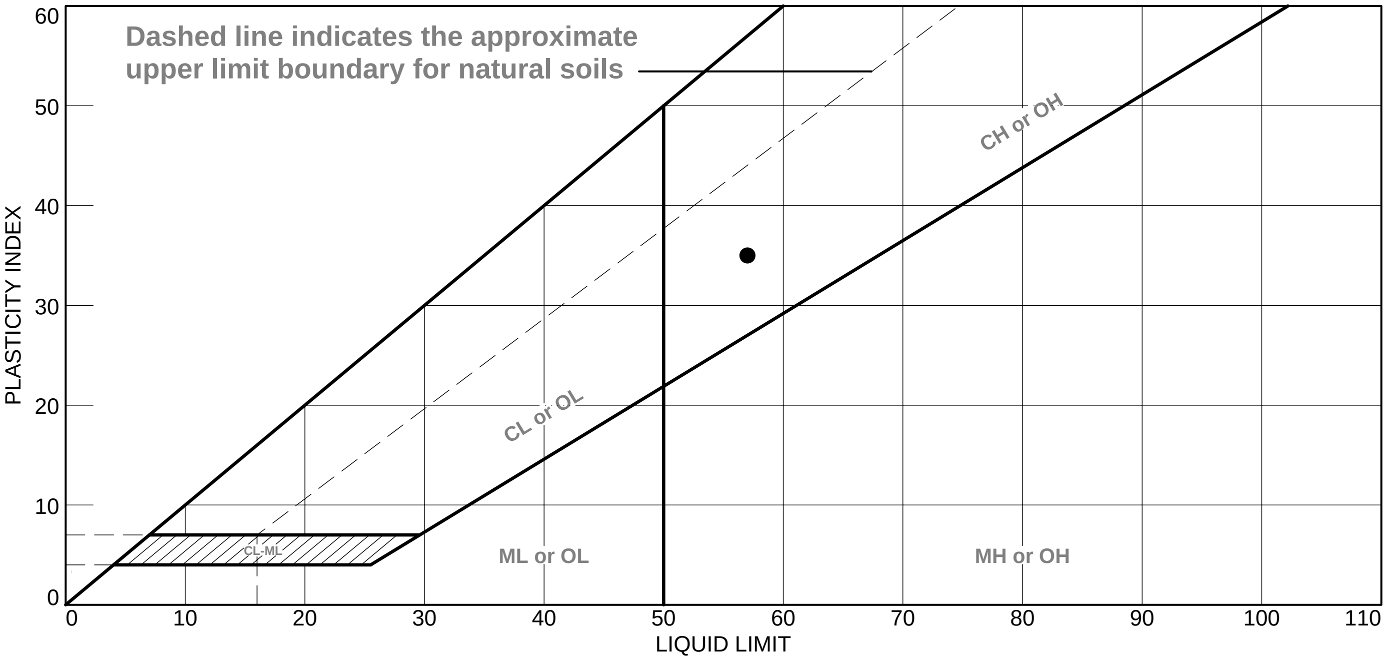
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY FAT CLAY SHELL - ORGANICS NOTED	57	22	35			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

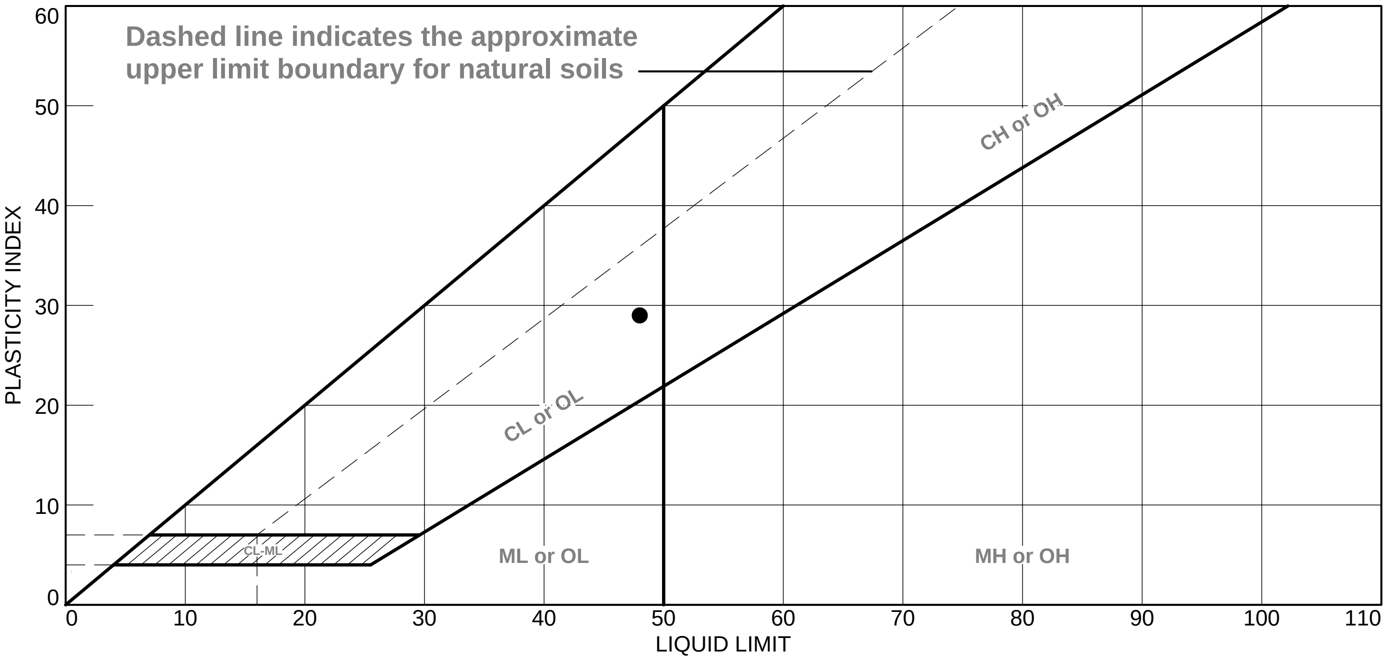
Source of Sample: EDW-B005 **Depth:** 41.0'-43.0'
Sample Number: S-11

Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND DARK GRAY LEAN CLAY TRACE SAND	48	19	29			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

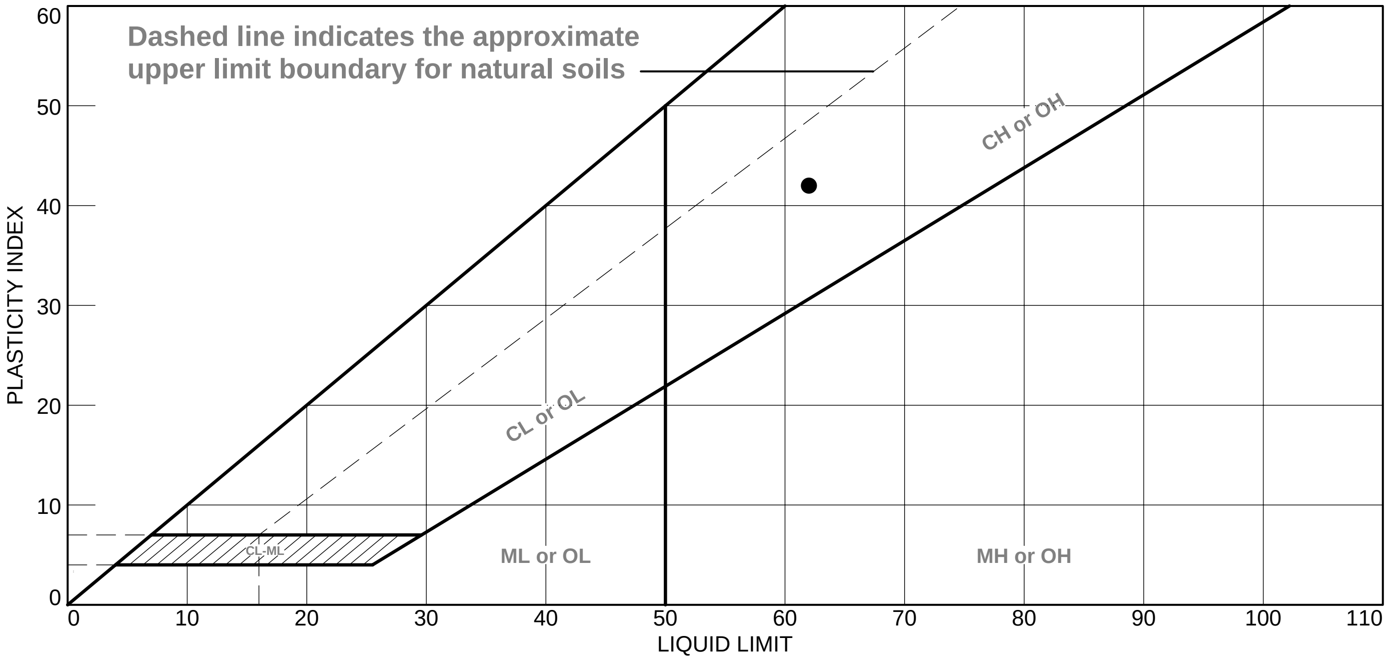
Source of Sample: EDW-B006 **Depth:** 5.0'-6.5'
Sample Number: S-3

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY FAT CLAY WITH SAND	62	20	42			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B006 **Depth:** 13.0'-15.0'
Sample Number: S-6

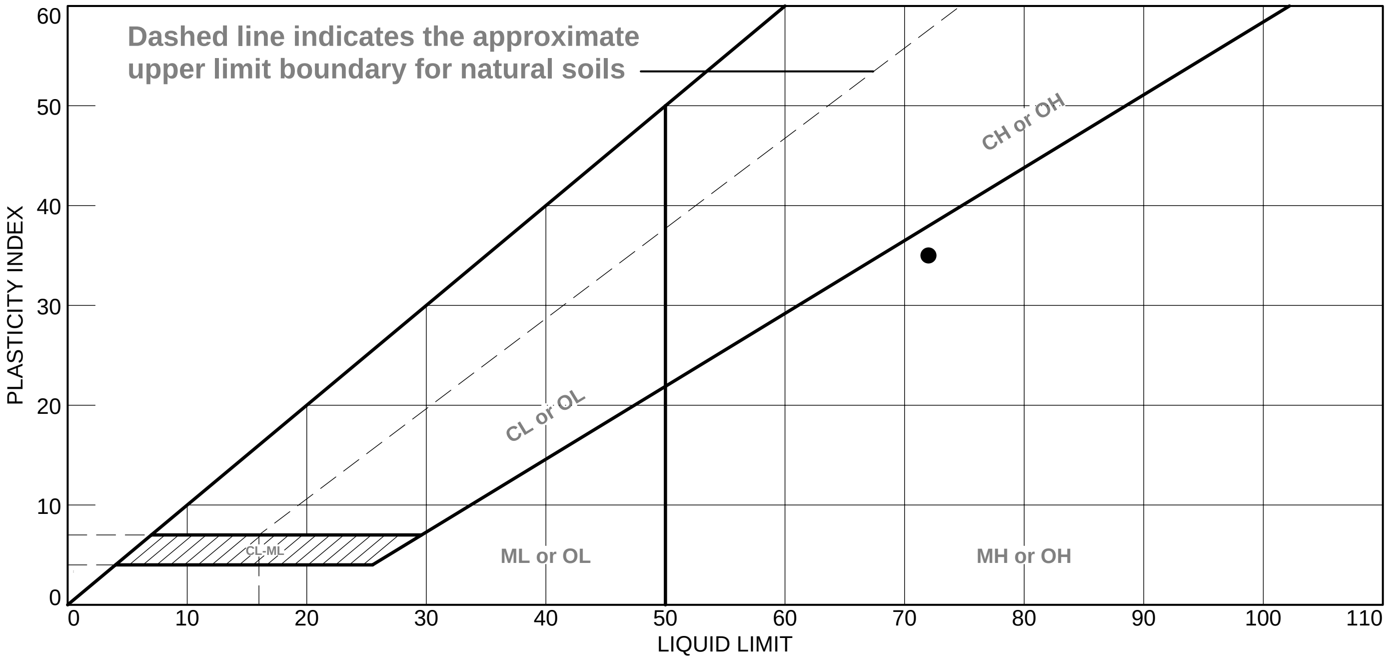
Terracon

Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY ORGANIC SILT	72	37	35			OH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B006 **Depth:** 26.0'-28.0'
Sample Number: S-9

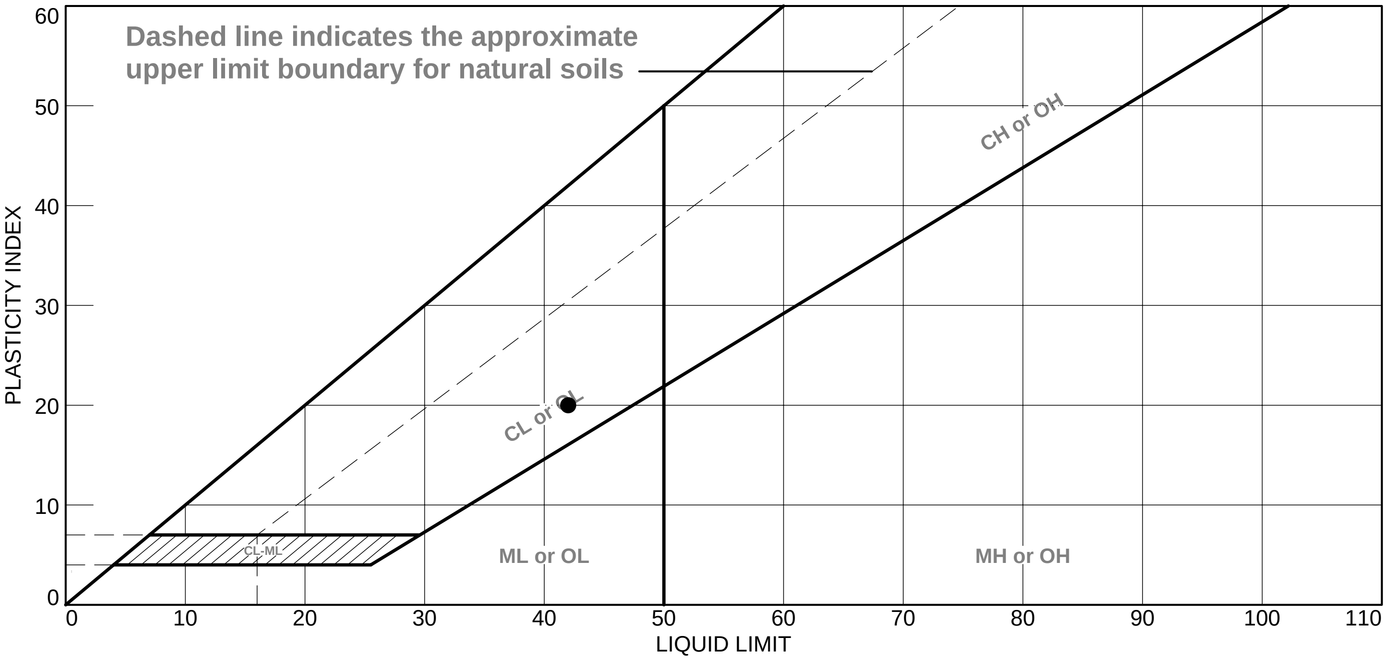
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWN LEAN CLAY WITH SAND	42	22	20			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

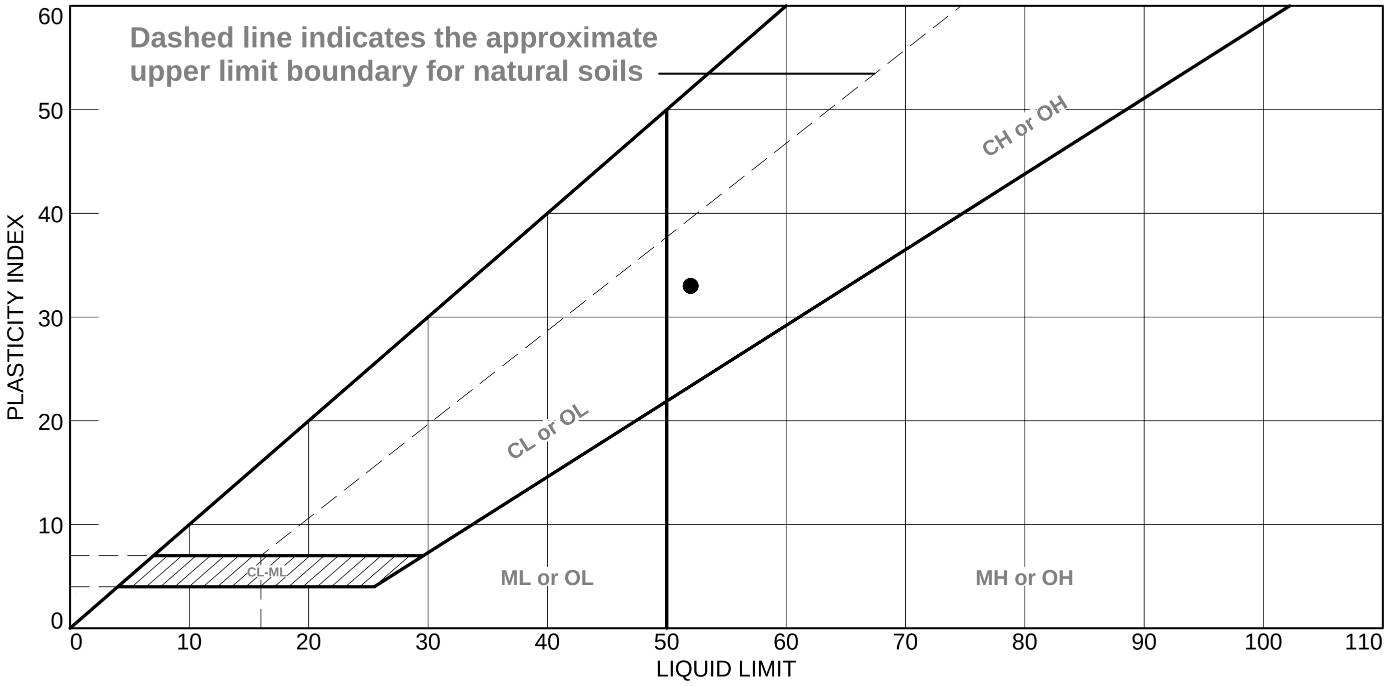
Source of Sample: EDW-B008 **Depth:** 2.5'-4.0'
Sample Number: S-2

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND GRAY FAT CLAY WITH SAND	52	19	33			CH

Project No. MR155218 **Client:** DYNEGY

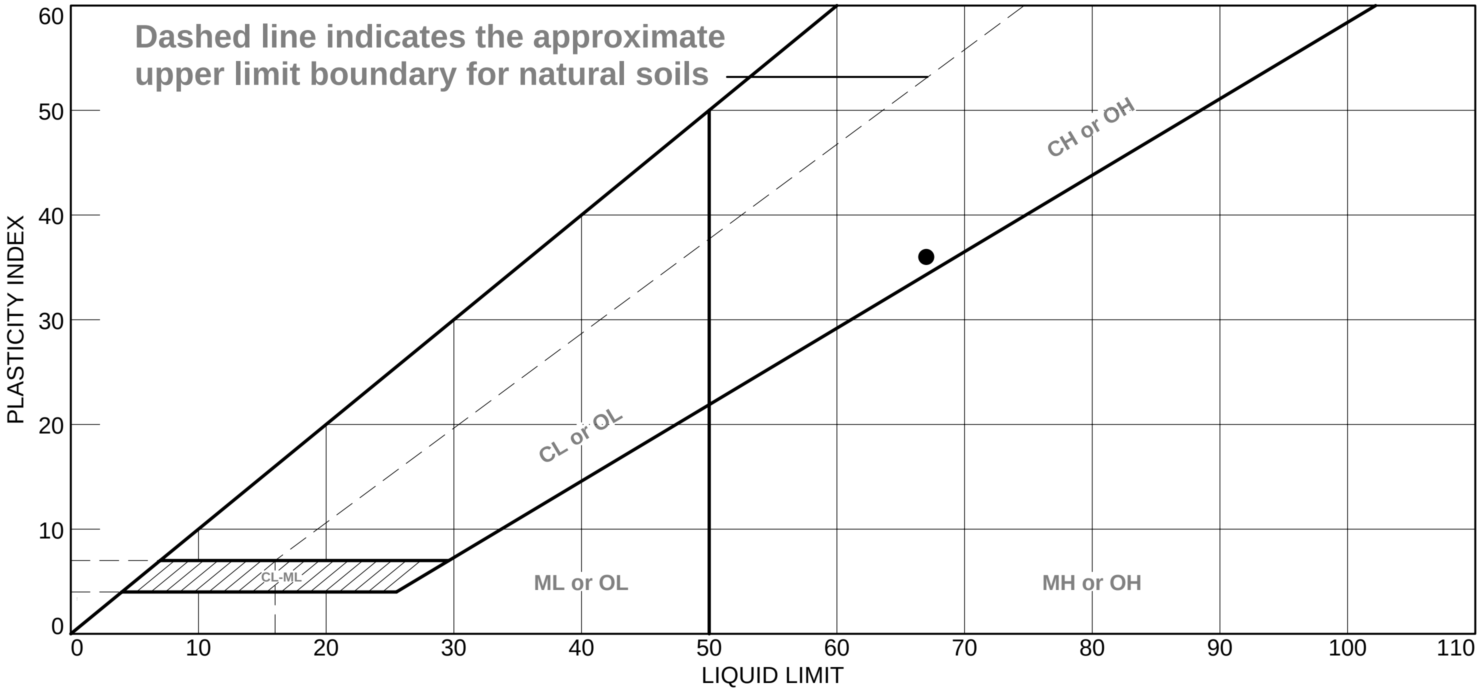
Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B008 **Depth:** 11.0'-13.0'
Sample Number: S-5

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY FAT CLAY SHELL - ORGANICS NOTED	67	31	36			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

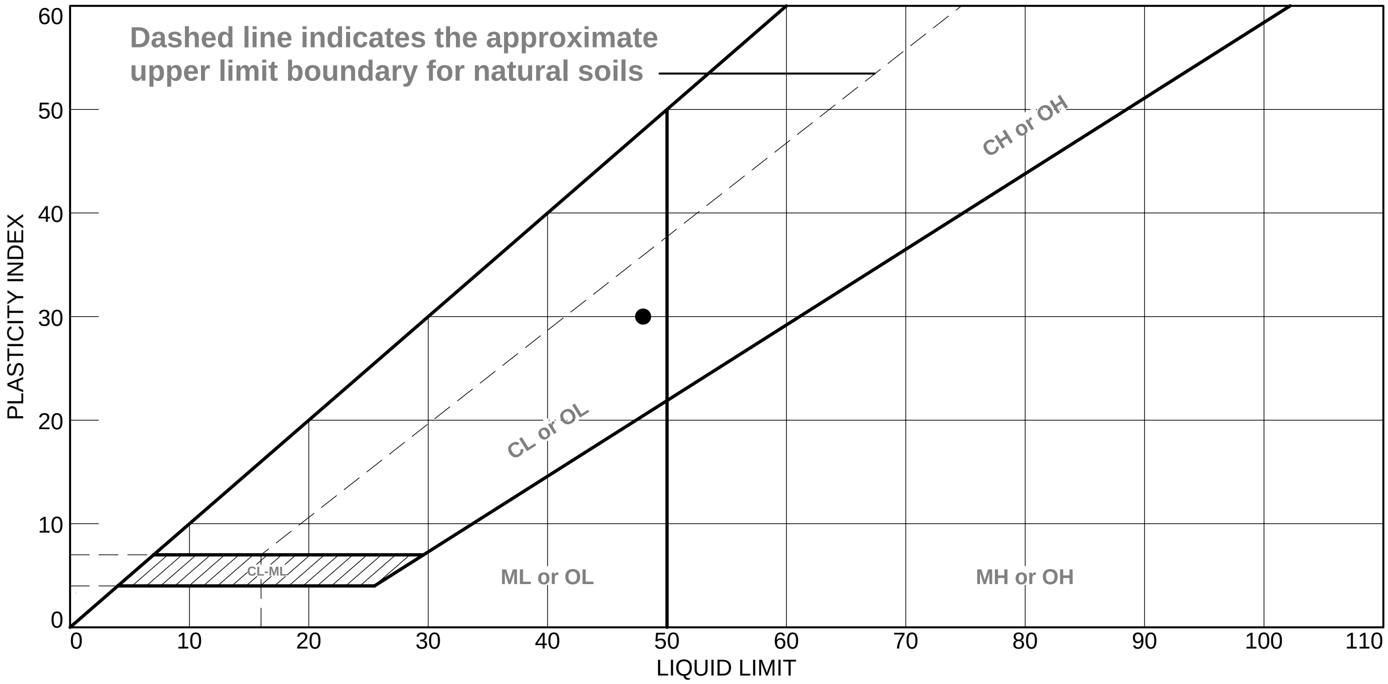
Source of Sample: EDW-B008 **Depth:** 24.0'-26.5'
Sample Number: S-8

Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND GRAY MOTTLED LEAN CLAY	48	18	30			CL

Project No. MR155218 **Client:** DYNEGY

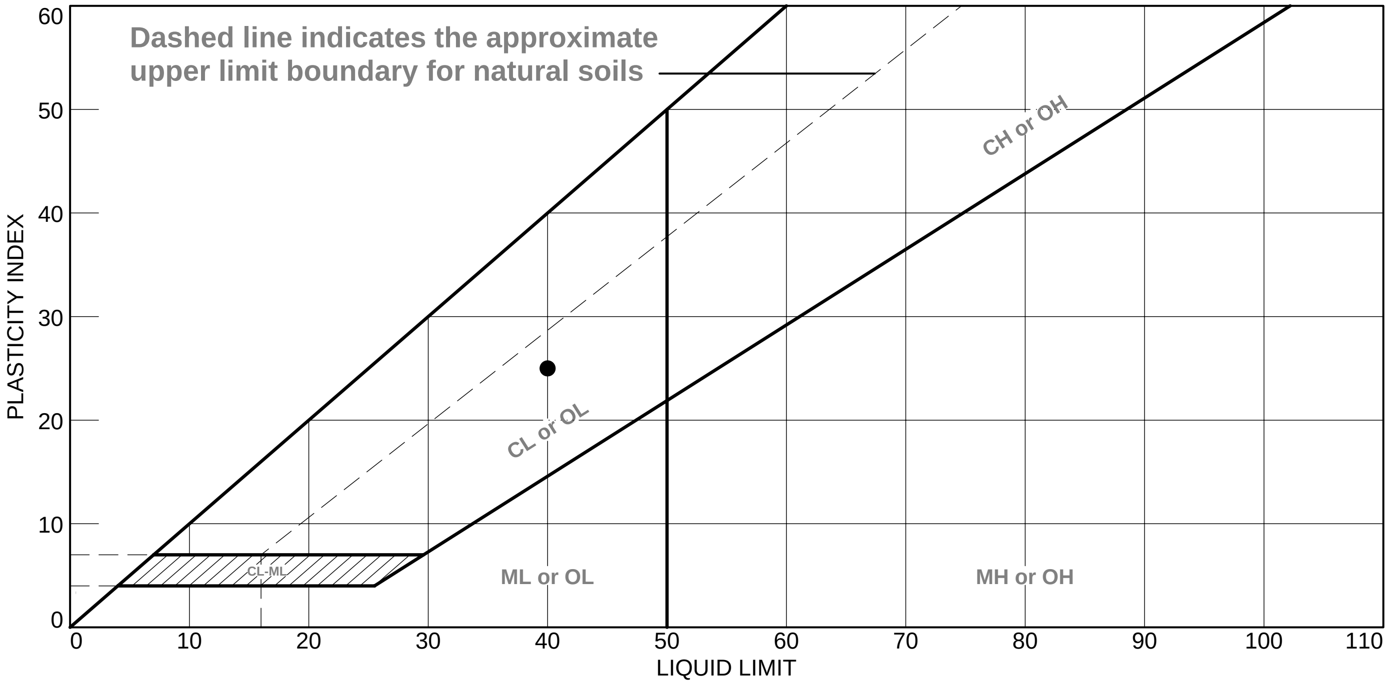
Project: DYNEGY - EDWARDS SITE

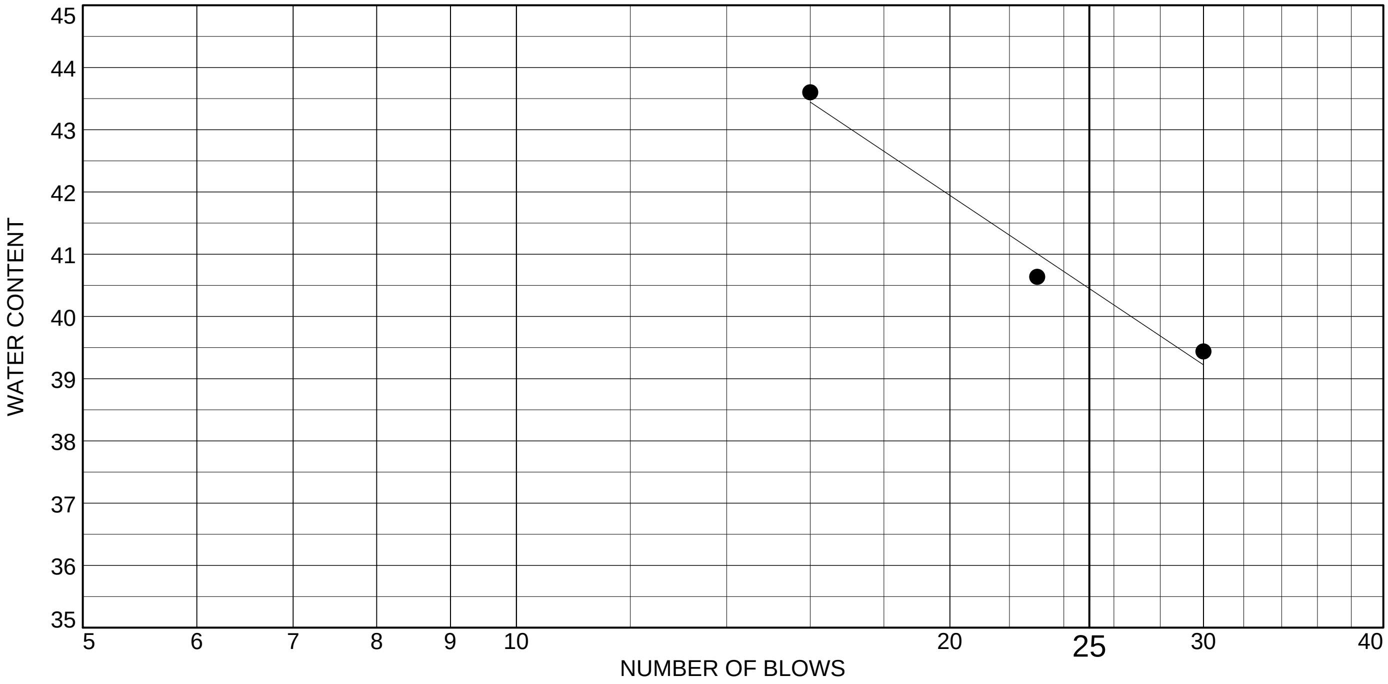
Source of Sample: EDW-B010 **Depth:** 15.0'-17.0'
Sample Number: S-7

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BLUISH GRAY LEAN CLAY	40	15	25			CL

Project No. MR155218 **Client:** DYNEGY

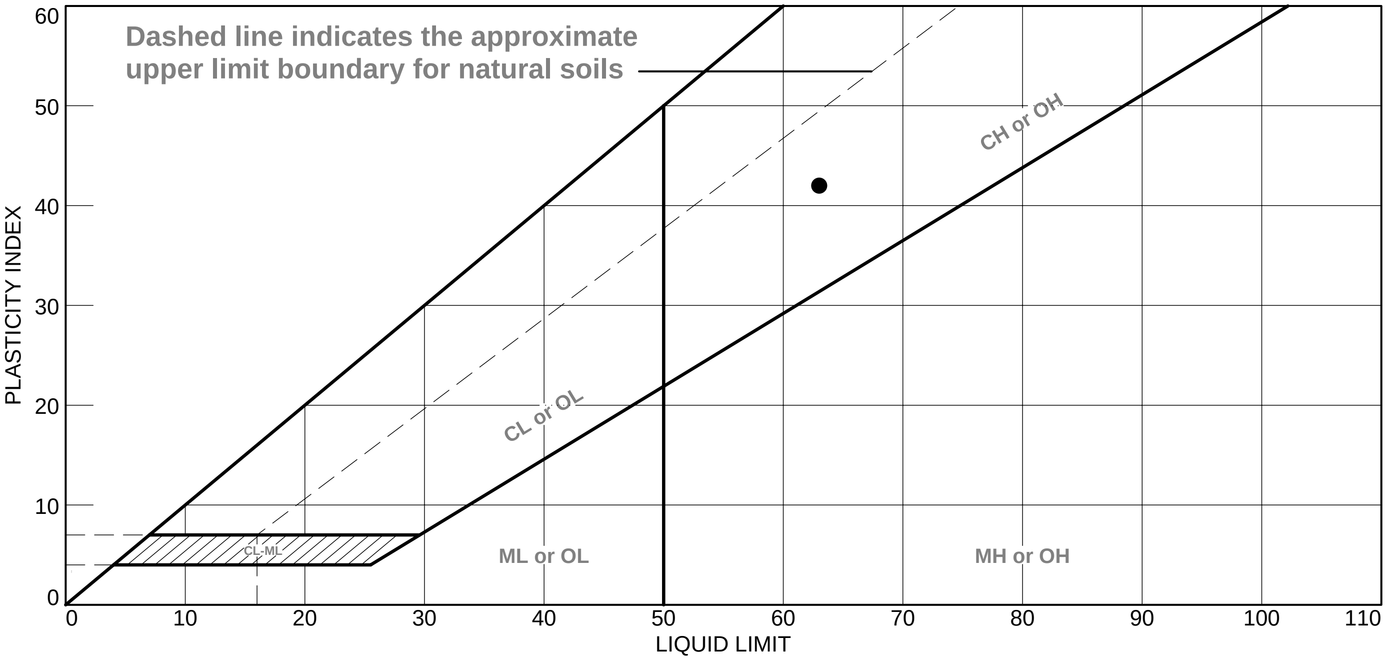
Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B010 **Depth:** 30.0'-32.0'
Sample Number: S-10

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAYISH BROWN FAT CLAY WITH SAND	63	21	42			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B011 **Depth:** 45.0'-46.5'
Sample Number: S-14

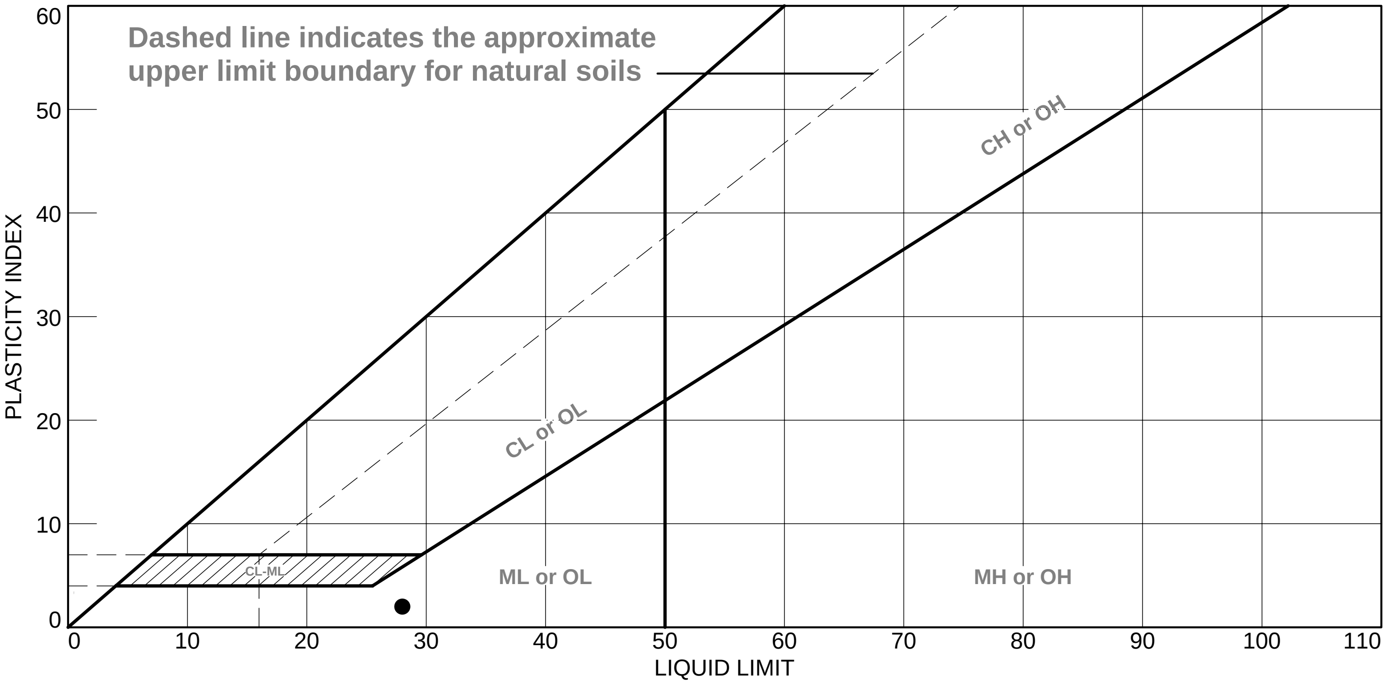
Terracon

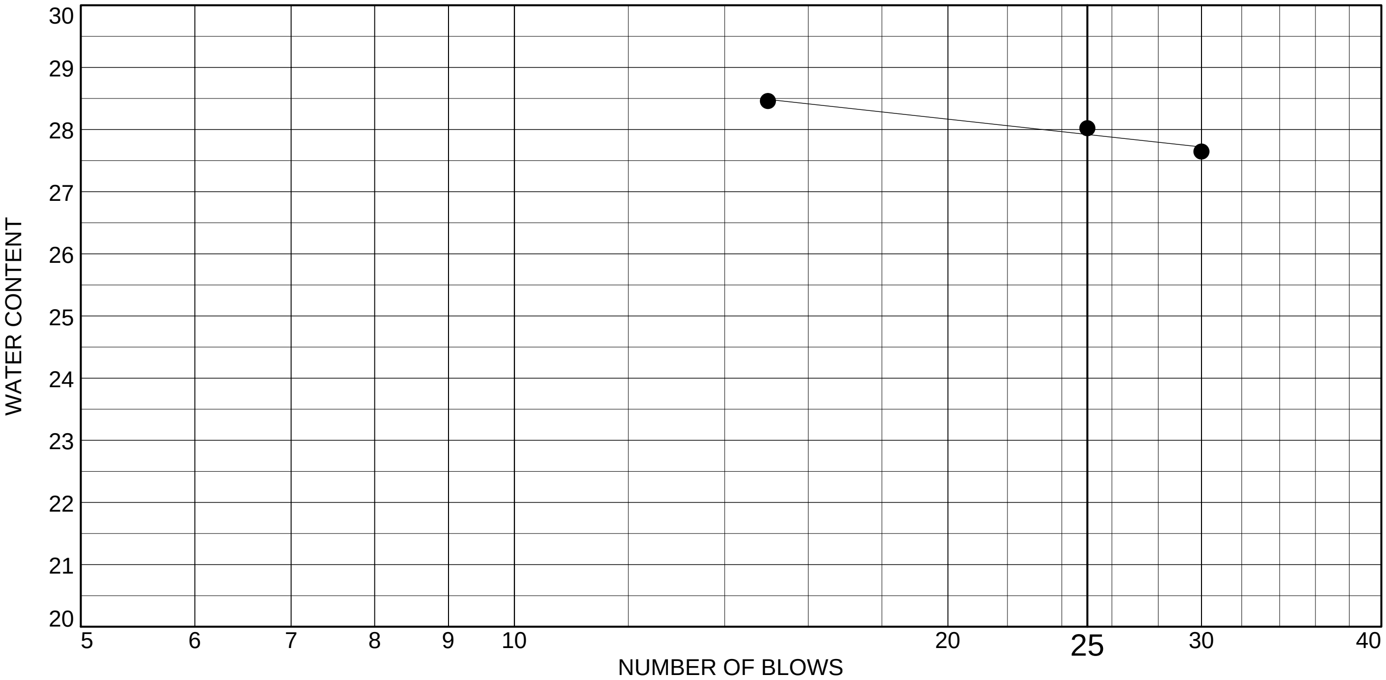
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	FILL: DARK GRAY FLY ASH	28	26	2			

Project No. MR155218 **Client:** DYNEGY

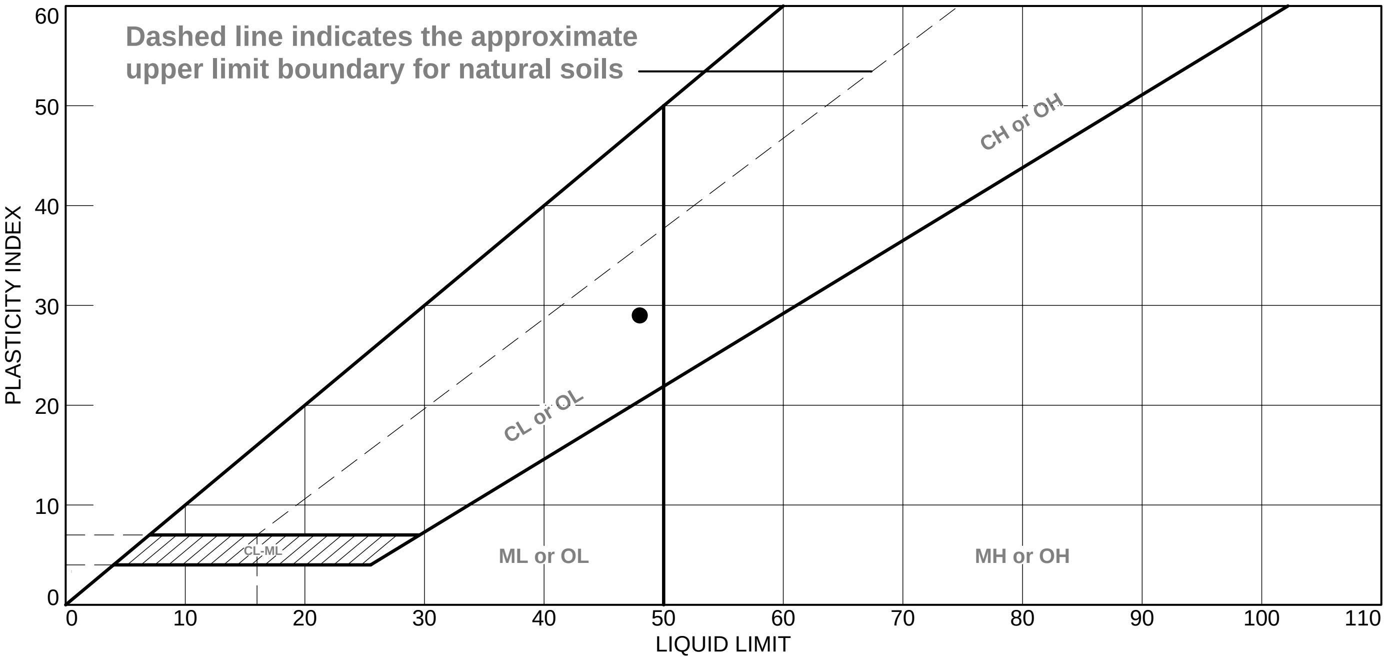
Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B012 **Depth:** 2.5'-4.0'
Sample Number: S-2

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND RUST BROWN MOTTLED LEAN CLAY	48	19	29			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B012 **Depth:** 15.0'-16.5'
Sample Number: S-7

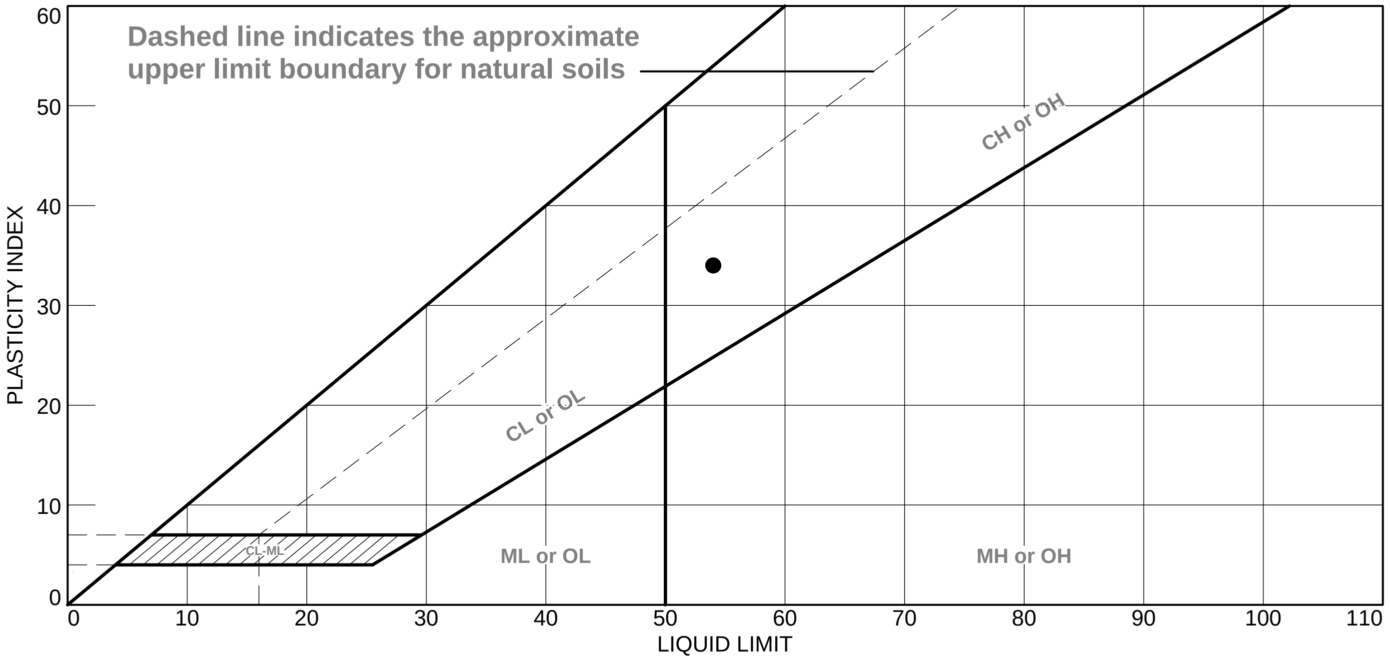
Terracon

Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY FAT CLAY	54	20	34			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

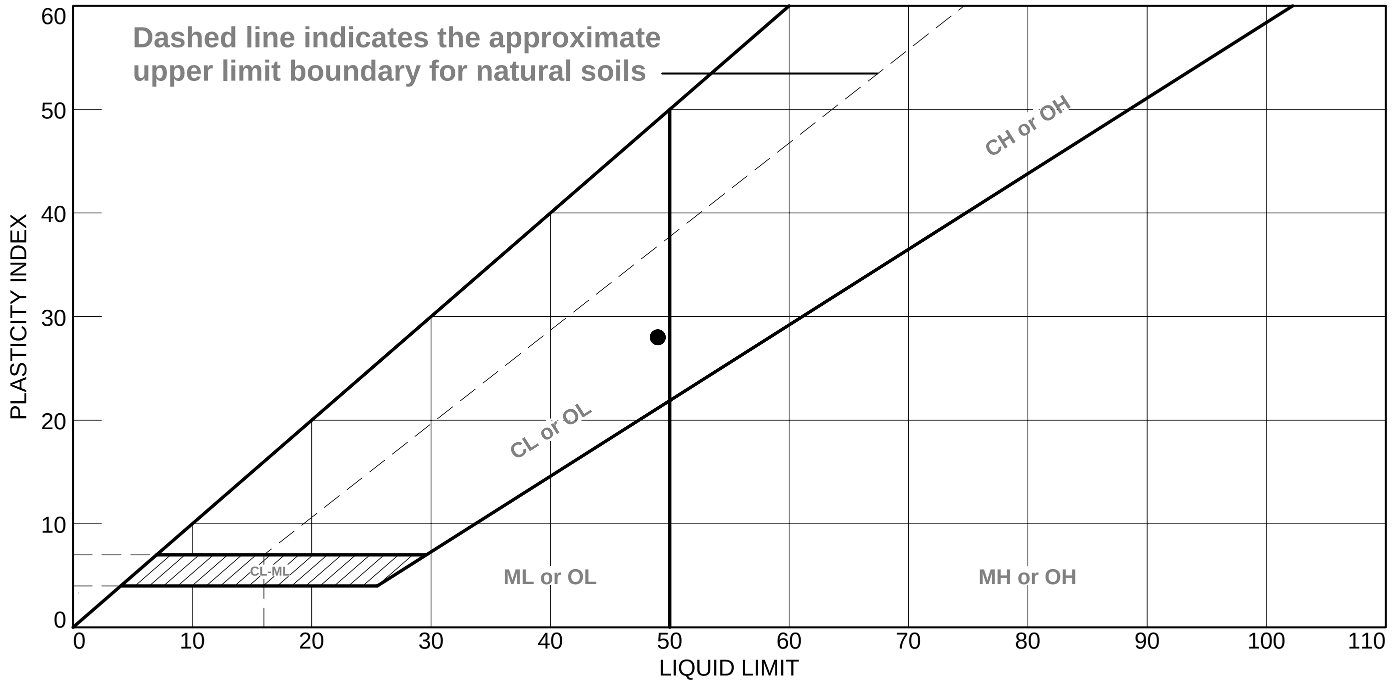
Source of Sample: EDW-B012 **Depth:** 47.0'-49.0'
Sample Number: S-14

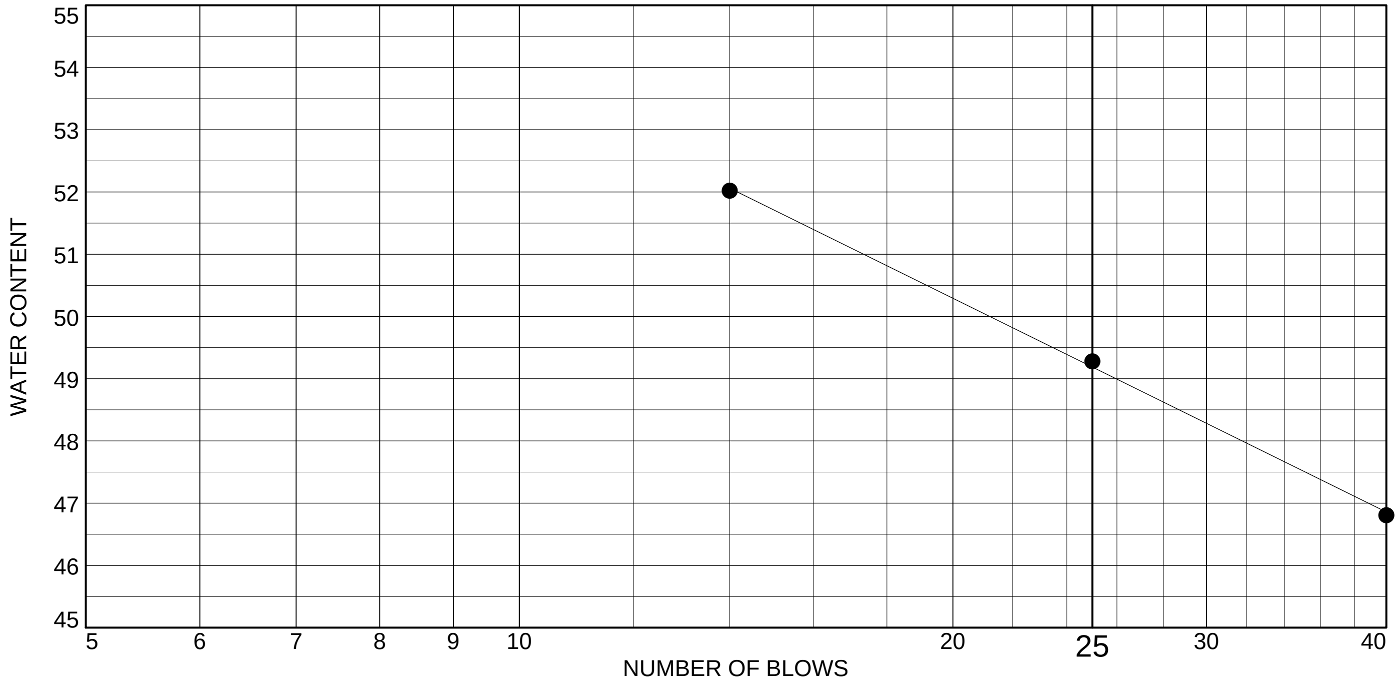
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWNISH GRAY LEAN CLAY WITH SAND AND GRAVEL	49	21	28			CL

Project No. MR155218 **Client:** DYNEGY

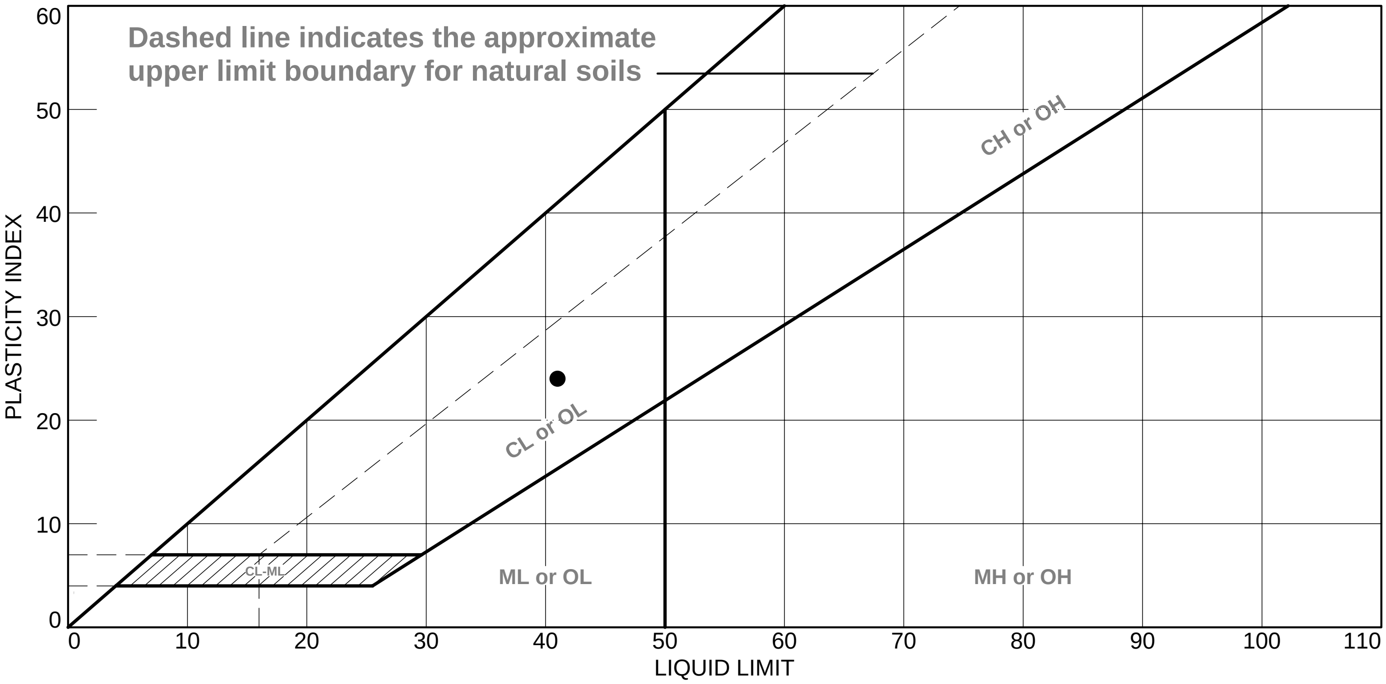
Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B013 **Depth:** 6.0'-8.0'
Sample Number: S-3

Remarks:

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY AND BROWNISH GRAY LEAN CLAY	41	17	24			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

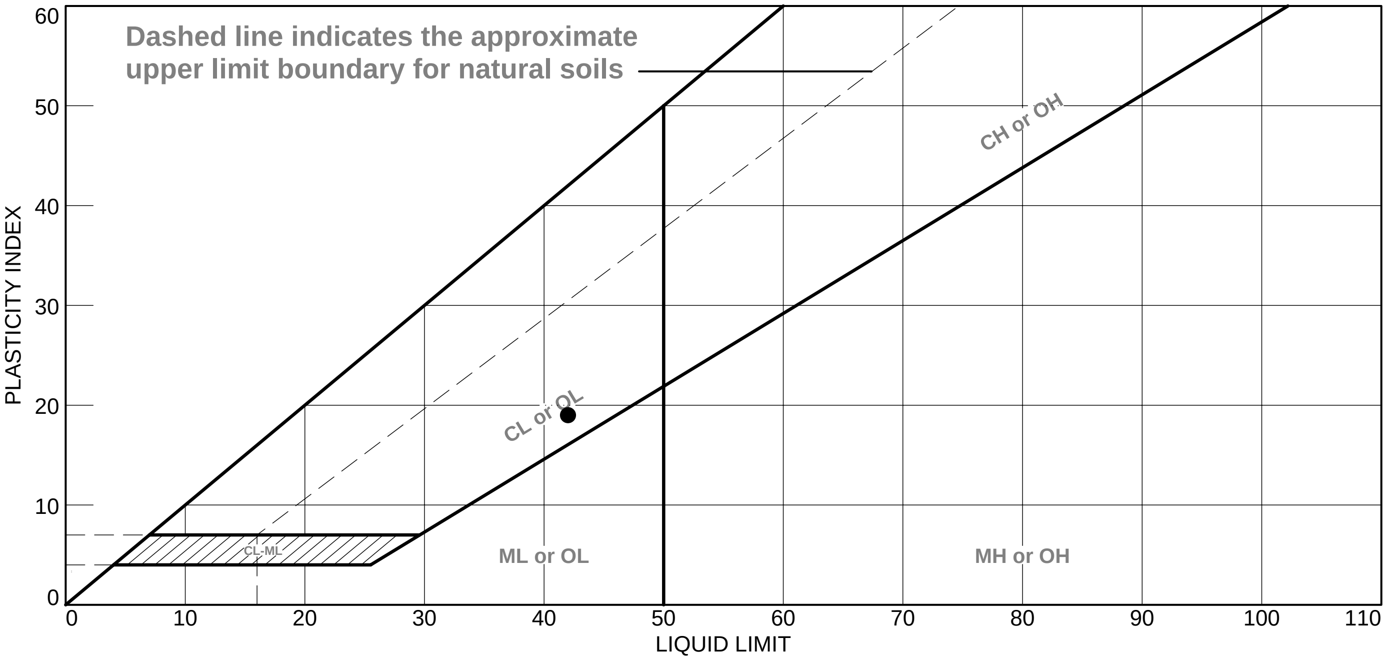
Source of Sample: EDW-B013 **Depth:** 15.0'-16.5'
Sample Number: S-6

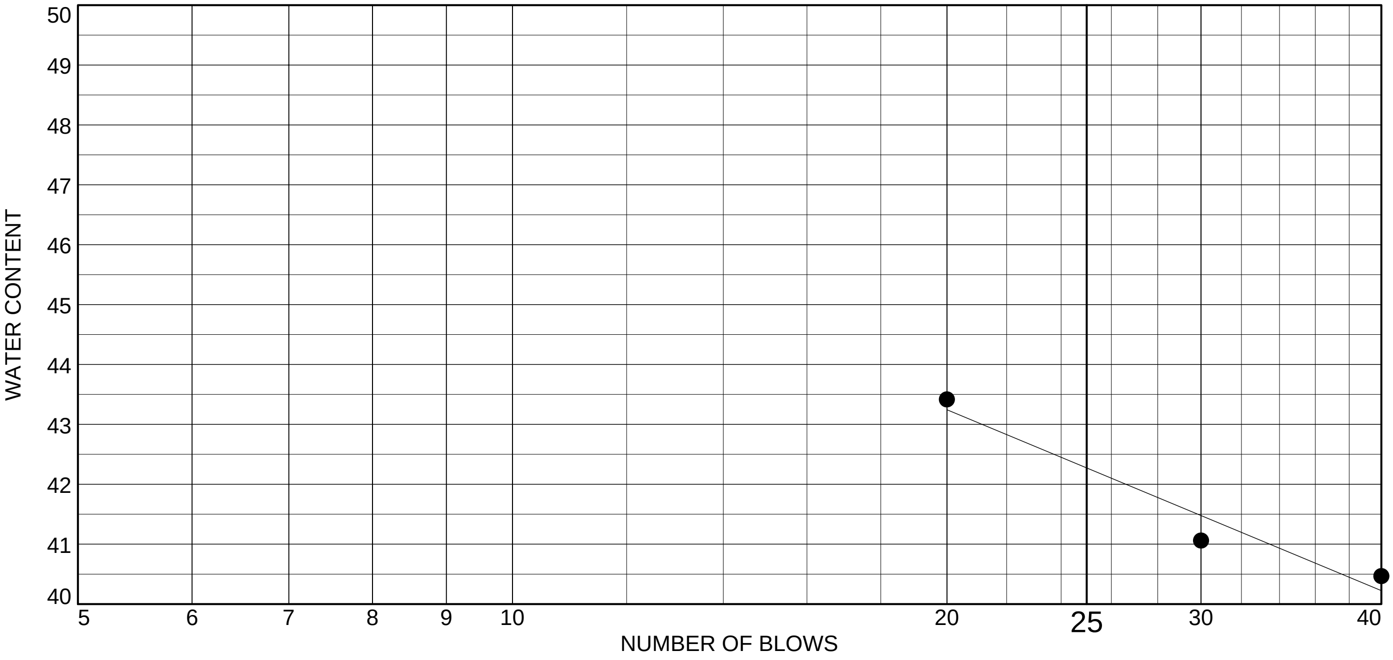
Remarks:

Terracon

Figure

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND BROWN LEAN CLAY WITH SAND	42	23	19			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

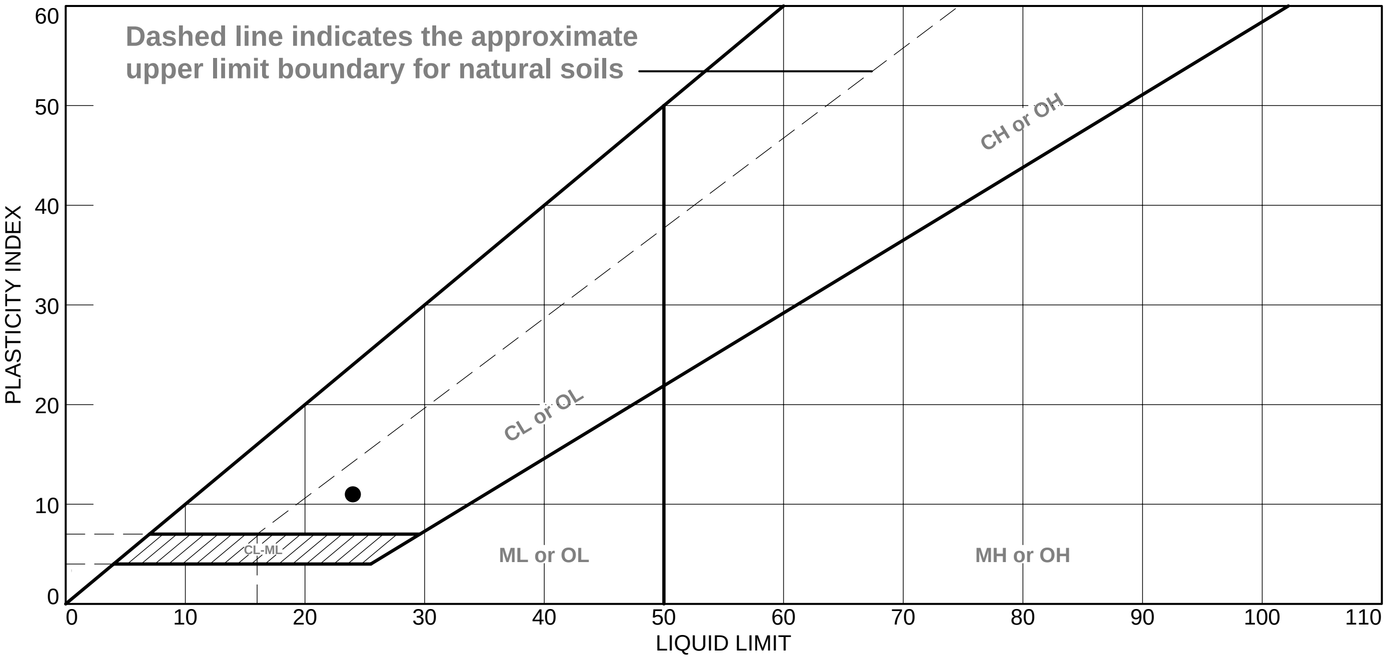
Source of Sample: EDW-B013 **Depth:** 32.0'-34.0'
Sample Number: S-10

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND GRAY MOTTLED SANDY LEAN CLAY WITH GRAVEL	24	13	11			CL

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B015 **Depth:** 31.0'-33.0'
Sample Number: S-10

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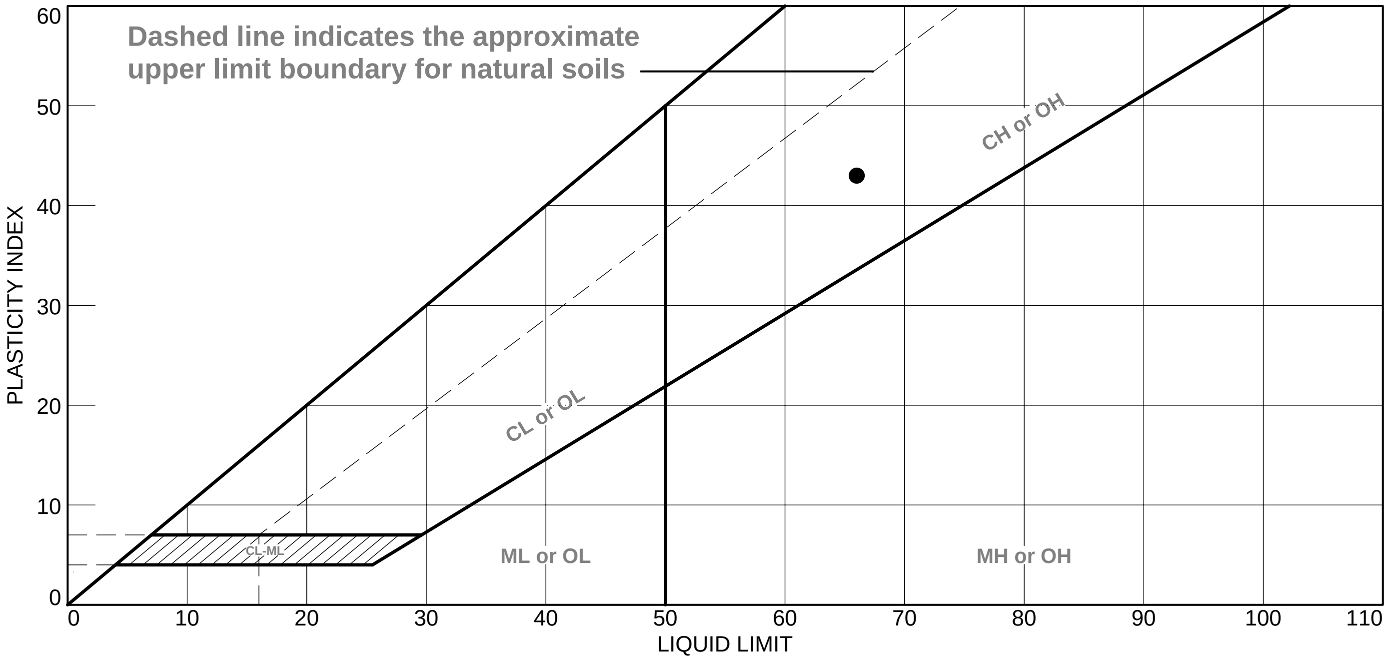
Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY FAT CLAY	66	23	43			CH

Project No. MR155218 **Client:** DYNEGY

Project: DYNEGY - EDWARDS SITE

Source of Sample: EDW-B015 **Depth:** 37.0'-39.0'
Sample Number: S-12

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Remarks:

Figure

Tested By: SJH **Checked By:** WPQ

SPECIFIC GRAVITY OF SOIL SOLIDS

ASTM D-854

Project Number: MR155218
Project Name: Dynegy Edwards
Test Date: 11/10/2015

Results Summary

Boring / Sample	Sample Description	USCS	Sample Number	Depth (ft)	Passing #4	Specific Gravity (Gs)
EDW-B002	DARK GRAY FLY ASH		S-8	25.0'-27.0'	100.00%	2.471
EDW-B002	GRAY LEAN CLAY	CL	S-11	40.0'-41.5'	100.00%	2.592
EDW-B003	FILL: DARK GRAY FLY ASH WITH SAND		S-1	0.0'-1.5'	100.00%	2.469
EDW-B003	FILL: DARK GRAY FLY ASH WITH SAND AND GRAVEL		S-6	15.0'-16.5'	100.00%	2.772
EDW-B004	GRAY LEAN CLAY WITH SAND	CL	S-14	50.0'-51.5'	100.00%	2.617
EDW-B005	DARK GRAY AND GREENISH GRAY LEAN CLAY WITH SAND - ORGANICS AND SHALE NOTED	CL	S-12	45.0'-46.5'	100.00%	2.521
EDW-B011	FILL: DARK GRAY FLY ASH - CLAY NOTED		S-8	25.0'-29.0'	100.00%	2.691
EDW-B014	FILL: DARK GRAY FLY ASH		S-7	20.0'-22.5'	100.00%	2.524
EDW-B014	BLUISH GRAY LEAN CLAY WITH SAND AND GRAVEL	CL	S-11	40.0'-40.5'	100.00%	2.719

Soil Resistivity	**AASHTO T 288/ ASTM G 57**
Soil pH	**AASHTO T 289/ ASTM G 51**
Soil REDOX	**DIPRA**
Soil Sulfides	**DIPRA**
Water Content	**AASHTO T 93/ ASTM D 2216**

Terracon
Consulting Engineers & Scientists

Laboratory Services Group **750 Corporate Woods Parkway** **Vernon Hills, Illinois 60061** **Ph. (224)352-7000** **Fax (224)352-7024**

Soil Corrosivity Indication Series

Project No.: MR155218
Project Name: DYNEGY EDWARDS

Client Name: AECOM
Test Date: 5/11/13/15

Summary of Test Results

Boring / Sample No.	Resistivity Natural Miller Soil Box(ohms)	Resistivity Saturated Miller Soil Box(ohms)	pH Soil Water Slurry	REDOX (mV)Soil Water Slurry	Sulfides Reaction	As Received WC%	Saturated WC%	Total Points
EDW-B002 S6	**1,720**	**1,550**	**9.77**	**65**	**NEG**	**52.3**	**77.4**	**14.5**
Points	0	8	3	3.5	0			
Description:	DARK GRAY FLY ASH							
EDW-B004 S3	**3,380**	**3,070**	**8.97**	**140**	**NEG**	**21.4**	**36.9**	**3.0**
Points	0	0	3	0	0			
Description:	BROWN AND GRAY LEAN CLAY							
EDW-B005 S12	**1,120**	**960**	**8.38**	**195**	**NEG**	**88.7**	**99.4**	**10.0**
Points	0	10	0	0	0			
Description:	DARK GRAY AND GREENISH GRAY LEAN CLAY WITH SAND							
EDW- B011 S6	**1,760**	**1,600**	**9.85**	**60**	**NEG**	**63.6**	**82.3**	**14.5**
Points	0	8	3	3.5	0			
Description:	DARK GRAY FLY ASH							
EDW-B0014 S7	**1,995**	**1,810**	**10.89**	**35**	**4**	**86.5**	**98.6**	**15.0**
Points	0	8	3	4	0			
Description:	DARK GRAY FLY ASH							

Resistivity:	Points:	pH:	Points:	Redox:	Points:	Sulfides:	Points:	†
<1500 ohms	10	0.0-2.0	5	Negative	5	Positive	3.5	
1500-1800	8	2.0-4.0	3	0 - 50mV	4	Trace	2	
1800-2100	5	4.0-6.5	0	50 - 100mV	3.5	Negative	0	
2100-2500	2	6.5-7.5	0*	100mV+	0			
2500-3000	1	7.5-8.5	0					
3000+	0	8.5 +	3					

*- If Sulfides are present and a low or neg. ReDox, add 3 points

† - THIS SYSTEM IS BASED ON A 25.5 POINT CORROSIVITY RATING SYSTEM DEVELOPED BY THE AMERICAN NATIONAL STANDARDS FOR POLYETHYLENE ENCASEMENT AND DUCTILE-IRON PIPE SYSTEMS. IT SHOULD BE NOTED THAT THESE TEST RESULTS ARE AN INDICATION OF SOIL CHEMISTRY AND SHOULD BE USED AS A INDICATION OF POSSIBLE CORROSIVE CONDITIONS. TERRACON IS NOT LIABLE FOR ANY REMEDIAL MEASURES TAKEN ON THE BASIS OF THESE RESULTS.

Tested by: BCM

Checked By: WPQ

ORGANIC CONTENT TEST
ASTM D-2974
Method C

Project No.:	MR155218
Project Name:	DYNEGY - EDWARDS SITE
Client:	AECOM
Date Tested:	11/13/2015

Sample Information

Boring / Source:	EDW-B005
Sample No.:	S-12
Depth (ft.):	45.0-46.5'
Description:	CL

Organic Content Test Data

Tare No.:	C
Tare Wt. (gm):	20.04
Wet Wt. + Tare (gm):	49.66
Dry Wt. + Tare (gm):	36.05
Moisture Content (%):	**85.01**
Wt. of Ash + Tare (gm):	34.63
Percent Ash:	91.13
Organic Content (%):	**8.87**

** Note: Test performed by heating the sample to 440 degrees Centigrade until constant weight of ash is attained.

Attachment F. Material Characterization Calculations

1. Objective

This calculation package summarizes the material characteristics of the subsurface strata encountered during AECOM's geotechnical investigation of the Ash Pond at Dynegy's Edwards Power Station in Bartonville, Illinois. Selection of material properties for slope stability analyses is also developed and summarized within this package.

2. Subsurface Conditions

A subsurface exploration was performed at the East Ash Complex between August 19 and November 5, 2015. The subsurface exploration included the following; fourteen soil borings, installation of four piezometers to monitor phreatic conditions, and a program of twenty-two cone penetrometer test (CPT) soundings. Pore pressure dissipation testing and seismic shear wave velocity measurements were conducted on a selection of the CPT soundings. A full set of AECOM's boring logs, including soil descriptions, types of sampling, and choice laboratory test results, is provided in **Attachment B** of the report. A complete report that includes the graphical CPT logs and the results of the SCPTu and PPD tests is included in **Attachment D** of the report. The geotechnical exploration locations are shown on **Figure 2-1 – East Ash Pond Geotechnical Site Plan** in **Attachment A** of the report.

Based on the results of the investigation, five main stratigraphic materials were identified at the site. These are listed below and briefly summarized:

New Embankment Materials: The perimeter embankment / dike of the Edwards Ash Pond was constructed in two stages, with an original embankment, and a later raise constructed on top of and on the downstream slope of the existing dike, to facilitate the addition of a rail loop around the impoundment. This raise was completed in the early 2000s, raising the dike crest from an original elevation around 455 ft to the current typical elevation around 461 ft. This newer embankment fill material is comprised of fly ash from the plant (as beneficial reuse material), classified as lean silt (ML) to poorly-graded silty sand with gravel (SP). The consistency of the new embankment fill, as measured by the standard penetration test, ranged from soft to very stiff, but generally had a stiff to very stiff consistency and appeared to be well-compacted materials.

Table F-1: New Embankment Material Summary

Category	Min.	Max.	Representative Average
First Encountered (ft bgs)	<0.5	<0.5	<0.5
Thickness (feet)	7.5	11	9.6
SPT-N	2	28	11
Pocket Penetrometer (tsf)	.125	1.5	.75
Cone Resistance (tsf)	2	537	95
Sleeve Resistance (tsf)	<0.25	6.8	1.1
Cone/Sleeve Ratio (%)	<0.25	9.2	2.0
SCPTu Shear Wave Velocity (ft/sec)	400	1250	600

Historical compaction data for the new embankment fill material was not available, but field data are generally indicative of well-compacted materials.

Old Embankment Materials: As noted above, the original Ash Pond dike was constructed to approximately elevation 455 ft, but was raised in the early 2000s to facilitate the addition of the rail loop. The original perimeter embankment / dike of the Edwards Ash Pond is largely comprised of clay fill with trace sand and shells, classified as lean clay (CL). The consistency of the old embankment fill, as measured by the standard penetration test, ranged from soft to stiff, but generally had a stiff consistency and appeared to be well-compacted materials. It was noted that the Old Embankment Fill generally had a higher measured shear strength above approximately elevation 450 ft, so this material was split into two materials (Old Embankment Fill 1 and Old Embankment Fill 2) within the slope stability models.

Table F-2: Old Embankment Fill Material Summary

Category	Min.	Max.	Representative Average
First Encountered (ft bgs)	<0.5	11	6.8
Thickness (feet)	11	24.5	16.7
SPT-N	2	13	7
Pocket Penetrometer (tsf)	.25	2.125	1
Cone Resistance (tsf)	2	444	13
Sleeve Resistance (tsf)	<0.25	2.3	<1
Cone/Sleeve Ratio (%)	<0.25	8.3	4.3
SCPTu Shear Wave Velocity (ft/sec)	400	450	400

Impounded Ash Materials: Fly ash materials were encountered in the borings drilled within the Edwards Ash Pond. The material was generally silt sized with some sand and clay, and trace gravel, and was classified as a silt (ML - fly ash). The measured consistency of the ash ranged from very loose to very dense, though generally, the consistency of ash was loose to very loose and was saturated below the residual water level in the Ash Pond.

Table F-3: Ash Material Summary

Category	Min.	Max.	Representative Average
First Encountered (ft bgs)	<0.5	<0.5	<0.5
Thickness (feet)	2.5	40	24.7
SPT-N	0	100	12
Pocket Penetrometer (tsf)	N/A	N/A	N/A
Cone Resistance (tsf)	2	969	39
Sleeve Resistance (tsf)	<0.25	3.9	<1
Cone/Sleeve Ratio (%)	<0.25	13.8	2.6
SCPTu Shear Wave Velocity (ft/sec)	450	600	600

Native Alluvial Clay Crust: The Edwards Ash Pond is underlain by a native clay of alluvial origin. This material was typically classified as lean clay (CL), with some zones of fat clay (CH) occasionally identified. (Much of the clay has a Liquid Limit near 50, denoting a borderline fat/lean clay.) The uppermost approximately 5 feet of this native alluvial clay, near the original ground surface, measured significantly higher in strength, signifying a desiccated crust layer at the original ground surface. The consistency of this clay was generally stiff.

Table F-4: Native Alluvial Clay Crust Summary

Category	Min.	Max.	Representative Average
First Encountered (ft bgs)	0	35	24.9
Thickness (feet)	2	5	4.3
SPT-N	4	14	8
Pocket Penetrometer (tsf)	.5	1.5	.75
Cone Resistance (tsf)	3	47	12
Sleeve Resistance (tsf)	<0.25	1.6	<1
Cone/Sleeve Ratio (%)	<0.25	8.5	4.1
SCPTu Shear Wave Velocity (ft/sec)	450	600	500

Native Alluvial Clay: As noted above, the Edwards Ash Pond is underlain by a native clay of alluvial origin, typically classified as lean clay (CL), with some zones of fat clay (CH) occasionally identified. (Much of the clay has a Liquid Limit near 50, denoting a borderline fat/lean clay.) Beneath the upper crust material, the clay has significantly less shear strength, and is normally consolidated or slightly over-consolidated, with strength increasing with depth. The clay consistency varied from soft to medium stiff near the top of the stratum, generally increasing in strength with depth to a consistency of medium stiff to stiff at the bedrock below. To capture this strength increase within the stability models, this material was divided into three layers (Native Clay 1, Native Clay 2, Native Clay 3).

Table F-5: Native Alluvial Clay Summary

Category	Min.	Max.	Representative Average
First Encountered (ft bgs)	5	40	30
Thickness (feet)	5.5	28	17.9
SPT-N	0	100	6
Pocket Penetrometer (tsf)	.125	1.5	.5
Cone Resistance (tsf)	2	40	7
Sleeve Resistance (tsf)	<0.25	1.7	<1
Cone/Sleeve Ratio (%)	<0.25	10.9	2.7
SCPTu Shear Wave Velocity (ft/sec)	400	800	500

Shale Bedrock: Shale bedrock was encountered below the native alluvial soils in several of the borings. The shale was found to be slightly weathered to weathered near the upper contact, and became hard with depth. The shale was cored in two locations to verify classification, but no further testing was completed on this material.

Other Materials: Other materials were encountered in relatively small quantities at the site, appearing at only one or two exploration locations, and were not considered part of the site-wide stratigraphy. These materials include old and recent fill (similar in properties to the old and new embankment fill materials), historic ash material (similar in properties to the more recent ash fill), and crushed stone embankment fill in the cut-off embankment that constructed the “Dead Pond”. The crushed stone embankment fill was observed to be medium dense, fine to coarse, crushed stone gravel with sand, classified as poorly graded gravel (GP). A final additional material, a clean crushed stone toe drain material, was noted on available historical design drawings, but not encountered in the borings performed for this project.

3. Laboratory Testing Program

Representative samples were collected at regular intervals from the borings and were utilized for laboratory testing. The laboratory tests were assigned to characterize the site materials including index (moisture content, unit weight, Atterberg limits, specific gravity, and particle size analysis), permeability and consolidation tests. Strength testing included isotropically consolidated-undrained triaxial tests with pore pressure measurements (CIU), Unconfined Compression (UC) tests, and direct shear tests (DS) on the native clay materials, embankment materials, and ash materials.

Table F-6: Laboratory Testing Program for Ash Pond

ASTM Designation	Test Type	Number of Tests							
		Total	Ash	New Embankment Fill	Old Embankment Fill	Other Fill Materials	Native Clay Crust	Native Clay	Bedrock
D2216	Moisture Content	181	47	15	21	19	5	56	18
D4318	Atterberg Limits	26	4	1	5	1	1	14	-
T311, D1140, D422	Gradation / Hydrometer	10	7	3	-	-	-	-	-
D854	Specific Gravity	9	5	-	-	-	4	-	-
D5084	Hydraulic Conductivity	3	2	-	-	-	-	1	-
D2435	Consolidation	2	-	-	-	-	-	2	-
D 2166	Unconfined Compression	5	-	-	-	-	-	5	-
D4767	Consolidated Undrained Triaxial (CIU)	5	-	-	3	-	-	2	-
D6528	Direct Shear (DS)	8	2	-	-	-	1	5	-
G57, G51	Corrosion Suite	5	4	-	-	-	-	1	-

Compete results of the laboratory tests are included in **Attachment E** of the report.

4. Material Properties

Material properties for slope stability analyses were developed using both laboratory testing data (index and strength testing) and strength correlations from SPT and CPT data.
The following specific material properties were developed for the new embankment material, old embankment material, impounded ash, native clay crust, and native clay, for use in the various stability analyses performed as part of this study:

- Unit Weight
- Drained and Undrained Shear Strength of Fine-Grained Soil Strata
- Drained and Undrained Shear Strength of Ash

Material properties for the various historic fill materials on site were conservatively estimated based on the data available, empirical correlations, and experience with similar materials.

Unit Weight

Unit weight for the old embankment, ash, native clay crust, and native clay materials were evaluated using measured results from samples collected. Values were plotted and design unit weight lines were then fit to the plotted data, and layers were divided where warranted by differences in the data. Plots of these measured values are included as Attachments F.1 through F.5 at the end of this document.

For materials that could not be directly measured for unit weight (new embankment and crushed stone, and historic fill materials), estimates of the unit weight were based on empirical correlations, and experience with similar materials.

The following total unit weights were selected for use in stability analyses:

- New embankment (compacted ash): 115 pounds per cubic foot (pcf),
- Old embankment: 125 pcf,
- Ash materials: 105 pcf,
- Native clay crust: 120 pcf, and
- Native Clay: 105-117 pcf.

Drained Shear Strength Selection

Drained shear strengths were selected for all materials for use in the Long Term and Max Pool analyses. Drained strengths were primarily based on results from DS and CIU testing. Plots of both effective friction angle and effective cohesion values were created for each material type to estimate average values across each material. To supplement the effective friction angle measured in laboratory testing, correlated values of phi' were calculated using the procedure developed by Peck, Hanson, and Thornburn, 1974, based on corrected SPT blow counts. Measured laboratory values were given precedence when selecting design values. For materials that could not be directly measured for drained shear strength (new embankment, crushed stone and historic fill materials), the above correlation was used for effective friction angles. Effective cohesion values for these materials were conservatively estimated based on experience with similar materials. Where materials existed, but were not encountered in the field investigation (gravel toe drain, GP) experience with similar materials was used. Design strength lines were then fit to the plotted data, and layers were divided where warranted by differences in the data. Plots of the measured and correlated drained shear strength values for the five primary materials are included as Attachments F.1 through F.5.

Undrained Shear Strength Selection

Undrained shear strengths were selected for the cohesive materials for use in the Pseudostatic and analyses. Undrained strengths were based on results from CIU and UC testing, and correlated values of undrained shear strength from the CPT tests. Plots of undrained shear strength were created for each material type to estimate average values across each material. To supplement the undrained shear strengths measured in laboratory testing, correlated values were calculated using the procedure developed by Aas, et al (1986), based on CPT data. An NKT factor of 17 was selected for use in this correlation based on published values. S_u / σ'_{vo} lines were also calculated and plotted for comparison purposes. Design strength lines were then fit to the plotted data, and layers were divided where warranted by differences in the data. Plots of the measured and correlated undrained shear strength values for the five primary materials are included as Attachments F.1 through F.5.

Bedrock Material Selection

Based on the field investigation, the bedrock encountered is generally hard shale. SPT samples of this material were recovered, though testing, other than water contents, was generally not possible. Therefore, conservative strength and unit weight values were selected for this material, based on experience with similar materials. Failure surfaces within the models are generally not expected to extend through this material.

5. Material Properties for Analysis

The table below summarizes the material parameters used in the stability analysis, based on the analysis and strength selection procedures and considerations presented in the preceding sections.

Table F-8: Summary of Material Parameters used in Stability Analysis

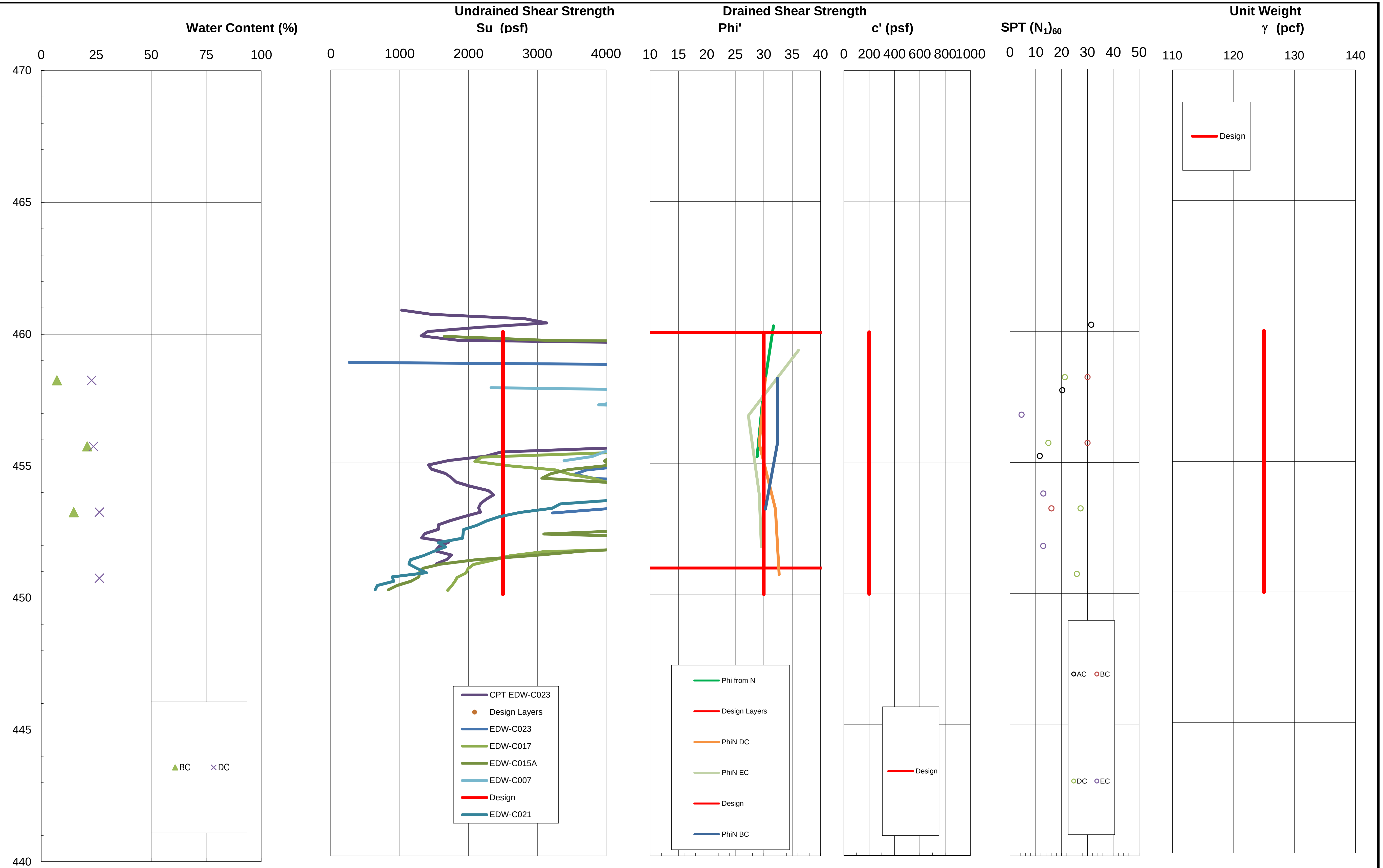
Material	Unit Weight Above WT (pcf)	Unit Weight Below WT (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
			c' (psf)	Φ' (°)	c (psf)	Φ (°)
New Embankment	115	115	200	30	2500	0
Old Embankment 1	125	125	200	28	2500	0
Old Embankment 2	125	125	100	29	1250	0
Native Clay Crust	120	120	200	27.5	1250	0
Native Clay 1	117	117	100	26	650	0
Native Clay 2	105	105	200	26	700	0
Native Clay 3	105	105	200	26	900	0
Fly Ash	105	105	100	27	600	0
Historic Ash	105	105	100	26	750	0
Historic Fill	125	125	200	28	1000	0
Recent Fill	115	115	200	30	1250	0
GP (Very Dense)	135	135	0	36	0	36
New Embankment (Crushed Stone - Sandy Gravel)	120	120	0	32	0	32
Bedrock - Shale	140	140	1000	36	1000	36

References:

Aas, G., Lacasse, S., Lunne, I., and Hoeg, K. (1986). “Use of In situ Tests for Foundation Design in Clay,” Proceedings, In Situ 86, American Society of Civil Engineers, pp. 30.

Peck, R.B., Hanson, W.E. and Thornburn, T.H., 1974. Foundation Engineering, 2nd edition, John Wiley and Sons, Inc.

Attachment F.1 Material Characterization Plot – New Embankment



New Embankment Data

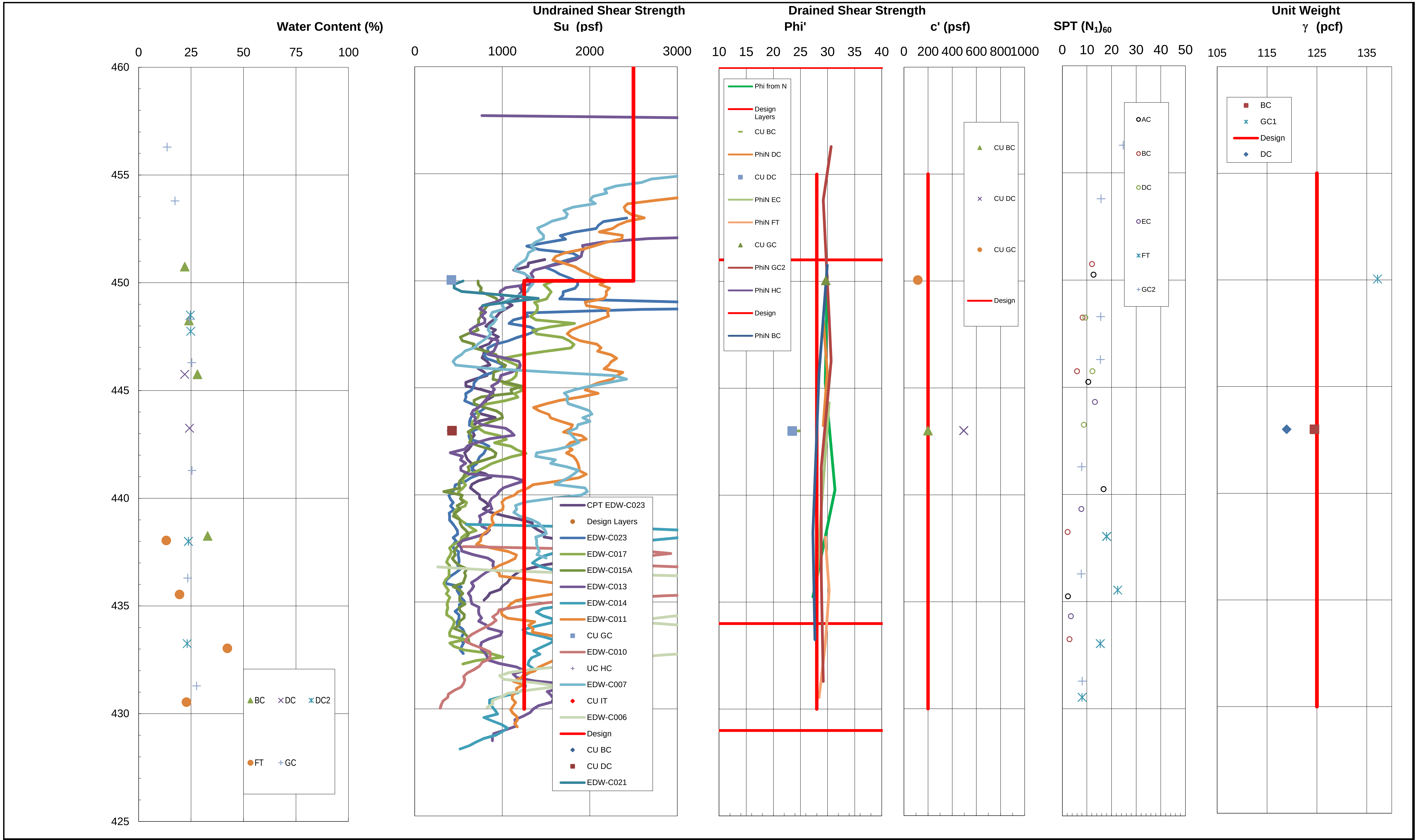
Project No.
60440202

Material Properties

AECOM

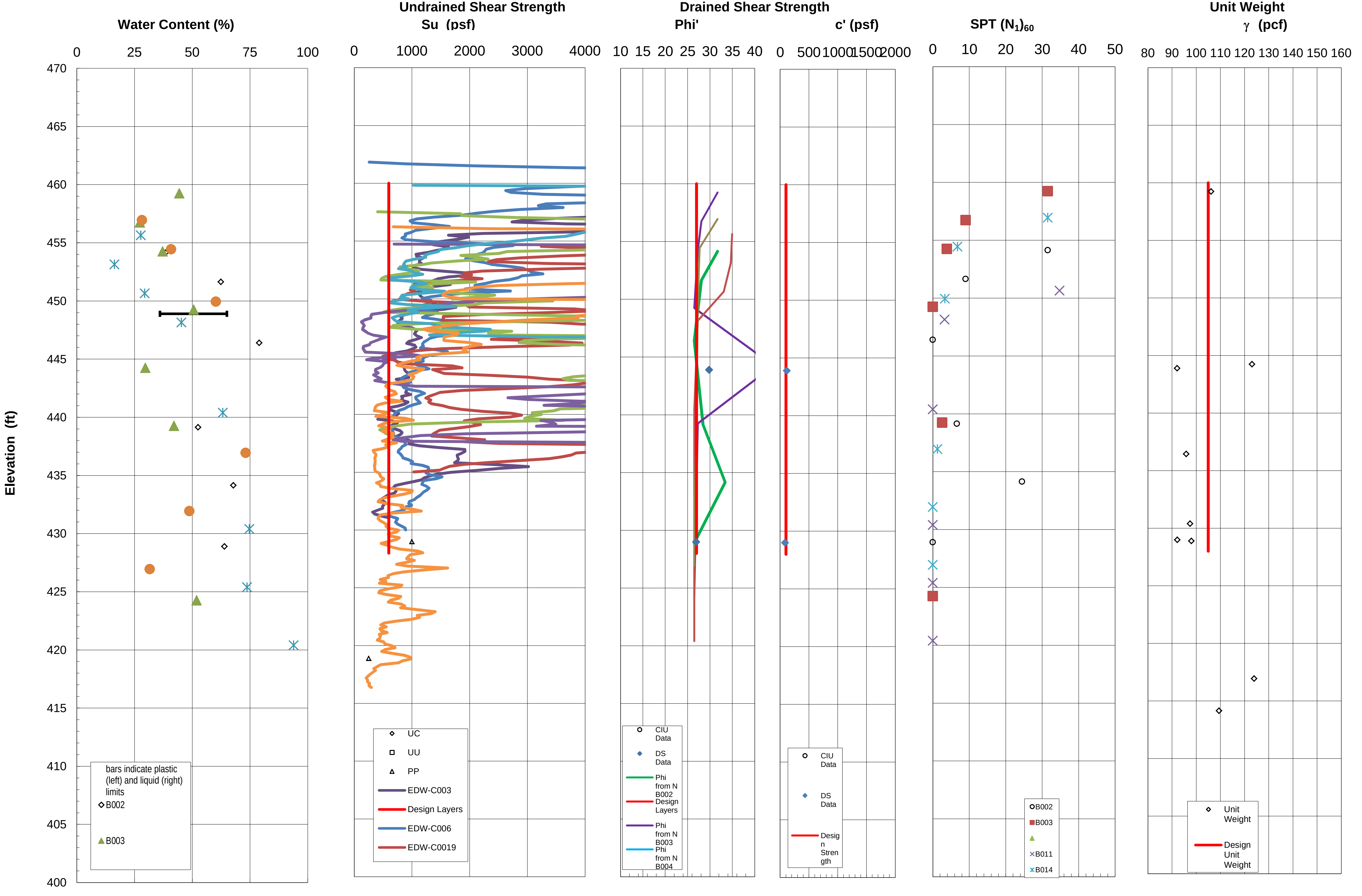
Attachment
F.1

Attachment F.2 Material Characterization Plot – Original Embankment Data



Original Embankment Data	Project No. 60440202	Material Properties	AECOM		Attachment F.2

Attachment F.3 Material Characterization Plot – Ash Data



Ash Data

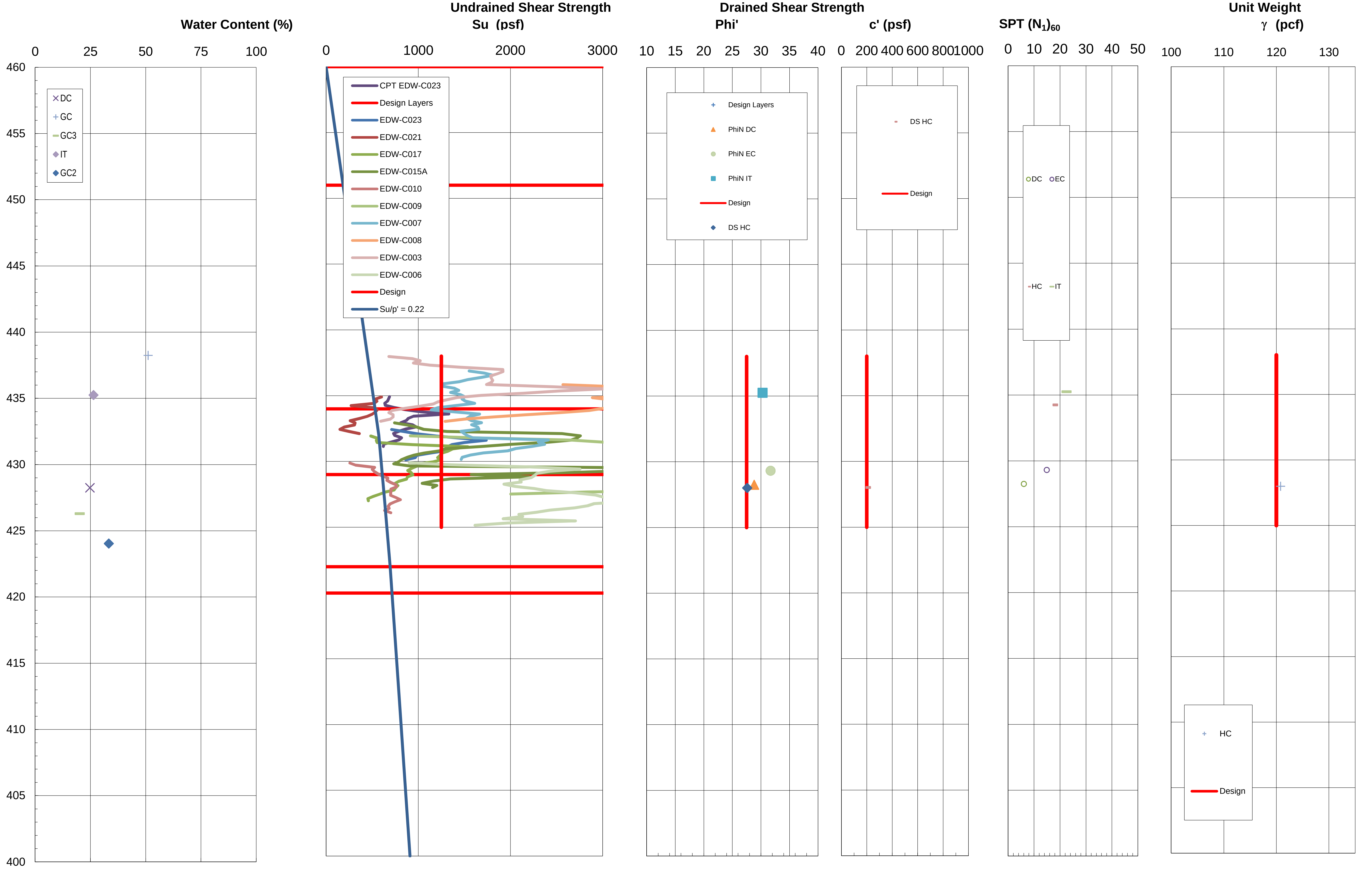
Project No.
60440202

Material Properties

AECOM

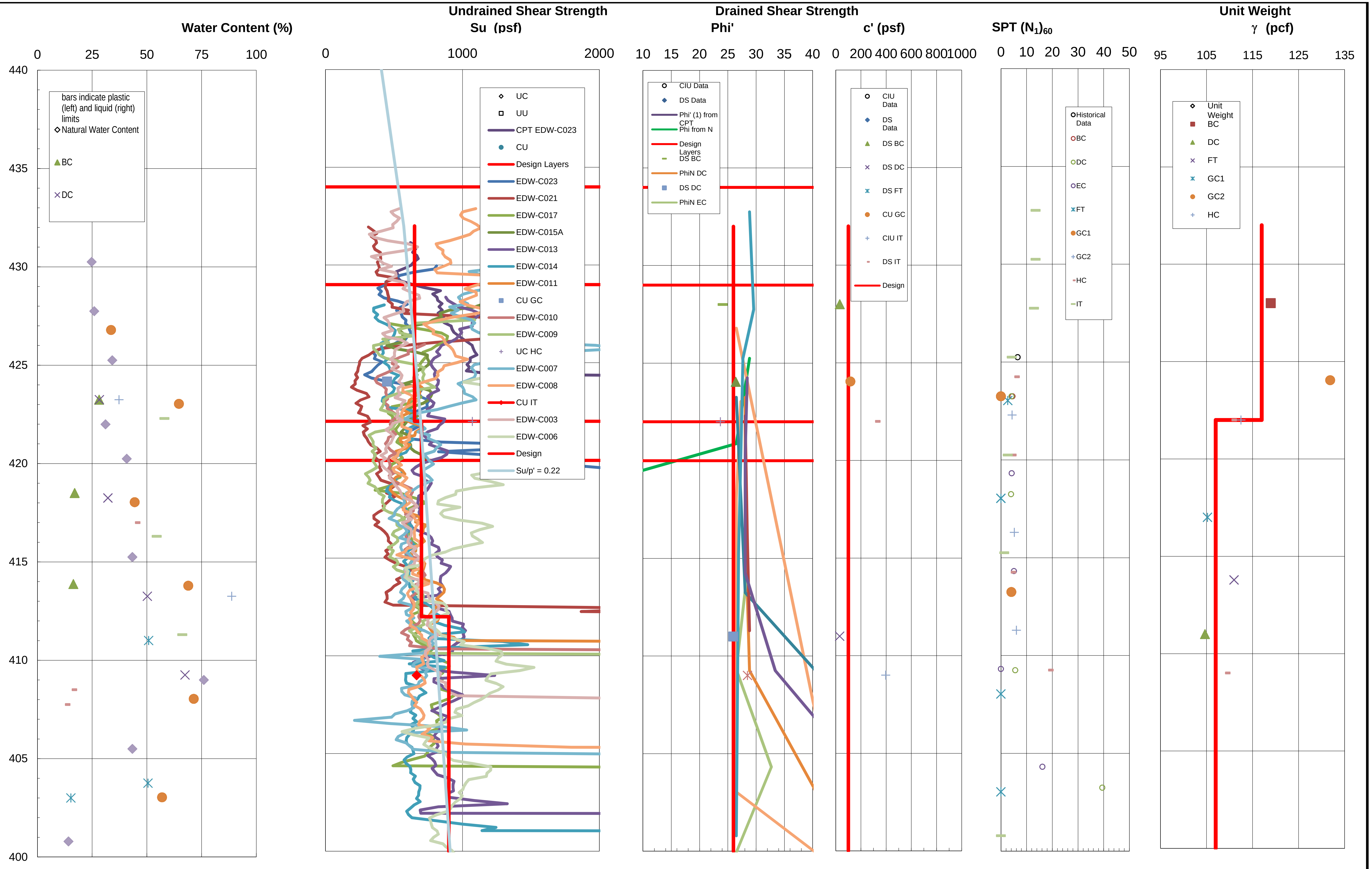
Attachment
F.3

Attachment F.4 Material Characterization Plot – Native Clay Crust Data



Native Clay Crust Data	Project No. 60440202	Material Properties	AECOM		Attachment F.4

Attachment F.5 Material Characterization Plot – Native Clay Data



Native Clay Data	Project No. 60440202	Material Properties	AECOM		Attachment F.5

Attachment G. Slope Stability Analysis

1. Objective & Introduction

This calculation package summarizes the limit equilibrium slope stability analyses for both the static and seismic loading conditions performed in support of the Edwards Ash Pond CCR Unit Geotechnical Report for Dynegy's Edwards Power Station. Figures, calculations and computer program outputs are provided as attachments and are referenced herein. Slope stability analyses have been completed for ten cross-sections within the Edwards Ash Pond to evaluate the stability of the embankment under loading conditions required by the CCR Rule.

The objective for the slope stability analysis is to determine factors of safety (FoS) at critical cross section locations across the East Ash Pond dike complex for the following loading cases:

- Static, Steady-State, Normal Pool Conditions;
- Static, Maximum Pool Surcharge Conditions;
- Seismic Slope Stability Analysis;

The factors of safety determined from each of these loading conditions will be utilized to determine if the requirements outlined by the USEPA CCR Rule criteria are met. The methodology used to perform the slope stability analysis and the results of the analyses are summarized in the subsequent sections listed below.

2. Development of Cross-Sections for Analysis

A total of ten cross-sections (A, B, C, D, E, F, G, H, I, and J) were utilized to evaluate the perimeter embankment stability at the Ash Pond.

The section geometry for each analysis cross-section was determined based on the LiDAR ground surface topographic contours obtained from the Illinois Geospatial Data Clearinghouse.

3. Subsurface Conditions

Subsurface materials and extents (stratigraphy) at each cross section were developed by utilizing nearby subsurface explorations (CPTs and borings) from AECOM's exploration activities and historic geotechnical explorations. The subsurface strata generally encountered across the exploration locations can be generalized into five typical layers. These layers are listed below and are further described in Appendix F – Material Characterization.

- New Embankment Fill Materials
- Old Embankment Fill Materials
- Ash Material
- Native Alluvial Clay Crust
- Native Alluvial Clay

Material interfaces inferred from the subsurface explorations nearest to the cross-sections were transposed onto the profile and a reasonable interpretation of the subsurface stratigraphy between the exploration locations was developed. Table G-1 below summarizes the exploration locations utilized to construct each cross-section:

Table G-1
Cross-section Locations for Slope Stability Analyses

Cross-Section	Approximate Station	Location (Crest/Toe)	Boring/CPT Number
A	15+00	CREST	EDW-B001, EDW-C001
		TOE	
B	18+00	CREST	EDW-B010, EDW-C023
		TOE	
C	31+00	CREST	EDW-C021
		TOE	
D	41+00	CREST	EDW-B012, EDW-C017
		TOE	
E	51+00	CREST	EDW-B009, EDW-C015
		TOE	EDW-C016
F	54+00	CREST	EDW-C013
		TOE	EDW-B008, EDW-C014
G	58+00	CREST	EDW-B005, EDW-B013, EDW-C011, EDW-C012
		TOE	EDW-C010
H	60+00	CREST	EDW-B015, EDW-C009
		TOE	
I	67+00	CREST	EDW-C007
		TOE	EDW-B006, EDW-C008
J	87+00	CREST	EDW-C003
		TOE	

Additionally, design drawings from “Proposed 150 Car Loop Track For Edwards Power Plant Bartonville, Illinois” by Design Nine, Inc. (2003) were used to supplement the subsurface investigation in developing the subsurface embankment geometry. The relevant CPT soundings and test borings that were used to develop subsurface stratigraphy at the 10 analysis sections are listed in Table E-1 below.

Phreatic conditions were modeled as a piezometric line in SLOPE/W. Elevations and configuration of the lines were established based on the water levels encountered in the borings and CPTs, the piezometers installed during the 2015 AECOM exploration, and the normal pool elevation of approximately 447.2 feet for the Clarification Pond sub-basin and 449.5 feet for the Cooling Pond sub-basin, based on the 2016 AECOM hydraulics and hydrology report (AECOM, 2016).

4. Analysis Methodology

Analyses were performed using Spencer's Method which is a limit equilibrium slope stability analysis procedure. The computer program SLOPE/W 2012 by Geo-Slope International was utilized. The program analyzes a large number of potential slip surface geometries and identifies the geometry that results in a critical (i.e. lowest) factor of safety (FS). Additional information on the program is available at http://www.geo-slope.com/. Circular shaped failure surfaces, with optimization, were analyzed for the each of the loading cases considered. The optimization option within Slope/W allows the checking of non-circular failure surfaces by incrementally altering the location of the failure surface to find the lowest factor of safety. This procedure allows the failure surface to follow thin layers of lower strength, and interface boundaries to calculate a more critical factor of safety.

Each section was analyzed for the following cases:

- **Static, Steady-State, Normal Pool Condition:** This case models the conditions under static, long-term conditions, under the normal storage water level within the impoundment. Drained (effective stress) shear strength parameters were used for all materials, and phreatic conditions were estimated based on available data as described above. A target **Factor of Safety of 1.50** is needed for this loading condition. The operating water level of the Ash Pond is El. 447.2 and 449.5 ft, obtained from AECOM's Hydrologic and Hydraulic Analysis, for the Clarification Pond and Cooling Pond sub-basins, respectively. These levels were utilized in this analysis.
- **Static, Maximum Surcharge Pool Condition:** This case models the conditions under short-term surcharge pool conditions. Drained (effective stress) shear strength parameters were used for all materials, as the change in pool elevation primarily affects the upstream slope of the dike and is not anticipate to result in the development of undrained conditions within the downstream face of the dike, which is where the critical slip surface was found from the normal pool condition analysis. It was assumed that the temporary surcharge load was not of a sufficient duration to significantly alter the phreatic surface (i.e. saturation line within the embankment). Therefore, the phreatic surface was modeled equivalent to the steady state case. A target **Factor of Safety of 1.40** is needed for this loading condition. The water level of the Ash Pond was modeled at El. 457.8 and 457.4 ft for the Clarification Pond and Cooling Pond sub-basins, respectively, for this case. These values are from the 2016 Hydraulics and Hydrology report generated for this project.

- **Seismic Stability Condition:** These analyses incorporate a horizontal seismic coefficient kh selected to be representative of expected loading during the design earthquake event (i.e., a "pseudostatic" analysis). The analyses utilized peak undrained strength parameters in soils that are not consider to be rapidly draining materials, and peak drained strengths in soils considered to freely drain. The phreatic surface and pore water pressures corresponding to the Steady State Normal Storage Pool case from the static analyses were utilized. Seismic loading was included in this analysis using a pseudostatic coefficient (kh). A **Factor of Safety of 1.00** is required for this loading condition.

  Ground motion parameters for the pseudostatic analysis were estimated using the USGS Interactive Deaggregation tool (http:earthquake.usgs.gov/hazards/apps/). This application generates acceleration values, including peak ground acceleration (PGA), and mean and modal moment magnitudes, based on user entered values of location, exceedance probability, and spectral period. Results are computed based on the 2008 NSHMP PSHA Seismic Hazard Maps.

  For the Edwards Power Station, the calculated PGA for a 2,500-year event was 0.067g for top of hard rock. To determine the free-field, ground surface horizontal acceleration, the site was classified according to the site classes defined in IBC (2003) and amplified using the site amplification factors found in NEHRP (2009) The site class was determined based on the weighted average of the shear wave velocity of the foundation soils (600 ≤ vs ≤ 1,200 ft/s) and found to be Site Class D. This corresponds to a NEHRP amplification factor of 1.6, resulting in a ground surface acceleration of 0.107g. The Peak Transverse Acceleration at the dike crest was estimated using the ground surface acceleration and the procedure proposed by Idriss (2015), resulting in a crest acceleration of 0.32.

The pseudostatic coefficient was calculated based on the simplified procedure developed by Makdisi and Seed (1978). Specifically, the pseudostatic coefficient was taken as the parameter kmax, which represents the peak average acceleration along the failure surface. As shown in Figure 1 below (excerpted from the above reference), the ratio kmax/umax (where umax is the peak acceleration at the crest of the embankment) for a full height failure surface (y/H = 1.0) is 0.34. From the procedure noted above, the anticipated maximum peak crest acceleration is approximately 0.43g. Therefore, the pseudostatic coefficient kh was estimated as kh= 0.34*0.43g = 0.109g for these analyses.

The seismic hazard deaggregation output and calculations for the pseudostatic coefficient are provided at the back of this document.

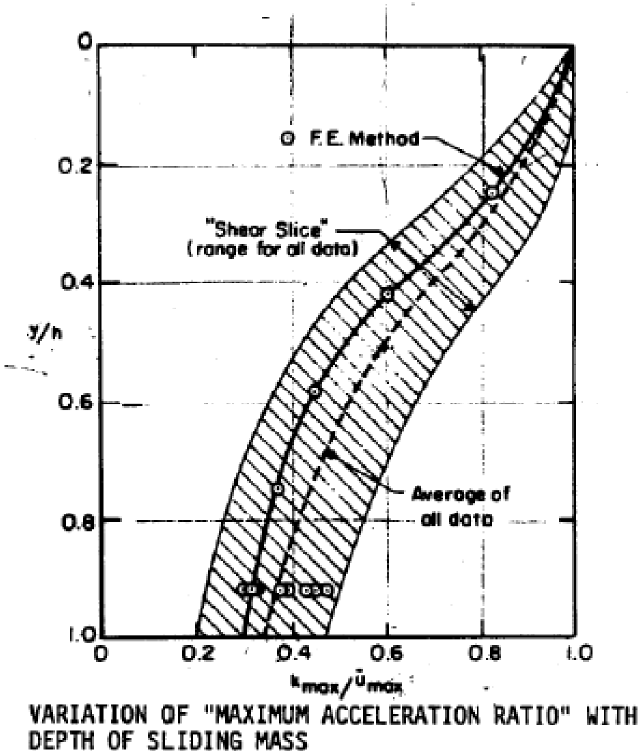


Figure 1: Determination of Maximum Average Acceleration Along Failure Surface

5. Material Properties for Analysis

Material properties for slope stability analyses were developed using both laboratory testing data (index and strength testing) and strength correlations from CPT and SPT data. Details of the material characterization and strength parameter selection for each stratum are provided in Attachment F of this report. The properties used in the stability analysis are summarized in the table below:

Table G-2: Summary of Material Parameters used in Stability Analysis

Material	Unit Weight Above WT (pcf)	Unit Weight Below WT (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
			c' (psf)	Φ' (°)	c (psf)	Φ (°)
New Embankment	115	115	200	30	2500	0
Old Embankment 1	125	125	200	28	2500	0
Old Embankment 2	125	125	100	29	1250	0
Native Clay Crust	120	120	200	27.5	1250	0
Native Clay 1	117	117	100	26	650	0
Native Clay 2	105	105	200	26	700	0
Native Clay 3	105	105	200	26	900	0
Fly Ash	105	105	100	27	600	0
Historic Ash	105	105	100	26	750	0
Historic Fill	125	120	200	28	1000	0
Recent Fill	115	115	200	30	1250	0
GP (Very Dense)	135	135	0	36	0	36
New Embankment (Crushed Stone - Sandy Gravel)	120	120	0	32	0	32
Bedrock - Shale	140	140	1000	36	1000	36

6. Results

Table G-3 summarizes the results of the stability analyses for each section, and output figures from the SLOPE/W models are provided at the back of this document.

Table G-3: Summary of Minimum Slope Stability Factors

Cross Section	Factor of Safety		
	Drained		Undrained
	Steady State (Normal Pool)	Surcharge Pool (Flood)	Seismic (Pseudostatic)
CCR Rule Criteria	*FS ≥ 1.50*	*FS ≥ 1.40*	*FS ≥ 1.00*
A	2.02	2.02	1.37
B	1.59	1.59	1.28
C	1.83	1.82	1.09
D	1.79	1.79	1.18
E	1.54	1.54	1.11
F	2.31	2.31	1.08
G	2.12	2.12	1.13
H	2.08	2.08	1.08
I	2.26	2.26	1.30
J	2.08	2.58	2.00

7. Conclusions

Load cases analyzed for this study included static (steady-state) normal pool, maximum flood surcharge pool, and seismic (pseudo-static). The calculated factors of safety from the limit equilibrium slope stability analysis satisfy the USEPA CCR Rule § 257.73(e) requirements for all the load cases analyzed at the critical analysis sections for the perimeter of the impoundment. Load cases analyzed for this study included static (steady-state) normal pool, maximum flood surcharge pool and seismic (pseudo-static).

8. References

AECOM (2016). Hydrologic and Hydraulic Summary Report for Edwards Power Generating Station, Cooling Pond and Clarification Pond CCR Units.

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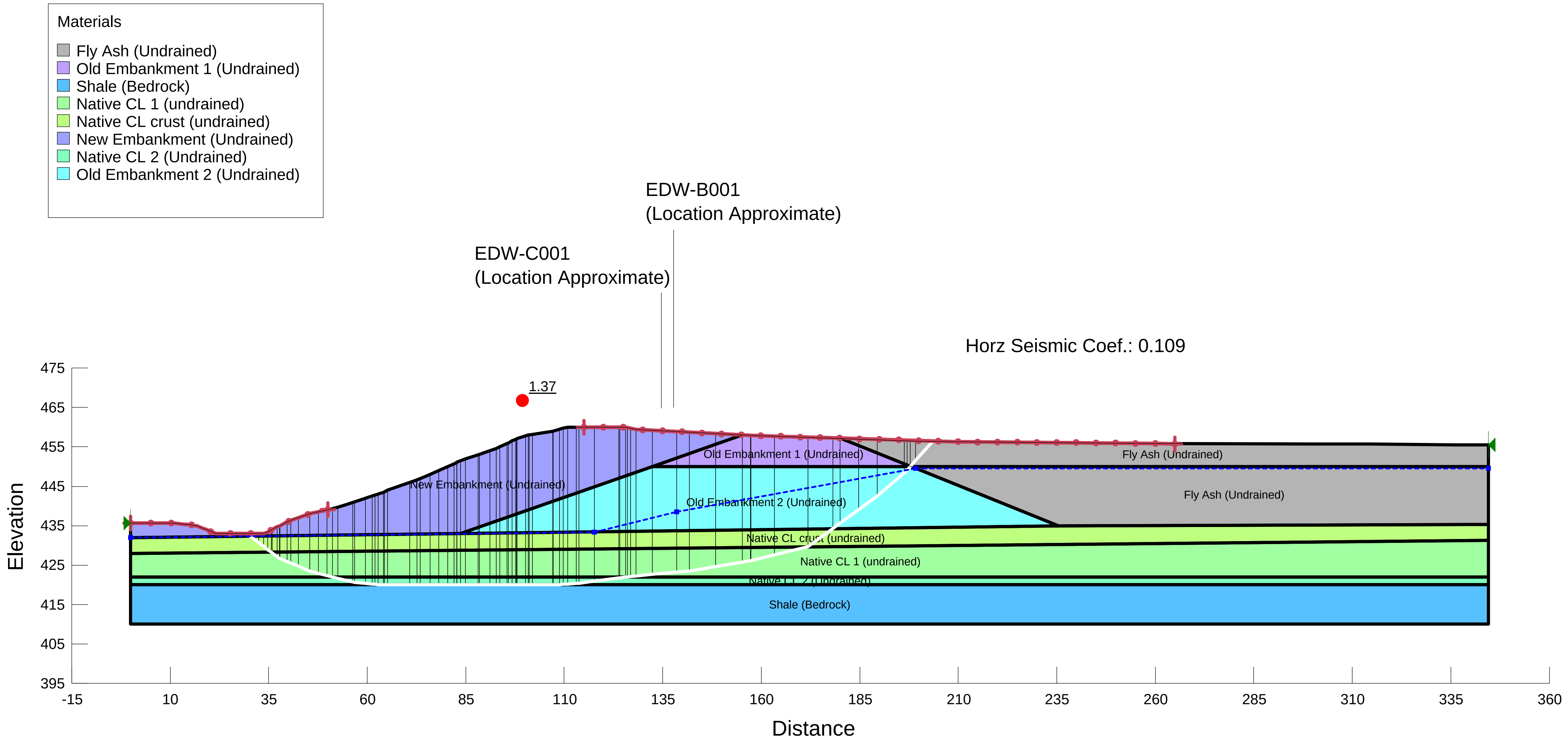
9. Attachments

G.1	Slope Stability Analysis Output Data
G.2	Seismic Parameter Calculations

Attachment G.1 Slope Stability Analysis Output Data

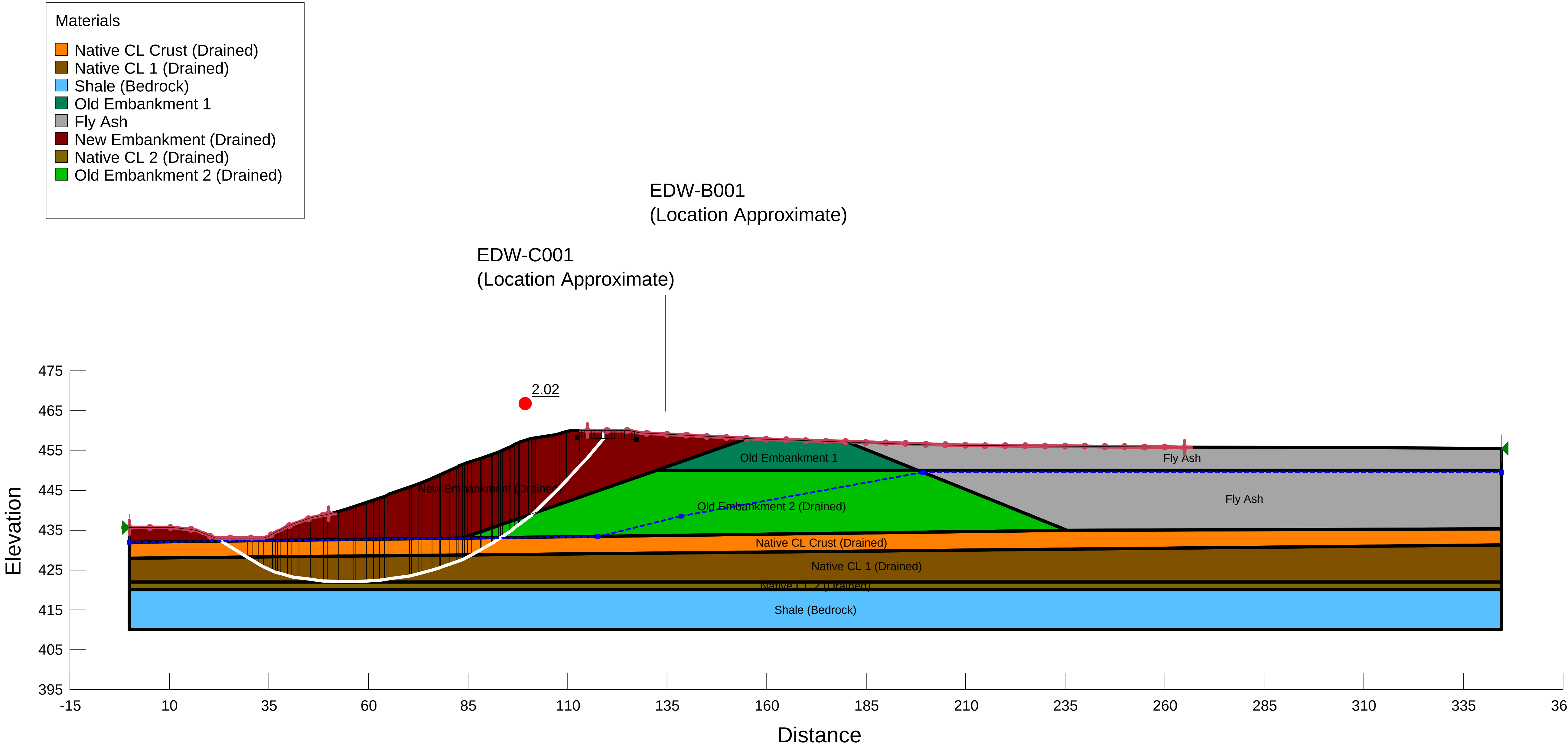
Dynegy Edwards
Cross-section A
Slope Stability - Seismic

Name: Fly Ash (Undrained) Unit Weight: 105 pcf Cohesion': 600 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Undrained) Unit Weight: 115 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1



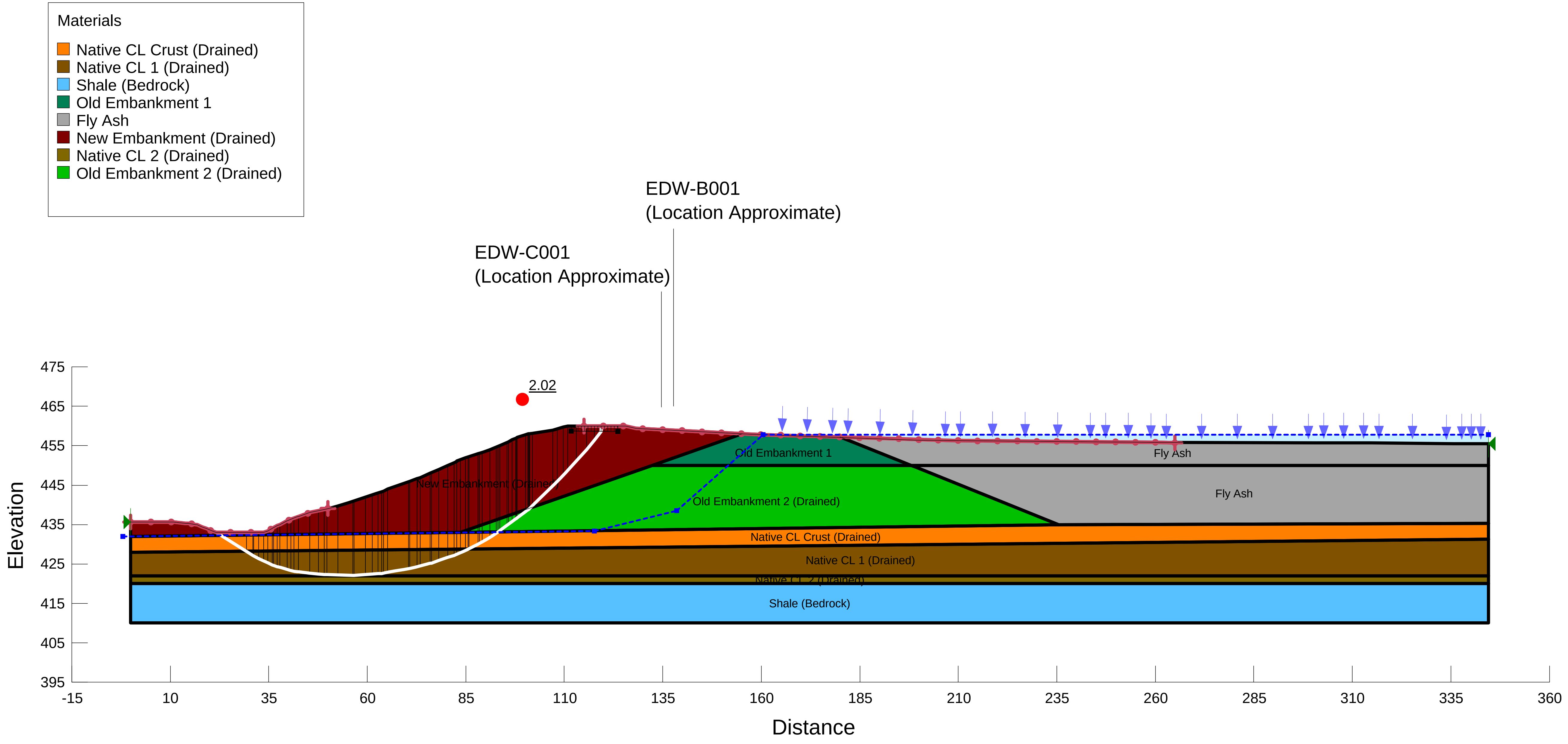
Dynegy Edwards
Cross-section A
Slope Stability - Steady State

Name: Native CL Crust (Drained)   Unit Weight: 120 pcf   Cohesion': 200 psf   Phi': 27.5 °   Piezometric Line: 1
Name: Native CL 1 (Drained)   Unit Weight: 117 pcf   Cohesion': 100 psf   Phi': 26 °   Piezometric Line: 1
Name: Shale (Bedrock)   Unit Weight: 140 pcf   Cohesion': 1,000 psf   Phi': 36 °   Piezometric Line: 1
Name: Old Embankment 1   Unit Weight: 125 pcf   Cohesion': 200 psf   Phi': 28 °   Piezometric Line: 1
Name: Fly Ash   Unit Weight: 105 pcf   Cohesion': 100 psf   Phi': 27 °   Piezometric Line: 1
Name: New Embankment (Drained)   Unit Weight: 115 pcf   Cohesion': 200 psf   Phi': 30 °   Piezometric Line: 1
Name: Native CL 2 (Drained)   Unit Weight: 105 pcf   Cohesion': 200 psf   Phi': 26 °   Piezometric Line: 1
Name: Old Embankment 2 (Drained)   Unit Weight: 125 pcf   Cohesion': 100 psf   Phi': 29 °   Piezometric Line: 1



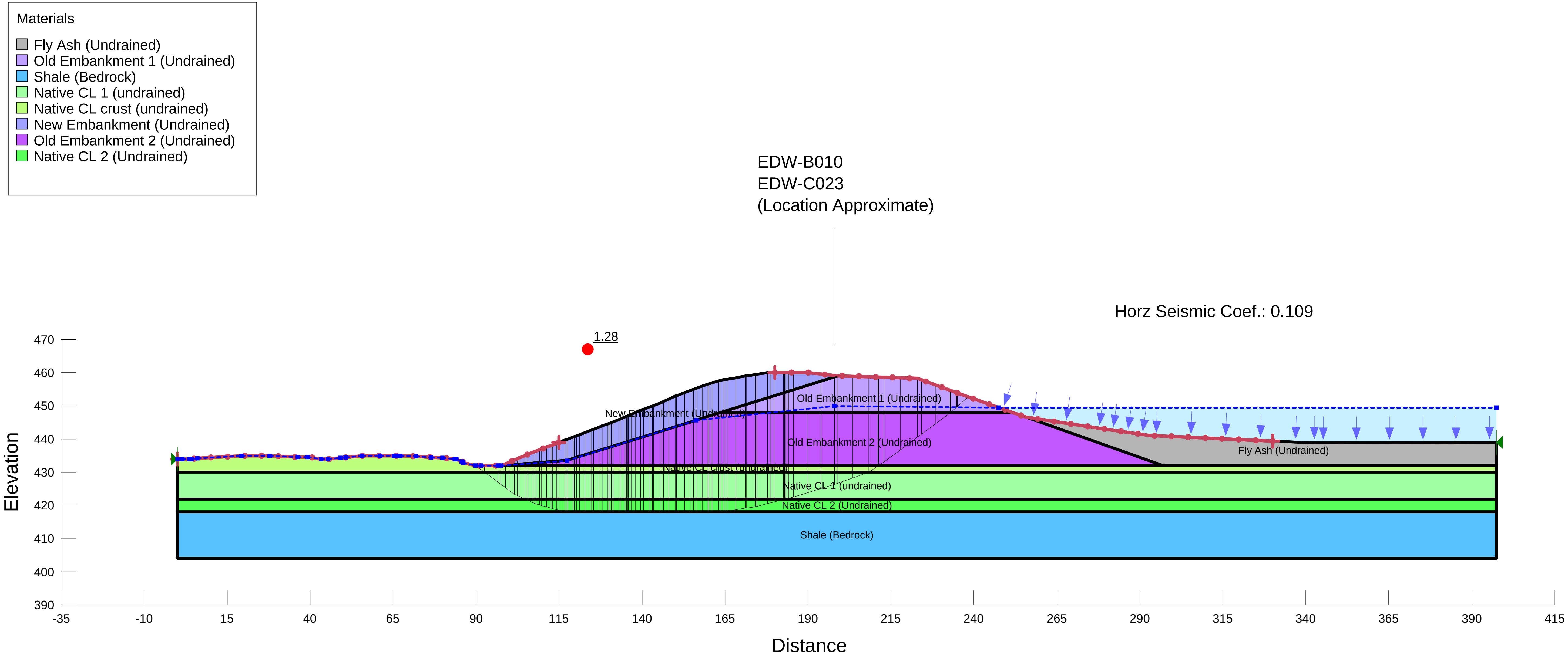
Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section A
Slope Stability - Surcharge Pool



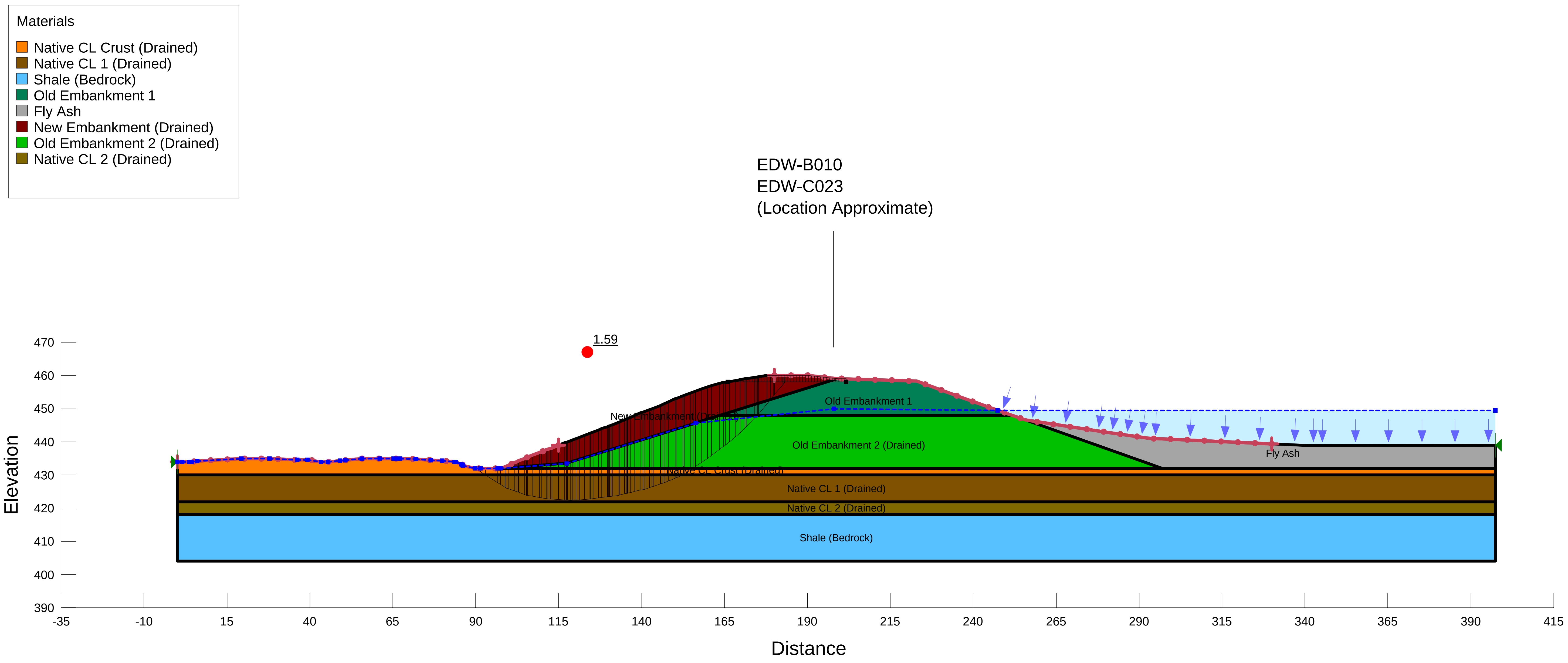
Name: Fly Ash (Undrained)   Unit Weight: 105 pcf   Cohesion': 600 psf   Phi': 0 °   Piezometric Line: 1
Name: Old Embankment 1 (Undrained)   Unit Weight: 125 pcf   Cohesion': 2,500 psf   Phi': 0 °   Piezometric Line: 1
Name: Shale (Bedrock)   Unit Weight: 140 pcf   Cohesion': 1,000 psf   Phi': 36 °   Piezometric Line: 1
Name: Native CL 1 (undrained)   Unit Weight: 117 pcf   Cohesion': 650 psf   Phi': 0 °   Piezometric Line: 1
Name: Native CL crust (undrained)   Unit Weight: 120 pcf   Cohesion': 1,250 psf   Phi': 0 °   Piezometric Line: 1
Name: New Embankment (Undrained)   Unit Weight: 115 pcf   Cohesion': 2,500 psf   Phi': 0 °   Piezometric Line: 1
Name: Old Embankment 2 (Undrained)   Unit Weight: 125 pcf   Cohesion': 1,250 psf   Phi': 0 °   Piezometric Line: 1
Name: Native CL 2 (Undrained)   Unit Weight: 105 pcf   Cohesion': 700 psf   Phi': 0 °   Piezometric Line: 1

Dynegy Edwards
Cross-section B
Slope Stability - Seismic



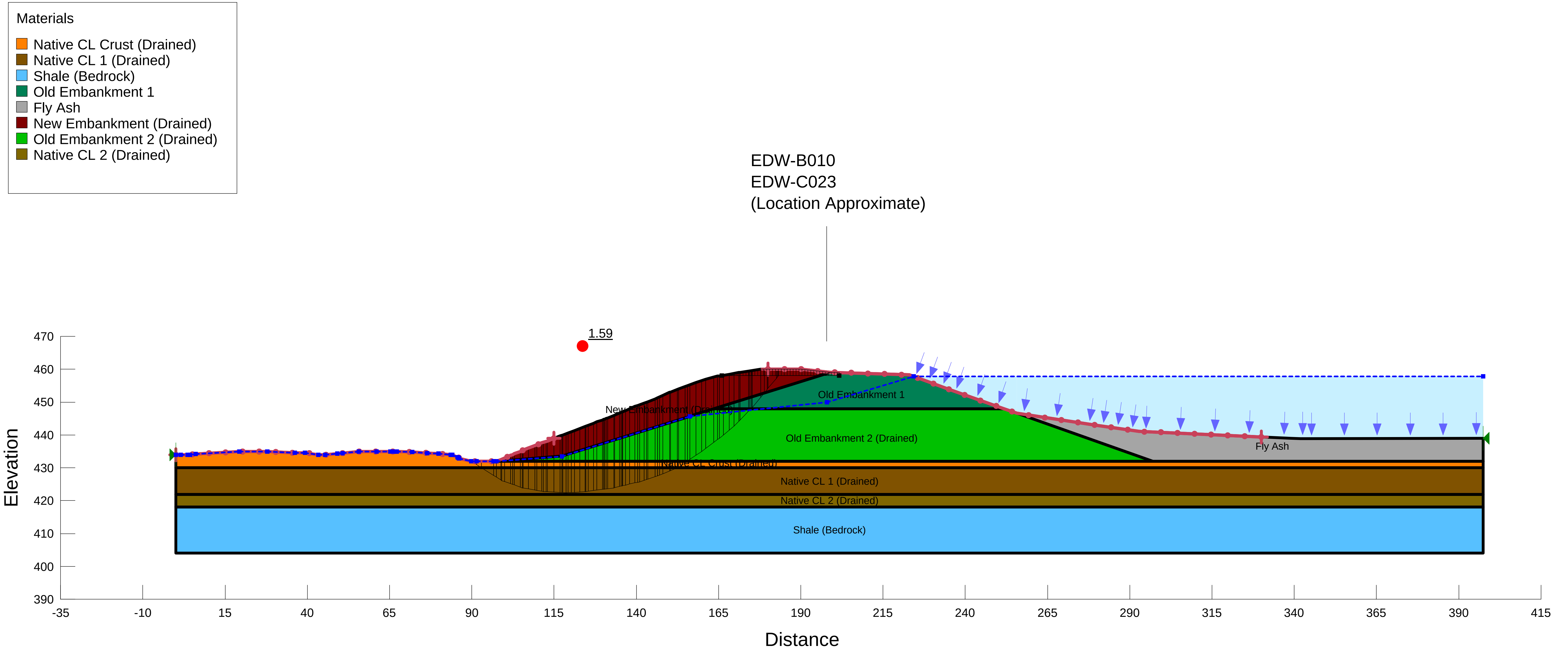
Dynegy Edwards
Cross-section B
Slope Stability - Steady State

Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1



Dynegy Edwards
Cross-section B
Slope Stability - Surcharge Pool

Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1

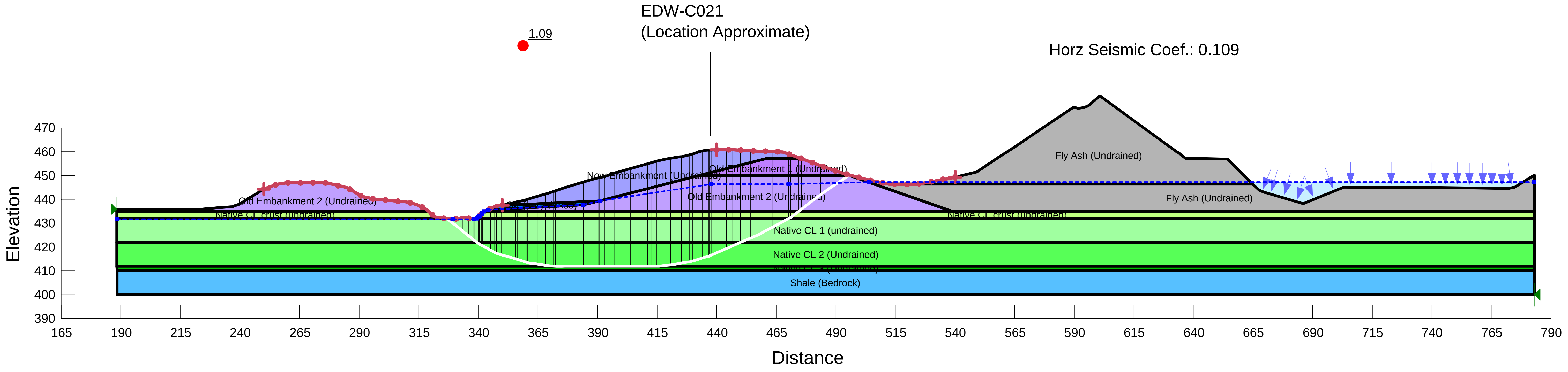


Dynegy Hennepin
Cross-section C
Slope Stability - Seismic

Name: Fly Ash (Undrained) Unit Weight: 105 pcf Cohesion': 600 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Undrained) Unit Weight: 115 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1

Materials

- ⬜ Fly Ash (Undrained)
- 🟪 Old Embankment 2 (Undrained)
- 🟦 Shale (Bedrock)
- 🟩 Native CL 1 (undrained)
- 🟩 Native CL crust (undrained)
- 🟦 New Embankment (Undrained)
- 🟦 GP (very dense)
- 🟩 Native CL 2 (Undrained)
- 🟩 Native CL 3 (Undrained)
- 🟪 Old Embankment 1 (Undrained)

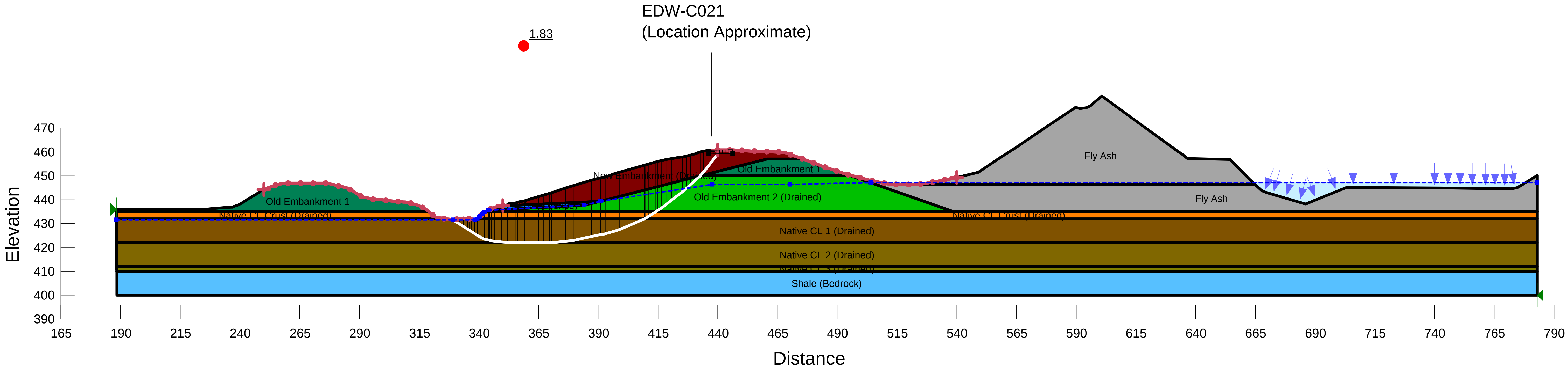


Dynegy Hennepin
Cross-section C
Slope Stability - Steady State

Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2 (Drained)

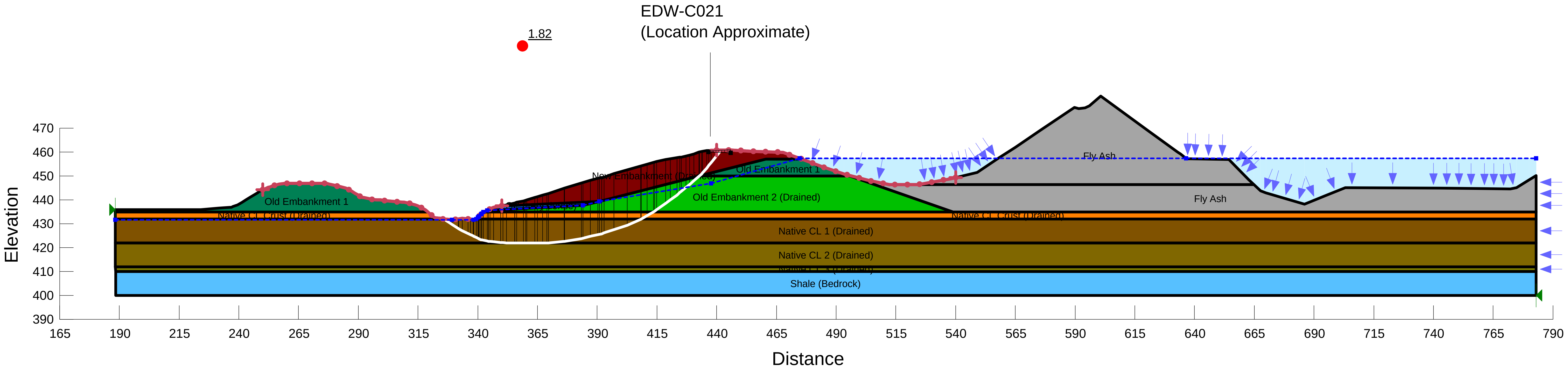


Dynegy Hennepin
Cross-section C
Slope Stability - Surcharge Pool

Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2 (Drained)

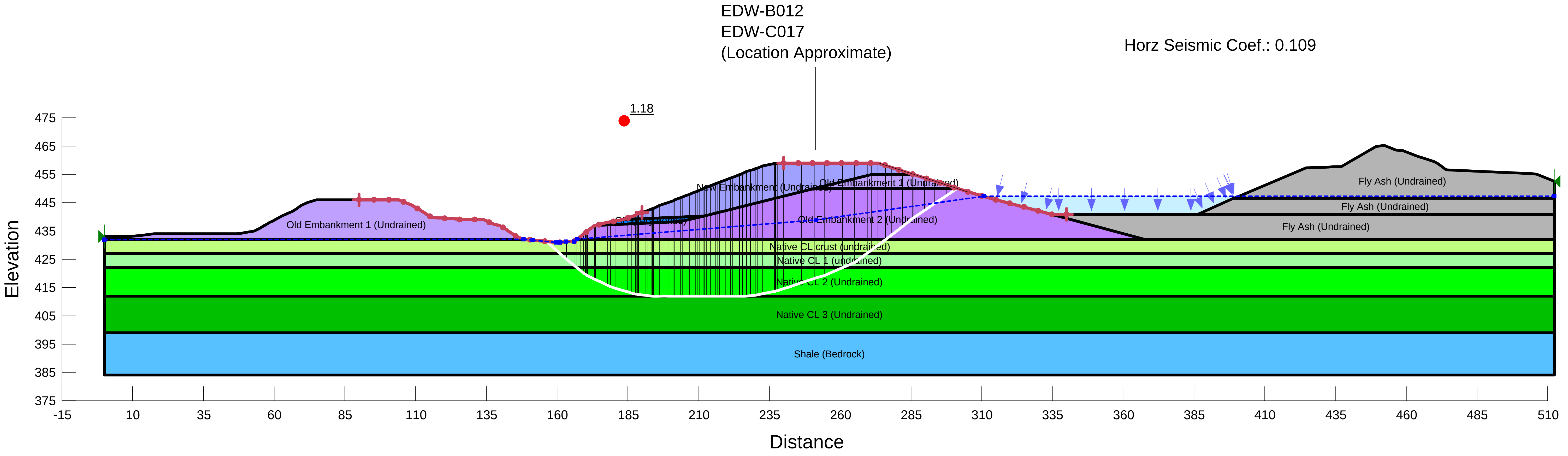


Name: Fly Ash (Undrained) Unit Weight: 105 pcf Cohesion': 600 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Undrained) Unit Weight: 115 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1

Dynegy Edwards
Cross-section D
Slope Stability - Seismic

Materials

▨ Fly Ash (Undrained)
▨ Old Embankment 1 (Undrained)
▨ Shale (Bedrock)
▨ Native CL 1 (undrained)
▨ Native CL crust (undrained)
▨ New Embankment (Undrained)
▨ GP (very dense)
▨ Native CL 2 (Undrained)
▨ Native CL 3 (Undrained)
▨ Old Embankment 2 (Undrained)



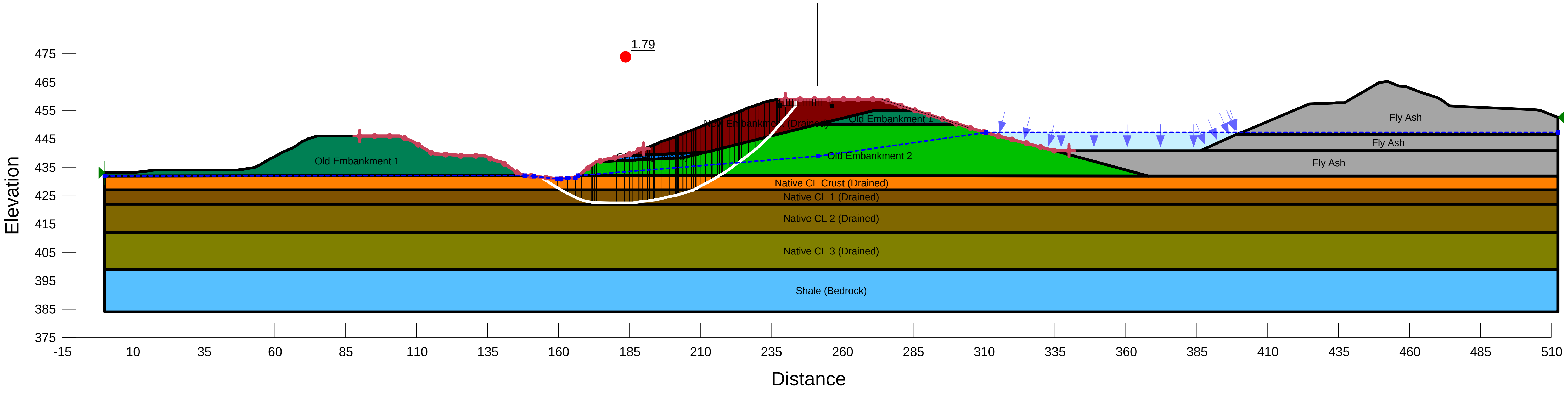
Name: Native CL Crust (Drained)   Unit Weight: 120 pcf   Cohesion': 200 psf   Phi': 27.5 °   Piezometric Line: 1
Name: Native CL 1 (Drained)   Unit Weight: 117 pcf   Cohesion': 100 psf   Phi': 26 °   Piezometric Line: 1
Name: Shale (Bedrock)   Unit Weight: 140 pcf   Cohesion': 1,000 psf   Phi': 36 °   Piezometric Line: 1
Name: Old Embankment 1   Unit Weight: 125 pcf   Cohesion': 200 psf   Phi': 28 °   Piezometric Line: 1
Name: Fly Ash   Unit Weight: 105 pcf   Cohesion': 100 psf   Phi': 27 °   Piezometric Line: 1
Name: New Embankment (Drained)   Unit Weight: 115 pcf   Cohesion': 200 psf   Phi': 30 °   Piezometric Line: 1
Name: GP (very dense)   Unit Weight: 135 pcf   Cohesion': 0 psf   Phi': 36 °   Piezometric Line: 1
Name: Native CL 2 (Drained)   Unit Weight: 105 pcf   Cohesion': 200 psf   Phi': 26 °   Piezometric Line: 1
Name: Native CL 3 (Drained)   Unit Weight: 105 pcf   Cohesion': 200 psf   Phi': 26 °   Piezometric Line: 1
Name: Old Embankment 2   Unit Weight: 125 pcf   Cohesion': 100 psf   Phi': 29 °   Piezometric Line: 1

Dynegy Edwards
Cross-section D
Slope Stability - Steady State

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2

EDW-B012
EDW-C017
(Location Approximate)

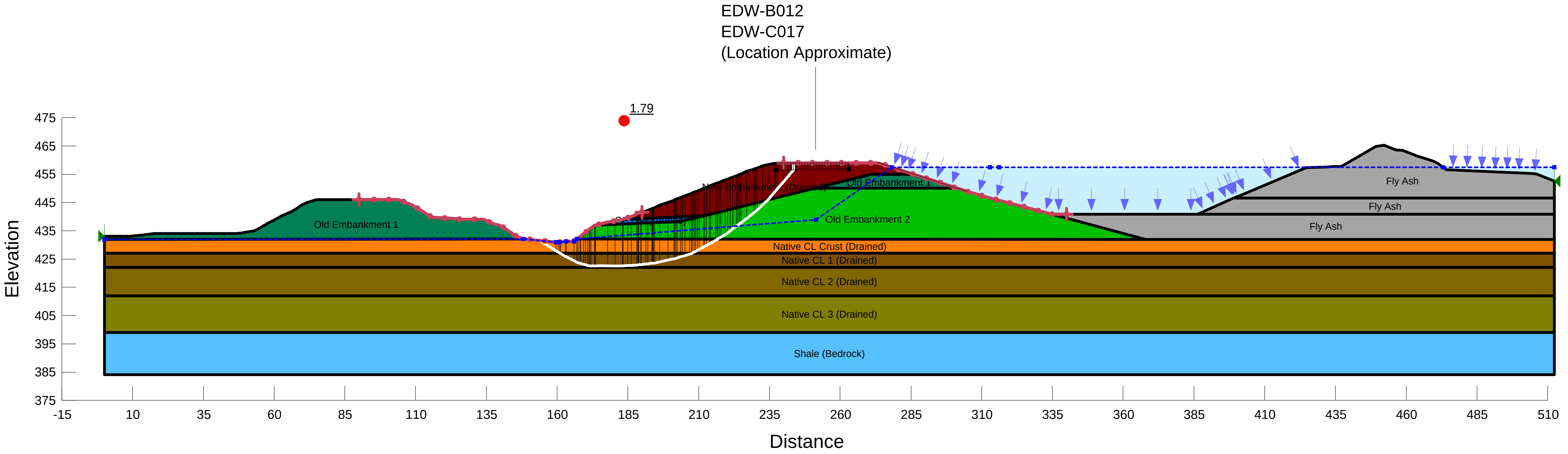


Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section D
Slope Stability - Surcharge Pool

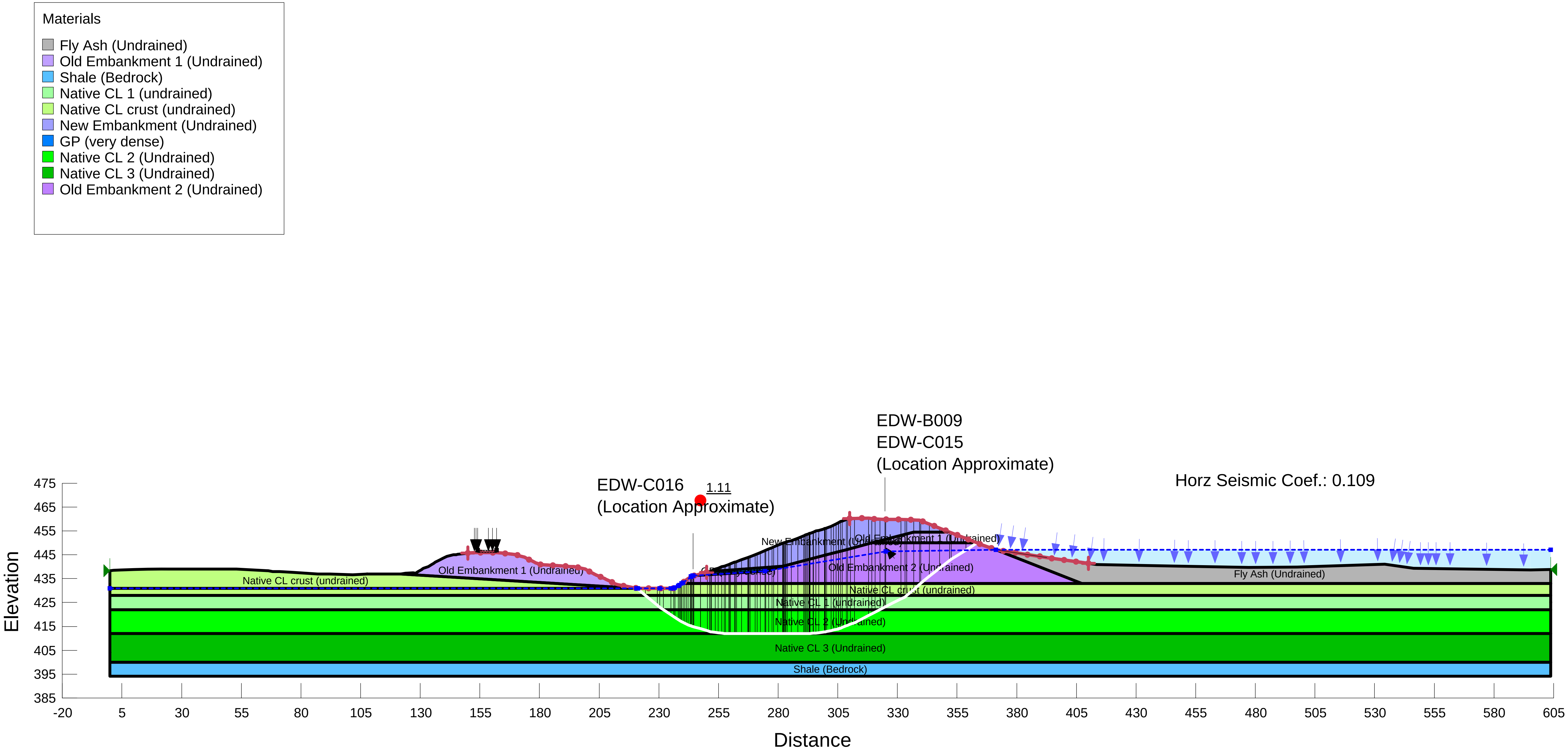
Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2



Name: Fly Ash (Undrained)   Unit Weight: 105 pcf   Cohesion': 600 psf   Phi': 0 °   Piezometric Line: 1
Name: Old Embankment 1 (Undrained)   Unit Weight: 125 pcf   Cohesion': 2,500 psf   Phi': 0 °   Piezometric Line: 1
Name: Shale (Bedrock)   Unit Weight: 140 pcf   Cohesion': 1,000 psf   Phi': 36 °   Piezometric Line: 1
Name: Native CL 1 (undrained)   Unit Weight: 117 pcf   Cohesion': 650 psf   Phi': 0 °   Piezometric Line: 1
Name: Native CL crust (undrained)   Unit Weight: 120 pcf   Cohesion': 1,250 psf   Phi': 0 °   Piezometric Line: 1
Name: New Embankment (Undrained)   Unit Weight: 115 pcf   Cohesion': 2,500 psf   Phi': 0 °   Piezometric Line: 1
Name: GP (very dense)   Unit Weight: 135 pcf   Cohesion': 0 psf   Phi': 36 °   Piezometric Line: 1
Name: Native CL 2 (Undrained)   Unit Weight: 105 pcf   Cohesion': 700 psf   Phi': 0 °   Piezometric Line: 1
Name: Native CL 3 (Undrained)   Unit Weight: 105 pcf   Cohesion': 900 psf   Phi': 0 °   Piezometric Line: 1
Name: Old Embankment 2 (Undrained)   Unit Weight: 125 pcf   Cohesion': 1,250 psf   Phi': 0 °   Piezometric Line: 1

Dynegy Edwards
Cross-section E
Slope Stability - Seismic

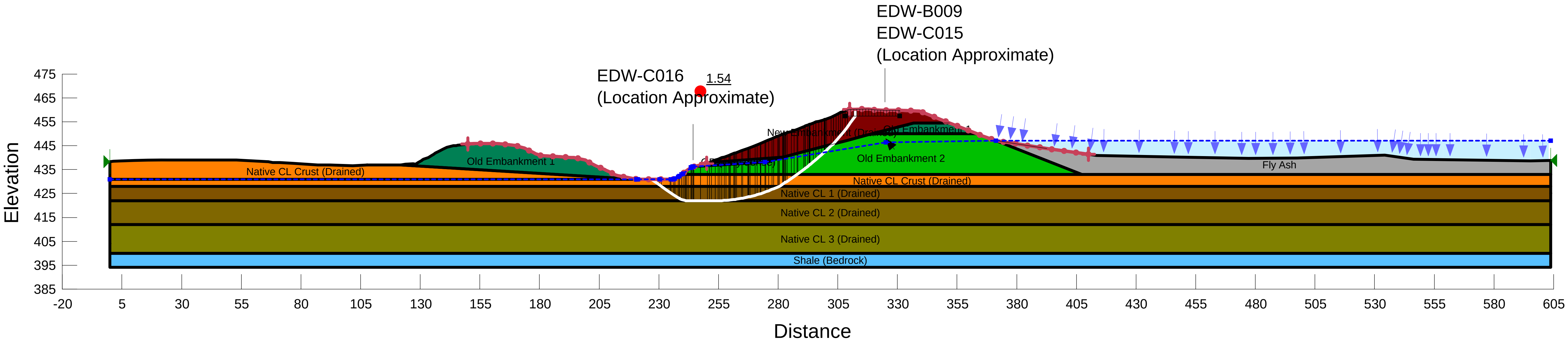


Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section E
Slope Stability - Steady State

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2

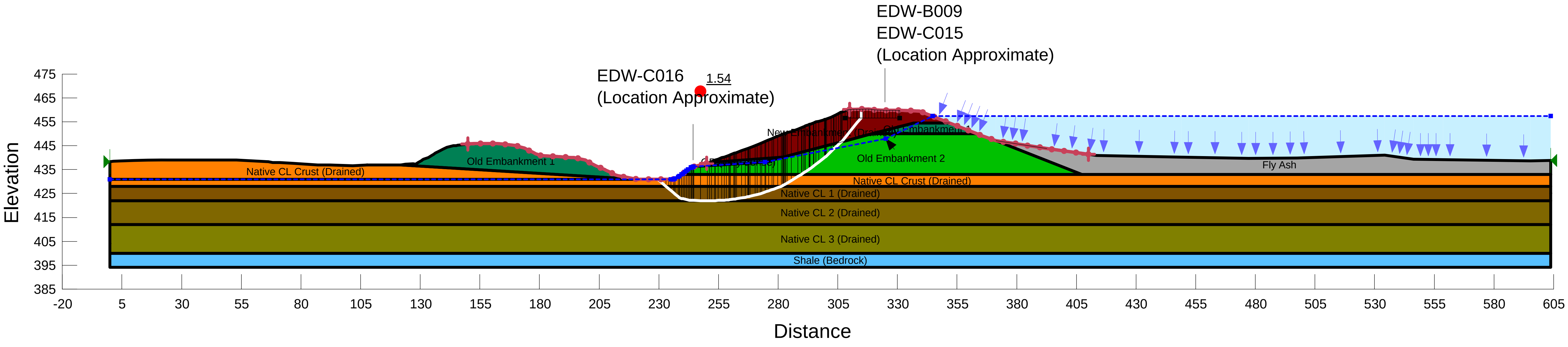


Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: GP (very dense) Unit Weight: 135 pcf Cohesion': 0 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section E
Slope Stability - Surcharge Pool

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash
- 🟥 New Embankment (Drained)
- 🟦 GP (very dense)
- 🟫 Native CL 2 (Drained)
- 🟨 Native CL 3 (Drained)
- 🟩 Old Embankment 2

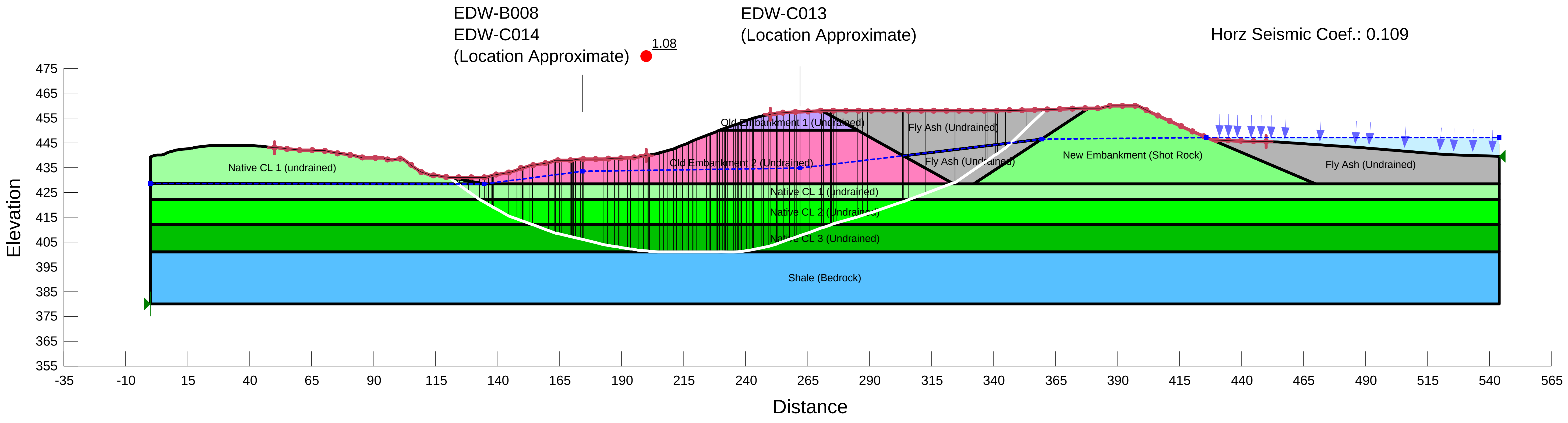


Name: Fly Ash (Undrained) Unit Weight: 105 pcf Cohesion': 600 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Shot Rock) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Piezometric Line: 1
Name: Native CL 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1

Dynegy Edwards
Cross-section F
Slope Stability - Seismic

Materials

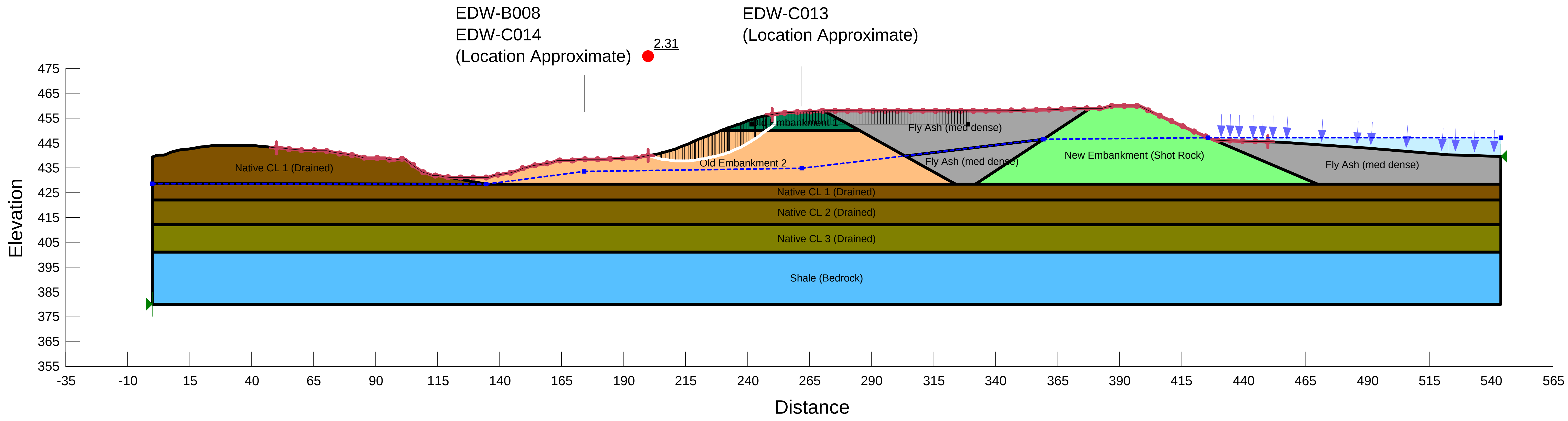
- ⬜ Fly Ash (Undrained)
- 🟪 Old Embankment 1 (Undrained)
- 🟦 Shale (Bedrock)
- 🟩 Native CL 1 (undrained)
- 🟩 New Embankment (Shot Rock)
- 🟩 Native CL 2 (Undrained)
- 🟩 Native CL 3 (Undrained)
- 🟥 Old Embankment 2 (Undrained)



Dynegy Edwards
Cross-section F
Slope Stability - Steady State

Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Shot Rock) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Materials
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash (med dense)
- 🟩 New Embankment (Shot Rock)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟧 Old Embankment 2

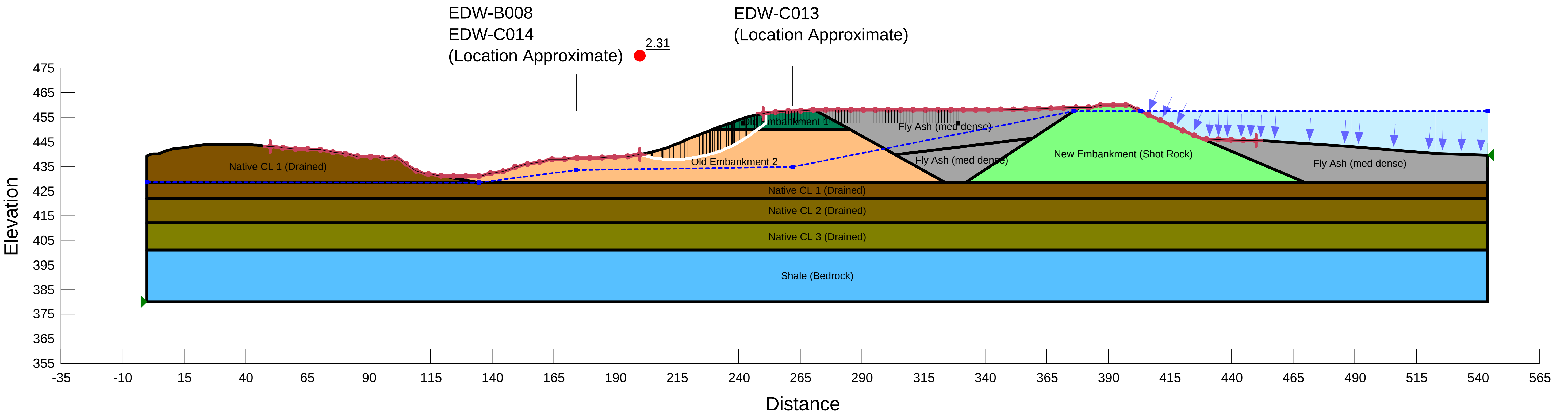


Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Shot Rock) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section F
Slope Stability - Surcharge Pool

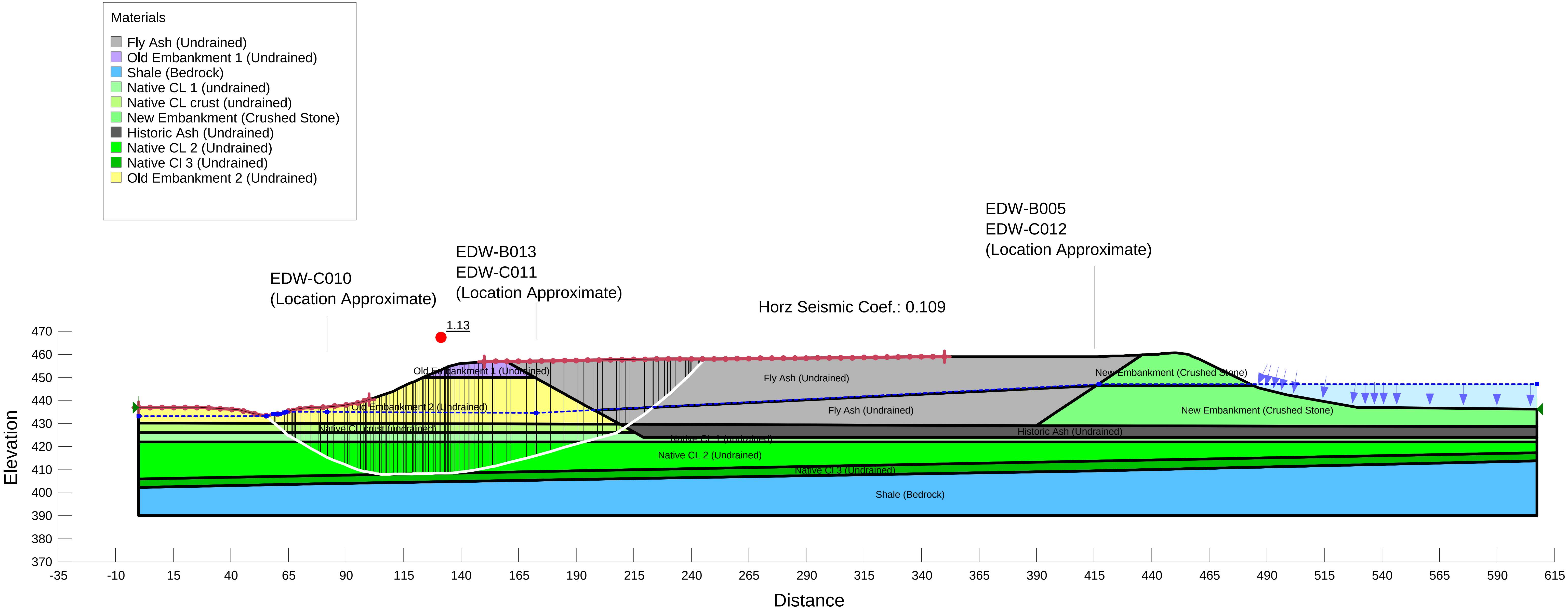
Materials

🟫 Native CL 1 (Drained)
🟦 Shale (Bedrock)
🟩 Old Embankment 1
⬜ Fly Ash (med dense)
🟩 New Embankment (Shot Rock)
🟫 Native CL 2 (Drained)
🟫 Native CL 3 (Drained)
🟧 Old Embankment 2



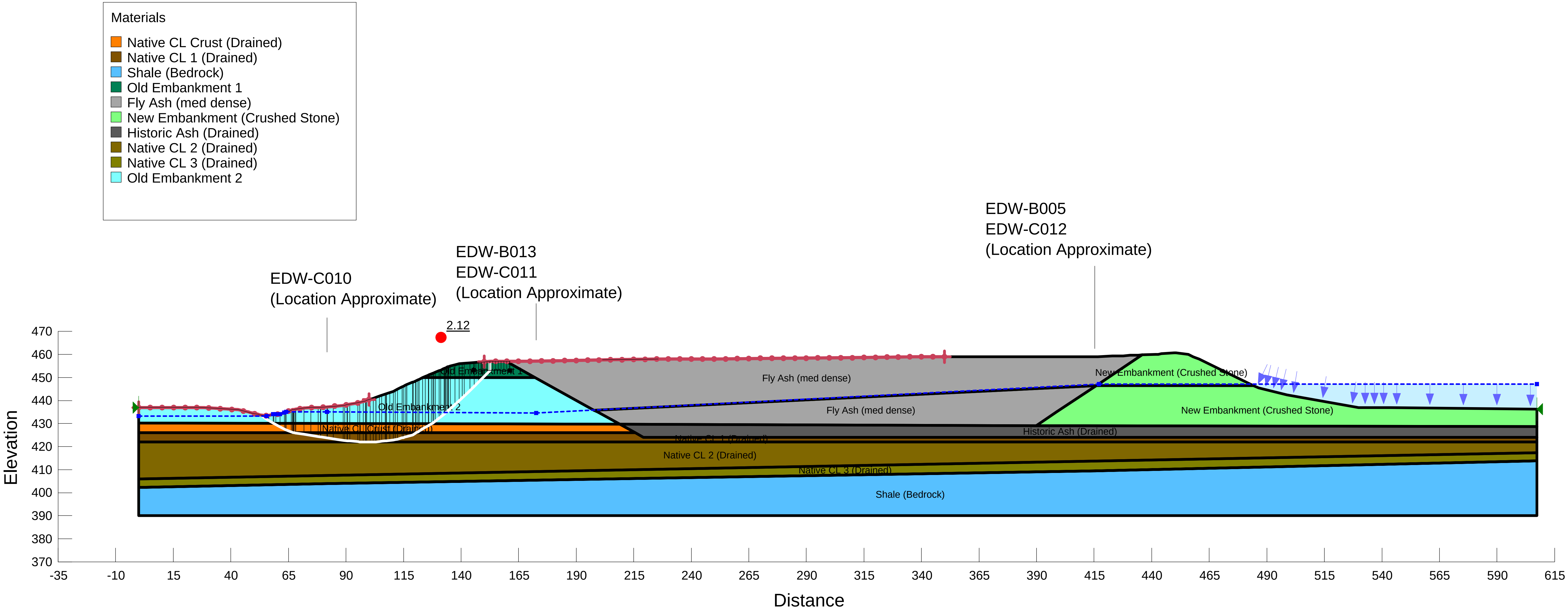
Dynegy Edwards
Cross-section G
Slope Stability - Seismic

Name: Fly Ash (Undrained) Unit Weight: 105 pcf Cohesion': 600 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Undrained) Unit Weight: 105 pcf Cohesion': 750 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Piezometric Line: 1
Name: Native Cl 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1



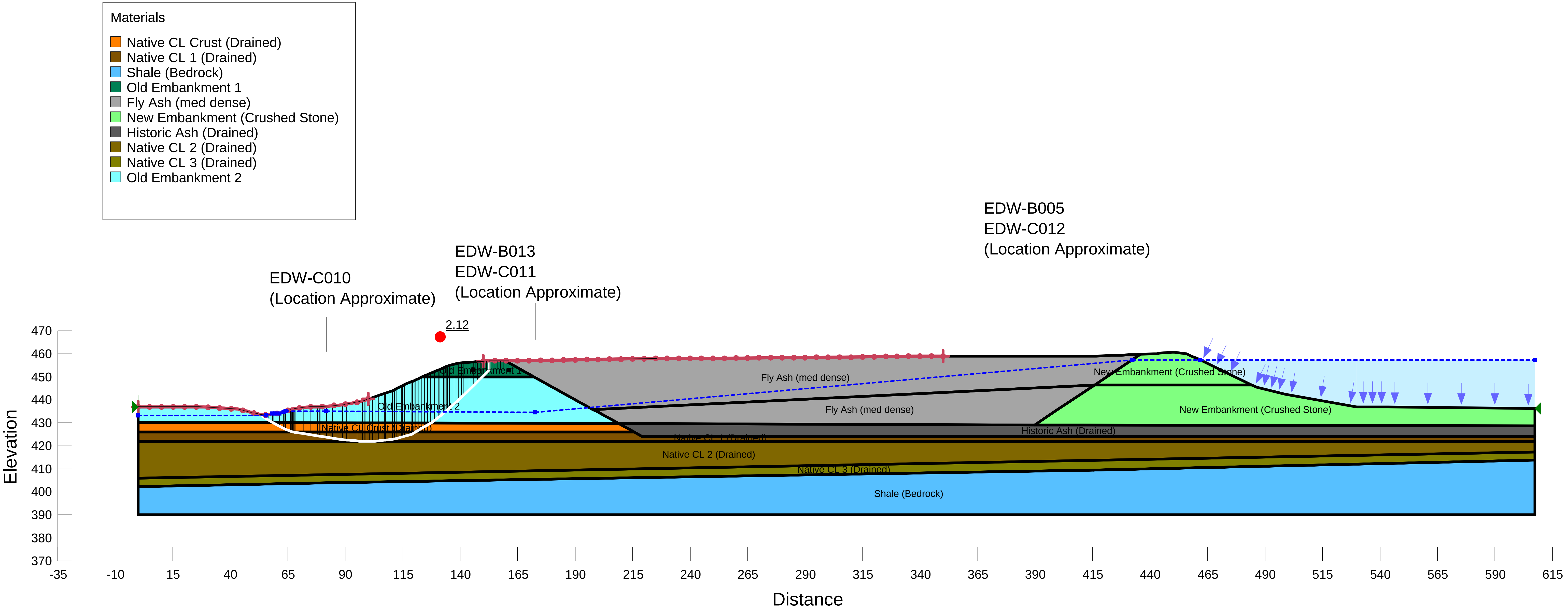
Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Drained) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section G
Slope Stability - Steady State



Name: Native CL Crust (Drained) Unit Weight: 120 pcf Cohesion': 200 psf Phi': 27.5 ° Piezometric Line: 1
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Drained) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section G
Slope Stability - Surcharge Pool



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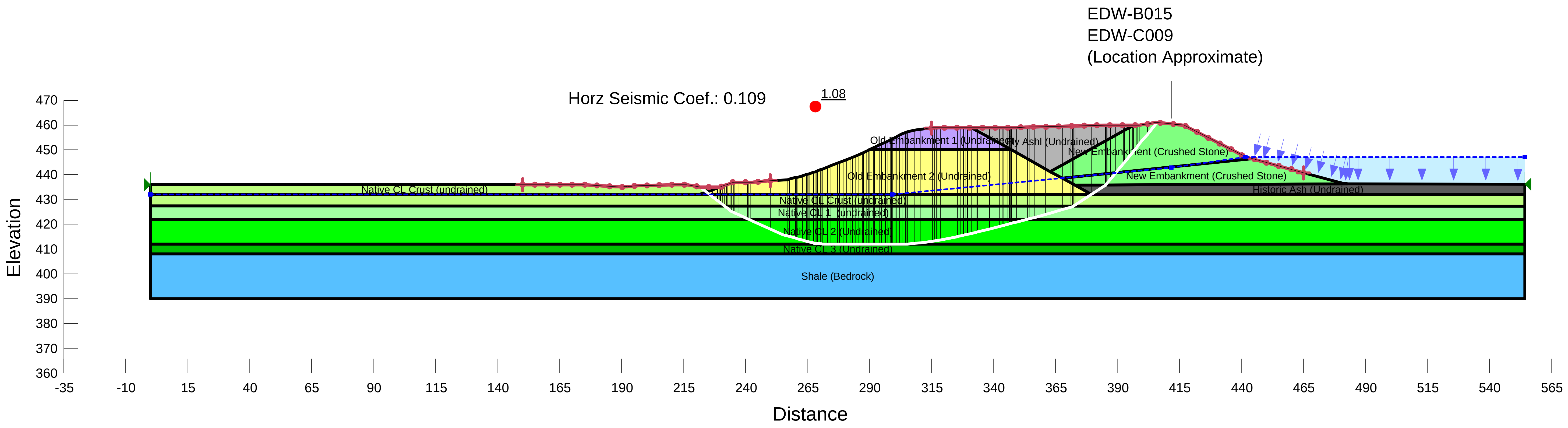
Name: Old Embankment 1 (Undrained) Unit Weight: 125 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL Crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Undrained) Unit Weight: 105 pcf Cohesion': 750 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 117 pcf Cohesion': 700 psf Piezometric Line: 1
Name: Native CL 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1

Dynegy Edwards
Cross-section H
Slope Stability - Seismic

Materials

- ▩ Fly Ashl (Undrained)
- 🟪 Old Embankment 1 (Undrained)
- 🟦 Shale (Bedrock)
- 🟩 Native CL 1 (undrained)
- 🟩 Native CL Crust (undrained)
- 🟩 New Embankment (Crushed Stone)
- ⬛ Historic Ash (Undrained)
- 🟩 Native CL 2 (Undrained)
- 🟩 Native CL 3 (Undrained)
- 🟨 Old Embankment 2 (Undrained)



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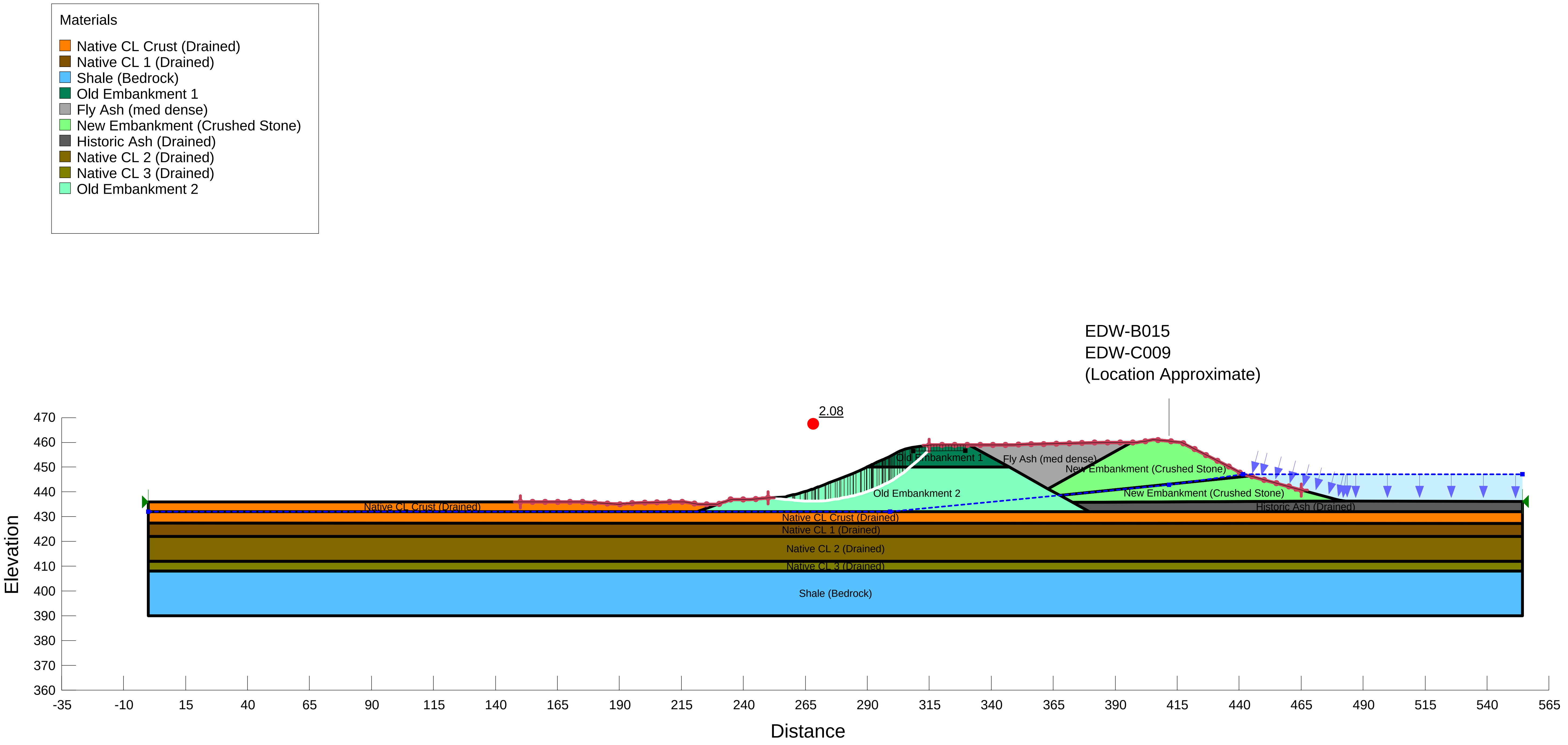
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Drained) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section H
Slope Stability - Steady State



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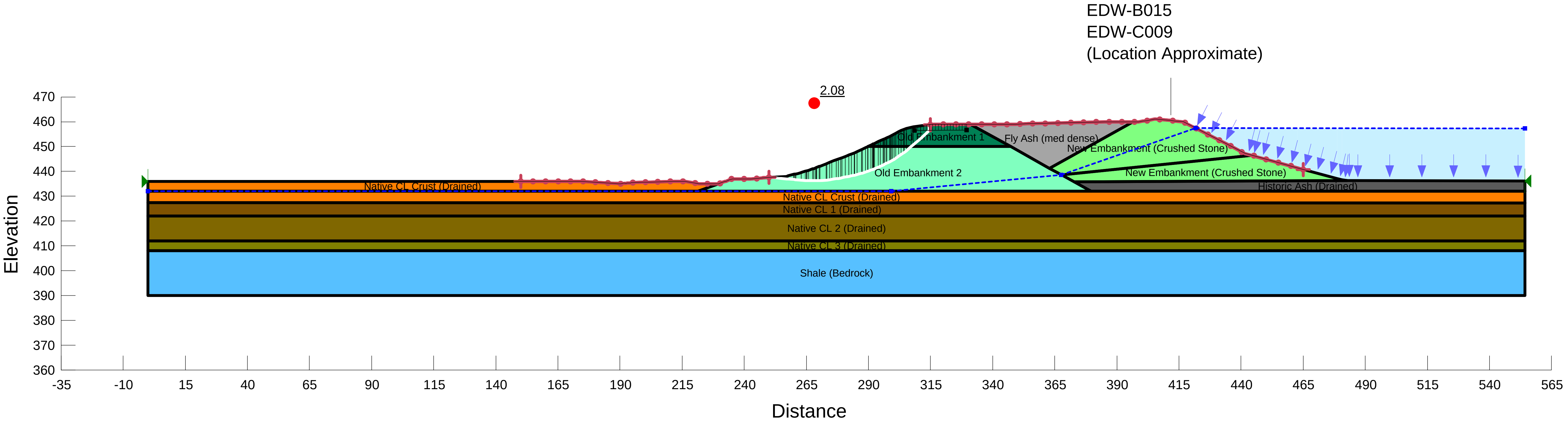
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Fly Ash (med dense) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 27 ° Piezometric Line: 1
Name: New Embankment (Crushed Stone) Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 ° Piezometric Line: 1
Name: Historic Ash (Drained) Unit Weight: 105 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Old Embankment 2 Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1

Dynegy Edwards
Cross-section H
Slope Stability - Surcharge Pool

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1
- ⬜ Fly Ash (med dense)
- 🟩 New Embankment (Crushed Stone)
- ⬛ Historic Ash (Drained)
- 🟫 Native CL 2 (Drained)
- 🟫 Native CL 3 (Drained)
- 🟩 Old Embankment 2



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Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Native CL 1 (undrained) Unit Weight: 117 pcf Cohesion': 650 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: New Embankment (Undrained) Unit Weight: 115 pcf Cohesion': 2,500 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Phi': 0 ° Piezometric Line: 1
Name: Old Embankment 2 (Undrained) Unit Weight: 125 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
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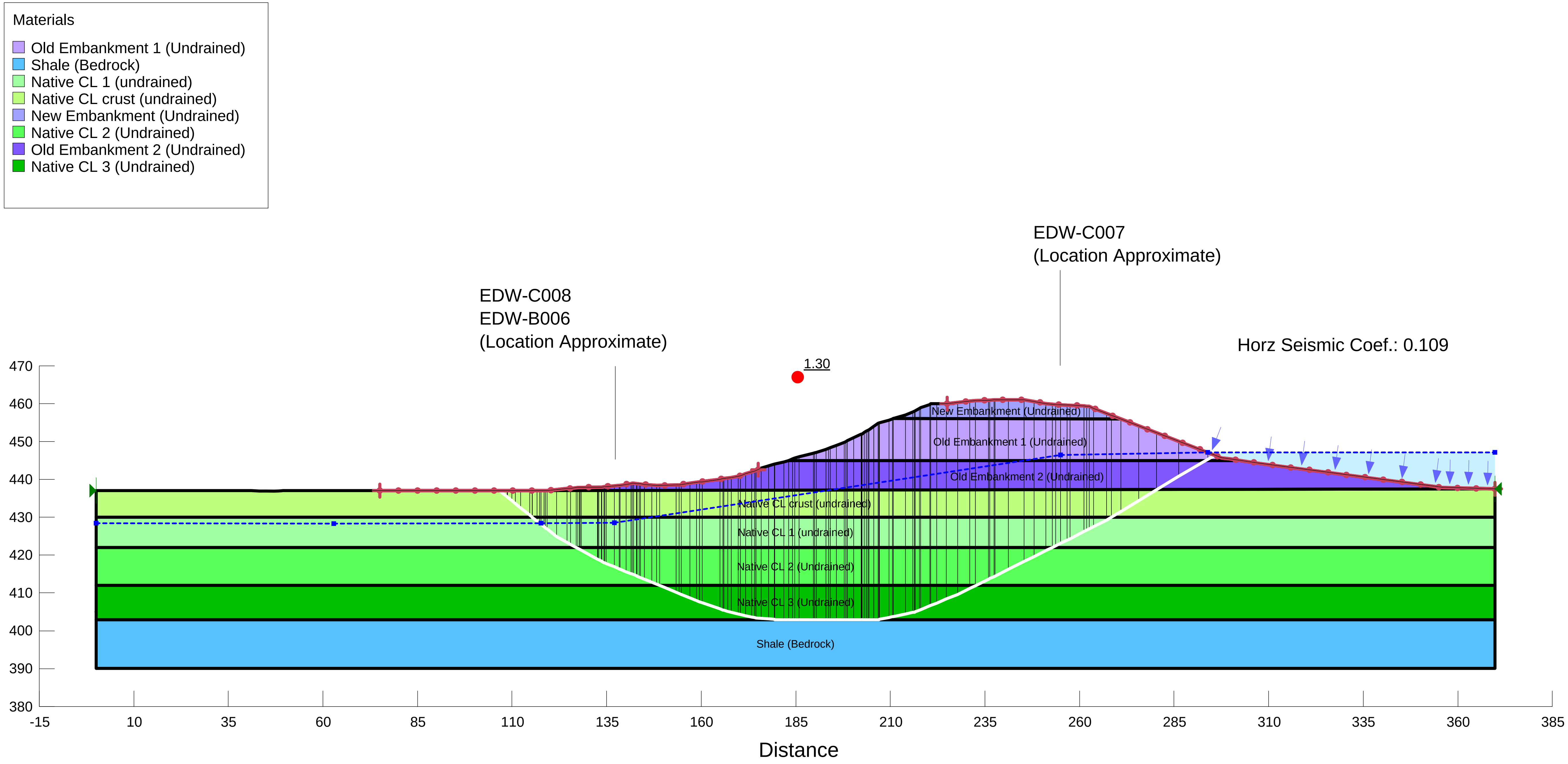
Dynegy Edwards
Cross-section I
Slope Stability - Seismic



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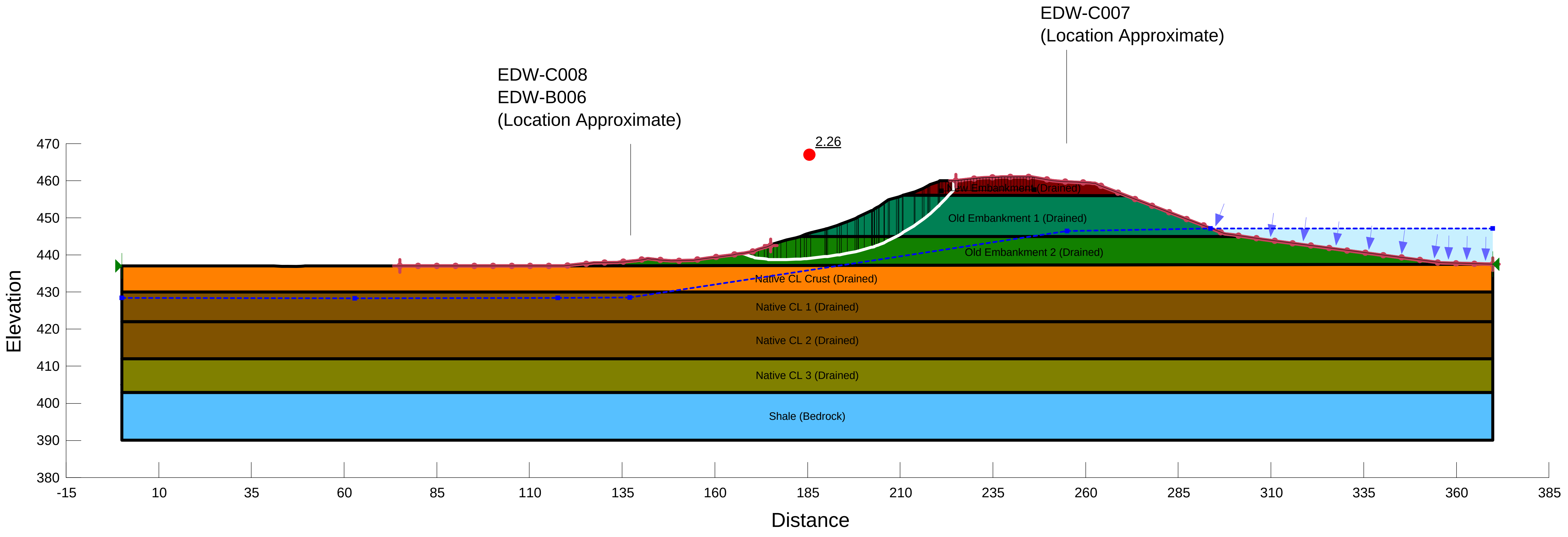
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 (Drained) Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1

Dynegy Edwards
Cross-section I
Slope Stability - Steady State

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟩 Old Embankment 1 (Drained)
- 🟥 New Embankment (Drained)
- 🟩 Old Embankment 2 (Drained)
- 🟫 Native CL 2 (Drained)
- 🟨 Native CL 3 (Drained)



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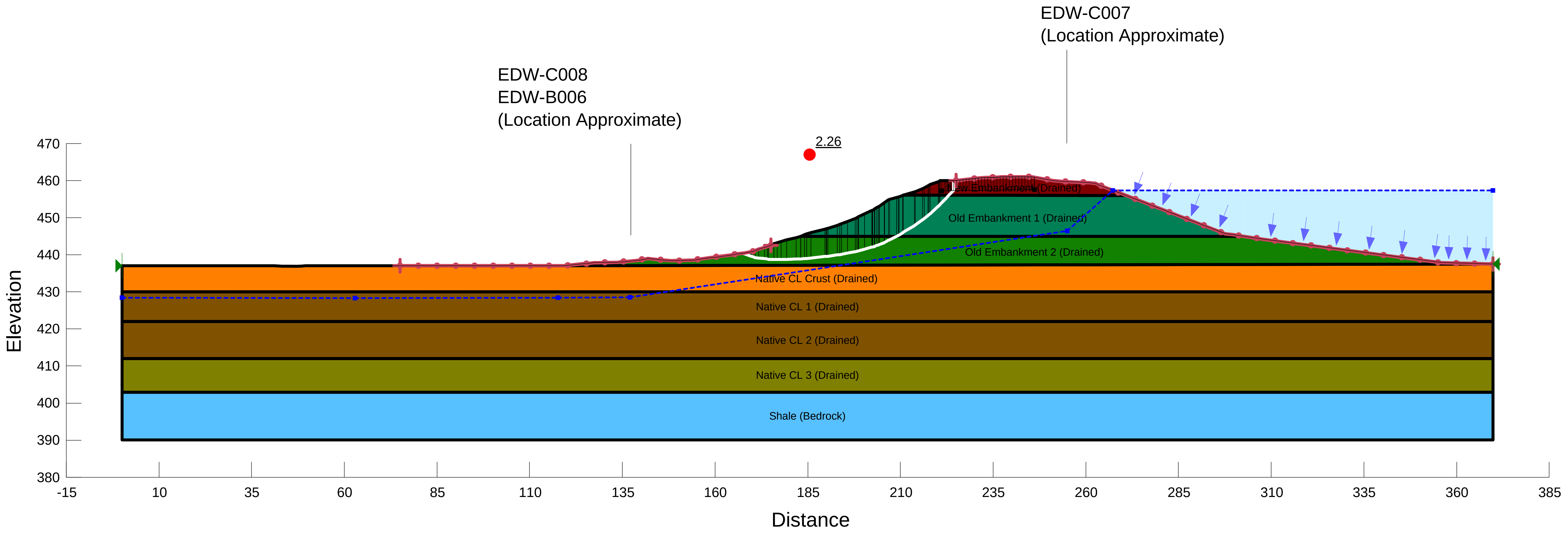
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Old Embankment 1 (Drained) Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: New Embankment (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Old Embankment 2 (Drained) Unit Weight: 125 pcf Cohesion': 100 psf Phi': 29 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1

Dynegy Edwards
Cross-section I
Slope Stability - Surcharge Pool

Materials

🟧 Native CL Crust (Drained)
🟫 Native CL 1 (Drained)
🟦 Shale (Bedrock)
🟩 Old Embankment 1 (Drained)
🟥 New Embankment (Drained)
🟩 Old Embankment 2 (Drained)
🟫 Native CL 2 (Drained)
🟨 Native CL 3 (Drained)



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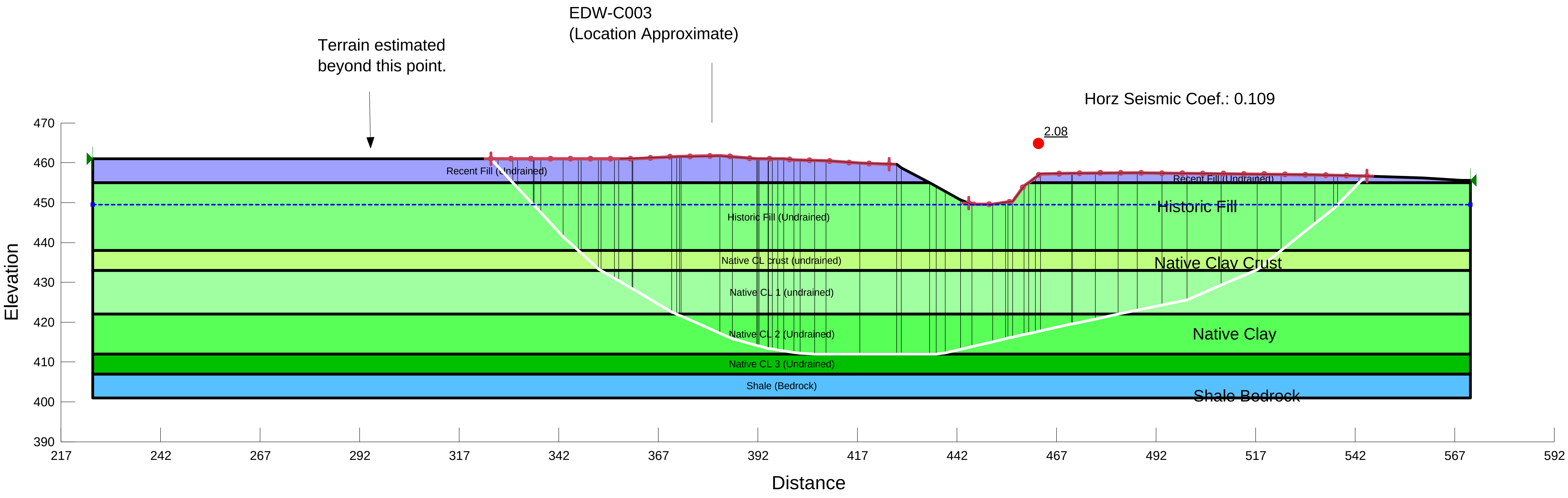
Name: Native CL crust (undrained) Unit Weight: 120 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: Recent Fill (Undrained) Unit Weight: 115 pcf Cohesion': 1,250 psf Phi': 0 ° Piezometric Line: 1
Name: Historic Fill (Undrained) Unit Weight: 125 pcf Cohesion': 1,000 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 2 (Undrained) Unit Weight: 105 pcf Cohesion': 700 psf Phi': 0 ° Piezometric Line: 1
Name: Native CL 3 (Undrained) Unit Weight: 105 pcf Cohesion': 900 psf Piezometric Line: 1

Dynegy Edwards
Cross-section J
Slope Stability - Seismic

Materials

- 🟦 Shale (Bedrock)
- 🟩 Native CL 1 (undrained)
- 🟩 Native CL crust (undrained)
- 🟪 Recent Fill (Undrained)
- 🟩 Historic Fill (Undrained)
- 🟩 Native CL 2 (Undrained)
- 🟩 Native CL 3 (Undrained)


EDW-C003
(Location Approximate)

Terrain estimated
beyond this point.

Horz Seismic Coef.: 0.109

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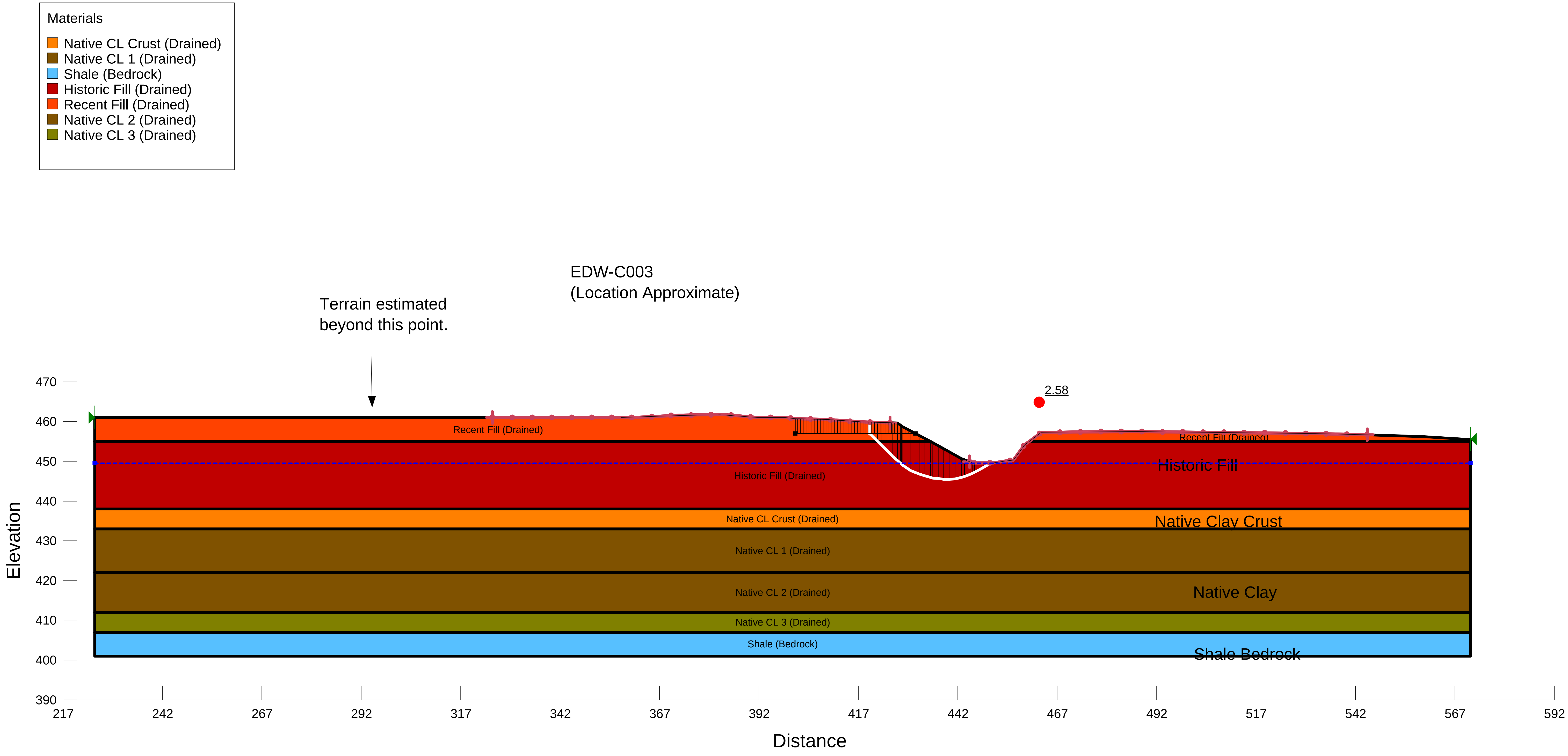
Name: Native CL 1 (Drained) Unit Weight: 117 pcf Cohesion': 100 psf Phi': 26 ° Piezometric Line: 1
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Historic Fill (Drained) Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Recent Fill (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1

Dynegy Edwards
Cross-section J
Slope Stability - Steady-State



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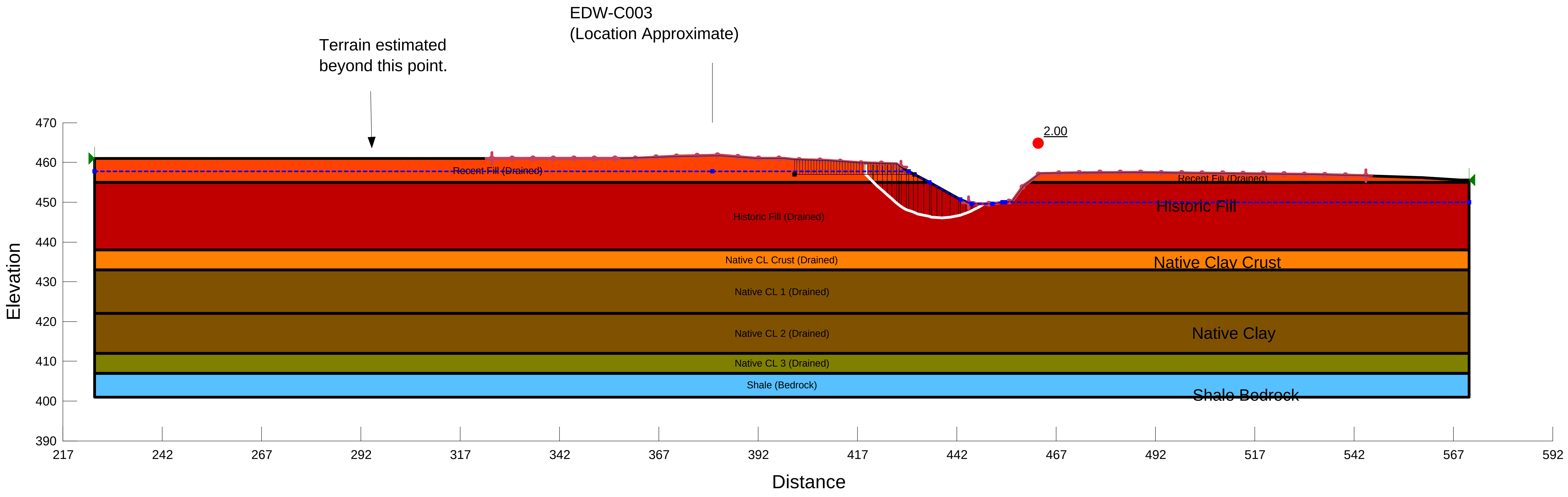
Name: Shale (Bedrock) Unit Weight: 140 pcf Cohesion': 1,000 psf Phi': 36 ° Piezometric Line: 1
Name: Historic Fill (Drained) Unit Weight: 125 pcf Cohesion': 200 psf Phi': 28 ° Piezometric Line: 1
Name: Recent Fill (Drained) Unit Weight: 115 pcf Cohesion': 200 psf Phi': 30 ° Piezometric Line: 1
Name: Native CL 2 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1
Name: Native CL 3 (Drained) Unit Weight: 105 pcf Cohesion': 200 psf Phi': 26 ° Piezometric Line: 1

Dynegy Edwards
Cross-section J
Slope Stability - Surcharge Pool

Materials

- 🟧 Native CL Crust (Drained)
- 🟫 Native CL 1 (Drained)
- 🟦 Shale (Bedrock)
- 🟥 Historic Fill (Drained)
- 🟥 Recent Fill (Drained)
- 🟫 Native CL 2 (Drained)
- 🟩 Native CL 3 (Drained)



Attachment G.2 Seismic Parameter Calculations

Calculation of K_h for Pseudostatic Analysis

Calc By:	AJW
Date:	2/15/2016

Objective: Estimate kh for pseudostatic analysis.

Given:
Seismic Hazard Deaggregation with PGA_{BC} = 0.067, M=6.8
Site Class D, based on IBC (2008)
FPGA = 1.6, based on NEHRP (2009)
Holzer (1998) Figure for estimation of crest acceleration
Makdisi Seed (1978) Figure for Max Acc of Slide Mass

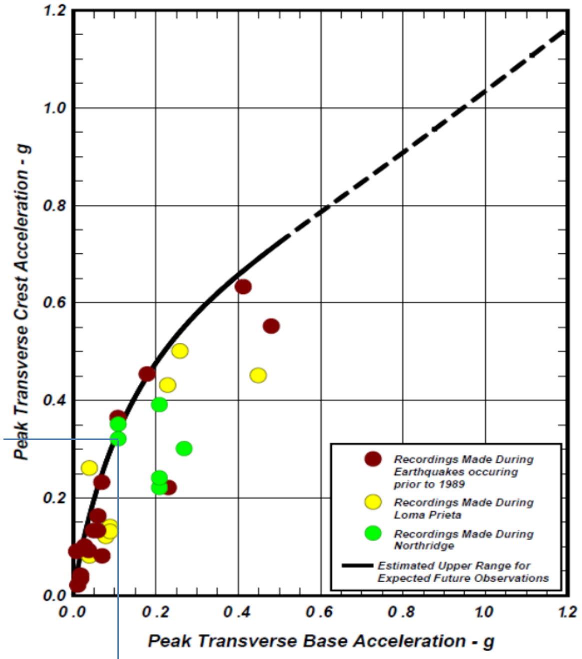


Figure 3. Variations of Recorded Peak Crest Accelerations versus those Recorded at the Base of Earth and Rock Fill Dams by Idriss (2015). Source of recorded values for Loma Prieta Earthquake and prior earthquakes: Holzer, (1998).

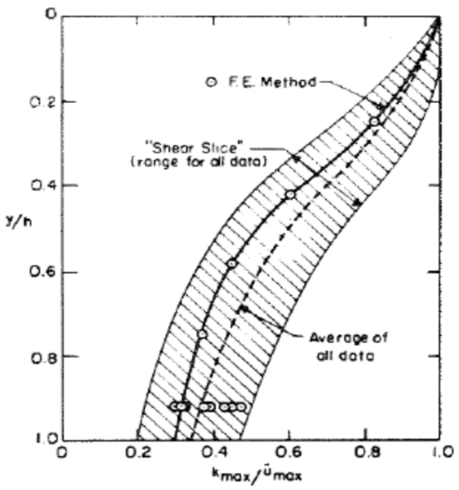
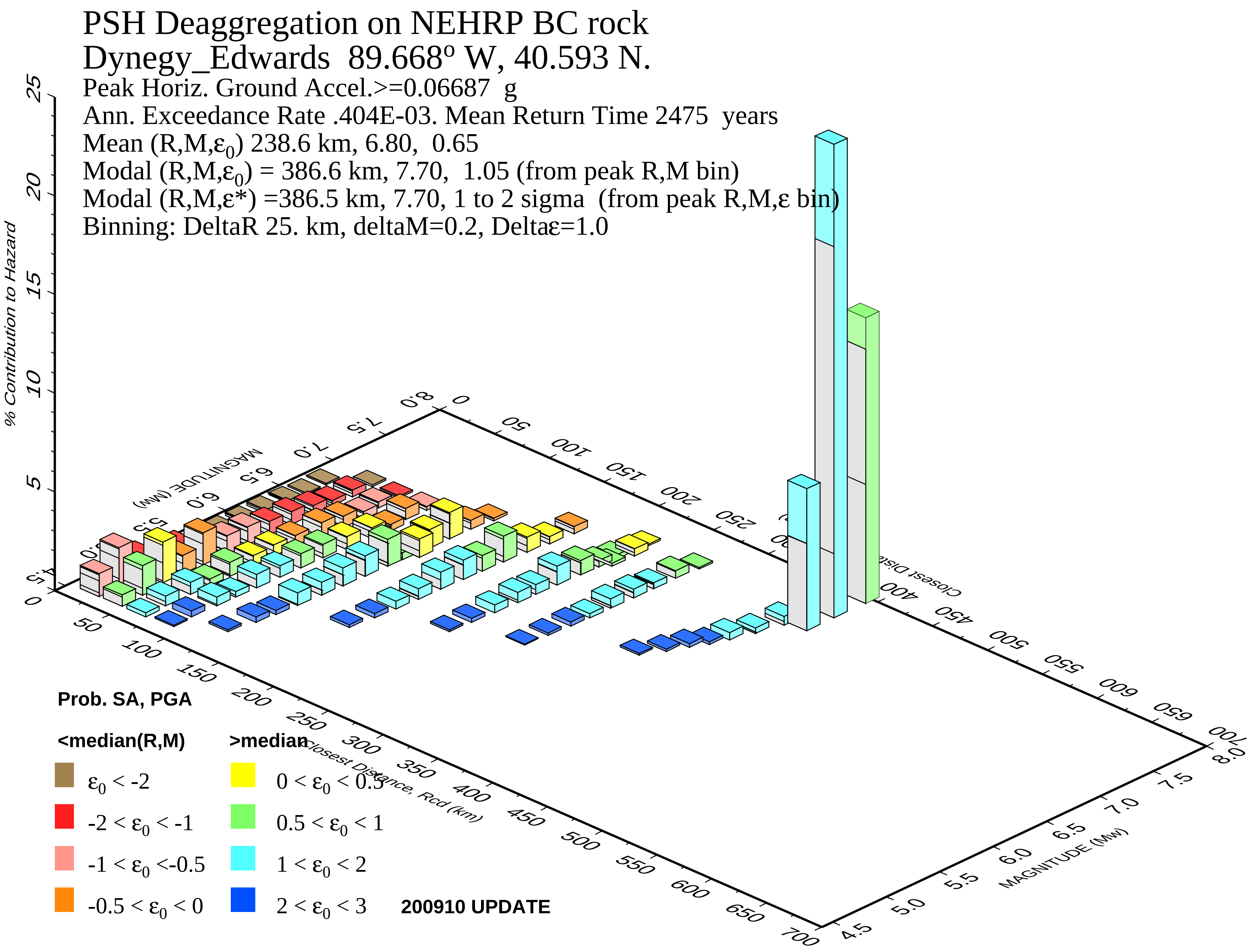


Figure 4. Variations of Maximum Acceleration Ratio with Depth of Sliding Mass (Makdisi and Seed, 1977). Maximum Acceleration Ratio is the Ratio between $(PGA)_{base\ of\ slide\ mass}$ and $(PGA)_{crest}$.

PGA_{BC}	Site class	F_{PGA}	PGA_{BASE}	PGA_{CREST}	Makdisi -Seed reduction for full height failure	k_h
0.06687	D	1.6	0.107	0.32	0.34	0.109

Results:

Use k_h = 0.109 for pseudostatic analyses.



GMT 2015 Dec 11 15:44:51 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

Appendix C. Hydrologic and Hydraulic Report

AECOM

AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110-1337
www.aecom.com

314.429.0100 tel
314.429.0462 fax

October 7, 2016

Mr. Matt Ballance, PE
Senior Project Engineer
Dynegy Inc.
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

RE: Hydrologic and Hydraulic Summary Report
Edwards Power Station
Ash Pond

Dear Mr. Ballance:

AECOM is pleased to provide this Summary Report of Hydrologic and Hydraulic Modeling for the Illinois Power Resources Generating, LLC (IPRG) Edwards Ash Pond Coal Combustion Residual (CCR) Unit. This analysis was performed to document that the facility meets the requirements of 40 CFR §257.82(a) with regard to the Inflow Design Flood Control Plan. Based on AECOM's analysis, the Ash Pond meets all hydraulic requirements for certification per 40 CFR §257.82(a).

AECOM looks forward to providing continued support to IPRG and working together on this important program. Please do not hesitate to call Ron Hager at 314-429-0100 (office) / 440-591-7868 (mobile), if you have any questions.

Sincerely,

AECOM

Ronald H. Hager

Jeremy Thomas, PE
Site Manager
jeremy.thomas@aecom.com

Ronald Hager
Program Manager
ronald.hager@aecom.com

cc: Mark Rokoff, PE – AECOM

Attachments:

A. Location Maps and Pertinent Drawings
B. Hydrologic and Hydraulic Analysis

1. INTRODUCTION

1.1. *Purpose of This Memorandum*

This report presents the results of the hydrologic and hydraulic analysis prepared by AECOM for the Illinois Power Resources Generating, LLC (IPRG)[1] Ash Pond Coal Combustion Residuals (CCR) unit at the Edwards Power Station, located near Bartonville, Illinois in Peoria County (See Attachment A for Location Map). This analysis was completed in accordance with the Environmental Protection Agency (EPA) 40 CFR Part §257, Subpart D, regulations for the disposal of CCR. As required by §257.82(a), by October 17, 2016 owners and operators of existing CCR surface impoundments must develop an Inflow Design Flood Control Plan that documents how the inflow design flood control system had been designed and constructed to meet the following requirements:

- *(40 CFR 257.82 (a)(1)* - The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood.

- *(40 CFR 257.82 (a)(2)* - The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood.

The Ash Pond has a high hazard potential based on the initial hazard potential classification assessment performed by Stantec in 2016, in accordance with §257.73(a)(2). The “High Hazard” category indicates that the inflow design flood for risk analysis is the Probable Maximum Flood (PMF) flood event. Since the Ash Pond does not have an inflow watershed outside of precipitation that falls directly into the CCR Unit, the PMF corresponds to the probable maximum precipitation (PMP) rainfall event. This event is the basis for AECOM certification.

1.2. *Brief Description of Impoundments*

The Edwards Power Station is a coal-fired facility that sluices bottom ash, fly ash, boiler slag and plant process water into the Ash Pond. There are three separate sub-basins within the Ash Pond: the Process Water Pond (referred to the as the “Cooling Pond” in the attachments), the Fly Ash Pond, and the Clarification Pond. The first sub-basin is referred to as the Process Water Pond and is in the northwestern end of the Ash Pond. The plant operations sluice boiler slag into the Process Water Pond and flow is discharged downstream to the Clarification Pond through a 24 inch diameter corrugated metal pipe (CMP) culvert. The normal water surface elevation (WSE) in the Process Water Pond is elevation 449.5 feet which is the invert elevation of the outlet culvert pipe. The second sub-basin is the Fly Ash Pond. During normal plant operations both bottom ash and fly ash are sluiced into settling channels within the Fly Ash Pond. The settling channels discharge into the Clarification Pond through culvert pipes. However, during the design storm rainfall discharge through these channels greatly exceeds the capacity of the culvert pipes, and will likely overtop or wash out the small interior splitter

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[1] Although the Edwards Power Station and Ash Pond are owned and operated by IPRG, Dynegy Administrative Services Company (*Dynegy*) contracted AECOM to develop this Hydrologic and Hydraulic Summary Report on behalf of IPRG. Therefore, “Dynegy” is references in materials attached to this hydrologic and hydraulic report.

dikes and discharge directly into the Clarification Pond. Therefore, the upstream storage potential of the channel was ignored and rainfall was modeled to discharge directly into the Clarification Pond. The third sub-basin is the Clarification Pond, which is located furthest downstream in the southern end of the Ash Pond. The clarified water is discharged from the Clarification Pond to the Illinois River through a 36 inch diameter CMP or reinforced concrete pipe (RCP) (material type has not been verified) vertical drop structure that leads to a nearly horizontal 36 inch CMP outfall pipe with a flap-gate back-flow preventer. This discharge is the site's NPDES-permitted outfall. The Clarification Pond normal WSE is 447.2 feet, which is the invert elevation of the outlet structure. The Location Map / Site Vicinity Map and Site Plan are included in Attachment A.

Elevations in this report are in feet and are referenced with respect to the North American Vertical Datum of 1988.

2. POND CAPACITY COMPUTATIONS

2.1. *Ash Pond*

Topographic and bathymetric surveys of the Ash Pond were performed by Maurer-Stutz in 2015 (Maurer-Stutz, 2015) supplemented with a 1/9 arc second Digital Elevation Model (DEM) obtained by AECOM from the U.S. Geologic Survey National Map website (http://nationalmap.gov). AECOM used this survey data to estimate storage capacity curves for the Ash Pond consisting of the Process Water Pond and the Clarification Pond impoundments using the conical basin volume equation in HydroCAD and are provided in in Attachment B. During the design storm event the peak discharge through the settling channels in the Fly Ash Pond portion of the Ash Pond greatly exceeds the hydraulic capacity of the culvert pipes connecting the channels to the Clarification Pond. The interior separation berms will likely overtop or washout, therefore, to be conservative the upstream storage capacity of the Fly Ash Pond was ignored and discharged directly into the Clarification Pond.

3. HYDROLOGIC AND HYDRAULIC ANALYSIS OF EDWARDS PONDS

3.1. *Rainfall Data*

The high hazard rainfall depths were selected using the National Weather Service – Hydrometerological Report No. 51 (HMR 51) for the 10-square mile all-season Probable Maximum Precipitation (PMP). The 24-hour PMP rainfall total is 32.8 inches. The HMR 51 figures are included in Attachment B.

3.2. *Runoff Computations*

The HydroCAD Version 10.0 computer model, by HydroCAD Software Solutions, LLC, was used to model the Ash Pond collection and control system, for the runoff calculations, and storage and discharge structure evaluations. The model evaluated pond capacities, hydraulics of the ponds considering details of the between-pond discharge structures, and the final outlet structure during peak discharges.

3.3. *Illinois River Tailwater*

The Ash Pond discharges to the Illinois River and therefore the pool level in the Illinois River may affect the corresponding pool level in the Ash Pond. The historic high water elevation in the Illinois River was obtained from NOAA website for the Illinois River gage at Peoria Lock and Dam. The historic high water elevation in the Illinois River is 456.7 feet. It is assumed that during the design storm event that the outlet pipe into the Illinois River will be completely submerged and no flow would be discharged from the Ash Pond. This is because the flap-gate structure on the end of the pipe is not expected to be opened based on the flood in the upstream Ash Pond, which is within 3 feet of the flood elevation in the Illinois River. Therefore, it is unlikely to cause the flap gate to open significantly.

Please refer to Attachment B for further details and modeling results.

4. CONCLUSIONS

- The inflow design flood control system of the Edwards Ash Pond adequately manages flow into and out of the Ash Pond during and following the peak discharge of the PMP storm event inflow design flood. Results of the model are summarized in Table 4.1. The Edwards Ash Pond meets the §257.82(a) requirements for certification.

Table 4.1
Edwards Summary of Hydrologic and Hydraulic Analysis,
24-hour PMP Storm

CCR Unit	Beginning WSE[1] (ft)	Peak WSE (ft)	Crest Elevation (ft)
Ash Pond - Process Water Pond Area	449.5	457.8	458.8
Ash Pond - Clarification Pond Area	447.2	457.4	459.6

Notes:
[1] WSE = Water Surface Elevation

5. LIMITATIONS

Background information, design basis, and other data, which AECOM has used in preparing this report have been furnished to AECOM by IPRG. AECOM has relied on this information as furnished, and is not responsible for the accuracy of this information. Our recommendations are based on available information from previous and current investigations. These recommendations may be updated as future investigations are performed.

The conclusions presented in this report are intended only for the purpose, site location, and project indicated. The recommendations presented in this report should not be used for other projects or purposes. Conclusions or recommendations made from these data by others are their responsibility. The conclusions and recommendations are based on AECOM's understanding of current plant operations, maintenance, stormwater handling, and ash handling procedures at the station, as provided by IPRG. Changes in any of these operations or procedures may invalidate the findings in this report until AECOM has had the opportunity to review the changes, and revise the report if necessary.

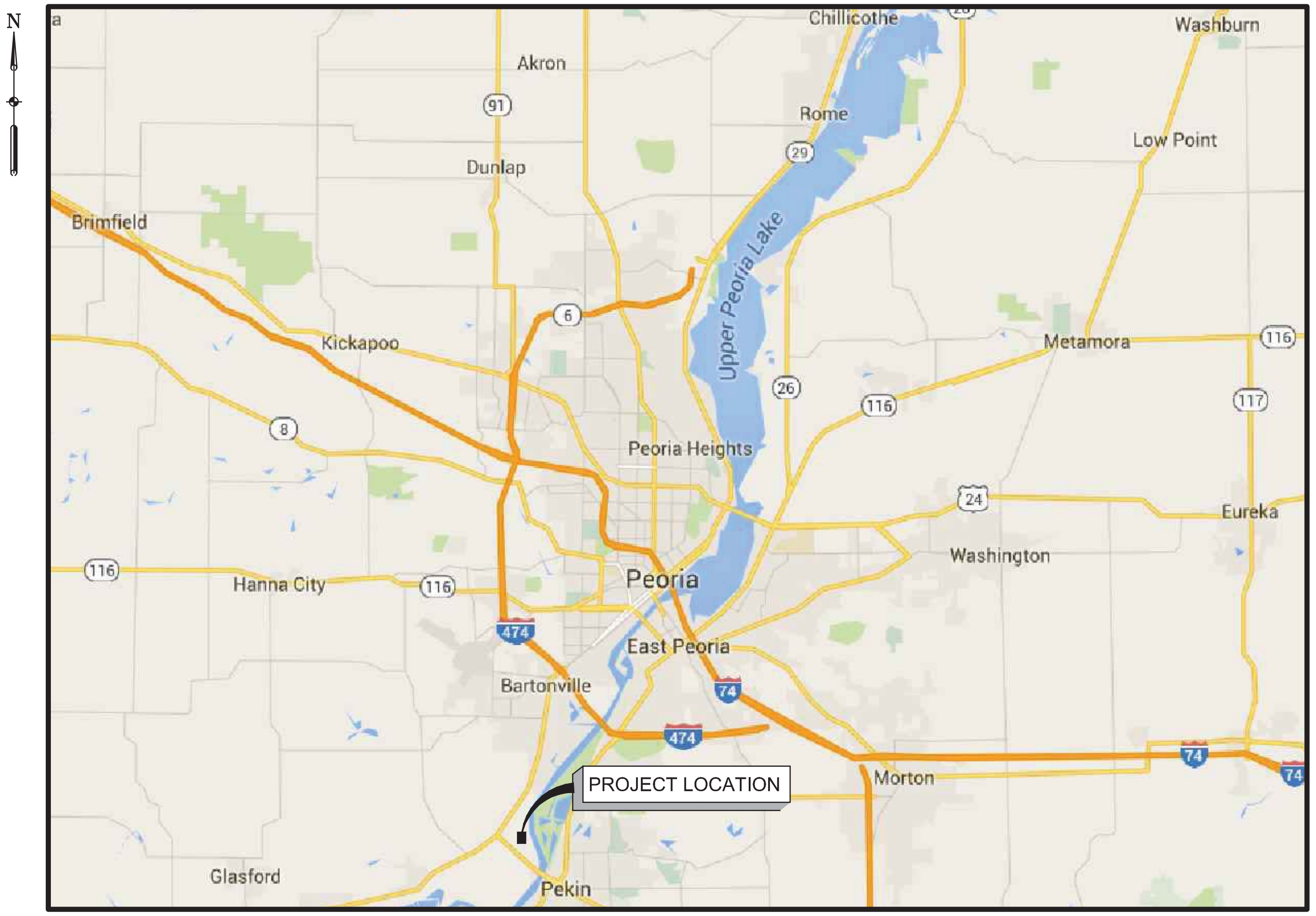
This hydrologic and hydraulic analysis was performed in accordance with the standard of care commonly used as state-of-practice in our profession. Specifically, our services have been performed in accordance with accepted principles and practices of the engineering profession. The conclusions presented in this report are professional opinions based on the indicated project criteria and data available at the time this report was prepared. Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

6. REFERENCES

1. Kleinfelder Engineers, 2011. Coal Ash Impoundment Site Assessment Final Report – E.D. Edwards Power Generating Station, May 10, 2011
2. Maurer-Stutz, 2015. Topographical and Bathymetric Survey, Edwards Ash Pond, Performed in June and July 2015.

Attachment A

A1 – Location Map and Site Vicinity Map
A2 – Site Map



LOCATION MAP

NOT TO SCALE

VICINITY MAP

NOT TO SCALE

AERIAL FROM GOOGLE EARTH PRO
MAP FROM GOOGLE

AECOM
558 N Main Street
Oshkosh, Wisconsin
920 235-0270 (phone)
920 235-0321 (fax)

DYNEGY
Dynegy Inc.
1500 East Port Plaza Drive
Collinsville, IL 62234

CCR RULE ASSESSMENT
OF PLANTS

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

H&H REPORT
ASH POND

ISSUED FOR BIDDING ____ DATE BY

ISSUED FOR CONSTRUCTION ____ DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60440202
DRAWN BY:	TPB
DESIGNED BY:	_
CHECKED BY:	_
DATE CREATED:	2/17/2016
PLOT DATE:	2/17/2016
SCALE:	AS SHOWN
ACAD VER:	2014

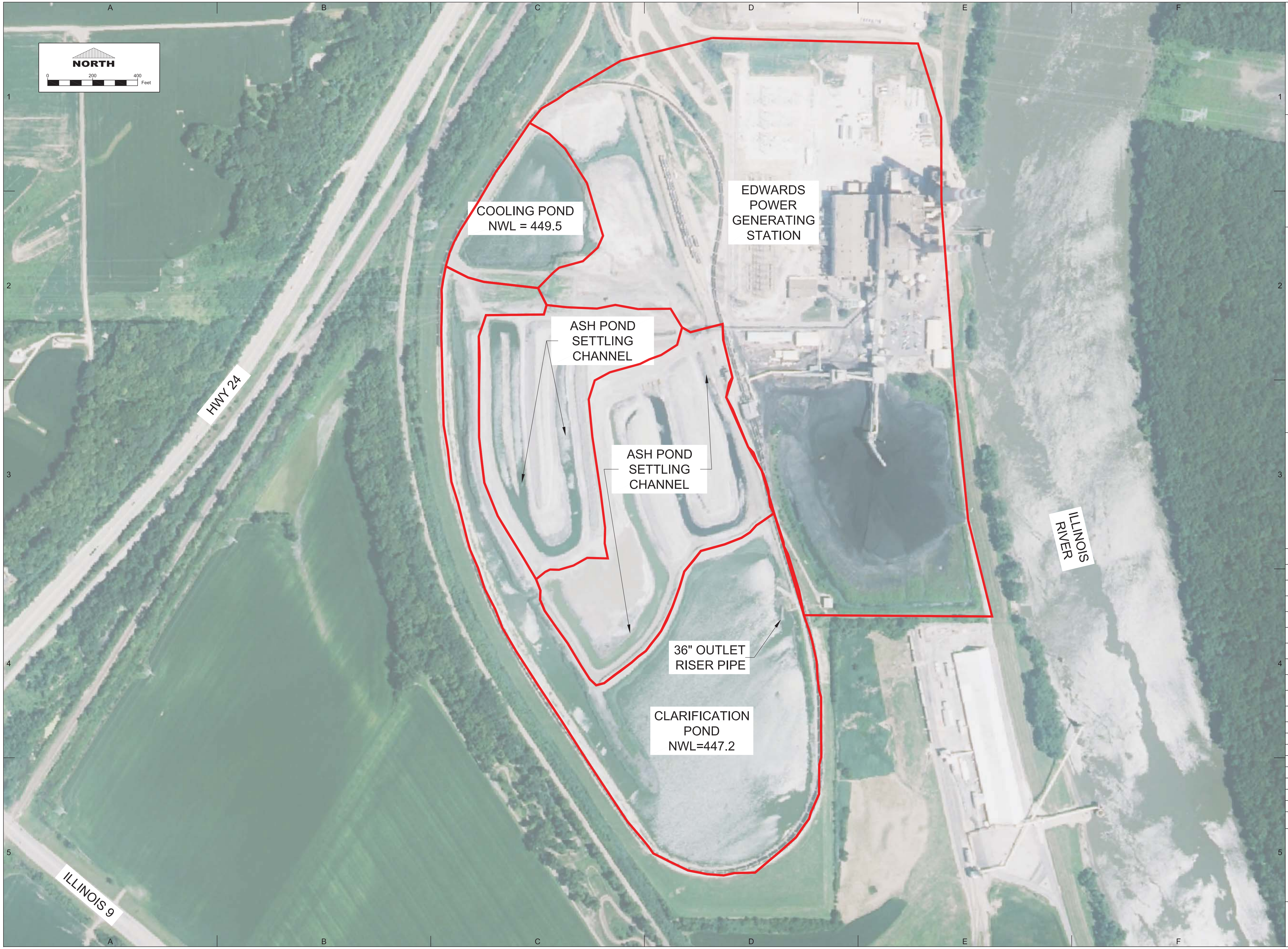
SHEET TITLE

LOCATION MAP AND
SITE VICINITY MAP

ATTACHMENT A-1

AECOM DRAWING PATH: K:\Projects\60427894-Dynegy\900-WORKING DOCS-CAD\902-SHEETS\30% Design Sheets_Edwards\EDW 1 LOCATION PLAN.dwg

BRAND, TRAVIS, 2/22/2016 11:05 AM



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AECOM PROJECT NO:	60440202
DRAWN BY:	
DESIGNED BY:	
CHECKED BY:	
DATE CREATED:	2/25/2016
PLOT DATE:	2/25/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

SITE MAP

ATTACHMENT A-2

Attachment B

Hydrologic and Hydraulic Analysis

Objective: **This analysis describes the independent investigation and design calculations and considerations of the on-site hydrology and hydraulics as required by the Environmental Protection Agency's (EPA's) Final Coal Combustion Residuals (CCR) Rule. In particular, the analysis investigates the performance of the existing spillways and outlet structures for the Edwards Ash Pond during the probable maximum precipitation (PMP) storm event as required by the EPA's CCR Rule. AECOM evaluated how the onsite hydraulics will be affected by the existing conditions of the Ash Pond. In addition, the analyses evaluate how large flows from off-site affect the station's operations.**

Overview

The Ash Pond has three pond areas that collect and route water within the impoundment; the Process Water Pond located on the north end of the Ash Pond and the Clarification Pond located on the south end of the Ash Pond. In addition the central portion of the Ash Pond, known as the Fly Ash Pond, is filled with CCR material and contains two drainage channels which convey water to the Clarification Pond. During the design storm event the discharge from the channels greatly exceeds the hydraulic capacity of the culvert pipes, therefore, the potential storage area in the channels was ignored and rainfall within the Fly Ash Pond area was modeled to directly discharge into the Clarification Pond.

Process Water Pond

The Process Water Pond receives plant process water flow of 8 cubic feet per second (cfs), based on information provided by Dynegy, and discharges to the Clarification Pond through a 24-inch CMP culvert. The normal water surface elevation (WSE) of the Process Water Pond is 449.5 feet as listed in the Kleinfelder Site Assessment Final Report dated May 10, 2011.

Clarification Pond

The Clarification Pond receives flows from the Process Water Pond as well as the two channels in the central area of the Ash Pond. The Clarification Pond discharges to the Illinois River through a 36-inch corrugated metal pipe (CMP) vertical drop structure with a back-flow preventer. The normal WSE of the Clarification Pond is 447.2 feet as listed in the Kleinfelder Site Assessment Final Report dated May 10, 2011. The pool level in the Ash Pond sub-basins is not listed in the 2015 Maurer-Stutz survey.

Selected Methods:

AECOM developed a hydrologic model for the ash ponds using HydroCAD-10 modeling software. Development of the model includes the most recent and available information that best represent the existing conditions at the site. 2015 survey data from Maurer-Stutz supplemented with survey data from the U.S. Geologic Survey National Map website in areas outside of the extents of the Maurer-Stutz survey was also used in developing the model. Site soil characteristics from NRCS were used to input hydrologic parameters. Curve numbers were assigned based on soil and land use data. Times of concentrations were calculated in the model based on the longest hydraulic flow path for each sub-catchment. Additional elevations from drawings and current NPDES permitted outflows were used to generate the existing model. Flows entering the ponds were modeled according to AECOM's best estimation of current conditions in the Ash Pond and plant operations.

All storm calculations are to include the assumption that the tailwater conditions in the Illinois River during PMP flood are at elevation 456.7 feet, the historical high water elevation; the outlet pipe from the Ash Pond would be completely submerged and no flow would be discharged from the Ash Pond during the PMP storm event due to the flap-gate back-flow preventer in the outlet pipe, which is unlikely to be opened during the PMP IDF due to the nominal head difference between the pool level in the Illinois River and the East Ash Pond.

- **Data & Assumptions**

Watershed Area

The Edwards Ash Pond watershed is separated by the perimeter dike system that surrounds the site. The watershed delineation was performed using topographic survey provided by Dynegy, and supplemented with a 1/9 arc second Digital Elevation Model (DEM) obtained by AECOM from the U.S. Geologic Survey National Map website (http://nationalmap.gov). The watershed delineation is provided in **Appendix A**. The Ash Pond watershed was sub divided into four Sub-Watersheds to describe the total watershed. The watersheds include the Process Water Pond Watershed draining via overland flow and storm sewer networks, the North and South Ash Pond watersheds draining via the settling channels to the Clarification Pond, and the direct runoff into the Clarification Pond. The sub-watersheds are summarized in Table 1 below.

Table 1 Summary of Sub-Watersheds

Sub-Watershed	Area (acres)	Area (square miles)	Drainage Path Description
Process Water Pond	34.0	0.053	Site Runoff to Process Water Pond, including switch yard, warehouse, and parking areas.
North Ash Pond	14.7	0.023	Runoff to the Clarification Pond through the Settling Channel
South Ash Pond	19.4	0.030	Runoff to the Clarification Pond through the Settling Channel
Clarification Pond	35.8	0.056	Direct Runoff to Clarification Pond
Total:	**103.9**	**0.162**	-

Rainfall Depths

The 24-hour PMP storm was evaluated to meet the CCR Rule. The National Weather Service – Hydrometeorological Report No. 51 (HMR 51) was used to obtain the design storm depth of 32.8 inches for the Edwards Power Station. The data obtained from HMR 51 is presented in **Appendix B.**

Loss Rates

The runoff loss rates are dependent upon land use, hydrologic soil groups, and antecedent moisture conditions. The land use at the project site includes reservoirs, gravel roads and industrial. The underlying soil at the project site is a combination of urban land, orthents, and silty loams based on the Natural Resources Conservation Service (NRCS) Web Soil Survey with a hydrologic soil group of predominately Group C. Group C infiltration rates are estimated to be between 0 to 0.05 in. per hour. An Antecedent Moisture Condition (AMC) of II was used to describe average moisture condition before the storm events. The Web Soil Survey Report is included in **Appendix C**. These factors were combined to estimate a SCS Runoff Curve Number (RCN). A high RCN indicates low infiltration rates with greater runoff volumes, while a low RCN indicates high infiltration rates with lesser runoff volumes. For this analysis, a RCN of 96 was selected for gravel surfaces, 91 for industrial areas and 98 for water surfaces. Calculations for the weighted runoff curve numbers for each sub-watershed were performed in HydroCAD and are included in **Appendix F**.

Unit Hydrograph Methods

A NCRS TR-60 PMP, 24-hour rainfall distribution was applied to the PMP/24 hour storm of 32.8 inches.

Plant Operations and Base-Flow

Plant operation base-flows include approximately 5.16 million gallons per day (MGD). These base flows were taken from the NPDES permit Renewal Application Dated July 23, 2010. The plant base-flows were added to the inflow into the Clarification Pond during and after the IDF.

- **<u>Results</u>**

Flood Stage Hydraulic Analysis Results Summary

Tables 2 and 3 below give details of the maximum pond water surface elevation for the design storm, and inflow and discharge rates for the 24-hour PMP storm event.

Table 2 – Ash Pond - Process Water Pond Area Routing Summary – 24-hour PMP

Storm Event	Rainfall Depth (inches)	Peak IDF Inflow (cfs)	Inflow Design Flood Pool (feet)	Outflow (cfs)
PMP, 24-hour	32.8	149	457.8	44

Table 3 – Ash Pond - Clarification Pond Area Routing Summary – 24-hour PMP

Storm Event	Rainfall Depth (inches)	Peak IDF Inflow (cfs)	Inflow Design Flood Pool (feet)	Outflow (cfs)
PMP, 24-hour	32.8	338	457.4	0

- **Conclusions**

Based on the HydroCAD model results, the Ash Pond does not overtop its crest during the 24-hour PMP storm event. Nearby off-site drainage does not enter the Ash Pond through culverts or overtopping of the outside berms. Therefore, the Edwards Power Station Ash Pond meets the hydrologic and hydraulic requirements for certification under CCR regulations.

- **List of Appendices**

Appendix A – HydroCAD Model Schematic

Appendix B – High Hazard PMP Rainfall Depths (HMR 51)

Appendix C – NRCS Soil Survey

Appendix D – FEMA Flood Insurance Rate Map

Appendix E – NOAA Illinois River Gage at Peoria Lock and Dam

Appendix F – PMP/24-hour storm HydroCAD Output

Appendix A

HydroCAD Model Schematic

AECOM

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DYNEGY

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1500 East Port Plaza Drive
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CCR RULE ASSESSMENT OF PLANTS

EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

H&H
REPORT
ASH POND

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NO.	DESCRIPTION	DATE
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AECOM PROJECT NO:	60440202
DRAWN BY:	
DESIGNED BY:	
CHECKED BY:	
DATE CREATED:	2/25/2016
PLOT DATE:	2/25/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

HYDROCAD
MODEL
SCHEMATIC

ATTACHMENT C-1

Appendix B

High Hazard PMP Rainfall Depths (HMR 51)

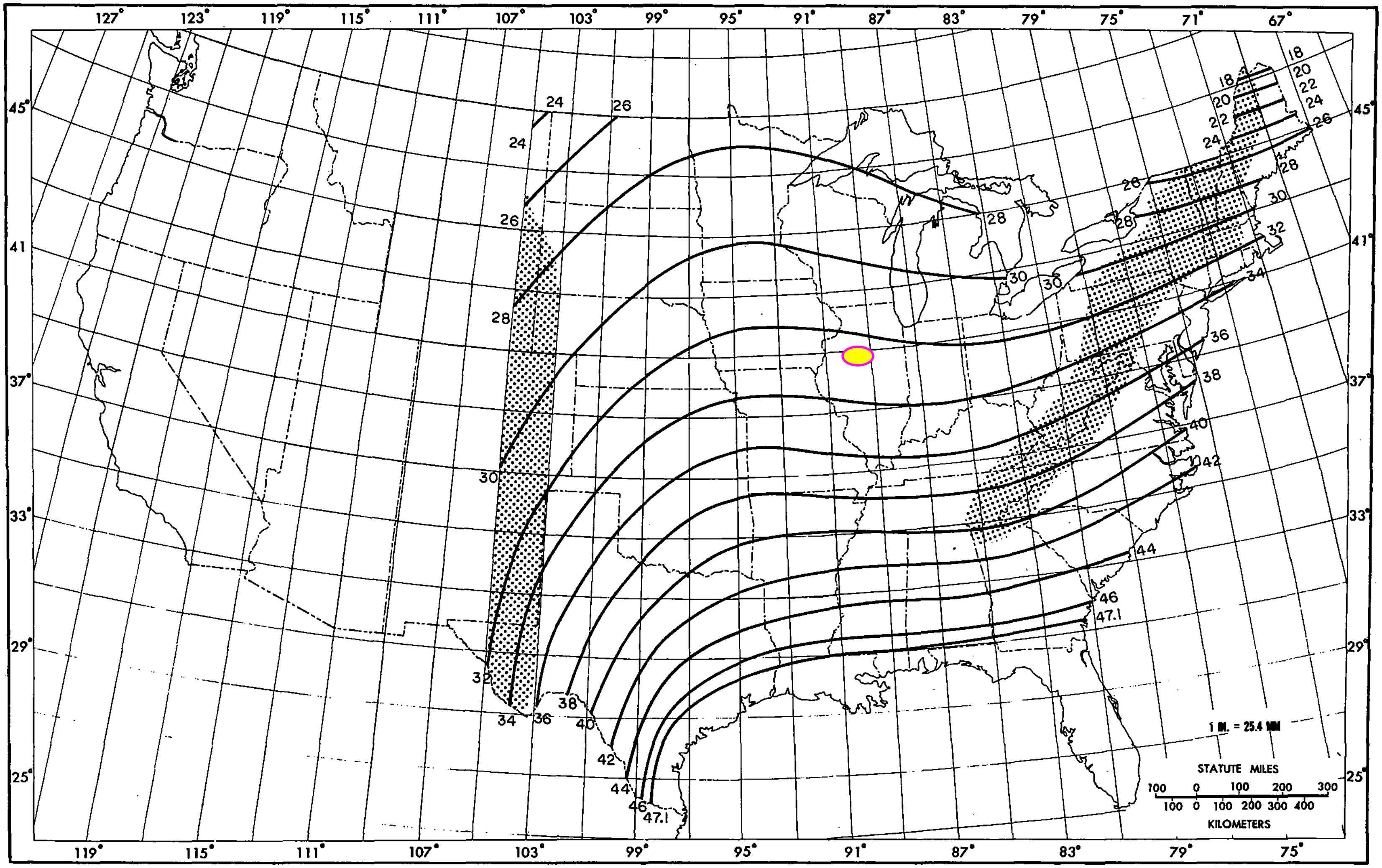
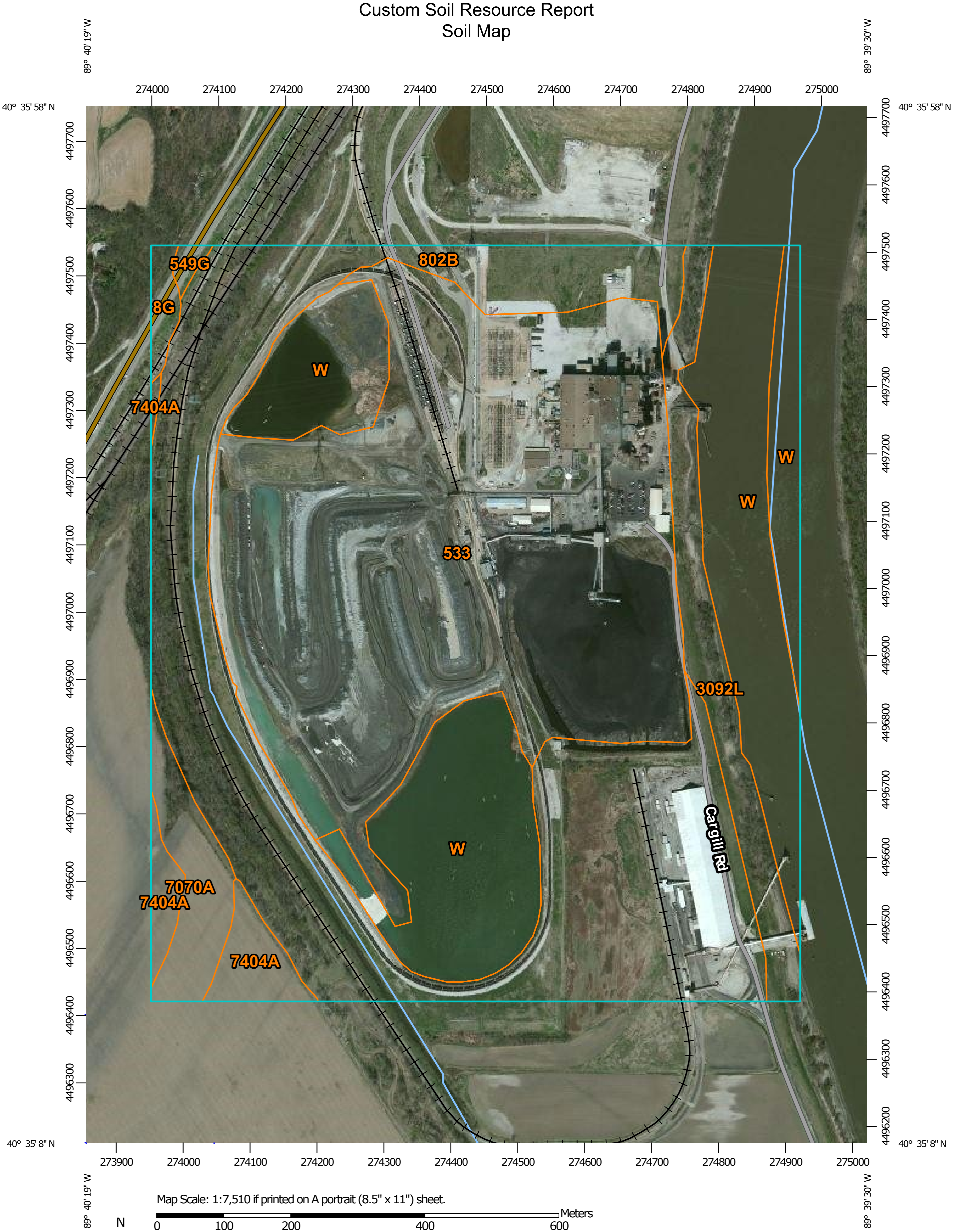


Figure 20.--All-season PMP (in.) for 24 hr 10 mi^2 (26 km^2).

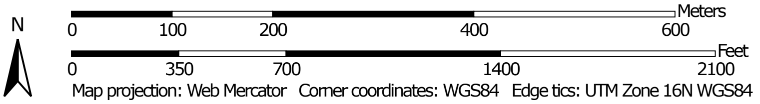
Appendix C

NRCS Soil Survey

Soil Map



Map Scale: 1:7,510 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Peoria County, Illinois
Survey Area Data: Version 10, Sep 25, 2015

Soil Survey Area: Tazewell County, Illinois
Survey Area Data: Version 9, Sep 25, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Peoria County, Illinois (IL143)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8G	Hickory silt loam, 35 to 60 percent slopes	1.6	0.6%
533	Urban land	104.3	38.6%
549G	Marseilles silt loam, 35 to 60 percent slopes	0.6	0.2%
802B	Orthents, loamy, undulating	79.3	29.3%
3092L	Sarpy loamy fine sand, 0 to 2 percent slopes, frequently flooded, long duration	12.8	4.7%
7070A	Beaucoup silty clay loam, 0 to 2 percent slopes, rarely flooded	7.1	2.6%
7404A	Titus silty clay, 0 to 2 percent slopes, rarely flooded	5.7	2.1%
W	Water	52.9	19.6%
Subtotals for Soil Survey Area		**264.3**	**97.8%**
Totals for Area of Interest		**270.4**	**100.0%**

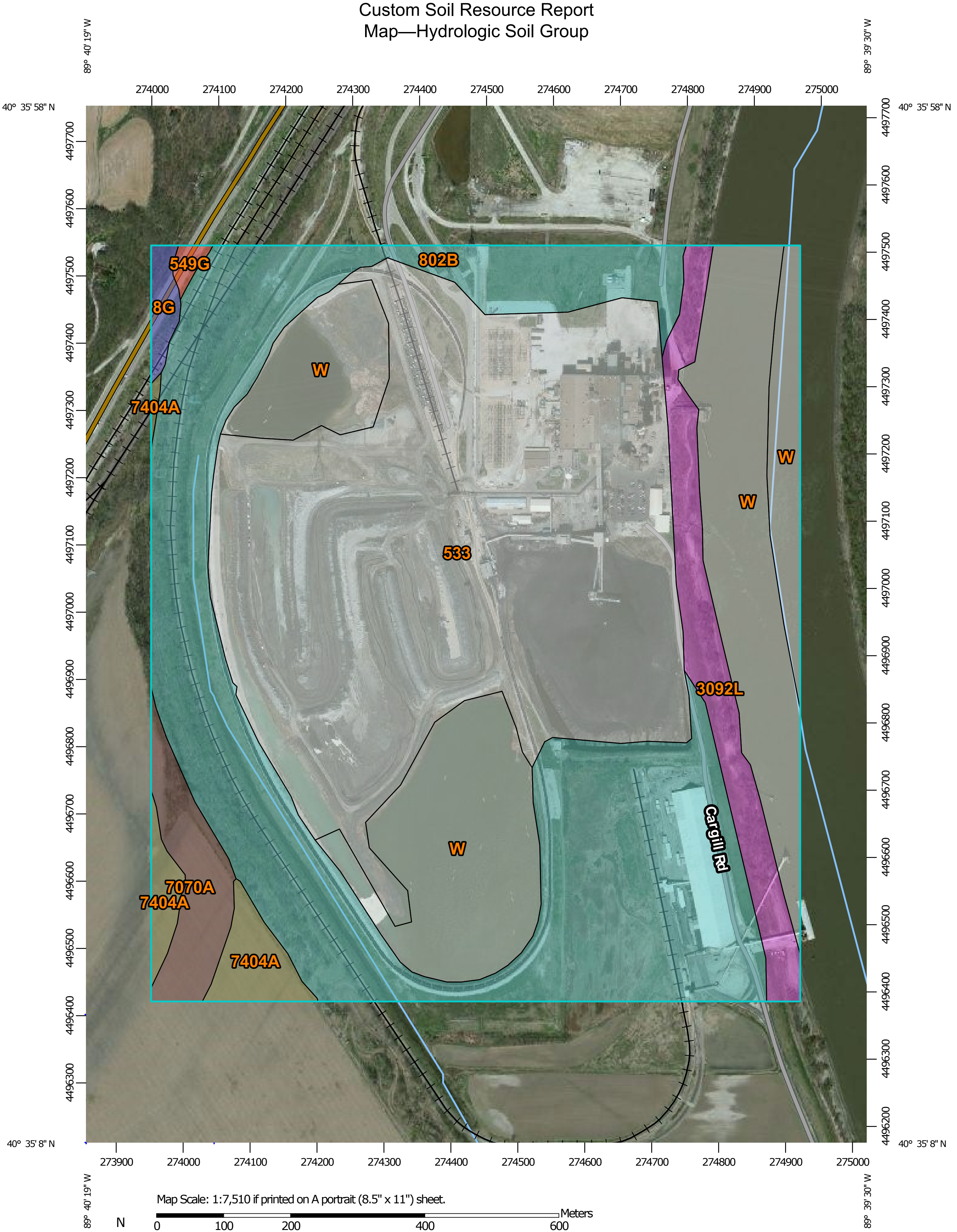
Tazewell County, Illinois (IL179)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	6.1	2.2%
Subtotals for Soil Survey Area		**6.1**	**2.2%**
Totals for Area of Interest		**270.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:7,510 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- ⬜ Area of Interest (AOI)

Soils

Soil Rating Polygons

- 🟪 A
- 🟩 A/D
- 🟦 B
- 🟫 B/D
- 🟦 C
- 🟨 C/D
- 🟥 D
- ⬜ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ■ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

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Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Peoria County, Illinois
Survey Area Data: Version 10, Sep 25, 2015

Soil Survey Area: Tazewell County, Illinois
Survey Area Data: Version 9, Sep 25, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Peoria County, Illinois (IL143)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
8G	Hickory silt loam, 35 to 60 percent slopes	B	1.6	0.6%
533	Urban land		104.3	38.6%
549G	Marseilles silt loam, 35 to 60 percent slopes	D	0.6	0.2%
802B	Orthents, loamy, undulating	C	79.3	29.3%
3092L	Sarpy loamy fine sand, 0 to 2 percent slopes, frequently flooded, long duration	A	12.8	4.7%
7070A	Beaucoup silty clay loam, 0 to 2 percent slopes, rarely flooded	B/D	7.1	2.6%
7404A	Titus silty clay, 0 to 2 percent slopes, rarely flooded	C/D	5.7	2.1%
W	Water		52.9	19.6%
Subtotals for Soil Survey Area			**264.3**	**97.8%**
Totals for Area of Interest			**270.4**	**100.0%**

Hydrologic Soil Group— Summary by Map Unit — Tazewell County, Illinois (IL179)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
W	Water		6.1	2.2%
Subtotals for Soil Survey Area			**6.1**	**2.2%**
Totals for Area of Interest			**270.4**	**100.0%**

Rating Options—Hydrologic Soil Group

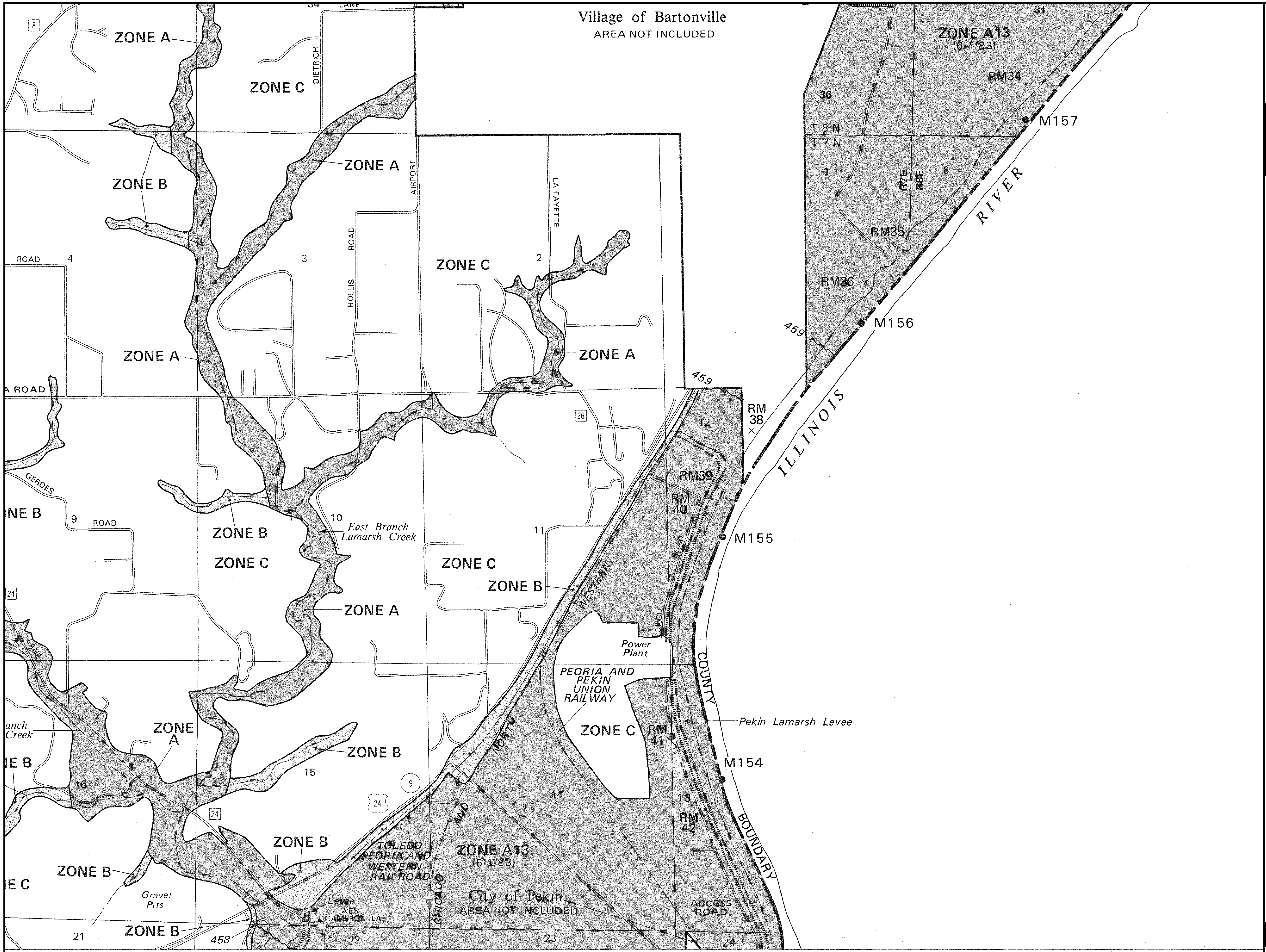
Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Appendix D

FEMA Flood Insurance Rate Map



N

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

COUNTY OF
PEORIA,
ILLINOIS
(UNINCORPORATED AREAS)

PANEL 175 OF 200

COMMUNITY-PANEL NUMBER
170533 0175 B

MAP REVISED:
JUNE 1, 1983

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix E

NOAA Illinois River Gage at Peoria Lock and Dam

weather.gov

National Weather Service

Advanced Hydrologic Prediction Service

Home News Organization Search for: ☐ ● NWS ○ All NOAA Go

Return to: Illinois River Point Selection Page

Jump to Location

Important Note: Book-marking page saves current search criteria

Illinois River At Peoria Lock and Dam (PRAI2)

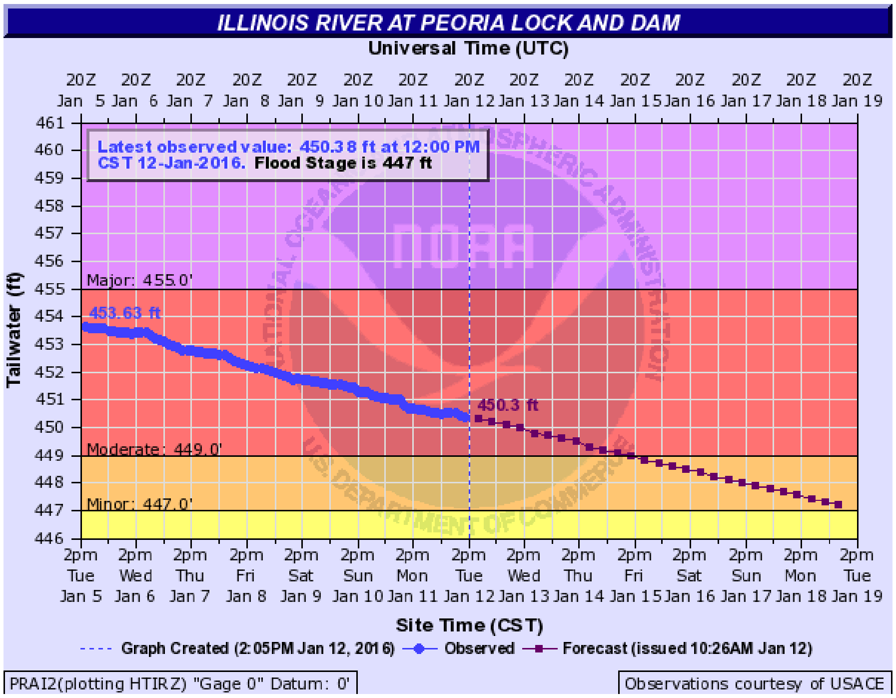
Return to Top

NOTE: River forecasts for this location take into account past precipitation and the precipitation amounts expected approximately 48 hours into the future from the forecast issuance time.

Flood Stage: 447 Feet Latest Stage: 450.38

Current Warnings/Statements/Advisories: None currently.

Complete information about the Illinois River at Peoria Lock and Dam available from NWS Lincoln, IL



Switch Basemap

County of Peoria, Esri, HER...

Gauge Location ●

Disclaimer

Latitude/Longitude Disclaimer: The gauge location shown in the above map is the approximate location based on the latitude/longitude coordinates provided to the NWS by the gauge owner.

Flood Categories (in feet)

Major Flood Stage:	455
Moderate Flood Stage:	449
Flood Stage:	447
Action Stage:	444

Historic Crests

(1) 456.57 ft on 04/24/2013
(2) 455.90 ft on 05/24/1943
(3) 455.80 ft on 03/23/1979
(4) 455.60 ft on 03/08/1985
(5) 454.65 ft on 06/30/2015 **(P)**

Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests

(1) 454.13 ft on 01/03/2016 **(P)**
(2) 454.65 ft on 06/30/2015 **(P)**
(3) 456.57 ft on 04/24/2013
(4) 454.30 ft on 09/19/2008
(5) 454.20 ft on 03/03/1997

Show More Recent Crests

(P): Preliminary values subject to further review.

Collaborative Agencies

Collapse

The National Weather Service prepares its forecasts and other services in collaboration with agencies like the US Geological Survey, US Bureau of Reclamation, US Army Corps of Engineers, Natural Resource Conservation Service, National Park Service, ALERT Users Group, Bureau of Indian Affairs, and many state and local emergency managers across the country. For details, please click here.

NWS Information

National Weather Service
Lincoln Weather Forecast Office
1362 State Route 10
Lincoln, IL 62656
(217) 732-3089
Ask Questions/Webmaster
Page last modified: 16-Nov-2015 1:20 PM

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Credits
Glossary

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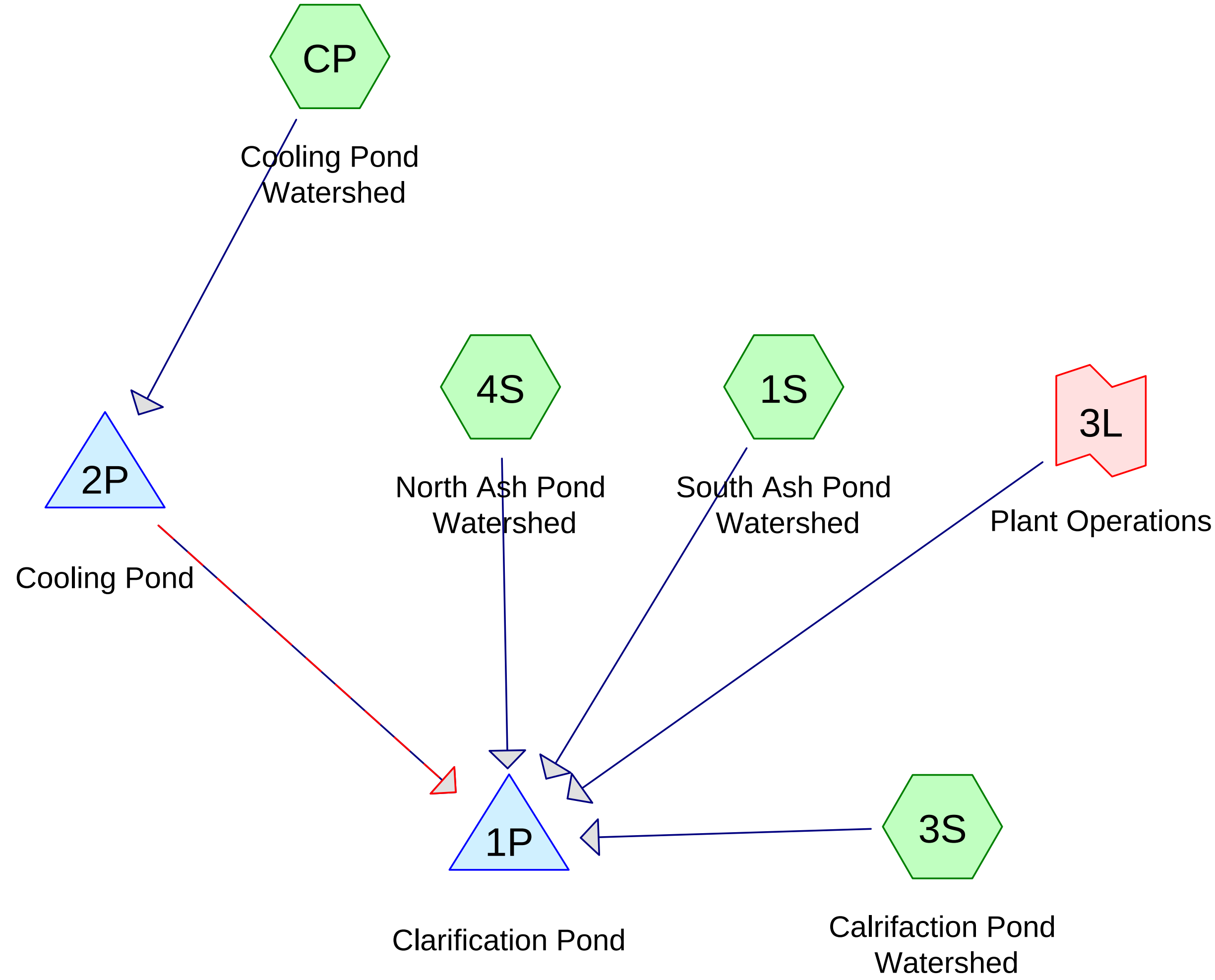
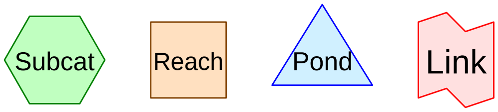
Career Opportunities

Appendix F

PMP/24-hour Storm HydroCAD Output





Routing Diagram for Edwards_IDF
Prepared by AECOM, Printed 9/21/2016

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
15.600	96	Gravel surface, HSG C (CP)
49.300	91	Urban industrial, 72% imp, HSG C (1S, 3S, 4S, CP)
39.000	98	Water Surface, HSG C (1S, 3S, 4S, CP)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
103.900	HSG C	1S, 3S, 4S, CP
0.000	HSG D	
0.000	Other	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	434.00	432.00	1,090.5	0.0018	0.011	36.0	0.0	0.0
2	2P	449.50	449.40	80.0	0.0013	0.025	24.0	0.0	0.0

Summary for Subcatchment 1S: South Ash Pond Watershed

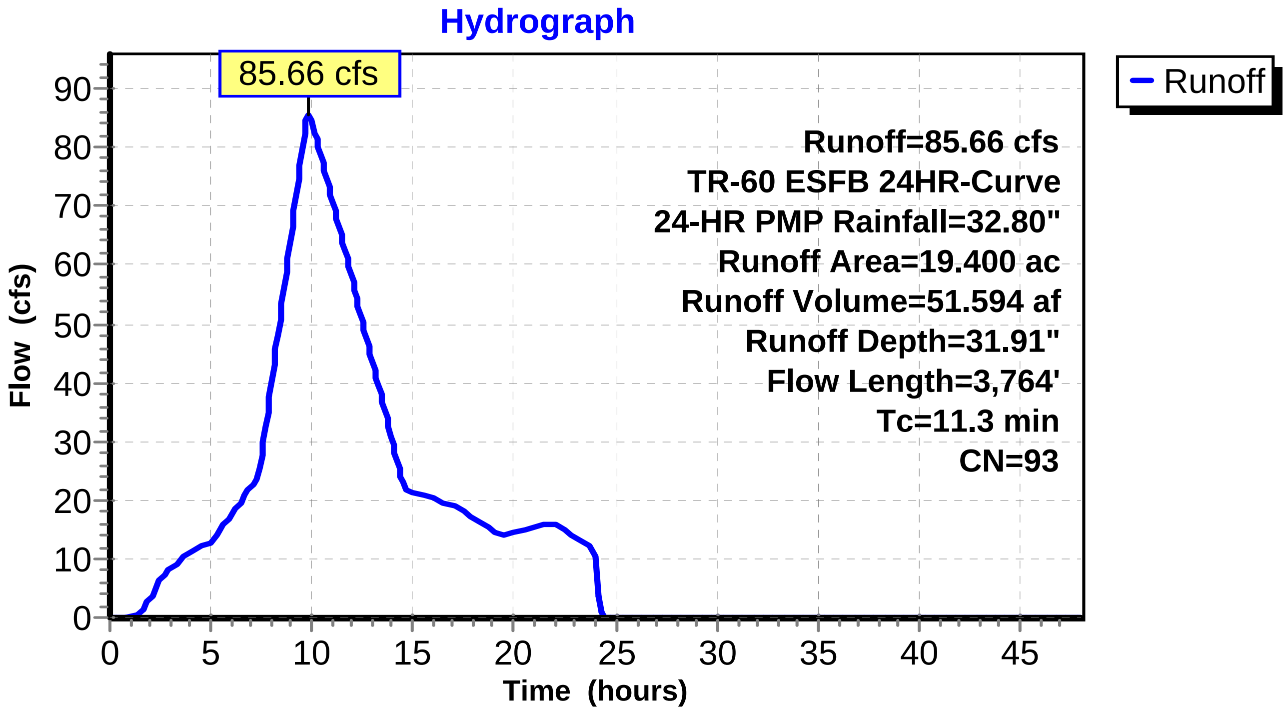
Runoff = 85.66 cfs @ 9.809 hrs, Volume= 51.594 af, Depth=31.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
TR-60 ESFB 24HR-Curve 24-HR PMP Rainfall=32.80"

Area (ac)	CN	Description
4.300	98	Water Surface, HSG C
15.100	91	Urban industrial, 72% imp, HSG C
19.400	93	Weighted Average
4.228		21.79% Pervious Area
15.172		78.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0400	1.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.97"
10.6	3,700	0.0020	5.81	3,198.10	**Channel Flow,** Area= 550.0 sf Perim= 84.0' r= 6.55' n= 0.040 Winding stream, pools & shoals
11.3	3,764	Total			

Subcatchment 1S: South Ash Pond Watershed



Summary for Subcatchment 3S: Calrifaction Pond Watershed

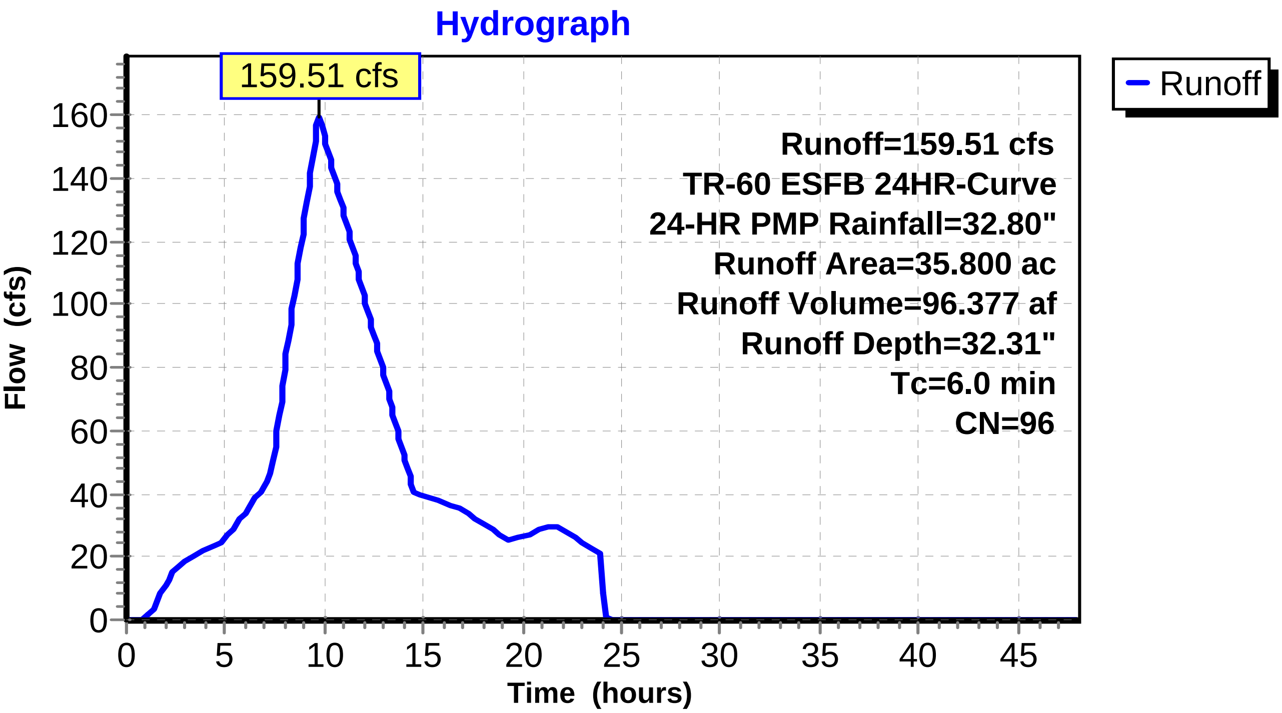
Runoff = 159.51 cfs @ 9.720 hrs, Volume= 96.377 af, Depth=32.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
TR-60 ESFB 24HR-Curve 24-HR PMP Rainfall=32.80"

Area (ac)	CN	Description
25.100	98	Water Surface, HSG C
10.700	91	Urban industrial, 72% imp, HSG C
35.800	96	Weighted Average
2.996		8.37% Pervious Area
32.804		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: Calrifaction Pond Watershed



Summary for Subcatchment 4S: North Ash Pond Watershed

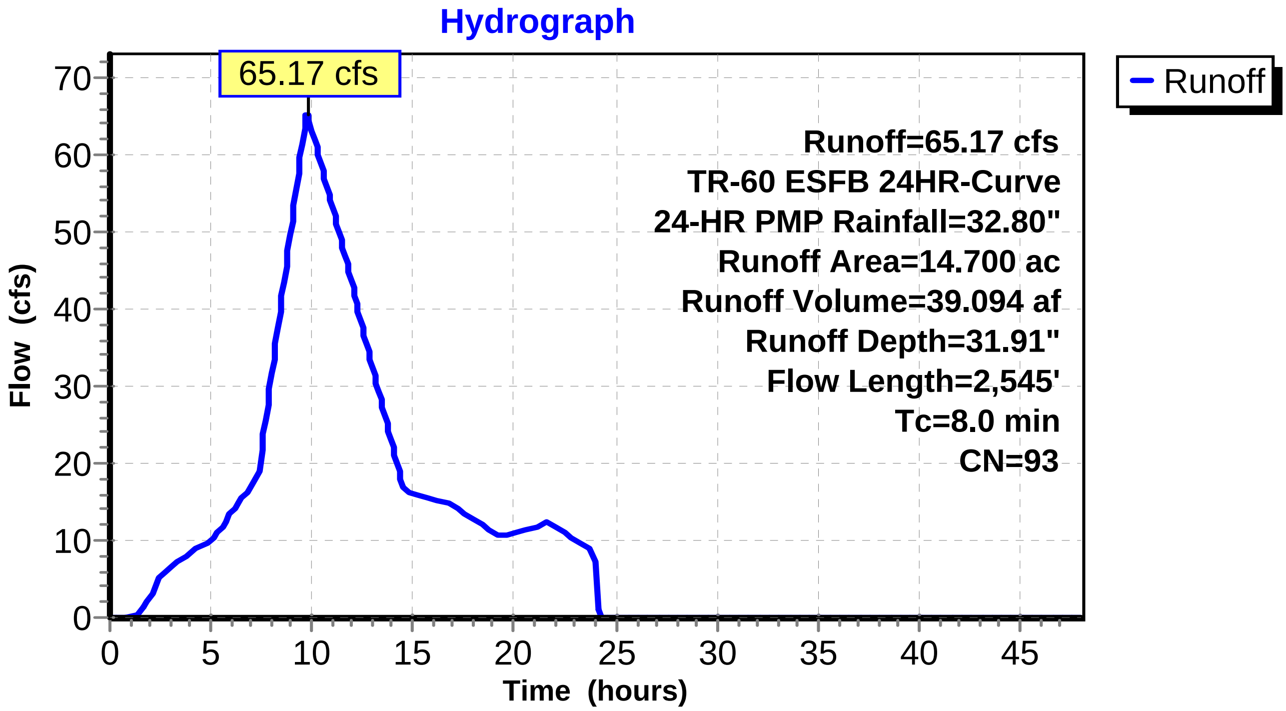
Runoff = 65.17 cfs @ 9.746 hrs, Volume= 39.094 af, Depth=31.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
TR-60 ESFB 24HR-Curve 24-HR PMP Rainfall=32.80"

Area (ac)	CN	Description
4.400	98	Water Surface, HSG C
10.300	91	Urban industrial, 72% imp, HSG C
14.700	93	Weighted Average
2.884		19.62% Pervious Area
11.816		80.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0400	1.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.97"
7.0	2,445	0.0020	5.81	3,198.10	**Channel Flow,** Area= 550.0 sf Perim= 84.0' r= 6.55' n= 0.040 Winding stream, pools & shoals
8.0	2,545	Total			

Subcatchment 4S: North Ash Pond Watershed



Summary for Subcatchment CP: Cooling Pond Watershed

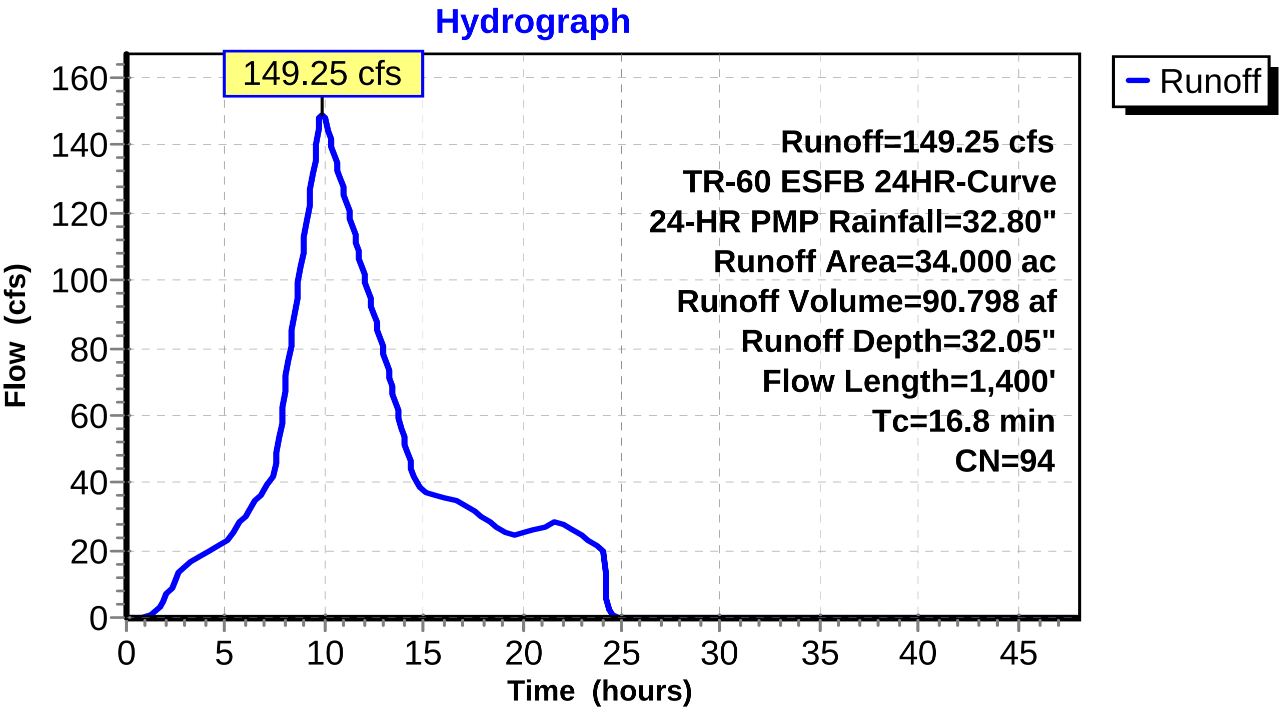
Runoff = 149.25 cfs @ 9.897 hrs, Volume= 90.798 af, Depth=32.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
TR-60 ESFB 24HR-Curve 24-HR PMP Rainfall=32.80"

Area (ac)	CN	Description
5.200	98	Water Surface, HSG C
15.600	96	Gravel surface, HSG C
13.200	91	Urban industrial, 72% imp, HSG C
34.000	94	Weighted Average
19.296		56.75% Pervious Area
14.704		43.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0100	1.00		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.97"
15.1	1,300	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
16.8	1,400	Total			

Subcatchment CP: Cooling Pond Watershed



Summary for Pond 1P: Clarification Pond

```
Inflow Area =      103.900 ac, 71.70% Impervious, Inflow Depth > 30.61"   for 24-HR PMP event
Inflow      =      337.54 cfs @    9.749 hrs, Volume=        265.009 af
Outflow     =        0.00 cfs @    0.000 hrs, Volume=          0.000 af, Atten= 100%, Lag= 0.0 min
Primary     =        0.00 cfs @    0.000 hrs, Volume=          0.000 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
Starting Elev= 447.20' Surf.Area= 22.678 ac Storage= 171.804 af
Peak Elev= 457.36' @ 48.000 hrs Surf.Area= 28.887 ac Storage= 436.780 af (264.976 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

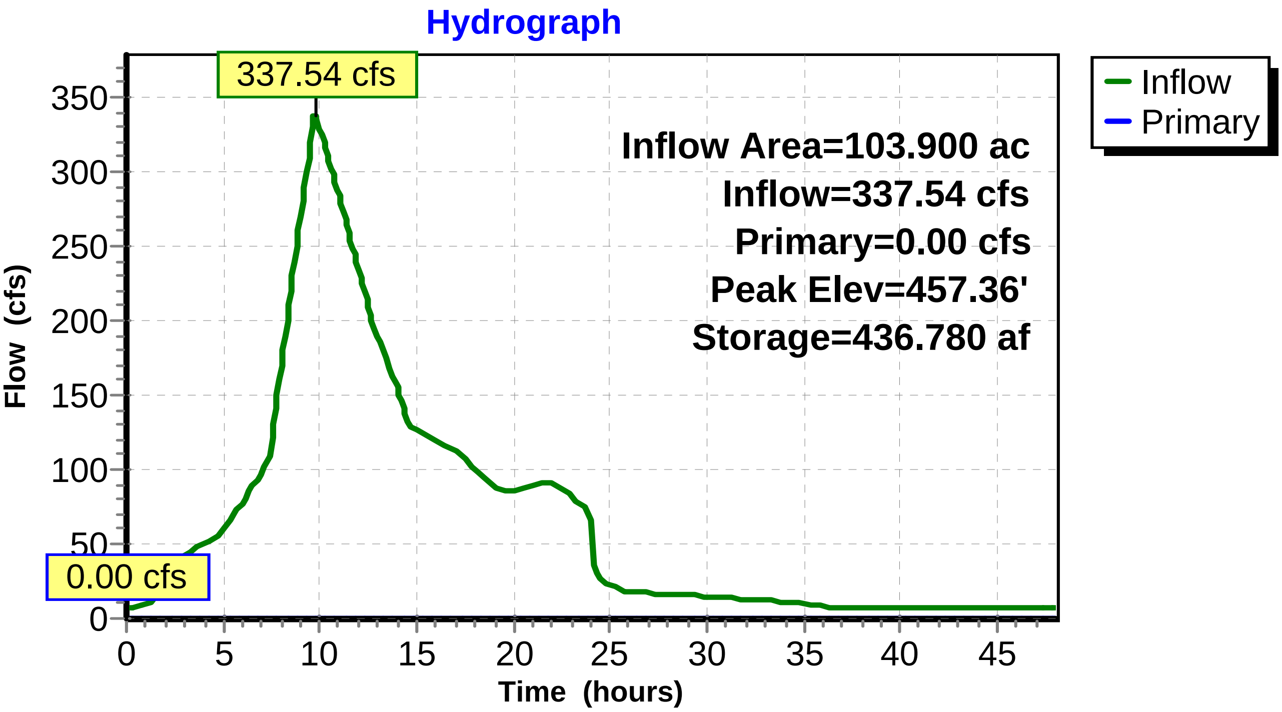
Volume	Invert	Avail.Storage	Storage Description
#1	434.00'	660.837 af	**Custom Stage Data (Conic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
434.00	0.098	0.000	0.000	0.098
436.00	4.173	3.274	3.274	4.173
438.00	9.434	13.254	16.528	9.435
440.00	14.495	23.749	40.276	14.497
442.00	16.159	30.639	70.915	16.167
444.00	18.420	34.554	105.470	18.432
446.00	21.068	39.458	144.928	21.084
448.00	23.752	44.793	189.721	23.773
450.00	24.969	48.716	238.437	25.002
452.00	26.048	51.013	289.450	26.094
454.00	27.040	53.085	342.535	27.101
456.00	28.135	55.171	397.707	28.211
458.00	29.239	57.370	455.077	29.330
460.00	32.274	61.488	516.565	32.371
464.00	40.000	144.272	660.837	40.107

Device	Routing	Invert	Outlet Devices
#1	Primary	434.00'	**36.0" Round Culvert** L= 1,090.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 434.00' / 432.00' S= 0.0018 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf
#2	Device 1	447.20'	**36.0" Horiz. Orifice/Grate X 0.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.000 hrs HW=447.20' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 74.01 cfs potential flow)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Clarification Pond



Summary for Pond 2P: Cooling Pond

Inflow Area = 34.000 ac, 43.25% Impervious, Inflow Depth = 32.05" for 24-HR PMP event
Inflow = 149.25 cfs @ 9.897 hrs, Volume= 90.798 af
Outflow = 43.98 cfs @ 14.360 hrs, Volume= 46.141 af, Atten= 71%, Lag= 267.7 min
Primary = 23.47 cfs @ 11.000 hrs, Volume= 32.229 af
Secondary = 22.30 cfs @ 14.422 hrs, Volume= 13.913 af

Routing by Dyn-Stor-Ind method, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs
Starting Elev= 449.50' Surf.Area= 3.551 ac Storage= 22.537 af
Peak Elev= 457.81' @ 14.422 hrs Surf.Area= 11.372 ac Storage= 75.167 af (52.630 af above start)

Plug-Flow detention time= 930.0 min calculated for 23.604 af (26% of inflow)
Center-of-Mass det. time= 331.8 min (1,064.0 - 732.2)

Volume	Invert	Avail.Storage	Storage Description
#1	438.00'	104.602 af	**Custom Stage Data (Conic)**Listed below (Recalc)

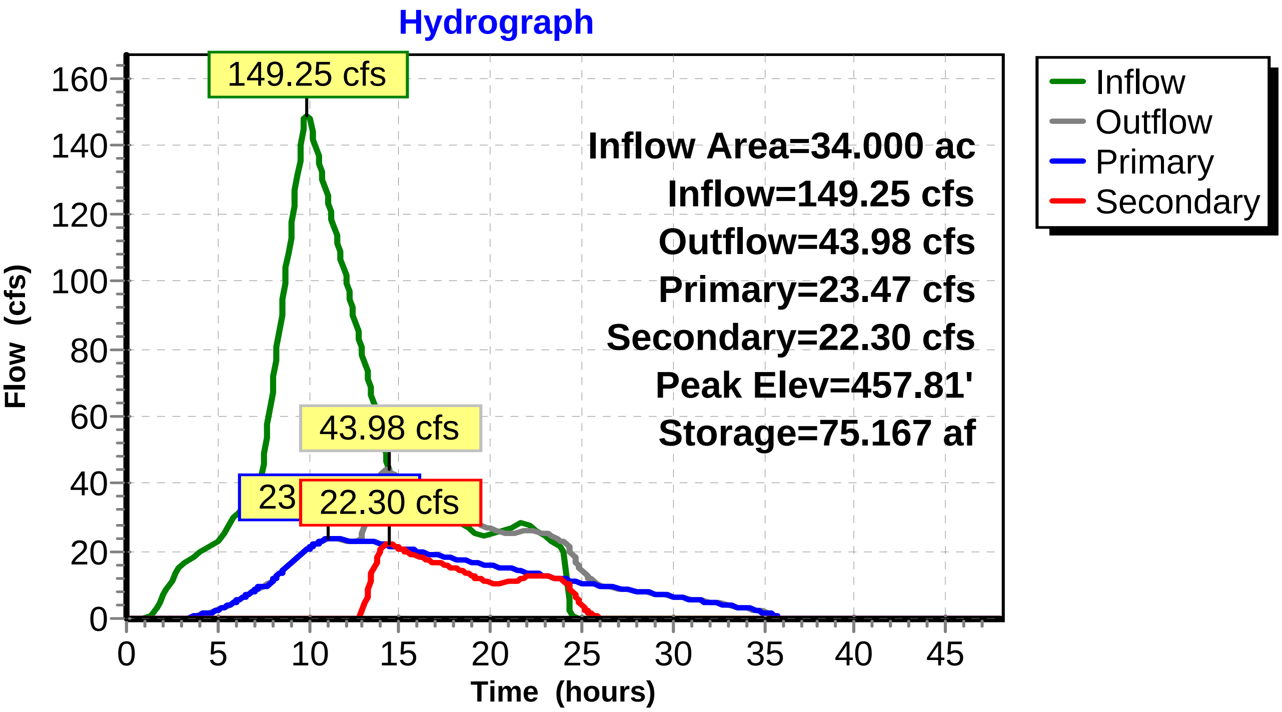
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
438.00	0.107	0.000	0.000	0.107
440.00	0.681	0.706	0.706	0.681
442.00	1.525	2.150	2.856	1.526
444.00	2.182	3.687	6.543	2.184
446.00	2.755	4.926	11.468	2.760
448.00	3.234	5.982	17.451	3.243
450.00	3.660	6.889	24.340	3.673
452.00	4.051	7.708	32.048	4.070
454.00	6.031	10.016	42.064	6.051
456.00	8.858	14.798	56.862	8.880
458.00	11.647	20.441	77.303	11.671
460.00	15.755	27.299	104.602	15.781

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 80.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 449.50' / 449.40' S= 0.0013 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Secondary	457.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=23.25 cfs @ 11.000 hrs HW=456.29' TW=451.54' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 23.25 cfs @ 7.40 fps)

Secondary OutFlow Max=22.29 cfs @ 14.422 hrs HW=457.81' TW=453.74' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 22.29 cfs @ 1.42 fps)

Pond 2P: Cooling Pond



Summary for Link 3L: Plant Operations

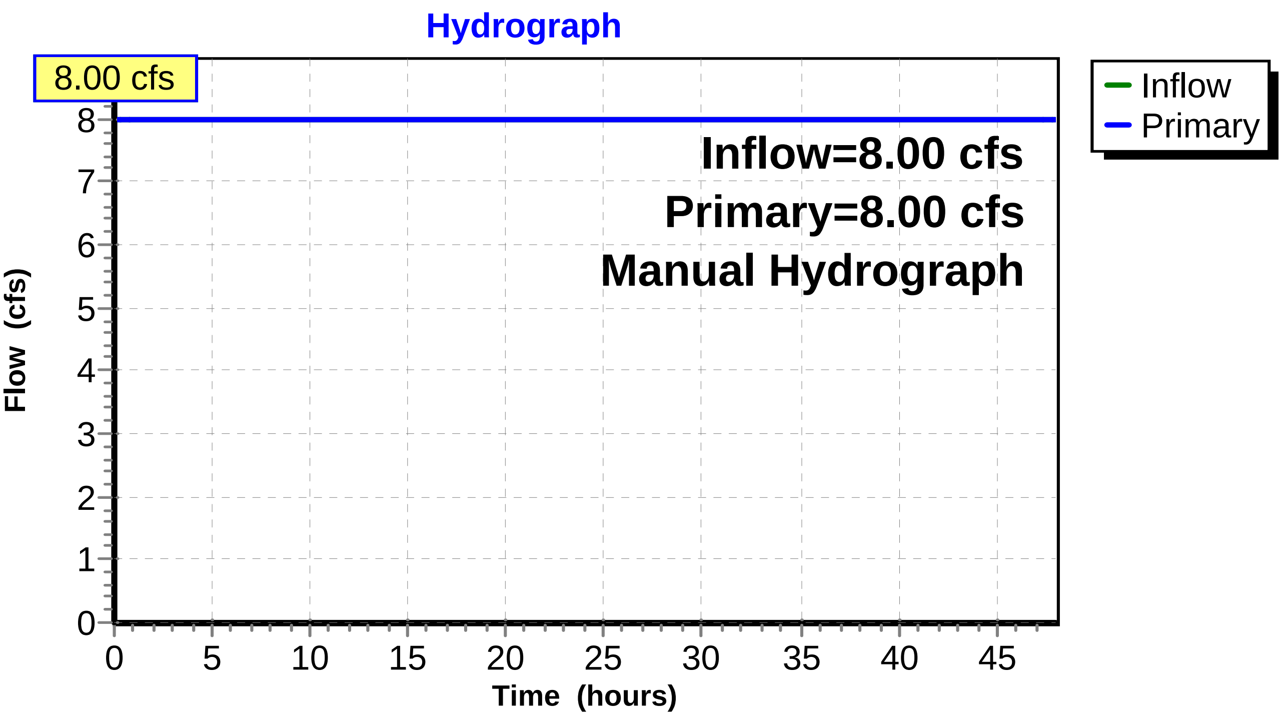
Inflow = 8.00 cfs @ 0.000 hrs, Volume= 31.802 af
Primary = 8.00 cfs @ 0.000 hrs, Volume= 31.802 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.000-48.000 hrs, dt= 0.100 hrs

61 Point manual hydrograph, To= 0.000 hrs, dt= 1.000 hrs, cfs =

8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
8.00									

Link 3L: Plant Operations



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Attachment C

35 I.A.C. §845 SAFETY AND HEALTH PLAN

DECEMBER 29, 2023

EDWARDS POWER PLANT ASH POND

CONTENTS

APPENDICES

ACRONYMS & ABBREVIATIONS

%	Percent
§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
29 C.F.R.	Title 29 of the Code of Federal Regulations
ACGIH	American Conference of Governmental Industrial Hygienists
CCR	Coal Combustion Residual
CDC	Centers for Disease Control and Prevention
EPP	Edwards Power Plant
IPRG	Illinois Power Resources Generating, LLC
HAZWOPER	Hazardous Waste Operations and Emergency Response
ID	identification
IDLH	Immediately Dangerous to Life and Health
IEPA	Illinois Environmental Protection Agency
kV	kilovolt
NID	National Inventory of Dams
NIOSH	National Institute for Occupational Safety and Health
No.	number
OSHA	Occupational Safety and Health Administration
Part 845	35 I.A.C. Part 845: Residuals in Surface Impoundments
PEL	Permissible Exposure Level
PFAS	Per- and polyfluoroalkyl substances
PFD	Personal Flotation Device
PNOR	particulates not otherwise recognized
POC	Point of Contact
PPE	personal protective equipment
ppm	parts per million
SDS	Safety Data Sheet
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	time-weighted averages
USCG	United States Coast Guard

REVISION SUMMARY

Revision Date	**Description of Changes** (Section title or number – description)
12/30/2022	2.1 – Removed reference to COVID screening 3.8 – Revised to follow CDC guidelines 4.6 – Added the table found in 29 C.F.R. § 1926.1408(h) 5.1 – Updated PEL for iron oxide and TLV for titanium dioxide Appendix D – Removed COVID-19 Vistra Site Guidelines Appendix F – Moved Overhead Power Line Locations to Appendix D
12/29/2023	Annual update as required by 35 I.A.C. § 845.530 1.1 – Updated text regarding bordering property to the north 1.2 – Updated Facility Personnel contacts 3.0 - Included additional information regarding storage of training records and summary of training program 3.1 – Added "that informs them of the hazards at the facility" to the first sentence 3.5 - Removed references to ammonia 4.7 - Updated severe weather shelter location 4.12 - Removed section regarding railroad safety 5.2 - Removed anhydrous ammonia section 5.3 – Updated contact person 5.4 - Removed references to anhydrous ammonia 6.1 – Updated emergency phone numbers; added incident notifications contact information 6.4 – Updated emergency phone numbers 6.7 - Added bullet "Contract workers and third party contractors should notify the site EPP Spill Coordinator as soon as possible." 6.9 - Removed section regarding ammonia response plan Appendix A – Updated muster point location

PREFACE

Illinois Power Resources Generating, LLC (IPRG) has prepared this Safety and Health Plan in accordance with requirements set forth in Title 35 of the Illinois Administrative Code (35 I.A.C.) Part 845: Residuals in Surface Impoundments (Part 845), Section (§) 845.530. IPRG assessed health and safety hazards of its coal combustion residual (CCR) surface impoundments to develop and update this Safety and Health Plan.

This document describes the minimum anticipated protective measures necessary for worker health and safety at the Edwards Power Plant (EPP) Ash Pond (Vistra identification [ID] number [No.] 301, Illinois Environmental Protection Agency [IEPA] ID No. W1438050005-01, National Inventory of Dams [NID] No. IL50710). Employees of IPRG, contract workers, and third-party contractors must read and comply with the contents of this document. The contents of this document are not intended to cover all situations that may arise nor to waive any provisions specified in Federal, State, and local regulations or site owner / contractor health and safety requirements.

Third-party contractors are accountable for the health and safety of their employees. Third-party contractors are required to prepare a Safety and Health Plan that meets the minimum requirements herein. However, no requirements or provisions within this plan shall be construed as an assumption of IPRG of their legal responsibilities as an employer.

This Safety and Health Plan will be reviewed and updated annually, at a minimum. The Safety and Health Plan will also be updated if facility operations change, or a new hazard is identified.

1. INTRODUCTION

This Safety and Health Plan has been developed to outline the requirements to be met by employees of Illinois Power Resources Generating, LLC (IPRG), contract workers, and third-party contractors while performing any activity to construct, operate, or close the EPP Ash Pond. This Safety and Health Plan has been developed to meet the requirements of 35 I.A.C. § 845.530 and describes the responsibilities, training requirements, protective equipment, and safety procedures necessary to minimize the risk of injury, fires, explosion, chemical spills, material damage incidents, and near misses related to CCR activities. This Safety and Health Plan incorporates by reference the Occupational Safety and Health Administration (OSHA) regulations contained in Title 29 of the Code of Federal Regulations (29 C.F.R.) § 1910 and 29 C.F.R. § 1926.

The requirements and guidelines in this Safety and Health Plan are based on a review of available information and data, and an evaluation of identified on-site hazards. This Safety and Health Plan will be reviewed with persons assigned to work in the EPP Ash Pond and will be available on-site.

1.1 Site Description/History

The EPP is located in Peoria County between Mapleton and Bartonville in Section 11, Township 7 North, Range 7 East. The EPP is located near the Illinois River adjacent to a levee and has one CCR surface impoundment, the Ash Pond, covering approximately 91 surface acres. The EPP property is bordered by a vacant industrial property to the north, railroad right-of-way and former Orchard Mines to the west, the Illinois River and fertilizer production facility to the east, and agricultural land to the south (Appendix A).

1.2 Facility Personnel

The following table outlines key IPRG personnel with respect to facility operations and health and safety.

Name	Position	Phone Number
Mark Davis	Point-of-Contact (POC)/Plant Closure Environmental and Chemistry Supervisor	309-633-2861 (office) 309-241-4219 (mobile)
Security	Security	713-542-8520
Kevin Largent	Plant Closure Manager	309-565-4152 309-262-2818 (mobile)
Matt Ballance	Engineering Manager	618-792-7274 (mobile)
Jason Campbell	Dam Safety Manager	271-753-8904 (Springfield) 217-622-3491 (mobile)
Stu Cravens	Senior Technical Expert	217-390-1503 (mobile)
Vic Modeer	Engineering Manager	618-541-0878

1.3 Responsibilities

The following persons have responsibilities associated with communicating and implementing the Safety and Health Plan for the EPP Ash Pond.

1.3.1 IPRG Point of Contact

The IPRG Point of Contact (POC) is a management-level person who is requiring employees, contract workers, or third-party contractors to enter the EPP Ash Pond. The IPRG POC is responsible to communicate Safety and Health Plan information and requirements to employees, contract workers, and third-party contractors, and oversee work performed in the EPP Ash Pond to the extent necessary to confirm implementation of Safety and Health Plan requirements.

1.3.2 IPRG Employees

IPRG employees are directly hired by IPRG. They are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.3 Contract Workers

Contract workers are those hired by IPRG through an agency firm. Similar to IPRG employees, contract workers are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.4 Third-Party Contractor Employees

Third-party contractor employees work for firms under contract to IPRG. Third-party contractors include prime contractors and all of their lower tier subcontractors. Similar to IPRG employees, third-party contractors are required to implement Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.5 Third-Party Contractor Safety Competent Person

Third-party contractors will be required to designate a Safety Competent Person. The Safety Competent Person must be in a management position (*e.g.,* superintendent, foreman, etc.) with OSHA 30-hour construction safety certification who may perform other duties, unless IPRG requires a dedicated Safety Competent Person. A Safety Competent Person must be on site at all times when the subcontractor has employees performing work for IPRG and must possess a sound working knowledge of pertinent OSHA regulations, this Safety and Health Plan, and other applicable safety requirements related to the scope of work. Third-party contractors must also designate a backup Safety Competent Person that possesses the same authority and training. The competent person will ensure timely correction of safety deficiencies identified by IPRG. The Safety Competent Person is responsible to ensure Safety and Health Plan requirements have been communicated to lower-tier subcontractors and enforce Safety and Health Plan requirements.

2. SITE ACCESS & CONTROL

This section outlines requirements for ensuring that only authorized personnel and visitors are permitted at the EPP Ash Pond.

2.1 Facility Security

Elements of site control include restricting access to the EPP Ash Pond to persons until they have met the training requirements outlined in this Safety and Health Plan and have been authorized to do so by the EPP POC or their representative.

Prior to arriving to the facility all personnel must notify the IPRG POC. Upon arrival to the Site, all IPRG employees, contract workers, and third-party contractors must check in/out at Security.

2.2 Third-Party Contractor Management

Prior to working at EPP, all third-party contractors must maintain an active registration with ISNetworld and maintain a grade of A or B. Lower tier subcontractors are currently not required to be registered in ISNetworld, but this requirement may change at the discretion of IPRG.

2.3 Third-Party Contractor Safety and Health Plan

Prior to being authorized to conduct work at the EPP Ash Pond, third-party contractors must develop and submit a Safety and Health Plan. The third-party contractor's Safety and Health Plan must be specific to the scope of work that they will be performing at the EPP Ash Pond. The third-party contractor's Safety and Health Plan must meet or exceed all the requirements in this Safety and Health Plan, other IPRG requirements, and applicable regulations. All lower tier subcontractors of third-party contractors must meet the requirements in this Safety and Health Plan as well as the requirements outlined in the Safety and Health Plan of the third-party with whom they are contracted.

2.4 Authorized Personnel

At a minimum, authorized personnel who will be granted unescorted access to the project include IPRG employees, contract workers, and third-party contractors that meet the following:

- Reviewed this Safety and Health Plan and other applicable safety planning documentation.
- Have completed all the training, medical surveillance, and drug screen and background investigation requirements as outlined in Section 3 of this Safety and Health Plan.
- Have completed the Site Orientation/General Awareness Training.

2.5 Visitors

Visitors must be escorted by Authorized Personnel through the EPP Ash Pond if they have not reviewed this Safety and Health Plan or completed the training requirements outlined in Section 3 of this Safety and Health Plan. Visitors may not undertake any activity to construct, operate, or close a CCR surface impoundment.

2.6 Communication

Communication between workers and emergency services must be maintained at all times. Cellular service is consistently available and can be relied upon to summon emergency services.

3. TRAINING & MEDICAL REQUIREMENTS

Project personnel must be properly trained for the type of work being performed and in accordance with 35 I.A.C. § 845.530, 29 C.F.R. § 1926 and 29 C.F.R. § 1910, and IPRG policies. Additionally, personnel working in areas regulated by the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) must have current medical surveillance. All employees, contractors, and third-party contractors must complete the following prior to beginning any activity to construct, operate, or close the EPP Ash Pond.

The facility maintains an outline of the training programs used and a brief description of training program updates. Training records are located in the Plant Administration Building in accordance with 35 I.A.C. § 845.530(c)(1).

The training program ensures that employees, contract workers, and third-party contractors understand and are able to respond effectively to the following as outlined in 35 I.A.C. § 845.530(c)(2):

A) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment (see Section 3.4);

B) Communications or alarm systems (see Section 3.5);

C) Response to fires or explosions (see Section 6.5);

D) Response to a spill or release of CCR (see Sections 6.7 and 6.8);

E) The training under the Occupational Safety and Health Standards in 29 CFR 1910.120, 29 CFR 1926.65, and the OSHA 10-hour or 30-hour construction safety training (see Sections 3.1 and 3.2);

F) Information about chemical hazards and hazardous materials identified in subsection (b) (see Section 5.3); and

G) The use of engineering controls, administrative controls, and personal protective equipment (see Section 4).

3.1 HAZWOPER Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors be trained in accordance with 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65 that informs them of the hazards at the facility. The following training will be completed as required by job function:

- **OSHA 40-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have extensive contact with contaminated materials and/or may be required to wear a respirator.
- **OSHA 24-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have minimal contact with contaminated materials and will NOT be required to wear a respirator.
- **OSHA 8-hour Supervisor Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for Site Supervisors, Foremen, Superintendents, and others who will be directing and managing site activities.
- **OSHA 8-hour Refresher** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, completed within 12 months of initial 40-hour or 24-hour training and annually thereafter.

The following matrix outlines HAZWOPER training requirements based on typical job functions at the EPP Ash Pond. It is not intended to be all inclusive, new job functions must be evaluated per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65.

Training	Job Function
OSHA 40-hour	Ash handlers
OSHA 24-hour	Personnel not required to handle CCR materials
OSHA 8-hour Supervisor Training	Third-Party Contractor Safety Competent Persons
OSHA 8-hour refresher	All personnel

3.2 OSHA Construction Outreach Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors complete an OSHA 10-hour or 30-hour construction safety training. These trainings will be completed as follows:

- All employees, contract workers, and third-party contract employees: OSHA 10-hour or 30-hour construction outreach training.
- Supervisors, superintendents, foreman and safety professionals: OSHA 30-hour construction outreach training.

3.3 EPP Ash Pond Safety and Health Plan Review

Pursuant to 35 I.A.C. § 845.530(d)(e), before beginning any activity at the EPP Ash Pond, and annually thereafter, all IPRG employees, contract workers, and third-party contractors must review the content of this HASP. After reviewing this Safety and Health Plan all personnel will understand the following:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- Communications or alarm systems outlined in Section 6
- Response to fires and explosions outlined in Section 6
- Response to a spill or release of CCR
- Information about chemical hazards and hazardous materials outlined in Section 5
- The use of engineering controls, administrative controls, and personal protective equipment (PPE) outlined in Section 4

All personnel will acknowledge this HASP by signing the *Safety and Health Plan Acknowledgment Form (Appendix B).*

3.4 Emergency and Monitoring Equipment Training

All IPRG employees, contract workers, and third-party contractors must be aware of how to respond to alarms and other emergencies as outlined in Section 6 of this plan. Individuals may only use facility emergency and monitoring equipment if they have been trained in their use and authorized to do so by the designated POC. Additionally, a written release may need to be completed as required by Vistra Corporate Procedure FFA-POL-0006.

Individual IPRG employees and contract workers may be responsible for using, inspecting, repairing, and replacing facility emergency monitoring equipment. These individuals will be trained in accordance with procedures identified by IPRG. These individuals will review and adhere to the manufacturer’s instructions, where applicable.

Third-party contractors are responsible for inspecting, repairing, and replacing any owned emergency (*i.e.*, fire extinguishers) and monitoring equipment (*i.e.*, air monitoring equipment). Third-party contractors will maintain procedures for using, inspecting, repairing, and replacing owned emergency and monitoring equipment that is consistent with the manufacturer’s requirements. Third-party contractor employees who are responsible for this equipment will be trained in procedures for using, inspecting, and repairing owned equipment by their employer.

3.5 Hazard Communication

All employees, contract workers, and third-party contractors must be trained in chemical hazards (if any) associated with their work in accordance with 29 C.F.R. § 1910.1200. Work tasks performed on the EPP Ash Pond may include exposure to compounds identified in the Hazard Communication section of this Safety and Health Plan and is included as part of the Safety and Health Plan Review outlined in Section 3.3.

3.6 Medical Surveillance

All employees, contract workers, and third-party contractors engaged in operations specified in 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65 and meet one of the criteria outlined in 29 C.F.R. § 1910.120(f)(2) and 29 C.F.R. § 1926.65(f)(2) must participate in a medical surveillance program that is administered by their employer. The criteria for participating in a medical surveillance program are:

- All employees who are or may be exposed to hazardous substances at or above the established permissible exposure limit, without regard to the use of respirators, for 30 days or more a year;
- All employees who wear a respirator for 30 days or more a year; or
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

The medical surveillance program must result in documentation that an individual is cleared to work on sites covered by 29 C.F.R. § 1910.120 and 20 C.F.R. § 1926.65 and is medically fit to wear a respirator when applicable.

3.7 Drug Screen and Background Investigations

IPRG requires that contract worker agencies and third-party contractors are responsible for ensuring that all personnel have completed and passed a drug and alcohol test and background investigation prior to on-site work as described in Appendix C.

3.8 COVID-19 Site Entry Guidelines

All personnel entering Vistra work sites shall review and adhere to the Centers for Disease Control and Prevention (CDC) guidelines related to COVID-19.

3.9 Document Management

IPRG will maintain employee and contract employee training and medical surveillance records in the site files located in the Plant Administration Building. Third-party contractors are responsible for maintaining training and medical surveillance documentation for their employees. Third-party contractors will produce documentation upon IPRG request.

3.10 Industrial Hygiene Sampling Records

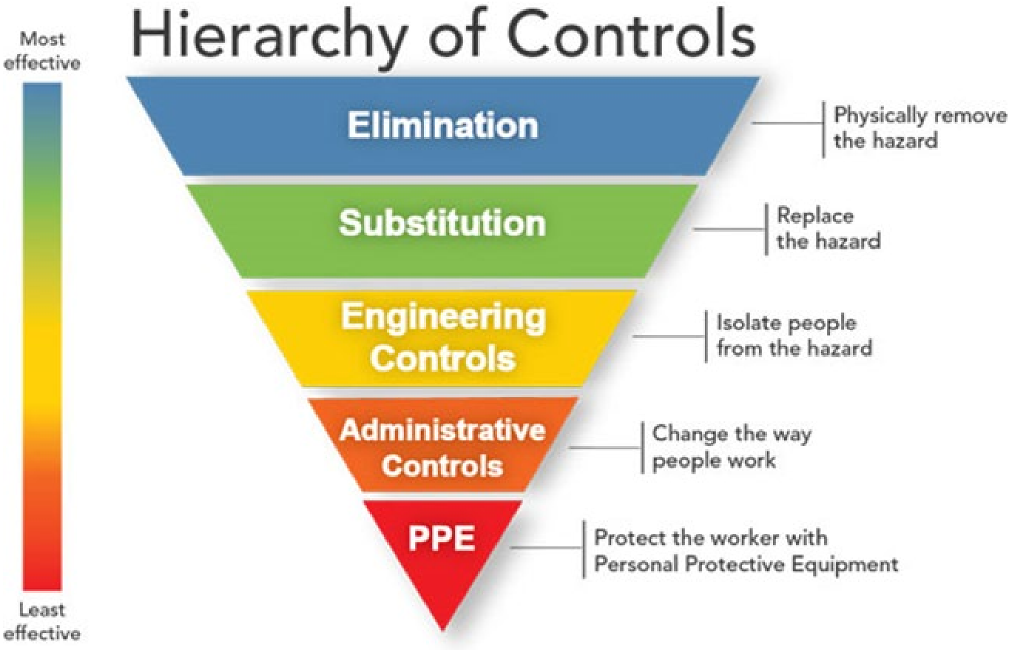
Upon receipt of exposure sampling results IPRG and third-party contractors must distribute exposure sampling results to employees within 15 business days unless otherwise required by applicable regulation. All personnel exposure sampling results and records must be maintained by the employee’s company for at least 30 years following termination of employment.

4. HAZARD & CONTROLS

The following section outlines general controls for the hazards and controls. Third-party contractors are still responsible for developing a Safety and Health Plan that incorporates requirements of this Safety and Health Plan, other safety requirements for the EPP, as well as the third-party contractor’s safety policies and procedures. Safety and Health Plans developed by third-party contractors must be specific to the site and the anticipated work means and methods.

Safety and Health Plans that consist of only standard operating procedures or are not otherwise specific to the work performed at the EPP Ash Pond will not be accepted by IPRG.

IPRG requires that a hierarchy of controls be considered when performing work at the EPP Ash Pond. Implement controls that favor elimination, substitution, and engineering over the use of administrative controls and PPE when feasible. See the figure below for additional guidance (courtesy of the National Institute for Occupational Safety and Health [NIOSH]).



4.1 Ash/Unstable Surfaces

Prior to working in or on an ash pond, third-party contractors must notify the facility POC. Work in or on an ash pond may not begin until the facility POC has approved the work. Upon completion of the work, third-party contractors must notify the POC that they have left the ash pond.

When working on ash ponds or unstable surfaces the following requirements must be implemented where applicable and feasible. The following table summarizes safety controls for work performed in ash ponds and on unstable surfaces and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure	Use crane mats or other cribbing to support heavy equipment on ash ponds	Traverse compacted paths that have previously been used by heavy equipment	Use a restraint (tethering) system to prevent falls or slips into unstable ash pond surfaces or surface water that represents a drowning hazard
			If an unstable condition exists, complete a Next Level Up Pre-Job Brief prior to accessing the ash pond.	

Elimination	Substitution	Engineering	Administrative	PPE
			Approach the ash pond from the most stable direction	
			Inspect travel paths for recent terrain shifts, particularly following heavy rains or rapid dewatering	
			Working alone on ash ponds is prohibited without pre-approval from the POC.	
			When a drowning hazard exists, implement requirements for working on/near water as outlined in Section 4.4.	
			Implement an emergency response plan with trained responders for falls into (or engulfment by) ash	

4.2 Ash Inhalation/Airborne Exposure

Ash that becomes airborne due to site activities or environmental conditions may result in an exposure to its components as outlined in Section 5.1. IPRG and third-party contractors are responsible for ensuring their respective employees’ and contract workers’ exposures are below occupational exposure limits. Upon request, third-party contractors must demonstrate to IPRG that exposure control methods are adequate. The following table summarizes airborne exposure controls and is aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Substitute manual work methods for those that can be completed from the cab of a vehicle	Continually wet work areas to reduce the amount of ash that becomes airborne Equip vehicles and heavy equipment cabs with filters. Clean and change filters as required	Conduct air monitoring or exposure sampling to confirm that airborne exposure is below regulatory limits	If exposure levels are above the PEL, equip employees with respirators appropriate to the level of exposure

4.3 Stuck Vehicles/Equipment

If a vehicle or piece of equipment becomes stuck, a third-party towing or wrecking company who is trained in vehicle extraction must be retained and the IPRG POC will be notified. Third-party contractors may extract their own vehicle if they have an approved extraction plan and a competent person is on site to implement the extraction. The extraction plan shall be included as part of the third-party contractor's reviewed and approved Safety and Health Plan. The above notifications are still required.

The hazards presented by stuck vehicles/equipment must not be underestimated. While the weight of the stuck equipment can be calculated, it's impossible to precisely calculate the other forces that are pulling against the towing vehicle which requires special training and experience to properly size towing equipment and select towing techniques. This is especially true for "complex" or high-hazard extractions involving equipment stuck at axle depth (or beyond) or sloped surfaces or any area where extraction activities could trigger shifts in the ground surface. No chains shall be used to remove stuck vehicles/equipment.

The following table summarizes safety controls related to stuck vehicles and equipment and are aligned to the hierarchy of controls:

Elimination	**Substitution**	**Engineering**	**Administrative**	**PPE**
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure Substitute tracked equipment for wheeled equipment	Use crane mats or other cribbing to support heavy equipment on ash ponds Lighten the load – Remove materials from stuck vehicles or equipment prior to extraction if possible	Only persons trained in vehicle extraction are permitted to remove stuck vehicles/equipment A professional towing/wrecking service is required Prepare for spills (damage to fuel or hydraulic systems)	All persons involved in removing stuck equipment must wear PPE that includes hard hat, safety boots, safety glasses, high visibility vests, and cut resistant gloves

4.4 Working Near/Over Water

All employees, contract workers, and third-party contractors must wear a United States Coast Guard (USCG) approved personal floatation device (PFD), when within 6 feet of water, over water, and/or wading in water where the danger of drowning exists. The PFD must be properly secured to the wearer, free of all defects including rips, tears, stress, and fading, and be kept clean and free of excessive dirt and oil.

If the possibility of falling into water has been eliminated through the use of guardrails, fall restraint, or other method, the use of a PFD is no longer required.

When performing work on water from a vessel, at least one lifesaving rescue vessel (*e.g.,* a skiff) shall be immediately available at locations where employees are working over, in, on, or adjacent to water where the danger of drowning exists. However, if the water is so shallow that rescuers could simply walk/run into the water body without endangering themselves and/or others or the work was being conducted very close to shore (*e.g.,* the length of the skiff from shore would be greater than the working distance from shore and/or the skiff would foul on the bottom), a skiff would not be required.

The following table summarizes the requirements for working over/near water where a drowning hazard exists and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work near a drowning hazard is no longer required		Install guardrails that separate work areas from the drowning hazard	All work to be performed by at least two people where each is equipped with proper safety gear and capable of summoning emergency rescue	All personnel are required to wear suitable PFDs
		Utilize equipment (crowd-control barricades, safety fence, etc.) that will keep personnel at least 6 feet from a drowning hazard	When working on water use of a rescue skiff as outlined above	
			Use of a ring buoy with 90 feet of braided polycarbonate (or equivalent) line	
			Ring buoys must be positioned within 100 feet of work (maximum of 200 feet spacing)	

4.5 Heavy Equipment

All heavy equipment operators must be competent and authorized to operate each piece of heavy equipment. Forklift and telehandler (*e.g.,* Lull, JLG) operators must have a license or certificate that indicates they have passed a written test and "road" test for the equipment they will be operating within the last 3 years. Third-party contractors will provide proof of qualification upon request of IPRG.

Persons working around heavy equipment must implement the “25 Foot Rule.” The 25 Foot Rule requires that persons get the operator’s attention and permission prior to approaching closer than 25 feet to heavy equipment. Persons must walk quickly through blind spots. Loitering in heavy equipment blind spots (especially to the rear) must be avoided.

Temporary fuel storage tanks will be labelled as to their content and be protected from collision by Site vehicles using solid barricades including balusters, chain link fence, or equivalent. Spill kit (55-gallon sorbent capacity contained in an overpack) and one 20-pound Type ABC fire extinguisher will be located within 45 feet of fueling areas. Tanks will be rated for above ground use and will be double walled or have secondary containment in case of a leak. Tanks and dispensing hose will be bonded and grounded. On-site filling of fuel storage tanks will be completed with trucks that have automatic over-flow shutoffs. These trucks will be properly bonded to the storage tank and meet all of the other storage tank requirements. Temporary secondary containment must be provided in the refueling area that includes the storage tank and dispensing hoses.

Elimination	Substitution	Engineering	Administrative	PPE
		Heavy equipment (and vehicles) must be equipped with backup alarms, horns, roll-over protection (when feasible)	Operators must be competent and authorized	Operators must use seatbelts when equipped
		Vehicles and heavy equipment operated at night must have headlights, tail lamps, and reflectors	Forklift operators must have a current license or certificate (within 3 years)	High visibility vests are required when working around heavy equipment
			All vehicles and equipment must be turned off when not in use	
			Operators must inspect equipment daily prior to use	
			Persons working near heavy equipment must follow the "25 Foot Rule" and avoid lingering in blind spots as outlined above	
			Always obey site speed limits – 15 mph unless otherwise posted	

4.6 Overhead Powerlines

All overhead powerlines must be assumed to be energized until confirmed otherwise. The minimum clearance distance for equipment working near energized power lines must be in accordance with the table of minimum clearance distances shown on the following page, as found in 29 C.F.R. § 1926.1408(h). The location and clearance distances for powerlines at EPP can be found in Appendix D.

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

The following table summarizes safety controls for work near energized power lines:

Elimination	**Substitution**	**Engineering**	**Administrative**	**PPE**
Plan to work away from powerlines	Use heavy equipment with shorter booms/attachments to avoid coming close to power lines	Contact the utility owner to deenergize the line	Install signs to warn personnel of overhead powerlines	
		Contact the utility owner to install insulated sleeves over energized lines	Install a non-conductive distance marker to delineate minimum clearance	
			Use a dedicated spotter to ensure equipment does not enter minimum clearance distances	

4.7 Severe Weather

Severe weather conditions include but are not limited to high winds, electrical storms, heavy rain, and tornados can cause hazardous conditions at CCR surface impoundments. The primary control for severe weather is monitoring weather reports prior to beginning work and as work occurs throughout the day.

Monitor lightning using a commercially available mobile application if cellular service is available. When lightning is observed within 10 miles of the CCR surface impoundment, or a storm is imminent, take shelter in the nearest solid structure or fully enclosed vehicle. If possible, secure all tools, materials, and equipment prior to the storm arriving. Work may resume 30 minutes after the last lightning strike is observed within 10 miles. The severe weather shelter location is in the main plant building; the location will be reviewed during the Site Orientation Training. The POC and/or security will assist in directing contractors to the shelter location.

Do not conduct work on a CCR surface impoundment when there is a risk for tornados in the area. If on a CCR surface impoundment and a tornado forms, seek the nearest substantial shelter. The tornado shelter location is the basement of the plant administrative building; the location will be reviewed during the Site Orientation Training. If no shelter is available, attempt to evacuate to a shelter using a vehicle. If a tornado forms and you are not in a shelter, take one of the following actions:

- Stay in a vehicle with the seat belt on, keep your head below the windows and cover it with your hands
- If there is an area which is noticeably lower than the work area, lie in that area and cover your head with your hands.

The following table summarizes safety controls related to severe weather:

Elimination	Substitution	Engineering	Administrative	PPE
Plan outdoor tasks on days with low potential for severe weather.			Prior to beginning outdoor work monitor the day's weather.	
			Periodically monitor weather throughout the day. Use a weather app which issues alerts for severe weather and lightning, assuming cell service is available	
			Utilize a weather radio if cellular service is inconsistent	
			Stop all outdoor work and seek shelter when lightning is observed	

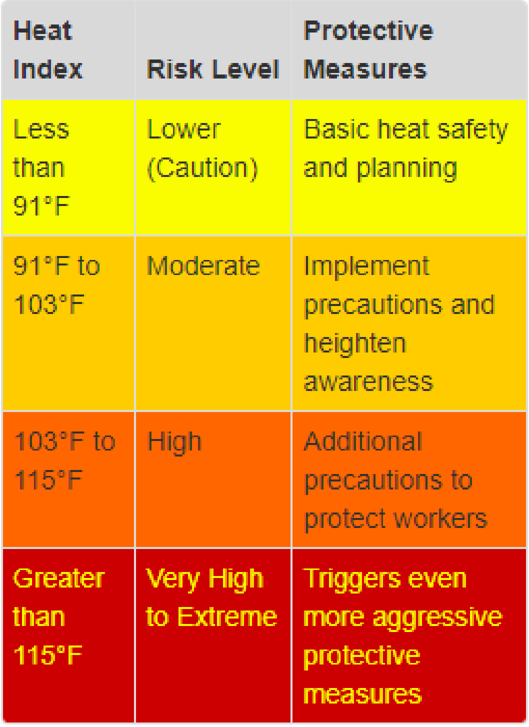
4.8 Heat Stress

Heat stress can be a significant hazard, especially for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Employees, contract workers, and third-party contractors will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and in the prevention of heat stress incidents.

Workers will be encouraged to immediately report any heat-related problems that they experience or observe in fellow workers. Any worker exhibiting signs of heat stress and exhaustion should be made to rest in a cool location and drink plenty of water. Emergency help by a medical professional is required immediately for anyone exhibiting symptoms of heat stroke, such as red, dry skin, confusion, delirium, or unconsciousness. Heat stroke is a life-threatening condition that must be treated immediately by competent medical authority.

4.8.1 Heat Stress Prevention

To prevent heat stress, IPRG employees, contract workers, and third-party contractors will implement heat stress prevention measures as outlined in OSHA's Heat Index (below). A summary of these precautions is described below.



Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

Know the Symptoms: Some symptoms associated with heat stress are: Employees should be aware of these symptoms with themselves and with their co-workers:

- Elevated heart rate, lack of concentration, difficulty focusing on a task, fatigue
- Irritability and/or sickness
- Cramps, rash, headache
- Loss of desire to drink water
- Fainting
- Skin clammy, moist, and pale (severe heat exhaustion)
- Skin extremely dry and red (heat stroke)

Acclimatize: When high heat stress conditions arise, employees should be exposed to the heat for short work periods followed by longer periods of work. Acclimatization usually takes five (5) days and should be provided for all new employees and employees returning from an absence of two (2) weeks or more. Contact Corporate Health and Safety for proper procedures.

Hydration & Pace of Work: Make sure all employees intake plenty of water throughout the work day (sometimes as much as a quart per worker per hour) and let employees know where the drinking water is located. Adjust your work pace and expectations on how much work can be done during periods of high heat stress. Workers cannot do as much during periods of high heat stress compared with similar periods of low heat stress. After acclimatization, workers may be able to resume a more "normal" work pace as long as fluid intake is adequate.

Work/Rest Periods: If possible, heavy work should be scheduled during the cooler parts of the day (*i.e.,* early morning) and rest periods should be taken in cool areas for longer periods.

Personal Protective Equipment (PPE): Employees using PPE (*i.e.*, Tyvek® suits or other equipment which may retain heat) can be more susceptible to heat stress due to the fact that heat/sweat often cannot escape the suits and/or the equipment. Persons wearing PPE that contributes to heat stress require more hydration, longer rest periods, or a reduced pace of work. Also, more careful monitoring of each person's health status is required by co-workers and management.

The following table summarizes safety controls for heat related illnesses:

Elimination	Substitution	Engineering	Administrative	PPE
Perform outdoor, strenuous, tasks at cooler times of day/year	Use mechanized equipment in place of manual labor	Install fans or air conditioning units in the work area	Train all personnel to know the signs of heat stress/stroke and how to prevent it	Implement the use of cooling vests or other similar PPE
		Install a canopy to provide shade to work areas	Allow workers to acclimatize to the work environment	
		Provide cool, shaded break areas	Adjust work pace to allow for the effects of heat	
			Implement work/rest periods	

4.9 Cold Stress

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds (wind chill), dampness, and cold water. One, or any combination of these factors, can cause cold-related hazards. Cold stress, including frostbite and hypothermia, can result in severe health effects. Employees, contract employees, and third-party contractors will be instructed in the identification of a cold stress victim, the first-aid treatment procedures for the victim and in the prevention of heat stress incidents.

A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures. Major risk factors for cold-related stresses include:

- Wearing inadequate or wet clothing thus increasing the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine, and medication thus inhibiting the body's response to the cold and/or impairing judgment.
- Having a cold or certain disease, such as diabetes, heart, vascular and thyroid problems, and thereby increasing susceptibility to the winter elements.
- Lower body-fat composition or other physiological differences. Statistics show that men experience far greater death rates due to cold exposure than women, potentially attributable to participation in risk-taking activities, lower body-fat composition and/or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, thus speeding up the effects of cold weather.

The following table provides the resulting equivalent chill temperature to exposed skin because of increasing wind speeds at decreasing actual temperatures. Personnel shall be aware of predicted weather conditions before beginning site work and stay apprised of changes.

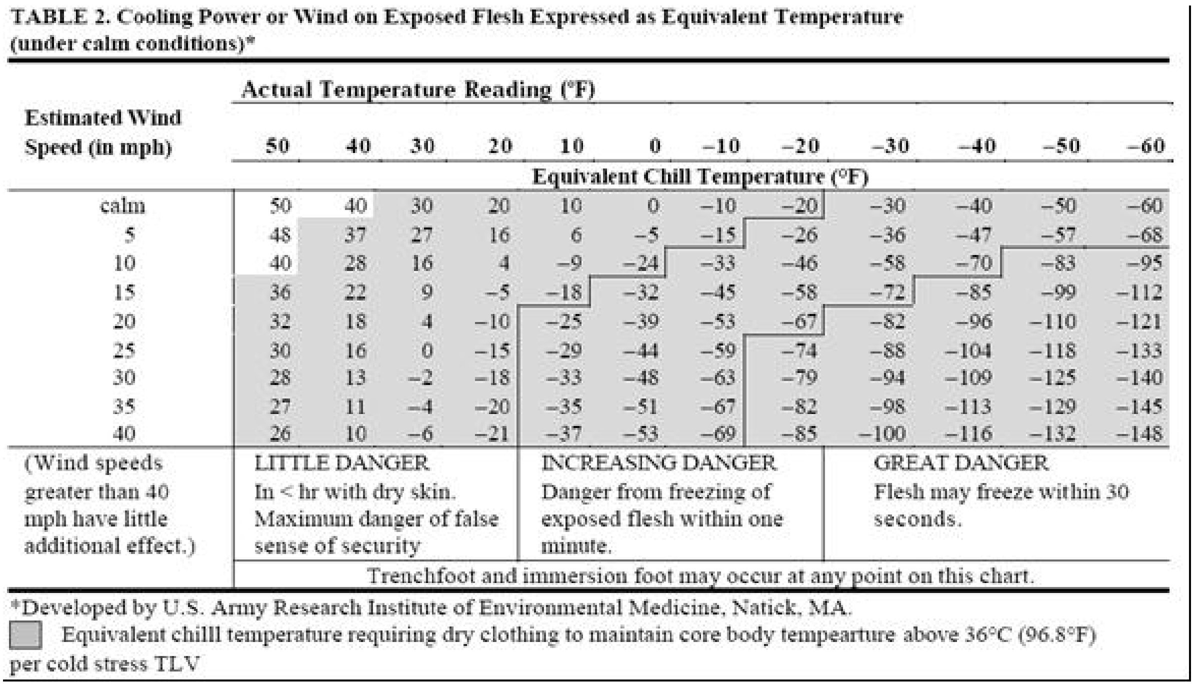


TABLE 2. Cooling Power or Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

▨ Equivalent chilll temperature requiring dry clothing to maintain core body tempearture above 36°C (96.8°F) per cold stress TLV

The following table summarizes safety controls for preventing cold stress:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or warmer parts of the year		Install heaters in enclosed work areas	Train all personnel on the symptoms of cold stress and how to prevent it	All personnel must wear multiple layers of clothing
		Provide a warm break area	Implement work/rest schedule	Utilize hand/foot warmers when required

An additional hazard in cold weather conditions is the increased risk for slips from the accumulation of ice and snow in general work areas, ruts where water is accumulated, and heavy equipment. The following table outlines controls that may be used for preventing slips:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or in areas free of accumulated areas		Clear snow in work areas		Use traction control devices (*i.e.,* YakTrax) on work boots to provide additional traction.
		Apply salt/sand to icy areas		
		Use equipment to access work areas		

4.10 Biological Hazards

The following are biological hazards that may be present at the EPP Ash Pond.

4.10.1 Ticks (Lyme Disease) & Mites

Although Lyme disease has been detected throughout the continental United States, it is prevalent primarily in certain areas in New England, the Mid-Atlantic and the northern Midwest states. Although Lyme disease is the most common tickborne illness, other tickborne illnesses include southern tick-associated rash illness, Rocky Mountain spotted fever, ehrlichiosis, and tularemia. More information on Lyme disease and other tickborne illnesses can be found from the CDC.

Prevention

- Standard field gear (work boots, socks, and light colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions shall be taken when working in areas that might be infested with ticks:
  - Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists, tape cuffs if necessary
  - Wear light colored clothing so ticks can be easily spotted
  - Per- and polyfluoroalkyl substances (PFAS)-free tick repellents (DEET and Permethrin) must be used when walking in all overgrown areas. DEET (≥25 percent [%]) must be applied to skin while permethrin must be applied to clothes and allowed to dry. Spray outer clothing, particularly your pant legs and socks, BUT NOT YOUR SKIN, with an insect repellent that contains permethrin. For heavily infested tick areas, wear spun polypropylene coveralls that have been sprayed with permethrin.
  - Inspect clothing frequently
  - Inspect head and body thoroughly when you return from the field, particularly on your lower legs and areas covered with hair
  - When walking in wooded areas, wear a hard hat, and avoid contact with bushes, tall grass, or brush as much as possible

Removal

- Remove any ticks by tugging with tweezers or special tick removal tools
- Do not squeeze or crush the tick
- DO NOT use matches, a lit cigarette, nail polish, or any other type of chemical to "coax" the tick out

Treatment

- Disinfect the area with alcohol or a similar antiseptic after removal
- Notify the Safety Competent Person of the embedded tick
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash.
- No further treatment is necessary for ticks embedded <48 hours.
- If other signs or symptoms of Lyme are observed (fever/chills, aches, and pains), then notify the Safety Competent Person and seek medical attention.

The following table summarizes safety controls to reduce the hazards associated with ticks and mites.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on tick and mite prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light colored long-sleeved shirt tucked into pants. Tuck pant legs into socks
			Perform frequent tick checks in the field and a thorough tick check after completing work activities	Apply Permethrin to clothes and DEET (20% or more) to exposed skin
			Call licensed pesticide contractors to remove infestations of bees, wasps, fire ants, etc.	

4.10.2 Insect Bites/Stings

Stinging/biting insects at the EPP Ash Pond include spiders, wasps, and bees. Contact with these insects may result in project personnel experiencing adverse health effects that range from being mildly uncomfortable to being life-threatening. Therefore, insects present a serious hazard to project personnel, and extreme caution must be exercised whenever Site and weather conditions increase the risk of encountering stinging insects. Some of the factors related to stinging insects that increase the degree of risk associated with accidental contact are as follows:

- The nests for these insects are frequently found in remote wooded or grassy areas or equipment staging areas where equipment has not been moved recently.
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock. Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.
- The hypersensitivity needed to cause anaphylactic shock, can in some people accumulate over time and exposure, therefore even if someone has been stung previously and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again.
- Spider bites generally only cause localized reactions such as swelling, pain, and redness. However, bites from a Black Widow or Brown Recluse, or if you are allergic to spiders, can cause symptoms that are more serious.
- ***If a worker knows that they are hypersensitive to bee, wasp, or hornet stings, or other insects, they must inform the Safety Competent Person prior to site work. Persons who have been prescribed epi-pens by their physician must have an epi-pen on the Site.***
- Inspect any clothing or PPE that has been left for a period of time prior to putting it on. Shake out the clothing and inspect the inside of safety shoes/boots prior to putting them on.
- Nests in active work areas must be eradicated. Small nests may be handled by Site personnel using consumer-type insecticide. A pest control contractor should be hired to handle large or difficult to reach nests.

The following table outlines safety controls to reduce the risk of hazards associated with stinging/biting insects.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on stinging/biting insect prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light colored long-sleeved shirt tucked into pants. Tuck pant legs into socks
		Eradicate nests in the work area as outlined above.	Instruct personnel to inspect/shake out clothing and work boots that have been left for a period of time.	Apply Permethrin to clothes and DEET (20% or more) to exposed skin – NOTE this will not repel bees/wasps
			Instruct employees who are hypersensitive to insect bites/stings to carry their epi-pen while on site	

4.10.3 Venomous Snakes

There are four species of venomous snakes in Illinois, they are:

- Copperhead
- Cottonmouth Water Moccasin
- Timber rattlesnake
- Eastern Massasauga

Generally, these snakes are found in the southern one-third of the state, with the Cottonmouth Water Moccasin found mostly in the southernmost portions of Illinois. Snakes are generally found in tall grass, wood piles, or other covered areas. Snakes are generally not aggressive towards humans, but if they are encountered avoid the snake and do not provoke it. If bitten by a snake that may be venomous seek medical treatment.

The following table outlines safety controls to reduce the hazard associated with venomous snakes.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove debris piles, overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of venomous snakes. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	If working in area with snakes cannot be avoided, wear snake chaps
			Instruct personnel to not disturb snakes if they identify one in their work area	

Elimination	Substitution	Engineering	Administrative	PPE
			Use caution when moving staged tools or materials into which snakes may have moved	

4.10.4 Poisonous Plants and Plant Hazards

Poison ivy and poison oak may be present at the Site. Poison ivy thrives in all types of light and usually grows in the form of a trailing vine; however, it can also grow as a bush and can attain heights of 10 feet or more. Poison ivy has pointed leaves that grow in clusters of three. Poison oak resembles poison ivy except that the poison oak leaves are more rounded rather than jagged like poison ivy, and the underside of poison oak leaves are covered with hair.

The skin reaction associated with contacting these plants is caused by the body's allergic reaction to toxins contained in oils produced by the plant. Becoming contaminated with the oils does not require contact with just the leaves. Contamination can be achieved through contact with other parts of the plant such as the branches, stems or berries, or contact with contaminated items such as tools and clothing. The allergic reaction associated with exposure to these plants will generally cause the following signs and symptoms:

Symptoms

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact and in many cases, persons experience almost immediate irritation.
- Reddening, swelling, itching, and burning at the site of contact.
- Pain, if the reaction is severe.
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin.

Prevention

- The best treatment appears to be removal of the irritating oil before it has had time to cause inflammation by wiping exposed skin with rubbing alcohol followed by washing with soap and water.
- A visual Site inspection and identification of the plants should be completed prior to starting work so that all individuals are aware of the potential exposure. Avoid contact with any poisonous plants on the Site, and keep a steady watch to identify, report, and mark poisonous plants found on the Site.
- Avoid contact with, and wash daily, contaminated tools, equipment, and clothing.
- Barrier creams (Ivy Block®) and orally administered desensitization may prove effective and should be tried to find the best preventive solution.
- Keeping the skin covered as much as possible (*i.e.*, long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure. PFAS-free spun polypropylene coveralls or Tyvek® may be worn to prevent contact of skin and clothes with poison ivy.

The following table outlines safety controls to mitigate the hazards associated with poisonous plants.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of poisonous plants	Wear pants and long sleeves when working in overgrown areas
			Instruct personnel to avoid areas where poisonous plants have been identified	Consider the use of a coverall when working in areas where these plants are present, especially for hypersensitive employees.
			Provide isopropyl alcohol along with soap and water to remove oils from skin, tools, and equipment.	

4.11 Working Alone

As outlined in Section 4.1, working alone while on the Ash Pond must be pre-approved by the POC. Working alone is prohibited for tasks deemed to be high risk by IPRG including, but not limited to, handling highly hazardous chemicals (sulfuric acid), work over/near water, excavation and trenching, hot work (grinding, welding and torch cutting), and elevated work that requires personal fall arrest. Third-party contractors are responsible for identifying potential high-risk tasks in their Safety and Health Plan and requiring that a buddy system be implemented while high risk work is performed. The buddy must be located in a safe area but may perform other tasks that do not prevent observing the person performing high risk work. Working alone may occur on and around other parts of the EPP Ash Pond when there is no drowning hazard or risk of severe injury due to high-risk work.

Elimination	Substitution	Engineering	Administrative	PPE
	Modify work methods by substituting lower hazard methods for high hazard methods	Varies depending on the hazard, but for example, could include installing guardrails (temporary or permanent) which mitigates a fall hazard reducing the risk to levels where working alone may be permitted	Prohibit working alone on ash ponds and for other high hazard tasks without prior approval from the POC.	
			Implement a buddy system whenever feasible (required for high hazard work)	

Elimination	Substitution	Engineering	Administrative	PPE
			Implement a worker check-in, emergency alerting, and monitoring system	

5. HAZARD COMMUNICATION

As required by 35 I.A.C. § 845.530, the OSHA HAZWOPER standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) and OSHA Hazard Communication Standard, site personnel, subcontractors, and visitors must be informed of chemical hazards associated with their work area. The information in this section is based on:

- Recommendations in the most recent "NIOSH Pocket Guide to Chemical Hazards" by the Department of Health and Human Services, Centers for Disease Control and Prevention, and the NIOSH Pocket Guide.
- Requirements set forth in the OSHA regulations from as defined in Chapter 17 of 29 C.F.R. § 1910.1200(c) for all hazards not otherwise classified.

5.1 Coal Combustion Residuals

Primary exposure to CCR is through inhalation and skin contact. CCR is typically a fine, black, grey, or tan particulate. CCR is comprised of several components. The following table outlines the components of the CCR. The exact percentage of each component will vary based on the type of ash and location at the surface impoundment.

Chemical	**Percentage**	**PEL**	**IDLH**	**ACGIH TLV**	**Symptoms of Exposure & Health Effects**
Crystalline Silica	20-60% (total)	0.05 mg/m^3 (respirable)	25 mg/m^3 (respirable)	0.025 mg/m^3 (respirable)	Cough, dyspnoea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]
Iron oxide	1-10%	10 mg/m^3	2500 mg/m^3	5 mg/m^3	Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)
Calcium oxide	10-30%	5 mg/m^3	25 mg/m^3	2 mg/m^3	irritation eyes, skin, upper respiratory tract; ulcer, perforation nasal septum; pneumonitis; dermatitis
Titanium dioxide	<3%	15 mg/m^3	ND	0.2 mg/m^3 (nanoscale particles) 2.5 mg/m^3 (fine-scale particles)	Lung fibrosis; [potential occupational carcinogen]
Aluminosilicates	10-60%	15 mg/m^3 (PNOR)	ND	10 mg/m^3 (PNOR)	irritation eyes, skin, throat, upper respiratory system
Magnesium oxide	2-10%				
Magnesium dioxide	<2%				
Phosphorous pentoxide	≤2%				
Sodium oxide	1-10%				
Potassium oxide	≤1%				
Bromide salt	<0.1%				

Footnotes:

All values are 8-hour time-weighted averages (TWAs) unless otherwise indicated.

- PEL: Permissible Exposure Limit, the concentration an employee may be exposed to for an 8-hour work day for a 40-hour work week for which nearly all employees may be repeatedly exposed without adverse health effects.
- IDLH: IMMEDIATELY Dangerous to Life and Health, contaminant concentration which present the possibility for severe health consequences if exposed to the IDLH concentration without the appropriate personal protective equipment (PPE).
- ACGIH TLV: American Conference of Governmental Industrial Hygienists Threshold Limit Value
- mg/m^3 = milligrams per cubic meter of air
- PNOR: Particulates Not Otherwise Regulated
- ND: Not Determined

5.2 Safety Data Sheets

Pursuant to 35 I.A.C. § 845.530(b)(3), IPRG will provide Safety Data Sheets (SDSs) to all employees, contract workers, and third-party contractors for the CCR located in the EPP Ash Pond. Third-party contractors will provide SDSs to Mark Davis (Environmental Manager) prior to bringing a material on site. SDSs are provided in Appendix E.

5.3 Signage

The absence of any of the following signage does not mean that a potential hazard does not exist. Signage will be posted by IPRG, but employees, contract workers, and third-party contractors must remain vigilant for changing site conditions.

To aid in hazard communication and pursuant to 35 I.A.C. § 845.530(f), IPRG will post the following signs at the EPP Ash Pond:

- Signs identifying the hazards of CCR, including dust inhalation when handling CCR.
- Signs identifying unstable CCR areas that make the operation of heavy equipment hazardous.
- Signs identifying the necessary safety measures and necessary precautions, including the proper use of PPE.

The following signs may also be posted at the CCR units to aid in hazard communication:

- Overhead electrical lines that may be struck by heavy equipment of vehicles will have signs warning drivers of their presence.

6. EMERGENCY RESPONSE PLAN

This emergency response section details actions to be taken in the event of site emergencies. This section is consistent with the EPP Ash Pond and Levee Emergency Response Plan. All personnel on site must be familiar with emergency signals and the content of this section.

6.1 Emergency Phone Numbers & Notifications

Emergency Number	
Site Address	**Emergency Phone Number**
7800 Cilco Lane Peoria, IL	911 or Peoria Fire: 309-674-3131
	Kevin Largent 309-565-4152
	Mark Davis 309-241-4219

Medical Treatment	
Local Hospital	**Phone Number**
OSF Saint Francis Medical Center 530 NE Glen Oak Ave Peoria, IL 61637	309-655-2000

Incident Notifications		
Title	**Name**	**Contact Number**
POC/Spill Coordinator	Mark Davis	309-241-4219

Detailed notifications are outlined in the EPP Ash Pond and Levee Emergency Response Plan. Notifications will be made by the Plant Closure Manager or Plant Environmental Supervisor. Initial notification will be made to the Plant Closure Manager or Plant Environmental Supervisor.

6.2 Evacuation Signal

Numerous evacuation signals are used at the facility depending on the nature of the incident. Emergency evacuation signals are reviewed in the Site Orientation/General Awareness Training.

Upon hearing an evacuation signal, all personnel will leave the work area and proceed to the muster point.

6.3 Muster Point

The muster point for the EPP Ash Pond is located at the main plant parking lot in front of Building A, unless directed otherwise. The muster point is shown in Appendix A.

6.4 Calls for Emergency Support

In the case of an emergency, call 911 or Peoria Fire: 309-674-3131 and notify the POC. The individual calling for emergency support will briefly explain the nature of the emergency and site conditions as follows:

- Indicate his/her name
- Location of emergency
- Description of emergency conditions that may require special rescue equipment, such as confined spaces, excavations, and elevated work platforms
- Potential chemical hazards and recommended PPE

6.5 Fire & Explosion Response Plan

Trained site personnel may respond to incipient stage fires using a 20-pound Type ABC dry chemical fire extinguisher or hose. An incipient stage fire is a fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class

II standpipe or small hose systems without the need for protective clothing or breathing apparatus. Personnel shall only attempt to extinguish the fire if it is safe to do so.

A fire that CANNOT be readily extinguished with a fire extinguisher will require evacuation of the work area personnel to Muster Point areas per this Safety and Health Plan. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan will also be followed.

All fires or explosions must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.6 Injury Response Plan

Treatment for minor injuries will be provided on site using available first aid supplies and personnel trained in first aid. All third-party contractors must have at least one individual on site who is trained in first aid, CPR, and AED use. Third-party contractors must provide their own first aid kits and AED. For minor injuries that are not life-threatening but require further medical attention, employees should be treated by occupational physicians at occupational clinics whenever possible. Treatment of minor injuries by emergency room or personal physicians should be avoided. When injured workers are released back to work with restrictions, all subcontractors are expected to accommodate those restrictions.

Emergency medical incidents include puncture wounds to the head, chest, and abdomen, serious head and spinal cord injuries, and loss of consciousness must be treated at the hospital emergency room listed in Section 6.1 of this Safety and Health Plan.

All injuries must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.7 Spill Response Plan

In general, IPRG employees, contract workers, and third-party contractors are trained and equipped to handle small spills associated with their work. Third-party contractors must include an approved spill response plan in their Safety and Health Plan. Site personnel will generally respond to spills as follows:

- Stop the leak immediately if it can be done without directly contacting the leaking material.
- Remove or stop all ignition sources (hot work, generators, etc.) that are within 25 feet of any part of the spill.
- Contract workers and third party contractors should notify the site EPP Spill Coordinator as soon as possible.
- On-site personnel should immediately secure the area to prevent unauthorized entry into the spill area.
- Although not likely given the anticipated types of spills, site personnel must immediately initiate evacuation if a spill may cause an explosion, death, or serious injury.
- Site personnel may only respond to incipient stage fires regardless of whether such fires are associated with a spill.
- PPE for spills to open areas generally requires Modified Level D PPE (poly-coat Tyvek®, nitrile gloves, and boot covers or boot decontamination). Over-boots or boot covers may also be used if persons cleaning the spill would have to walk on spilled materials. Latex gloves are not acceptable and will degrade with exposure to petroleum products.

6.8 CCR Spill or Release Response Plan

Response to minor or incidental spills of CCR will be managed as outlined in the General Spill Response Plan. An incidental release is a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up, nor does it have the potential to become an emergency within a short time frame.

Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up. An incidental spill may be safely cleaned up by employees who are familiar with CCR. Response to major releases of CCR will be in accordance with the EPP Ash Pond and Levee Emergency Response Plan.

6.9 Ash Pond Rescue

Ash ponds may be unstable and represent an engulfment hazard if persons and equipment traverse the surface, berms, or other unstable areas. Special training is required on behalf of emergency responders to retrieve persons and equipment who become trapped in unstable ash. **Untrained persons must not enter unstable areas** in an attempt to conduct rescue because of the significant potential that they will also become victims. Call the EPP emergency number and state that an "ash pond rescue" is required. The EPP emergency contact will notify the designated service to perform the ash pond rescue. On-site personnel should remain on stand-by to support the ash pond rescue team as necessary.

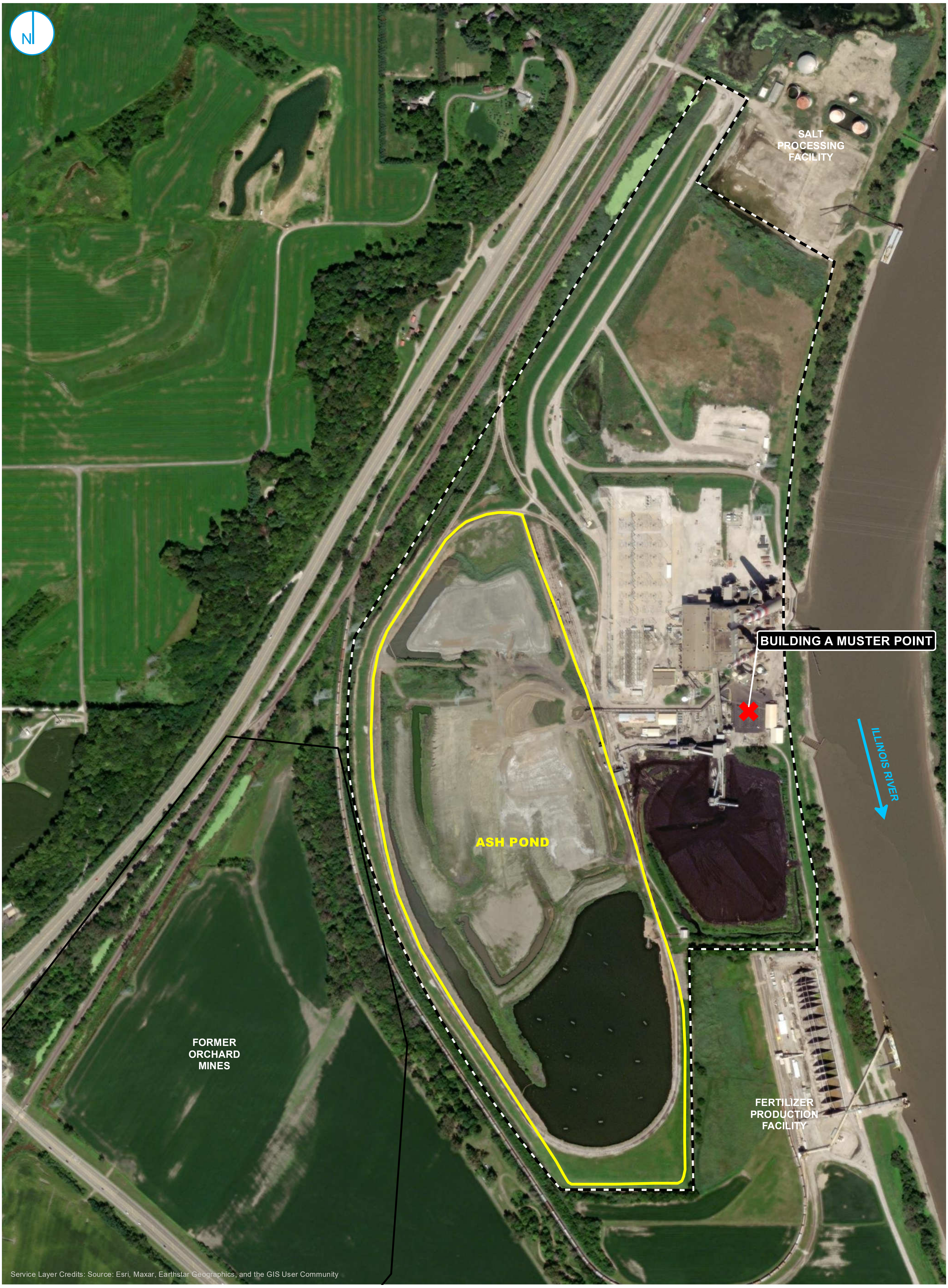
6.10 Incident Reporting

All incidents must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan. An Incident Report must be completed for all injuries, illnesses, spills, fire, explosion, or property damage. The absence of an injury does not preclude the need to complete an Incident Report as such incidents will be classified as "near miss" or "other." It will include, but is not limited to, the nature of the problem, time, location, and corrective actions taken to prevent recurrence.

APPENDIX A
SITE MAP

PROJECT: 169000XXXX | DATED: 11/20/2023 | DESIGNER: GALARNMC

Y:\Mapping\Projects\22\2285\MXD\845_Safety_and_Health_Plans\2023\EDW\Appendix A_EDW_Site Map.mxd



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

▭ 35 I.A.C. § 845 REGULATED UNIT (SUBJECT UNIT)
▭ PROPERTY BOUNDARY
▭ FORMER ORCHARD MINES AREA

0 250 500
Feet

SITE MAP

APPENDIX A

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

35 I.A.C. § 845 SAFETY AND HEALTH PLAN
EDWARDS POWER PLANT
BARTONVILLE, ILLINOIS

RAMBOLL

APPENDIX B
SAFETY AND HEALTH PLAN ACKNOWLEDGMENT FORM

SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT FORM

I HEREBY CERTIFY THAT I HAVE READ AND UNDERSTOOD ALL HEALTH AND SAFETY PROCEDURES AS STATED HEREIN:

Name and Affiliation (printed)	**Signature**	**Date**

APPENDIX C
DRUG SCREEN POLICIES AND SUPPLEMENTAL TERMS

Drug and Background Investigations

Contractor is solely responsible for ensuring that all members of Contractor Project Team have completed and passed all drug and alcohol tests and background investigations required under this Attachment and under Contractor's own programs before assigning such personnel to perform Work. Contractor is also solely responsible for ensuring that such testing and investigations are performed in accordance with all applicable laws.

1. Required Investigations. Except as otherwise required by applicable law, Required Investigations shall consist of all of the following:

   1.1 a 7-panel drug screening;

   1.2 a background investigation that includes a criminal records check in all counties where the applicable person has resided for at least the last seven (7) years;

   1.3 a third-party verification of previous employment and the highest education level completed by the applicable person;

   1.4 a check of the National Sex Offender Registry and Terrorist Watch List (Denied Parties); and

   1.5 a check of Motor Vehicles Record (if work to be performed by the applicable person requires driving as part of the defined duties).

2. Notices to Tested Persons Regarding Background Checks. All background checks will be conducted in compliance with applicable provisions of the Fair Credit Reporting Act.
3. Forms and Testing Organization for Drug Tests. Except for those positions subject to Department of Transportation ("DOT") drug and alcohol testing regulations, all drug testing shall be performed using the Universal Toxicology four part "Non-DOT" Chain of Custody and Request Form with white and blue top page, and shall be conducted by an independent third-party organization.

4. Pass/Fail Standards – Background Checks. A person shall be deemed to have failed the applicable background check if:

   4.1 information is reported through the background check process indicating that such person has failed to disclose or misrepresented information requested at any time about such a person's criminal background history; or

   4.2 such person has ever committed any felony constituting a violent crime, crime against a person, sexual offense or fraud; or

   4.3 such person has committed any other felony, or has been incarcerated for a felony, within ten (10) years prior to the date of such background check (i.e., for these felonies there must be a ten (10) year lapse in time from the later of the commission and the end of any period of incarceration); or

   4.4 such person has committed any misdemeanor that:

      4.4.1 involves violence that is sexually related; or

4.4.2 consists of a DUI that is the second (or more) DUI in the last two (2) years prior to the date of the background check; or

4.4.3 consists of a theft-related offense; provided that there can be no more than one theft by check and it must have been for an amount less that $100; or

4.4.4 consists of any drug-related misdemeanor committed at any time within forty-eight (48) months prior to the date of the background check.

4.4 For purposes of both felonies and misdemeanors, a person is deemed to have committed the applicable offense if he/she is convicted or enters a plea of guilty or nolo contendere for such offense (to include, without limitation, sentences of probation and deferred adjudication).

5. **Pass/Fail Standards – Drug Tests.** A person shall be deemed to have failed the applicable drug test if any of the following maximum cut-off levels are exceeded, unless there is a legitimate medical explanation for the presence of a tested substance at or above the applicable cut-off level:

5.1	Amphetamines	500ng/mL
5.2	Barbiturates	150ng/mL
5.3	Benzodiazepines	150ng/mL
5.4	Cocaine	150ng/mL
5.5	Marijuana	150ng/mL
5.6	Opiates	2000ng/mL
5.7	Phencyclidine	25ng/mL

For any positions subject to DOT drug and alcohol testing requirements, testing shall be conducted according to the applicable DOT panel and cutoff levels.

6. **Other Requirements.**

6.1 Background checks and drug tests will be paid for by Contractor without reimbursement by Company.

6.2 Contractor will keep background checks and drug test records while the applicable persons are working pursuant to this Agreement and for three (3) years thereafter.

6.3 Upon request, Contractor will provide a certification to Company that no person required hereunder to pass a background check or drug test has failed such investigation or test. Contractor will not provide the specific results of the background check or drug test of any individual to Company.

6.4 If any person required under this Agreement to pass a background check or drug test fails such check or test, Contractor will not report the specific results of such check or test to Company and will not allow such individual to perform any Work for Company. Although such person may not be assigned to perform any Work for Company, nothing in this Attachment requires Contractor to take any other action with respect to such person's employment with Contractor.

Supplemental Terms for Onsite Services

1. SAFETY

1.1 Contractor agrees that any safety-related assistance or initiatives undertaken by Company will not relieve Contractor while on Company Property from responsibility for the implementation of, and compliance with, safe working practices, as developed from their own experience, or as imposed by law or regulation, and will not in any way, affect the responsibilities resting with Contractor under the provisions of any agreement to which these policies are attached and to meet all safety requirements as specified by the Occupational Safety & Health Administration (OSHA), the Mine Safety Health Administration (MSHA), including the "Mining Contractor Safety Reference Handbook" located at http://www.vistraenergy.com/wp-content/uploads/2016/12/Contractors-Safety-Handbook_Final-MC-08262016.pdf, the Department of Transportation (DOT) and any other applicable state or federal safety and health laws or regulations.

1.2 In the event that a material safety data sheet, warning label, or other documentation concerning the use of hazardous chemicals at any property owned or controlled by Company or any of its affiliates (collectively, "**Company Properties**"), applies to any materials or equipment provided by Contractor as an aspect of the Work, such documentation will be provided by Contractor to Company prior to the commencement of any such Work.

1.3 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

2. SECURITY

2.1 It will be the affirmative duty of Contractor to ensure that Contractor Group assists in carrying out all security measures, to include reporting all information or knowledge of matters adversely affecting security to Company's designated security personnel.

2.2 Company reserves the right to exclude any of Contractor's employees from any Company Property by denial of access, suspension or revocation of access authorization, preemptory expulsion, or by any other means, without notice or cause. Former Company employees, and any of Contractor's employees who previously have been excluded from any Company Property, may be brought onto Company property or facilities only if prior approval from Company is obtained. If Contractor terminates a member of Contractor Group performing Work on Company's premises, Contractor shall inform Company immediately, but in no event, no later than twenty-four (24) hours after such employee is terminated in order for Company to remove access to Company Property for such employee.

2.3 Company measures may also include investigations, whether by Company or law enforcement officials. Contractor agrees to cooperate in such investigations and understands that Company reserves the right to require anyone in Contractor Group to authorize appropriate agencies to release his or her criminal records to Contractor as a condition of either initial or continued permission for access to any Company Property. Investigations may include searches of Contractor Group. Such searches may include searches of facilities assigned to Contractor Group, search of all Company Property areas and property at such Company Property areas, searches of including, but not limited to, offices, lockers, desks, lunch boxes, packages and motor vehicles (regardless of ownership). Without limiting the foregoing, Contractor acknowledges and agrees that all members of Contractor Group, to the extent that Company reasonably determines that such members require security badge access prior to entering onto any Company Property, shall be required to comply with Company's standard security badge requirements, including without limitation a background check to be performed by Company.

3. ISNETWORLD

3.1 Contractor agrees to maintain at Contractor's expense a subscription with ISNetworld (www.ISNetworld.com), Company's safety compliance program or any replacement program therefor, as directed by Company, for the Term of the Agreement. Contractor shall also furnish ISNetworld with any information requested by ISNetworld relating to ISNetworld's evaluation of the Contractor's safety program and practices. As a minimum, requested documents will be related to safety, health, and insurance (i.e., regulatory required training, certifications, safety plans, safe and secure workplace practices, insurance certificates, etc.), OSHA and MSHA injury rates and Experience Modification Rate (EMR).

3.2 Contractor has and during the performance of this Agreement shall continue to report full, complete and accurate information to ISNetworld concerning Contractor's employees.

4. MATERIALS, EQUIPMENT AND LABOR. Contractor will be solely responsible for the proper storage, transportation and disposal of any product or waste, other than sandblasting waste, used or generated in connection with the Work in accordance with all applicable Environmental Laws. Contractor will dispose of all waste materials, other than sandblasting waste, at an off-site disposal facility approved for such waste materials pursuant to applicable Environmental Laws and will complete and sign all waste manifests as the generator of such waste. Company will be responsible for the storage, transportation and disposal of any sandblasting waste generated during the performance of the Work.

5. CONDITIONS AFFECTING WORK

5.1 Contractor will investigate and acquaint itself with the conditions affecting the Work, including but not limited to those related to the transportation, disposal, handling and storage of materials and waste; availability of labor, water, electric power and roads; the uncertainties of weather, river stages or similar physical conditions at the site; the conformation and condition of the ground; and the character of equipment and facilities needed preliminary to and during prosecution of the Work. Contractor has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered. Contractor's failure to acquaint itself with any conditions affecting the Work or any available related information will not relieve it from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

5.2 Contractor assumes full responsibility for investigating conditions and determining the existence and magnitude of any hazards to the physical well-being of property of Contractor, the employees, agents, and servants of Contractor, or any other person or entity who is or may become involved in the performance of Work, and any and all other persons in the vicinity of the Work. Contractor will advise all of the above-specified persons or entities of any hazards relating to Work, and will ensure that those persons or entities are advised of and fully understand the nature of the hazards and safety precautions that can be taken to eliminate or minimize dangers relating to the hazards.

5.3 Contractor will provide information to Company regarding hazardous chemicals and/or consumable products that contain constituents listed in 40 CFR 372.65 used at any Company Property. Contractor will report the amount of such material carried on and off the site, the amount actually used and the manner of use. Contractor will provide the maximum quantity of the material stored on site at any one time and if a waste material was collected, where it was disposed of (location name and address). Contractor will provide information on the amount of material used for the previous calendar year by the first of February.

5.4 Contractor will use its best efforts to ensure that the Work is performed so as to minimize any adverse impact upon natural resources and the environment and will use best industry practices in this regard at all times.

5.5 Contractor acknowledges and agrees that all members of Contractor Group performing Work at any Company Generation or Mining Property are required to view Company's "Contractor/Visitor Safety Orientation" video (in the case of Company Generation property), when applicable, and to read and adhere to Company's "Contractor/Visitor Safety Booklet" (in the case of Company Mining property) prior to performing any Work at any Company Generation or Mining Property.

5.6 Contractor will immediately notify Company as soon as Contractor has reason to believe that Contactor, or any employee or other person performing the Work, is not or may not be performing the Work in compliance with applicable Environmental Laws. Contractor will provide Company with written notice to Company of such actual or potential non-compliance within three (3) days following the discovery thereof. Contractor will take immediate steps to ensure compliance with all applicable Environmental Laws and will, if directed by Company, cease all Work until authorized by Company to resume the Work.

5.7 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

6. WORK SITE PERMITS AND LICENSES

6.1 Subject to the following two paragraphs, Contractor will obtain, prior to the commencement of the Work, and provide to Company upon request, all permits, licenses and governmental authorizations, at its sole expense, required for the performance of the Work. Contractor will be solely responsible for maintaining compliance with such permits, licenses and governmental authorizations.

6.2 In the event that a storm water discharge permit is required for the performance of the Work, (i) Contractor will be responsible for filing a Notice of Intent with respect to the Work, in addition to any Notice of Intent that Company may be required to file, and (ii) Contractor will coordinate with

Company in the preparation and execution of a Storm Water Pollution Prevention Plan for the Work Site.

6.3 In the event that the performance of the Work involves the handling or abatement of asbestos-containing materials, Contractor will coordinate with Company in the preparation and filing of all required notification forms.

7. ACCESS. Should Contractor desire access to the Work Site over any land not controlled by Company, it will, at its sole expense, obtain all proper permits or written permission necessary for that access.

8. COMPANY FACILITIES. Contractor will not use Company's sanitary facilities, changehouses, shops, parks, storage buildings, tools, equipment or other facilities unless so directed by Company. Contractor will not discharge, without Company's prior written authorization, any product or waste used or generated in connection with the Work through any (i) Company-permitted outfall, (ii) Company-owned or operated pollution control equipment, or (iii) storm or sanitary sewer located at or in the vicinity of the Work Site. Any request for authorization to discharge will include, at a minimum, either a copy of the Material Safety Data Sheet for the product or a written description of the waste, including a list of the constituents of the waste and the relative concentrations thereof.

9. ENVIRONMENTAL

9.1 In the event that Contractor discovers during the performance of the Work any substance at the Work Site that is not the subject of the Work or has not otherwise been identified by Company for Contractor, which substance Contractor has reason to believe is or may be a Hazardous Substance that (i) has been or may be released or spilled into the soil, surface water, or groundwater or in a building or structure, or (ii) consists of asbestos-containing materials, lead-based paint, batteries, thermostats, lighting equipment, or equipment containing polychlorinated biphenyls, Contractor will immediately stop Work and notify Company of the discovery. Contractor will not resume the Work until receiving authorization from Company to do so.

9.2 The term "Hazardous Substance" means any product, waste, emission or substance defined, listed or designated as a hazardous or toxic substance, hazardous waste, hazardous material or pollutant by or pursuant to any Environmental Law and includes, but is not limited to, any petroleum-based product, substance or waste, including any additives associated therewith, pesticides, fertilizers, solvents, polychlorinated biphenyls, mercury, lead, lead-based paint, asbestos-containing material or explosives.

9.3 Contractor will immediately notify Company in the event of a spill or release of any material which Contractor knows or has reason to believe is a Hazardous Substance, whether onto the ground, into any body of water, a storm or sanitary sewer, or the air, or anywhere on property owned or controlled by Company, including within any building or structure. Contractor will be solely responsible, as may be required by applicable Environmental Laws, for, in consultation with Company, (i) notifying the appropriate governmental agencies of such spill or release caused or permitted by the acts or omissions of Contractor and (ii) for the cleanup and remediation of such spill or release.

10. PROTECTION OF HIGHWAYS AND RAILROADS. Contractor will make suitable arrangements with governmental authorities and railroads for the construction of all structures, whether underneath or over roads, railroads or rights-of-way to protect the public from accident or delay. Contractor will repair, at its

own expense, to the satisfaction of the governmental authorities or other owners, all roads, railroads and bridges that may be damaged by, or given undue wear due to the Work.

11. CLEANING UP

11.1 Contractor will at all times keep the Work Site free of waste materials or rubbish caused by the Work. After completing the Work, Contractor will remove all its waste materials, rubbish, tools, supplies, equipment and surplus materials from and about the Work Site.

11.2 If Contractor fails to keep the Work Site clean or to clean up after completing the Work, Company may do so and charge all costs of cleaning up to Contractor. Those costs may be deducted from the final payment to Contractor.

12. COLLATERAL WORK. Company and other contractors may be working at the Work Site. Company reserves the right to coordinate the performance of Contractor's Work with the work of others. Contractor will cooperate with and will not delay, impede or otherwise impair the work of others. Company does not guarantee Contractor continuous uninterrupted access to the Work Site, but will provide such access as good construction practices will allow, considering the other activities in the area.

13. ALCOHOLIC BEVERAGES, DRUGS AND WEAPONS. Contractor will inform all members of Contractor Group who may be involved in the performance of any Work of the following Company rules relating to alcoholic beverages, drugs and weapons, with which all personnel are expected to comply:

13.1 Bringing, attempting to bring, possessing, using or being under the influence of intoxicants, drugs, or narcotics while on any Company Property, including but not limited to parking areas, is prohibited. Possessing alcoholic beverages in sealed containers is permitted, however, in designated parking areas.

13.2 Prescription or over-the-counter medications that could affect the performance of safety-sensitive work are allowed on Company Property only if they have been previously cleared by Contractor. Contractor must confirm that the medication and dosage do not impair an individual's ability to perform safety-sensitive work before clearing the individual to perform such work while under the influence of the medication.

13.3 Bringing, attempting to bring, possessing or using firearms, whether classified as legal or illegal, while on any Company Property, including but not limited to buildings, parking areas, recreation facilities, equipment and vehicles, is prohibited, unless otherwise required by applicable law. Use or possession of firearms for specific situations is permitted if approved by function or higher level management of Company.

13.4 Off-the-job involvement with intoxicants, illegal drugs, or illegal narcotics that adversely affects Company's business, to include impairing the individual's ability to perform his job or the public trust in the safe operation of Company, is prohibited.

13.5 Any conduct on any Company Property which is in violation of any state or federal law or regulation is considered a violation of these rules and a breach of any agreement to which these policies are attached.

13.6 In order to enforce these rules, all individuals with access to any Company Property as well as the vehicles, offices, lockers and any personal belongings of such individuals on any Company Property are subject to search by Company and its agents, to include security representatives appointed or employed by Company. Individuals may be required to take a blood, urinalysis or Breathalyzer test, or submit to other recognized investigatory tests or procedures as are deemed appropriate or necessary by Company in the investigation of a violation of these rules.

14. TITLE AND RIGHT. Nothing in the Agreement will vest Contractor with any right of property in materials used after they have been attached to or incorporated into the Work, nor materials for which Contractor has received full or partial payment. All those materials, upon being so attached, incorporated or paid for, will become the property of Company. Any gravel, sand, stone, minerals, timber or other materials excavated, uncovered, developed or obtained in the Work, or on any land belonging to Company may be used, in the performance of the Work, provided such materials meet the requirements of this Agreement. Any objects or natural materials or animals excavated or exposed that may have historical significance or constitute a threatened or endangered species must be brought to the attention of Company.

15. PROTECTION AGAINST LIENS AND ENCUMBRANCES

15.1 Contractor will not at any time permit any lien, attachment or other encumbrance ("Encumbrance") by any person or persons whosoever or by reason of any claim or demand against Contractor to be placed or remain on the property of Company, including, but not limited to, the Work Site upon which Work is being performed or equipment and materials that are being furnished. To prevent an Encumbrance from being placed on the property of Company, Contractor will furnish during the progress of any Work, as requested from time to time, verified statements showing Contractor’s total outstanding indebtedness in connection with the Work.

15.2 If Contractor allows any indebtedness to accrue to subcontractors or others and fails to pay or discharge that indebtedness within five (5) days after demand, then Company may withhold any money due Contractor until that indebtedness is paid or pay the indebtedness and apply that amount against the money due Contractor.

15.3 If Contractor allows any Encumbrances, whether valid or invalid to be placed on the property of Company, any and all claims or demands for payment to Contractor will be denied by Company until the Encumbrance is removed. If the Encumbrance is not removed immediately, Company may pay that claim or demand and deduct the amount paid, together with all related expenses, including attorneys’ fees, from any further payment due Contractor, or at Company’s election, Contractor will, upon demand, reimburse Company for the amount paid and all related expenses. Any payment made in good faith by Company will be binding on Contractor.

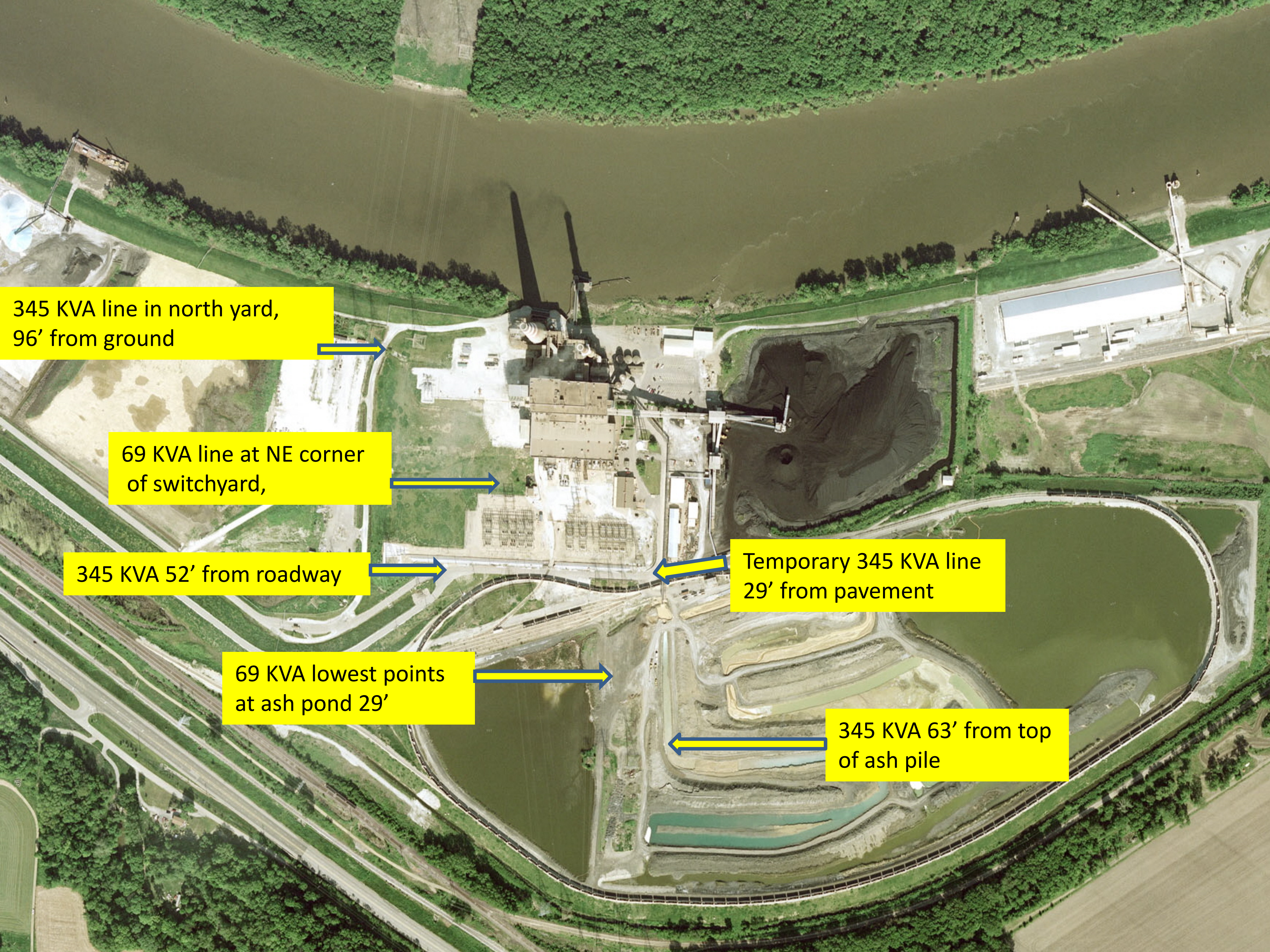
16. TERMINATION FOR DEFAULT

16.1 If a petition in bankruptcy should be filed by Contractor, or if Contractor should make a general assignment for the benefit of creditors, or if a receiver should be appointed due to the insolvency of Contractor, or if Contractor should refuse or fail to supply enough properly skilled workmen or proper equipment, materials or services or should fail to make prompt payment to subcontractors, or to pay promptly for materials or labor, or disregard laws, ordinances or the instruction of Company’s Contract Coordinator, or if Contractor should refuse or fail to abide by the SOW Construction Schedule or otherwise violate any provisions of the Agreement or SOW, then Company, upon a determination by Company's Contract Coordinator that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy available to it after giving Contractor seven (7) days' written notice, terminate the Agreement or the SOW and take possession of the Work Site. In the event of such a termination, Company may use all or part of Contractor's equipment and materials and may finish the Work by whatever method Company may deem expedient. In such event, Contractor will not be entitled to receive any further payment hereunder until the Work is finished. If the unpaid balance of the SOW fees will exceed the expense of finishing the Work, including compensation of Company's Contract Coordinator, other Company personnel, third party engineering companies, or other contractors for additional services, such excess will be paid to Contractor. If the expense of finishing the Work will exceed such unpaid balance, Contractor will pay the difference to Company within fifteen (15) days of receiving an invoice for same. The expenses incurred by Company herein, and the damage incurred through Contractor's default, will be determined by Company's Contract Coordinator, in its sole discretion, and such determination will be binding as between the parties.

16.2 In the event of a termination under the provisions of this Section 3, Contractor will transfer and assign to Company, in accordance with Company's instructions, all Work, all construction records, reports, permits, data and information, other materials (including all Company-supplied materials), supplies, Work in progress and other goods for which Contractor is entitled to receive reimbursement hereunder, and any and all plans, drawings, sketches, specifications, and information in connection with the Work, and will take such action as may be necessary to secure Company, at Company's sole election, the rights of Contractor under any or all orders and subcontracts made in connection with the Work.

16.3 In the event that Company so directs or authorizes, Contractor will sell at a price approved by Company, or retain at a mutually agreeable price, any such materials, supplies, Work in progress, or other goods as referred to in the preceding paragraph. In any event, Company will receive any and all records, plans, drawings, data, permits, specifications, sketches, reports, or other information relating to the Work. The proceeds of any such sale or the agreed price will be paid or credited to Company in such manner as Company may direct so as to reduce the amount payable by Company under this Section 3.

APPENDIX D
OVERHEAD POWER LINE LOCATIONS



345 KVA line in north yard, 96’ from ground

69 KVA line at NE corner of switchyard,

345 KVA 52’ from roadway

Temporary 345 KVA line 29’ from pavement

69 KVA lowest points at ash pond 29’

345 KVA 63’ from top of ash pile

Temporary 345 KVA line
29’ from pavement

Three danger signs in this area

05/22/2018 14:52


345 KVA
63’ from top
of ash pile
36’ from edge of
upper pile to lowest line
69 KVA lowest points
at ash pond 29’
05/24/2018 09:28

Yellow chain & cones installed at ash pond

05/22/2018 14:54

345 KVA 52’ from roadway

05/22/2018 14:56

69 KVA line at NE corner of switchyard, just outside fence line

05/23/2018 14:26

345 KVA line in north yard, 96’ from ground

05/22/2018 15:03

APPENDIX E
SAFETY DATA SHEETS

Safety Data Sheet

Section 1

Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Bottom Ash
Synonyms:	Ash; Ashes; Ash residues; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Coal Fly Ash; Pozzolan; Waste solids.
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause respiratory irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*20 - 40%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*Repeat Dose STOT, Category 1* *Carcinogen. Category 1A*
Aluminosilicates[2]	*Various, see Footnote 2*	*10 - 60%*	*Single Exposure STOT, Category 3*
Calcium oxide (CaO)	*1305-78-8*	*10 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Manganese dioxide (MnO_2)	*1313-13-9*	*<2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1 - 10%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant Category 2* *Eye Irritant Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	*See Footnote 3*	*Toxic to Reproduction Category 2*

[1] The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen 1A has been assigned.

[2] Aluminosilicates (CAS# 1327-36-2) may be in the form of mullite (CAS# 1302-93-8); aluminosilicate glass; pozzolans (CAS# 71243-67-9); or calcium aluminosilicates such as tricalcium aluminate (C3A), or calcium sulfoaluminate (C4A3S). The form is dependent on the source of the coal and or the process used to create the CCP. Pulverized coal combustion would be more likely to create high levels of pozzolans. Aluminosilicates may have inclusions of calcium, titanium, iron, potassium, phosphorus, magnesium and other metal oxides.

[3] Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction Category 2 has been assigned.

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable	0.05	0.05	0.025	0.05
Manganese dioxide **(as manganese compounds)**	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): 8 - 11	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point and boiling range (°C): Not applicable	**Partition coefficient: n-octane/water:** Not determined
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; no corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined)
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L
Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13
Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica
  - Titanium dioxide

- State Right-to-Know (RTK)

Component	**CAS**	**MA**[1,2]	**NJ**[3,4]	**PA**[5]	**RI**[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO_2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date

[2] 189th General Court of The Commonwealth of Massachusetts, no date

[3] New Jersey Department of Health and Senior Services, 2010a

[4] New Jersey Department of Health, 2010b

[5] Pennsylvania Code, 1986

[6] Rhode Island Department of Labor and Training, no date

Section 16

Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency
- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)							
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****	

** Chronic Health Effects*
****** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

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Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Class C Fly Ash
Synonyms:	Coal Fly Ash, Pozzolan
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause respiratory irritation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The* *classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*30 - 60%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Aluminosilicates	*71243-67-9* *1327-36-2*	*30 - 60%*	*Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Calcium oxide (CaO)	*1305-78-8*	*20 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1-8%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	*See Footnote 2*	*Toxic to Reproduction, Category 2*

Footnote 1: The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen, Category 1A has been assigned.

Footnote 2: Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction, Category 2 has been assigned.

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS

SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable Crystalline Silica	0.05	0.05	0.025	0.05
Titanium dioxide	Total	15	2.4 (fine) 0.3 (ultrafine)	10	10
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): Not Determined	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point/boiling range (°C): NA	**Partition coefficient: n-octane/water:** NA
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; No corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash C (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined).
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L

Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13

Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65.

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Manganese oxide-as manganese compounds	1313-13-9; Various	No	No	Yes	Yes
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

ACGIH:	American Conference of Industrial Hygienists
CA:	California
CAS:	Chemical Abstract Services
CCP:	Coal Combustion Product
CFR:	Code of Federal Regulations
EPA:	Environmental Protection Agency

GHS:	Globally Harmonized System of Classification and Labelling
IARC:	International Agency for Research on Cancer
LC50:	Concentration resulting in the mortality of 50 % of an animal population
LD50:	Dose resulting in the mortality of 50 % of an animal population
MA:	Massachusetts
NA:	Not Applicable
NJ:	New Jersey
NOEC:	No observed effect concentration
NIOSH:	National Institute of Occupational Safety and Health
NOx:	Nitrogen oxides
NTP:	US National Toxicology Program
OEL:	Occupational Exposure Limit
OSHA:	Occupational Safety and Health Administration
PA:	Pennsylvania
PBT:	Persistent, Toxic and Bioaccumulative
PEL:	Permissible exposure limit
PPE:	Personal Protective Equipment
REL:	Recommended exposure limit
RI:	Rhode Island
RCS:	Respirable Crystalline Silica
RTK:	Right-to-Know
SCBA:	Self-contained breathing apparatus
SDS:	Safety Data Sheet
STEL:	Short-term exposure limit
STOT-RE:	Specific target organ toxicity-repeated exposure
STOT-SE:	Specific target organ toxicity-single exposure
TLV:	Threshold limit value
TSCA:	Toxic Substances Control Act
TWA:	Time-weighted average
UEL:	Upper explosive limit
UVCB:	Unknown or Variable Composition/Biological
U.S.:	United States
U.S. DOT:	United States of Department of Transportation

16.3 Other Hazards

<table>
<tr><td colspan="8">Hazardous Materials Identification System (HMIS)
Degree of hazard (0= low, 4 = extreme)</td></tr>
<tr><td>Health:</td><td>2*</td><td>Flammability:</td><td>0</td><td>Physical Hazards:</td><td>0</td><td>Personal protection:**</td><td></td></tr>
</table>

** Chronic Health Effects*
****** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

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Attachment D

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

February 28, 2017

Josh Gabehart
Foth Infrastructure & Environment
2314 West Altorfer Drive
Peoria, IL 61615

RE: Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Dear Josh Gabehart:

Enclosed are the analytical results for sample(s) received by the laboratory on February 14, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky

Dan Milewsky for
Tod Noltemeyer
tod.noltemeyer@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: Mark Williams, Foth Infrastructure & Environment LLC

CERTIFICATIONS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

SAMPLE SUMMARY

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40145645001	**RIVER INLET**	Water	02/13/17 08:50	02/14/17 09:25
40145645002	**NORTH POND**	Water	02/13/17 10:35	02/14/17 09:25
40145645003	**ASH POND OUTFALL STRUCTURE**	Water	02/13/17 12:24	02/14/17 09:25
40145645004	**RIVER INLET BLANK**	Water	02/13/17 09:10	02/14/17 09:25
40145645005	**NORTH POND BLANK**	Water	02/13/17 10:45	02/14/17 09:25
40145645006	**ASH POND OUTFALL STRUCTURE BLA**	Water	02/13/17 12:37	02/14/17 09:25

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145645001	**RIVER INLET**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145645002	**NORTH POND**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145645004	**RIVER INLET BLANK**	EPA 1631E	LMS	1	PASI-G

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145645005	**NORTH POND BLANK**	EPA 1631E	LMS	1	PASI-G
40145645006	**ASH POND OUTFALL STRUCTURE BLA**	EPA 1631E	LMS	1	PASI-G

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **EPA 1631E**
Description: 1631E Mercury, Low Level
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
6 samples were analyzed for EPA 1631E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 1631E with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **EPA 6020**
Description: 6020 MET ICPMS
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **EPA 6020**
Description: 6020 MET ICPMS, Dissolved
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 248608

B: Analyte was detected in the associated method blank.
- BLANK for HBN 248608 [MPRP/153 (Lab ID: 1469086)
  - Lead, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **EPA 7470**
Description: 7470 Mercury, Dissolved
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 7470. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **EPA 1664A OG**
Description: 1664 HEM, Oil and Grease
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 1664A OG. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 461015

B: Analyte was detected in the associated method blank.
- BLANK for HBN 461015 [WET/5226 (Lab ID: 2521367)
  - Oil and Grease

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 248368

R1: RPD value was outside control limits.
- DUP (Lab ID: 1467692)
  - Total Suspended Solids

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248815

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145548005,40145701001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 1469829)
    - Fluoride

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days,Diss
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 248588

1q: Dissolved analyte or filtered analyte greater than total analyte: analysis passed QC based on precision criteria.

- NORTH POND (Lab ID: 40145645002)
  - Fluoride, Dissolved
- RIVER INLET (Lab ID: 40145645001)
  - Fluoride, Dissolved

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **EPA 420.4**
Description: 420.4 Phenolics, Total
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for EPA 420.4. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 420.4 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Method: **SM 4500-CN-E**
Description: 4500CNE Cyanide, Total
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for SM 4500-CN-E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 465990

B: Analyte was detected in the associated method blank.

- BLANK for HBN 465990 [WETA/437 (Lab ID: 1907600)
  - Cyanide

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Method: **SM 4500-CN-G**
Description: 4500CNG Cyanide, Amenable
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: February 28, 2017

General Information:
3 samples were analyzed for SM 4500-CN-G. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: RIVER INLET **Lab ID: 40145645001** Collected: 02/13/17 08:50 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**15.4**	ng/L	5.0	2.0	10	02/23/17 07:57	02/24/17 09:42	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**2.5**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 08:29	7440-38-2	
Barium	**79.6**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 08:29	7440-39-3	
Boron	**97.0**	ug/L	10.0	2.0	1	02/20/17 08:43	02/21/17 12:36	7440-42-8	
Cadmium	**0.23J**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 08:29	7440-43-9	
Chromium	**7.3**	ug/L	1.0	0.39	1	02/20/17 08:43	02/21/17 08:29	7440-47-3	
Copper	**6.3**	ug/L	1.0	0.26	1	02/20/17 08:43	02/21/17 08:29	7440-50-8	
Iron	**4200**	ug/L	250	10.0	1	02/20/17 08:43	02/21/17 08:29	7439-89-6	
Lead	**4.9**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 08:29	7439-92-1	
Manganese	**113**	ug/L	1.0	0.18	1	02/20/17 08:43	02/21/17 08:29	7439-96-5	
Nickel	**6.0**	ug/L	1.0	0.11	1	02/20/17 08:43	02/21/17 08:29	7440-02-0	
Selenium	**1.2**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 08:29	7782-49-2	
Silver	**0.028J**	ug/L	0.50	0.016	1	02/20/17 08:43	02/21/17 08:29	7440-22-4	
Total Hardness by 2340B	**344**	mg/L	5.0	0.15	1	02/20/17 08:43	02/21/17 08:29		
Zinc	**32.6**	ug/L	10.0	3.1	1	02/20/17 08:43	02/21/17 08:29	7440-66-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**<0.089**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:03	7440-43-9	
Copper, Dissolved	**1.9**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:03	7440-50-8	
Iron, Dissolved	**51.0J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:03	7439-89-6	
Lead, Dissolved	**0.086J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:03	7439-92-1	B
Nickel, Dissolved	**1.8**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:03	7440-02-0	
Zinc, Dissolved	**5.3J**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:03	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/20/17 10:50	02/21/17 11:44	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**<1.0**	mg/L	4.7	1.0	1		02/23/17 09:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**534**	mg/L	20.0	8.7	1		02/16/17 13:26		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**105**	mg/L	7.1	3.4	1		02/15/17 09:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**100**	mg/L	10.0	2.5	5		02/27/17 13:55	16887-00-6	
Fluoride	**0.23J**	mg/L	0.30	0.10	1		02/23/17 19:59	16984-48-8	
Sulfate	**64.7**	mg/L	15.0	5.0	5		02/27/17 13:55	14808-79-8	
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**0.25J**	mg/L	0.30	0.10	1		02/22/17 20:56	16984-48-8	1q

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: RIVER INLET **Lab ID: 40145645001** Collected: 02/13/17 08:50 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**<3.4**	ug/L	10.0	3.4	1	02/17/17 09:00	02/17/17 12:37	108-95-2	
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/20/17 12:44	57-12-5	
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/20/17 13:10	57-12-5	

ANALYTICAL RESULTS

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Sample: NORTH POND **Lab ID: 40145645002** Collected: 02/13/17 10:35 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**6.50**	ng/L	0.50	0.20	1	02/23/17 07:57	02/24/17 11:44	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**1.6**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 08:36	7440-38-2	
Barium	**184**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 08:36	7440-39-3	
Boron	**308**	ug/L	10.0	2.0	1	02/20/17 08:43	02/21/17 12:56	7440-42-8	
Cadmium	**<0.089**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 08:36	7440-43-9	
Chromium	**2.8**	ug/L	1.0	0.39	1	02/20/17 08:43	02/21/17 08:36	7440-47-3	
Copper	**7.0**	ug/L	1.0	0.26	1	02/20/17 08:43	02/21/17 08:36	7440-50-8	
Iron	**1050**	ug/L	250	10.0	1	02/20/17 08:43	02/21/17 08:36	7439-89-6	
Lead	**1.5**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 08:36	7439-92-1	
Manganese	**30.2**	ug/L	1.0	0.18	1	02/20/17 08:43	02/21/17 08:36	7439-96-5	
Nickel	**2.6**	ug/L	1.0	0.11	1	02/20/17 08:43	02/21/17 08:36	7440-02-0	
Selenium	**1.4**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 08:36	7782-49-2	
Silver	**<0.016**	ug/L	0.50	0.016	1	02/20/17 08:43	02/21/17 08:36	7440-22-4	
Total Hardness by 2340B	**340**	mg/L	5.0	0.15	1	02/20/17 08:43	02/21/17 08:36		
Zinc	**10.0**	ug/L	10.0	3.1	1	02/20/17 08:43	02/21/17 08:36	7440-66-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**<0.089**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:23	7440-43-9	
Copper, Dissolved	**4.5**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:23	7440-50-8	
Iron, Dissolved	**21.0J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:23	7439-89-6	
Lead, Dissolved	**0.070J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:23	7439-92-1	B
Nickel, Dissolved	**1.5**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:23	7440-02-0	
Zinc, Dissolved	**3.1J**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:23	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/20/17 10:50	02/21/17 11:47	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**1.3J**	mg/L	4.7	1.0	1		02/23/17 09:18		B
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**540**	mg/L	20.0	8.7	1		02/16/17 13:27		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**22.3**	mg/L	2.9	1.4	1		02/15/17 09:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**113**	mg/L	10.0	2.5	5		02/27/17 14:07	16887-00-6	
Fluoride	**0.26J**	mg/L	0.30	0.10	1		02/23/17 20:11	16984-48-8	
Sulfate	**79.0**	mg/L	15.0	5.0	5		02/27/17 14:07	14808-79-8	
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**0.27J**	mg/L	0.30	0.10	1		02/22/17 21:08	16984-48-8	1q

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: NORTH POND **Lab ID: 40145645002** Collected: 02/13/17 10:35 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**<3.4**	ug/L	10.0	3.4	1	02/17/17 09:00	02/17/17 12:37	108-95-2	
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**0.0017J**	mg/L	0.0050	0.0016	1		02/20/17 12:44	57-12-5	B
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/20/17 13:10	57-12-5	

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: ASH POND OUTFALL STRUCTURE **Lab ID: 40145645003** Collected: 02/13/17 12:24 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**2.46**	ng/L	0.50	0.20	1	02/23/17 07:57	02/24/17 11:51	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**2.2**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 08:43	7440-38-2	
Barium	**148**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 08:43	7440-39-3	
Boron	**355**	ug/L	10.0	2.0	1	02/20/17 08:43	02/21/17 13:03	7440-42-8	
Cadmium	**0.23J**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 08:43	7440-43-9	
Chromium	**1.8**	ug/L	1.0	0.39	1	02/20/17 08:43	02/21/17 08:43	7440-47-3	
Copper	**3.3**	ug/L	1.0	0.26	1	02/20/17 08:43	02/21/17 08:43	7440-50-8	
Iron	**220J**	ug/L	250	10.0	1	02/20/17 08:43	02/21/17 08:43	7439-89-6	
Lead	**0.53J**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 08:43	7439-92-1	
Manganese	**11.4**	ug/L	1.0	0.18	1	02/20/17 08:43	02/21/17 08:43	7439-96-5	
Nickel	**2.1**	ug/L	1.0	0.11	1	02/20/17 08:43	02/21/17 08:43	7440-02-0	
Selenium	**1.2**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 08:43	7782-49-2	
Silver	**<0.016**	ug/L	0.50	0.016	1	02/20/17 08:43	02/21/17 08:43	7440-22-4	
Total Hardness by 2340B	**317**	mg/L	5.0	0.15	1	02/20/17 08:43	02/21/17 08:43		
Zinc	**4.1J**	ug/L	10.0	3.1	1	02/20/17 08:43	02/21/17 08:43	7440-66-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**0.17J**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:30	7440-43-9	
Copper, Dissolved	**2.5**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:30	7440-50-8	
Iron, Dissolved	**11.0J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:30	7439-89-6	
Lead, Dissolved	**0.057J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:30	7439-92-1	B
Nickel, Dissolved	**1.6**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:30	7440-02-0	
Zinc, Dissolved	**<3.1**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:30	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/20/17 10:50	02/21/17 11:49	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**<1.1**	mg/L	4.7	1.1	1		02/23/17 09:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**494**	mg/L	20.0	8.7	1		02/16/17 13:28		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**7.0**	mg/L	2.0	0.95	1		02/15/17 09:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**92.5**	mg/L	10.0	2.5	5		02/27/17 14:19	16887-00-6	
Fluoride	**0.27J**	mg/L	0.30	0.10	1		02/23/17 20:23	16984-48-8	
Sulfate	**77.2**	mg/L	15.0	5.0	5		02/27/17 14:19	14808-79-8	

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: ASH POND OUTFALL STRUCTURE **Lab ID: 40145645003** Collected: 02/13/17 12:24 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**0.27J**	mg/L	0.30	0.10	1		02/22/17 21:20	16984-48-8	
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**<3.4**	ug/L	10.0	3.4	1	02/17/17 09:00	02/17/17 12:37	108-95-2	
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/20/17 12:45	57-12-5	
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/20/17 13:11	57-12-5	

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: RIVER INLET BLANK **Lab ID: 40145645004** Collected: 02/13/17 09:10 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/23/17 07:57	02/24/17 09:35	7439-97-6	

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: NORTH POND BLANK **Lab ID: 40145645005** Collected: 02/13/17 10:45 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/23/17 07:57	02/24/17 09:48	7439-97-6	

ANALYTICAL RESULTS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Sample: ASH POND OUTFALL STRUCTURE BLA **Lab ID: 40145645006** Collected: 02/13/17 12:37 Received: 02/14/17 09:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/23/17 07:57	02/24/17 10:01	7439-97-6	

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248943
Analysis Method: EPA 1631E
QC Batch Method: EPA 1631E
Analysis Description: 1631E Mercury
Associated Lab Samples: 40145645001, 40145645002, 40145645003, 40145645004, 40145645005, 40145645006

METHOD BLANK: 1470469
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003, 40145645004, 40145645005, 40145645006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/24/17 09:23	

METHOD BLANK: 1470470
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003, 40145645004, 40145645005, 40145645006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/24/17 10:46	

METHOD BLANK: 1470471
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003, 40145645004, 40145645005, 40145645006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/24/17 11:58	

METHOD BLANK: 1470472
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003, 40145645004, 40145645005, 40145645006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.21	0.53	0.21	02/24/17 09:29	

LABORATORY CONTROL SAMPLE & LCSD: 1470473 1470474

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Mercury	ng/L	5	4.91	5.16	98	103	79-121	5	21	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471204 1471205

Parameter	Units	40145645001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ng/L	15.4	20	20	33.1	33.6	88	91	75-125	1	24	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471206 1471207

Parameter	Units	2050282001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ng/L	0.729	2	2	2.44	2.44	86	85	75-125	0	24	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248634
Analysis Method: EPA 7470
QC Batch Method: EPA 7470
Analysis Description: 7470 Mercury Dissolved
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1469189
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	<0.13	0.42	0.13	02/21/17 11:07	

LABORATORY CONTROL SAMPLE: 1469190

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	5	5.1	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469191 1469192

Parameter	Units	40145646009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	<0.13	5	5	4.6	4.6	93	92	85-115	1	20	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248613
Analysis Method: EPA 6020
QC Batch Method: EPA 3010
Analysis Description: 6020 MET
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1469105
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.099	1.0	0.099	02/21/17 06:48	
Barium	ug/L	<0.062	1.0	0.062	02/21/17 06:48	
Boron	ug/L	<2.0	10.0	2.0	02/21/17 11:35	
Cadmium	ug/L	<0.089	1.0	0.089	02/21/17 06:48	
Chromium	ug/L	<0.39	1.0	0.39	02/21/17 06:48	
Copper	ug/L	<0.26	1.0	0.26	02/21/17 06:48	
Iron	ug/L	<10.0	250	10.0	02/21/17 06:48	
Lead	ug/L	<0.040	1.0	0.040	02/21/17 06:48	
Manganese	ug/L	<0.18	1.0	0.18	02/21/17 06:48	
Nickel	ug/L	<0.11	1.0	0.11	02/21/17 06:48	
Selenium	ug/L	<0.21	1.0	0.21	02/21/17 06:48	
Silver	ug/L	<0.016	0.50	0.016	02/21/17 06:48	
Total Hardness by 2340B	mg/L	<0.15	5.0	0.15	02/21/17 06:48	
Zinc	ug/L	<3.1	10.0	3.1	02/21/17 06:48	

LABORATORY CONTROL SAMPLE: 1469106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	500	516	103	80-120	
Barium	ug/L	500	507	101	80-120	
Boron	ug/L	500	526	105	80-120	
Cadmium	ug/L	500	528	106	80-120	
Chromium	ug/L	500	510	102	80-120	
Copper	ug/L	500	519	104	80-120	
Iron	ug/L	5000	5010	100	80-120	
Lead	ug/L	500	508	102	80-120	
Manganese	ug/L	500	509	102	80-120	
Nickel	ug/L	500	499	100	80-120	
Selenium	ug/L	500	554	111	80-120	
Silver	ug/L	250	263	105	80-120	
Total Hardness by 2340B	mg/L		35.2			
Zinc	ug/L	500	536	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469107 1469108

Parameter	Units	40145755001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	15.2	500	500	541	536	105	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469107 1469108

Parameter	Units	40145755001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	80.2	500	500	605	610	105	106	75-125	1	20	
Boron	ug/L	4530	500	500	5090	4960	112	85	75-125	3	20	
Cadmium	ug/L	0.28J	500	500	525	521	105	104	75-125	1	20	
Chromium	ug/L	2.3	500	500	515	508	102	101	75-125	1	20	
Copper	ug/L	2.1	500	500	506	501	101	100	75-125	1	20	
Iron	ug/L	253	5000	5000	5200	5200	99	99	75-125	0	20	
Lead	ug/L	1.6	500	500	507	497	101	99	75-125	2	20	
Manganese	ug/L	6.4	500	500	514	505	101	100	75-125	2	20	
Nickel	ug/L	2.7	500	500	491	486	98	97	75-125	1	20	
Selenium	ug/L	22.5	500	500	575	572	111	110	75-125	1	20	
Silver	ug/L	<0.16	250	250	257	255	103	102	75-125	1	20	
Total Hardness by 2340B	mg/L	156			202	190				6	20	
Zinc	ug/L	7.6J	500	500	541	535	107	105	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248608
Analysis Method: EPA 6020
QC Batch Method: EPA 3010
Analysis Description: 6020 MET Dissolved
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1469086
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium, Dissolved	ug/L	<0.089	1.0	0.089	02/21/17 01:40	
Copper, Dissolved	ug/L	<0.26	1.0	0.26	02/21/17 01:40	
Iron, Dissolved	ug/L	<10.0	250	10.0	02/21/17 01:40	
Lead, Dissolved	ug/L	0.093J	1.0	0.040	02/21/17 01:40	
Nickel, Dissolved	ug/L	<0.11	1.0	0.11	02/21/17 01:40	
Zinc, Dissolved	ug/L	<3.1	10.0	3.1	02/21/17 01:40	

LABORATORY CONTROL SAMPLE: 1469087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium, Dissolved	ug/L	500	532	106	80-120	
Copper, Dissolved	ug/L	500	524	105	80-120	
Iron, Dissolved	ug/L	5000	5100	102	80-120	
Lead, Dissolved	ug/L	500	500	100	80-120	
Nickel, Dissolved	ug/L	500	507	101	80-120	
Zinc, Dissolved	ug/L	500	547	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469088 1469089

Parameter	Units	40145510001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium, Dissolved	ug/L	<1.0	500	500	504	512	101	102	75-125	2	20	
Copper, Dissolved	ug/L	<1.0	500	500	489	492	98	98	75-125	0	20	
Iron, Dissolved	ug/L	1280	5000	5000	6080	6140	96	97	75-125	1	20	
Lead, Dissolved	ug/L	<1.0	500	500	485	491	97	98	75-125	1	20	
Nickel, Dissolved	ug/L	<1.0	500	500	470	472	94	94	75-125	0	20	
Zinc, Dissolved	ug/L	<10.0	500	500	536	540	106	107	75-125	1	20	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 461015
Analysis Method: EPA 1664A OG
QC Batch Method: EPA 1664A OG
Analysis Description: 1664 HEM, Oil and Grease
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 2521367
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Oil and Grease	mg/L	1.7J	5.0	1.1	02/22/17 14:36	

LABORATORY CONTROL SAMPLE: 2521368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	40	31.8	80	78-114	

MATRIX SPIKE SAMPLE: 2521369

Parameter	Units	10379005001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	ND	41.7	34.9	79	78-114	

SAMPLE DUPLICATE: 2521370

Parameter	Units	10378782001 Result	Dup Result	RPD	Max RPD	Qualifiers
Oil and Grease	mg/L	ND	7.9		18	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248493
Analysis Method: SM 2540C
QC Batch Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1468342
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	8.7	02/16/17 13:12	

LABORATORY CONTROL SAMPLE: 1468343

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	586	580	99	80-120	

SAMPLE DUPLICATE: 1468344

Parameter	Units	40145595001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	7220	7080	2	5	

SAMPLE DUPLICATE: 1468345

Parameter	Units	40145645001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	534	536	0	5	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248368
QC Batch Method: SM 2540D
Analysis Method: SM 2540D
Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1467690
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<0.48	1.0	0.48	02/15/17 09:42	

LABORATORY CONTROL SAMPLE: 1467691

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94.0	94	80-120	

SAMPLE DUPLICATE: 1467692

Parameter	Units	40145586001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	17.2	18.4	7	5	R1

SAMPLE DUPLICATE: 1467693

Parameter	Units	40145608001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	17.6	18.4	4	5	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248588
Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0
Analysis Description: 300.0 IC Anions,Dissolved
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1468930
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.30	0.10	02/22/17 12:39	

LABORATORY CONTROL SAMPLE: 1468931

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2	1.9	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468934 1468935

Parameter	Units	40145704008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	<0.50	10	10	10	10.7	100	107	90-110	7	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469275 1469276

Parameter	Units	40145780001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.28J	2	2	2.3	2.5	100	109	90-110	7	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 248815
Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1469824
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	0.50	02/23/17 10:45	
Fluoride	mg/L	<0.10	0.30	0.10	02/23/17 10:45	
Sulfate	mg/L	<1.0	3.0	1.0	02/23/17 10:45	

LABORATORY CONTROL SAMPLE: 1469825

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.7	98	90-110	
Fluoride	mg/L	2	2.0	98	90-110	
Sulfate	mg/L	20	19.6	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469826 1469827

Parameter	Units	40145548005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.3	20	20	26.1	26.3	109	110	90-110	1	15	
Fluoride	mg/L	1.3	2	2	3.5	3.5	108	109	90-110	0	15	
Sulfate	mg/L	41.7	100	100	146	141	105	99	90-110	4	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469828 1469829

Parameter	Units	40145701001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.5J	20	20	22.6	22.9	106	107	90-110	1	15	
Fluoride	mg/L	<0.10	2	2	2.2	2.2	109	112	90-110	2	15	M0
Sulfate	mg/L	7.0	20	20	28.6	29.0	108	110	90-110	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 460541
Analysis Method: EPA 420.4
QC Batch Method: EPA 420.4
Analysis Description: 420.4 Phenolics
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 2518696
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phenol	ug/L	4.7J	10.0	3.4	02/17/17 13:15	

LABORATORY CONTROL SAMPLE: 2518697

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenol	ug/L	250	250	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2518698 2518699

Parameter	Units	10378912001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phenol	ug/L	12.5	250	250	246	256	94	97	90-110	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 465990
QC Batch Method: SM 4500-CN-E
Analysis Method: SM 4500-CN-E
Analysis Description: 4500CNE Cyanide, Total
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1907600
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cyanide	mg/L	0.0017J	0.0050	0.0016	02/20/17 12:41	

LABORATORY CONTROL SAMPLE: 1907601

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	.1	0.099	99	69-126	

MATRIX SPIKE SAMPLE: 1907602

Parameter	Units	60238073002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	ND	.1	0.074	72	61-126	

SAMPLE DUPLICATE: 1907603

Parameter	Units	60238098001 Result	Dup Result	RPD	Max RPD	Qualifiers
Cyanide	mg/L	0.0061	0.0030J		46	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

QC Batch: 465991
Analysis Method: SM 4500-CN-G
QC Batch Method: SM 4500-CN-G
Analysis Description: 4500CNG Cyanide, Amenable
Associated Lab Samples: 40145645001, 40145645002, 40145645003

METHOD BLANK: 1907604
Matrix: Water
Associated Lab Samples: 40145645001, 40145645002, 40145645003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Amenable Cyanide	mg/L	0.0016J	0.0050	0.0016	02/20/17 13:09	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City
PASI-M	Pace Analytical Services - Minneapolis

BATCH QUALIFIERS

Batch: 461015

[BE]	Batch extracted by solid phase extraction (SPE).

ANALYTE QUALIFIERS

1q	Dissolved analyte or filtered analyte greater than total analyte: analysis passed QC based on precision criteria.
B	Analyte was detected in the associated method blank.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R1	RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.: 40145645

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145645001	**RIVER INLET**	EPA 1631E	248943	EPA 1631E	249040
40145645002	**NORTH POND**	EPA 1631E	248943	EPA 1631E	249040
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 1631E	248943	EPA 1631E	249040
40145645004	**RIVER INLET BLANK**	EPA 1631E	248943	EPA 1631E	249040
40145645005	**NORTH POND BLANK**	EPA 1631E	248943	EPA 1631E	249040
40145645006	**ASH POND OUTFALL STRUCTURE BLA**	EPA 1631E	248943	EPA 1631E	249040
40145645001	**RIVER INLET**	EPA 3010	248613	EPA 6020	248681
40145645002	**NORTH POND**	EPA 3010	248613	EPA 6020	248681
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 3010	248613	EPA 6020	248681
40145645001	**RIVER INLET**	EPA 3010	248608	EPA 6020	248680
40145645002	**NORTH POND**	EPA 3010	248608	EPA 6020	248680
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 3010	248608	EPA 6020	248680
40145645001	**RIVER INLET**	EPA 7470	248634	EPA 7470	248664
40145645002	**NORTH POND**	EPA 7470	248634	EPA 7470	248664
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 7470	248634	EPA 7470	248664
40145645001	**RIVER INLET**	EPA 1664A OG	461015		
40145645002	**NORTH POND**	EPA 1664A OG	461015		
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 1664A OG	461015		
40145645001	**RIVER INLET**	SM 2540C	248493		
40145645002	**NORTH POND**	SM 2540C	248493		
40145645003	**ASH POND OUTFALL STRUCTURE**	SM 2540C	248493		
40145645001	**RIVER INLET**	SM 2540D	248368		
40145645002	**NORTH POND**	SM 2540D	248368		
40145645003	**ASH POND OUTFALL STRUCTURE**	SM 2540D	248368		
40145645001	**RIVER INLET**	EPA 300.0	248815		
40145645002	**NORTH POND**	EPA 300.0	248815		
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 300.0	248815		
40145645001	**RIVER INLET**	EPA 300.0	248588		
40145645002	**NORTH POND**	EPA 300.0	248588		
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 300.0	248588		
40145645001	**RIVER INLET**	EPA 420.4	460541	EPA 420.4	460583
40145645002	**NORTH POND**	EPA 420.4	460541	EPA 420.4	460583
40145645003	**ASH POND OUTFALL STRUCTURE**	EPA 420.4	460541	EPA 420.4	460583
40145645001	**RIVER INLET**	SM 4500-CN-E	465990		
40145645002	**NORTH POND**	SM 4500-CN-E	465990		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:	17D005.00 DYNERGY-EDWARDS ANTI
Pace Project No.:	40145645

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145645003	**ASH POND OUTFALL STRUCTURE**	SM 4500-CN-E	465990		
40145645001	**RIVER INLET**	SM 4500-CN-G	465991		
40145645002	**NORTH POND**	SM 4500-CN-G	465991		
40145645003	**ASH POND OUTFALL STRUCTURE**	SM 4500-CN-G	465991		

Pace Analytical™
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

40145045

Page: 01 of 01

Section A **Required** Client Information:	**Section B** **Required** Project Information:	**Section C** Invoice Information:
Company: Foth Infrastructure and Environment, LLC	Report To: Mark A. Williams	Attention:
Address: 2314 W Altorfer Dr.	Copy To: Josh Gabehart	Company Name: Foth Infrastructure and Environment, LLC
Peoria, IL 6165		Address:
Email To: mark.williams@foth.com	Purchase Order No.:	Pace Quote Reference: 34036
Phone: 309 683 1681 Fax:	Dynegy- Edwards Antidegradation Study	Pace Project Manager: Tod Noltemeyer
Requested Due Date/TAT: Routine	Project Number: 17D005.00	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER________

SITE LOCATION: ☐ GA ☑ IL ☐ IN ☐ MI ☐ IC ☐ OH ☐ SC ☐ WI ☐ OTHER____

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Flouride Dissolved	TDS, TSS	Total Phenolics	Inorganic Total Analysis	Metals, Total Analysis	Metals, Diss Analysis	Oil and Grease	Hardness	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
	Filtered (Y/N)																	Y					Y				
1	River Inlet 001	WT	G			2/13/17	08.50	5.8 c		7	2	2		1				x	x	x	x	x	x	x	x		See additional sheet mm 2/14/17
2	North Pond 002	"	G			"	10:35	8.0 c		7	2	2		1				x	x	x	x	x	x	x	x		
3	Ash Pond Outfall Structure 003	"	G			"	12:24	6.9 c		7	2	2		1				x	x	x	x	x	x	x	x		
4	004 River inlet blank ①					2/13	0910AM																				
5	005 North Pond blank					2/13	1045																				
6	006 Ash Pond outfall Struc. blank					2/13	1237																				
7																											
8	①added by lab because																										
9	in shipment Kf 2/14/17																										
10																											
11																											
12																											

Additional Comments:

Inorganic Total Analysis: Cl, CN, F, Sulfate

Total Metal Analysis: As, Ba, B, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn

Dissolved Metal Analysis: Cd, Cu, Fe, Pb, Hg, Ni, Zn

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
M A Williams / Foth	2/13/17	14:35					Y/N	Y/N	Y/N
FedEx	2/14	0925	Mai McKay Pace	2/14	0925	4/1	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Marc Williams John Wisher

SIGNATURE of SAMPLER: M A Williams

DATE Signed (MM / DD / YY): 02/17/17

Sample Condition Upon Receipt

Client Name: Foth Project # 40145045

Additional Comments/Resolution:

001- 1-1Lag^{B}, 1-1Lp^{A}, 7-250mlp^{AAAADDG}, 1-125mlq^{C}, 1-250mlq^{A}

002-

003- ↓ ↓ ↓ ↓ ↓

004- 1-250mlq, ~~002~~ 005 MM21417 -1-250mlq 006-1-250mlq^{A}

001- time 918am, 9:15am, 8:15am + 9:28am + 9:30am
9:27am, 8:20am + 9:40am, 9:17am, 9:05
LL mercury blank time 9:10am

002-time 10:53, 11:00, 10:34 + 11:10 + 11:06 +
10:34 + 11:12 + 10:52, 10:50, 10:44, LL mercury
blank 10:45

003-time 12:55, 12:42, 12:49 + 12:25 + 12:39
12:48 + 12:25 + 12:40, 12;32, 12:32,
LL mercury blank 12:37

MM 2/14/17

Project Manager Review: ____________________ **Date:** ____________

Table 1
Antidegradataion Study Parameters, Analytical Methods, and Detection Limits

Parameter	Analytical Method	Standard (IAC 302.208)	Standard (35 IAC 304) (as Discussed with Dynegy)	Limit of Detection
Ammonia NH3	SM 4500 NH3	1.3 mg/l	No est. Stand.	0.25 mg/l
Arsenic, total	EPA 6020	No est. Stand.	0.25 mg/l	0.05 mg/l
Arsenic, Trivalent dissolved		190 ug/l	No est. Stand.	0.0669 ug/l
Barium, total	EPA 6020	5.0 mg/l	2.0 mg/l	0.5 mg/l
Boron, total	EPA 6020	7.6 mg/l	No est. Stand.	0.1 mg/l
Cadmium, total	EPA 6020	No est. Stand.	0.15 mg/l	0.001 mg/l
Cadmium, dissolved	EPA 6020	1.4 ug/l	No est. Stand.	0.089 ug/l
Chromium (Hex)	SM 3500 Cr-B	11 ug/l	0.1 mg/l (monthly ave) 0.3 mg/l (daily comp) 1.0 mg/l (daily grab)	0.01 mg/l
Chromium, total	EPA 6020	No est Stand.	1.0 mg/l	0.05 mg/l
Chromium, Trivalent dissolved		248 ug/l	No est. Stand.	0.231 ug/l
Chloride[5], total	EPA 300.0	500 mg/l	No est. Stand.	0.1 mg/l
Copper, total	EPA 6020	No est. Stand.	0.5 mg/l	0.005 mg/l
Copper, dissolved	EPA 6020	16 ug/l	No est. Stand.	1.0 ug/l
Cyanide[1], total	SM 4500-CN-G	5.2 ug/l	0.10 mg/l	5.0 ug/l
Fluoride, total	EPA 300.00	No est. Stand.	15 mg/l	0.1 mg/l
Fluoride, dissolved	EPA 300.00	1.4 mg/l	No est. Stand.	0.1 mg/l
Iron, total	EPA 6020	No est. Stand.	2.0 mg/l	0.5 mg/l
Iron, dissolved	EPA 6020	1.0 mg/l	No est. Stand.	0.25 mg/l
Lead, total	EPA 6020	No est. Stand.	0.2 mg/l	1.0 ug/l
Lead, dissolved	EPA 6020	25 ug/l	No est. Stand.	1.0 ug/l
Manganese, total	EPA 6020	1.0 mg/l	1.0 mg/l	0.5 mg/l
Mercury[2], total	EPA 1631E	No est. Stand.	0.5 ug/l	0.5 ng/l
Mercury[2], dissolved	EPA 7470	1.1 ug/l	No est. Stand.	0.179 ug/l
Nickel, total	EPA 6020	No est. Stand.	1.0 mg/l	0.005 mg/l
Nickel, dissolved	EPA 6020	7.0 ug/l	No est. Stand.	1.0 ug/l
Nitrogen (as total Kjeldahl N plus nitrate/nitrite	EPA 351.2 (water only)	No est. Stand.	No est. Stand.	0.5 mg/l

C:\Users\tnoltemeyer\Documents\GroupWise\Table 1.docx

O&G	EPA 1664A	No est. Stand.	15 mg/l	3.0 mg/l
pH	Field	6.5 to 9	6 to 9	
Phenols	EPA 420.1/420.2	0.1 mg/l	0.3 mg/l	0.005 mg/l
Selenium	EPA 6020	1.0 mg/l	No est. Stand.	0.005 mg/l
Sulfate[3,5]	EPA 300.00	500 mg/l	1284.3 mg/l	0.01 mg/l
Silver	EPA 6020	5.0 ug/l	0.1 mg/l	0.003 mg/l
TDS	SM 2450D	1000 mg/l	No est. Stand.	20 mg/l
TSS[5]	SM 2540D	No est. Stand.	15 mg/l	1.5 mg/l
Zinc, total	EPA 6020	No est. Stand.	1.0 mg/l	0.025 mg/l
Zinc, dissolved	EPA 6020	30 ug/l	No est. Stand.	3.053 ug/l
Hardness[4]	EPA 130.0	No est. Stand.	No est. Stand.	

Notes:

1 35 Ill. Adm. Code 302.510: Method of OIA-1677, DW: Available Cyanide by Flow injection, Ligand Exchange, and Amperometry, January 2004, Document Number EPA-821-R-04-001 or Cyanide Amenable to Chlorination, Standard Methods 4500-CN-G (40 CFR 136.3).

2 Human health standards apply

3 Sulfate Limit = [1,276.7 + 5.508 (hardness)-1.457(chloride)] *0.65 = 1,281.261 (when Chloride >25and <500 Hardness>100 and <500).

4 The hardness analytical test was added to Table 1 as the hardness concentration is required to determine the Total Sulfate limit.

5 The lowest limit of detection that the analytical laboratory is able to achieve for the parameters Chloride, Sulfate and TSS is above the value listed in the Limit of Detection Column as provided by Dynegy.

6 All samples are grab samples. For Chromium (Hex), the results of the grab sample will be evaluated against the daily grab limit of 1 mg/l.

7 For the parameters listed from IAC 302.208 the most stringent value between acute and chronic is listed.

8 Samples for dissolved analysis will be filtered by the environmental laboratory.

Sample Condition Upon Receipt

Pace Analytical™

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #: **WO#: 40145645**
40145645

Client Name: Foth

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other:
Tracking #: 7855 9602 8402

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no
Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no
Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other
Thermometer Used SR-66 **Type of Ice:** [✓ Wet] Blue Dry None ☑ Samples on ice, cooling process has begun
Cooler Temperature Uncorr: 3/0 /Corr: 4/1 **Biological Tissue is Frozen:** ☐ yes ☐ no
Temp Blank Present: ☑ yes ☐ no

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

Person examining contents:
Date: 2.14.17
Initials: MM

				Comments:
Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out: 2/14/17 KF	~~☐Yes~~	[✓ ☑No]	☐N/A	2. 004-006 added by lab KF 2/14/17
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9. LLHg volume received for all sample points KF 2/14/17
-Pace Containers Used:	☑Yes	☐No	☐N/A	
-Pace IR Containers Used:	☐Yes	☐No	☑N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☑Yes	☐No	☐N/A	11.
Sample Labels match COC:	☐Yes	☑No	☐N/A	12. Collect time different on all sample points mm 21417
-Includes date/time/ID/Analysis Matrix: WS				
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☑Yes	☐No	☐N/A	13. ☑ HNO3 ☐ H2SO4 ☑ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☑Yes	☐No	☐N/A	
exceptions: VOA, ~~coliform~~, TOC, TOX, TOH, [✓ O&G, WIDROW, Phenolics,] OTHER:	☑Yes	☐No		Initial when completed MM / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☐N/A	14.
Trip Blank Present:	☐Yes	☐No	☐N/A	15.
Trip Blank Custody Seals Present	☐Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution: If checked, see attached form for additional comments ☑
Person Contacted: Date/Time:
Comments/ Resolution: 2nd cooler 7855 9602 8413 mm 21417

Project Manager Review: AMH for TN **Date:** 2/14/17

F-GB-C-031-Rev.03 (9April2015) SCUR Form

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

March 02, 2017

Josh Gabehart
Foth Infrastructure & Environment
2314 West Altorfer Drive
Peoria, IL 61615

RE: Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Dear Josh Gabehart:

Enclosed are the analytical results for sample(s) received by the laboratory on February 16, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tod Noltemeyer

Tod Noltemeyer
tod.noltemeyer@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: Mark Williams, Foth Infrastructure & Environment LLC

CERTIFICATIONS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

SAMPLE SUMMARY

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40145726001	**RIVER INLET**	Water	02/15/17 14:24	02/16/17 09:05
40145726002	**NORTH POND**	Water	02/15/17 14:04	02/16/17 09:05
40145726003	**ASH POND OUTFALL STRUCTURE**	Water	02/15/17 13:21	02/16/17 09:05
40145726004	**TEST PIT 1**	Water	02/15/17 13:42	02/16/17 09:05
40145726005	**TEST PIT 2**	Water	02/15/17 12:23	02/16/17 09:05
40145726006	**TEST PIT 3**	Water	02/15/17 13:00	02/16/17 09:05

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145726001	**RIVER INLET**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40145726002	**NORTH POND**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40145726003	**ASH POND OUTFALL STRUCTURE**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40145726004	**TEST PIT 1**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40145726005	**TEST PIT 2**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40145726006	**TEST PIT 3**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Method: **Pace SOP**
Description: LC-ICPMS Speciated Arsenic
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 460553

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- ASH POND OUTFALL STRUCTURE (Lab ID: 40145726003)
  - Arsenic III
- BLANK (Lab ID: 2518722)
  - Arsenic III
- LCS (Lab ID: 2518723)
  - Arsenic III
- MS (Lab ID: 2518725)
  - Arsenic III
- MSD (Lab ID: 2518726)
  - Arsenic III
- NORTH POND (Lab ID: 40145726002)
  - Arsenic III
- RIVER INLET (Lab ID: 40145726001)
  - Arsenic III

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Method: **Pace SOP**
Description: LC-ICPMS Speciated Arsenic
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

Analyte Comments:

QC Batch: 460553

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- TEST PIT 1 (Lab ID: 40145726004)
    - Arsenic III
- TEST PIT 2 (Lab ID: 40145726005)
    - Arsenic III
- TEST PIT 3 (Lab ID: 40145726006)
    - Arsenic III

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 460474

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- ASH POND OUTFALL STRUCTURE (Lab ID: 40145726003)
  - Chromium, Trivalent
- BLANK (Lab ID: 2518322)
  - Chromium, Trivalent
- LCS (Lab ID: 2518323)
  - Chromium, Trivalent
- MS (Lab ID: 2518325)
  - Chromium, Trivalent
- MSD (Lab ID: 2518326)
  - Chromium, Trivalent
- NORTH POND (Lab ID: 40145726002)
  - Chromium, Trivalent
- RIVER INLET (Lab ID: 40145726001)
  - Chromium, Trivalent

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

Analyte Comments:

QC Batch: 460474

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- TEST PIT 1 (Lab ID: 40145726004)
  - Chromium, Trivalent
- TEST PIT 2 (Lab ID: 40145726005)
  - Chromium, Trivalent
- TEST PIT 3 (Lab ID: 40145726006)
  - Chromium, Trivalent

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

Method: **SM 3500-Cr B (Online)**
Description: Chromium, Hexavalent
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for SM 3500-Cr B (Online). All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 248490

1q: Analyte was detected in the associated method blank at a concentration of -0.0056mg/L.

- ASH POND OUTFALL STRUCTURE (Lab ID: 40145726003)
  - Chromium, Hexavalent
- NORTH POND (Lab ID: 40145726002)
  - Chromium, Hexavalent
- RIVER INLET (Lab ID: 40145726001)
  - Chromium, Hexavalent
- TEST PIT 1 (Lab ID: 40145726004)
  - Chromium, Hexavalent
- TEST PIT 2 (Lab ID: 40145726005)
  - Chromium, Hexavalent
- TEST PIT 3 (Lab ID: 40145726006)
  - Chromium, Hexavalent

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- NORTH POND (Lab ID: 40145726002)
  - Chromium, Hexavalent
- RIVER INLET (Lab ID: 40145726001)
  - Chromium, Hexavalent

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

Method: **TKN+NO3+NO2 Calculation**
Description: Total Nitrogen Calculation
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for TKN+NO3+NO2 Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

Method: **EPA 350.1**
Description: 350.1 Ammonia, Distilled
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 350.1 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248944

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145660001,40145742002

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 1470484)
  - Nitrogen, Ammonia

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Method: **EPA 351.2**
Description: 351.2 Total Kjeldahl Nitrogen
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for EPA 351.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 351.2 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 248746

2q: Analyte was detected in the associated method blank at a concentration of -0.27 mg/L.

- ASH POND OUTFALL STRUCTURE (Lab ID: 40145726003)
  - Nitrogen, Kjeldahl, Total
- NORTH POND (Lab ID: 40145726002)
  - Nitrogen, Kjeldahl, Total
- RIVER INLET (Lab ID: 40145726001)
  - Nitrogen, Kjeldahl, Total
- TEST PIT 1 (Lab ID: 40145726004)
  - Nitrogen, Kjeldahl, Total
- TEST PIT 2 (Lab ID: 40145726005)
  - Nitrogen, Kjeldahl, Total

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3 pres.
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 02, 2017

General Information:
6 samples were analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248650

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145726004,40145814001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 1469274)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: RIVER INLET **Lab ID: 40145726001** Collected: 02/15/17 14:24 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**<0.067**	ug/L	0.20	0.067	1		02/17/17 16:25		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 17:26		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.013**	mg/L	0.043	0.013	2.5		02/16/17 10:30		1q,D3
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**5.0**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.50**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:44	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.97**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:02	7727-37-9	2q
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.0**	mg/L	0.25	0.095	1		02/21/17 10:15		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: NORTH POND **Lab ID: 40145726002** Collected: 02/15/17 14:04 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**<0.067**	ug/L	0.20	0.067	1		02/17/17 17:51		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 17:45		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.013**	mg/L	0.043	0.013	2.5		02/16/17 10:30		1q,D3
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**5.3**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.30J**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:45	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.79**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:03	7727-37-9	2q
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.5**	mg/L	0.25	0.095	1		02/21/17 10:16		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: ASH POND OUTFALL STRUCTURE **Lab ID: 40145726003** Collected: 02/15/17 13:21 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**<0.067**	ug/L	0.20	0.067	1		02/17/17 18:13		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 17:49		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		02/16/17 10:30		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**4.7**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**<0.25**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:46	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.59J**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:04	7727-37-9	2q
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**4.1**	mg/L	0.25	0.095	1		02/21/17 10:17		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: TEST PIT 1 **Lab ID: 40145726004** Collected: 02/15/17 13:42 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**<0.067**	ug/L	0.20	0.067	1		02/17/17 18:35		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 17:54		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		02/16/17 10:30		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**0.81**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.55**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:49	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.62J**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:05	7727-37-9	2q
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.19J**	mg/L	0.25	0.095	1		02/21/17 10:18		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: TEST PIT 2 **Lab ID: 40145726005** Collected: 02/15/17 12:23 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**0.92**	ug/L	0.20	0.067	1		02/17/17 18:56		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 17:59		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**0.0097J**	mg/L	0.017	0.0051	1		02/16/17 10:30		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**2.5**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.28J**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:50	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.47J**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:05	7727-37-9	2q
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**2.0**	mg/L	0.25	0.095	1		02/21/17 10:21		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Sample: TEST PIT 3 **Lab ID: 40145726006** Collected: 02/15/17 13:00 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**0.14J**	ug/L	0.20	0.067	1		02/17/17 20:01		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		02/16/17 18:12		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		02/16/17 10:30		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**6.0**	mg/L	0.73	0.22	1		03/02/17 06:27	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**4.3**	mg/L	0.50	0.25	1	02/23/17 14:59	02/23/17 16:51	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**5.2**	mg/L	0.73	0.22	1	02/21/17 13:28	02/21/17 18:06	7727-37-9	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.80**	mg/L	0.25	0.095	1		02/21/17 10:22		

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 460553
Analysis Method: Pace SOP
QC Batch Method: Pace SOP
Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 2518722
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic III	ug/L	<0.067	0.20	0.067	02/17/17 15:42	N2

LABORATORY CONTROL SAMPLE: 2518723

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic III	ug/L	10	9.7	97	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2518725 2518726

Parameter	Units	40145726001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic III	ug/L	<0.067	10	10	9.7	10	97	99	75-125	2	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 460474
Analysis Method: Pace SOP
QC Batch Method: Pace SOP
Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 2518322
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Trivalent	ug/L	<0.23	0.50	0.23	02/16/17 17:17	N2

LABORATORY CONTROL SAMPLE: 2518323

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Trivalent	ug/L	5	5.3	107	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2518325 2518326

Parameter	Units	40145726001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Trivalent	ug/L	<0.23	5	5	5.1	5.1	98	99	75-125	1	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 248490
Analysis Method: SM 3500-Cr B (Online)
QC Batch Method: SM 3500-Cr B (Online)
Analysis Description: Chromium, Hexavalent by 3500
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 1468319
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	mg/L	<0.0051	0.017	0.0051	02/16/17 10:30	

LABORATORY CONTROL SAMPLE: 1468320

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	.3	0.29	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468321 1468322

Parameter	Units	40145726001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/L	<0.013	.75	.75	0.70	0.72	93	96	90-110	3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468323 1468324

Parameter	Units	40145747006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/L	<0.0051	.3	.3	0.32	0.31	106	102	90-110	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 248944
Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1
Analysis Description: 350.1 Ammonia, Distilled
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 1470480
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	<0.25	0.50	0.25	02/23/17 16:28	

LABORATORY CONTROL SAMPLE: 1470481

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	9.7	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1470482 1470483

Parameter	Units	40145660001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	<0.25	10	10	10.5	10.3	105	103	90-110	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1470484 1470485

Parameter	Units	40145742002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	<0.25	10	10	11.1	10.1	111	101	90-110	10	20	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 248746
Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2
Analysis Description: 351.2 TKN
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 1469621
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	<0.22	0.73	0.22	02/21/17 17:41	B

LABORATORY CONTROL SAMPLE: 1469622

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5	4.8	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469623 1469624

Parameter	Units	40145736001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	215	50	50	282	276	134	121	90-110	2	20	P6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469625 1469626

Parameter	Units	40145692001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	0.73	5	5	6.2	5.3	109	91	90-110	16	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

QC Batch: 248650
Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

METHOD BLANK: 1469240
Matrix: Water
Associated Lab Samples: 40145726001, 40145726002, 40145726003, 40145726004, 40145726005, 40145726006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	<0.095	0.25	0.095	02/21/17 10:01	

LABORATORY CONTROL SAMPLE: 1469241

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469242 1469243

Parameter	Units	40145726004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.19J	2.5	2.5	2.6	2.6	96	95	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469273 1469274

Parameter	Units	40145814001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.61	2.5	2.5	2.9	2.8	90	88	90-110	1	20	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145726

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

1q	Analyte was detected in the associated method blank at a concentration of -0.0056mg/L.
2q	Analyte was detected in the associated method blank at a concentration of -0.27 mg/L.
B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145726001	**RIVER INLET**	Pace SOP	460553		
40145726002	**NORTH POND**	Pace SOP	460553		
40145726003	**ASH POND OUTFALL STRUCTURE**	Pace SOP	460553		
40145726004	**TEST PIT 1**	Pace SOP	460553		
40145726005	**TEST PIT 2**	Pace SOP	460553		
40145726006	**TEST PIT 3**	Pace SOP	460553		
40145726001	**RIVER INLET**	Pace SOP	460474		
40145726002	**NORTH POND**	Pace SOP	460474		
40145726003	**ASH POND OUTFALL STRUCTURE**	Pace SOP	460474		
40145726004	**TEST PIT 1**	Pace SOP	460474		
40145726005	**TEST PIT 2**	Pace SOP	460474		
40145726006	**TEST PIT 3**	Pace SOP	460474		
40145726001	**RIVER INLET**	SM 3500-Cr B (Online)	248490		
40145726002	**NORTH POND**	SM 3500-Cr B (Online)	248490		
40145726003	**ASH POND OUTFALL STRUCTURE**	SM 3500-Cr B (Online)	248490		
40145726004	**TEST PIT 1**	SM 3500-Cr B (Online)	248490		
40145726005	**TEST PIT 2**	SM 3500-Cr B (Online)	248490		
40145726006	**TEST PIT 3**	SM 3500-Cr B (Online)	248490		
40145726001	**RIVER INLET**	TKN+NO3+NO2 Calculation	249405		
40145726002	**NORTH POND**	TKN+NO3+NO2 Calculation	249405		
40145726003	**ASH POND OUTFALL STRUCTURE**	TKN+NO3+NO2 Calculation	249405		
40145726004	**TEST PIT 1**	TKN+NO3+NO2 Calculation	249405		
40145726005	**TEST PIT 2**	TKN+NO3+NO2 Calculation	249405		
40145726006	**TEST PIT 3**	TKN+NO3+NO2 Calculation	249405		
40145726001	**RIVER INLET**	EPA 350.1	248944	EPA 350.1	248978
40145726002	**NORTH POND**	EPA 350.1	248944	EPA 350.1	248978
40145726003	**ASH POND OUTFALL STRUCTURE**	EPA 350.1	248944	EPA 350.1	248978
40145726004	**TEST PIT 1**	EPA 350.1	248944	EPA 350.1	248978
40145726005	**TEST PIT 2**	EPA 350.1	248944	EPA 350.1	248978
40145726006	**TEST PIT 3**	EPA 350.1	248944	EPA 350.1	248978
40145726001	**RIVER INLET**	EPA 351.2	248746	EPA 351.2	248787
40145726002	**NORTH POND**	EPA 351.2	248746	EPA 351.2	248787
40145726003	**ASH POND OUTFALL STRUCTURE**	EPA 351.2	248746	EPA 351.2	248787
40145726004	**TEST PIT 1**	EPA 351.2	248746	EPA 351.2	248787
40145726005	**TEST PIT 2**	EPA 351.2	248746	EPA 351.2	248787
40145726006	**TEST PIT 3**	EPA 351.2	248746	EPA 351.2	248787
40145726001	**RIVER INLET**	EPA 353.2	248650		
40145726002	**NORTH POND**	EPA 353.2	248650		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145726

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145726003	**ASH POND OUTFALL STRUCTURE**	EPA 353.2	248650		
40145726004	**TEST PIT 1**	EPA 353.2	248650		
40145726005	**TEST PIT 2**	EPA 353.2	248650		
40145726006	**TEST PIT 3**	EPA 353.2	248650		

Pace Analytical™
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

40145726

Page: 01 of 01

Section A
Required Client Information:
Company: Foth Infrastructure and Environment, LLC
Address: 2314 W Altorfer Dr.
Peoria, IL 6165
Email To: mark.williams@foth.com
Phone: 309 683 1681 Fax:
Requested Due Date/TAT: Routine

Section B
Required Project Information:
Report To: Mark A. Williams
Copy To: Josh Gabehart
Purchase Order No.:
Dynegy- Edwards Antidegradation Study
Project Number: 17D005.00

Section C
Invoice Information:
Attention:
Company Name: Foth Infrastructure and Environment, LLC
Address:
Pace Quote Reference: 34036
Pace Project Manager: Tod Noltemeyer
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER________

SITE LOCATION
☐ GA ☑ IL ☐ IN ☐ MI ☐ IC
☐ OH ☐ SC ☐ WI ☐ OTHER____

Filtered (Y/N)

Requested

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID		MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	Preservatives H_2SO_4	Preservatives HNO_3	Preservatives HCl	Preservatives NaOH	Preservatives $Na_2S_2O_3$	Preservatives Methanol	Preservatives Other	Chromium (Hex)	Inorganic Analysis	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
1	River Inlet	001	WT	G			2/15/17	14:24	5.8 c		1	1							x	x		2-250mlp AC
2	North Pond	002	"	"			"	14:04	8.0 c		1	1							x	x		
3	Ash Pond Outfall Structure	003	"	"			"	13:21	6.9 c		1	1							x	x		
4	Test Pit 1	004	"	"			"	13:42	4.3 c		1	1							x	x		
5	Test Pit 2	005	"	"			"	12:23	5.4 c		1	1							x	x		
6	Test Pit 3	006	"	"			"	13:00	5.0 c		1	1							x	x		
7																						
8																						
9																						
10																						
11																						
12																						

Additional Comments:

Inorganic Analysis: Ammonia (NH3),
Nitrogen (as Total Kjeldahl N plus Nitrate/Nitrite)

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
M Williams / Foth	2/15/17	16:00			
Fed Ex	2/16/17	0905	Pace	2/16/17	0905

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Marc Williams / John Fisher
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY): 2/15/17

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
1	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

E-File,(ALLQ020rev.3,31Mar05), 13Jun2005

Pace Analytical™

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Client Name: Foth

Project # **WO#:40145726**

40145726

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other:

Tracking #: 7856 2329 5720

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer Used SR68 **Type of Ice:** [✓ Wet] Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: / /Corr: / **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☑ yes ☐ no

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

Person examining contents:
Date: 2-16-17
Initials: SKW

Comments:

Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☑Yes	☐No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☐Yes	☑No	☐N/A	
-Pace IR Containers Used:	☐Yes	☐No	☑N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC: 2-16-17 SKW	~~☑Yes~~	☑No	☐N/A	12. 001-time on sample is 14:25. 002 time 14:05. 003 time 13:23. 004-i time 1344-No date; 005-time 12:05; 006-1300 time
-Includes date/time/ID/Analysis Matrix: W				
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☑Yes	☐No	☐N/A	13. ☐ HNO3 ☑ H2SO4 ☐ NaOH ☐ NaOH +ZnAct 2-16-17 SKW
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2, NaOH+ZnAct ≥9, NaOH ≥12)	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes	☑No		Initial when completed SKW | Lab Std #ID of preservative | Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A	14.
Trip Blank Present:	☐Yes	☐No	☑N/A	15.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution:

If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [illegible] **Date:** 2-16-17

F-GB-C-031-Rev.03 (9April2015) SCUR Form

Pace Analytical™
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10379270

Page: 01 of 01

Section A
Required Client Information:

Company: Foth Infrastructure and Environment, LLC
Address: 2314 W Altorfer Dr.
Peoria, IL 6165
Email To: mark.williams@foth.com
Phone: 309 683 1681 Fax:
Requested Due Date/TAT: Routine

Section B
Required Project Information:

Report To: Mark A. Williams
Copy To: Josh Gabehart
Purchase Order No.:
Dynegy- Edwards Antidegradation Study
Project Number: 17D005.00

Section C
Invoice Information:

Attention:
Company Name: Foth Infrastructure and Environment, LLC
Address:
Pace Quote Reference: 34036
Pace Project Manager: Tod Noltemeyer
Pace Profile #: 20102

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER______

SITE LOCATION ☐ GA ☑ IL ☐ IN ☐ MI ☐ IC ☐ OH ☐ SC ☐ WI ☐ OTHER______

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested As, Trivalent (Diss) (Filtered Y)	Cr, Trivalent (Diss) (Filtered Y)	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
1	River Inlet	WT	G			2/15/17	14:20	5.8°C		1		1						x	x		001
2	North Pond	"	G			"	14:00	8.0°C		1		1						x	x		002
3	Ash Pond Outfall Structure	"	G			"	13:18	6.9°C		1		1						x	x		003
4	Test Pit 1	"	G			"	13:39	4.3°C		1		1						x	x		004
5	Test Pit 2	"	G				12:23	5.4°C		1		1						x	x		005
6	Test Pit 3	"	G				12:56	5.0°C		1		1						x	x		006
7																					
8																					
9																					
10																					
11																					
12																					

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
M Williams / Foth	2/15/17	16:00	PACE	2/16/17	945	4.9	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Marc Williams John Wishart
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY) 02/15/17

E-File,(ALLQ020rev.3,31Mar05), 13Jun2005

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Dec2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.20**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: FOTH - Pace GB

Project #: WO#:10379270

10379270

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 7096 3371 9182

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other:

Temp Blank? ☒ Yes ☐ No

Thermometer Used: ☒ 151401163 ☐ 151401164

Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.8 **Cooler Temp Corrected (°C):** 4.9 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** CSG 2/16/17

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No CSG 2/16/17

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No		1.
Chain of Custody Filled Out?	☑ Yes	☐ No		2.
Chain of Custody Relinquished?	☑ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		6.
Rush Turn Around Time Requested?	☐ Yes	☑ No		7.
Sufficient Volume?	☑ Yes	☐ No		8.
Correct Containers Used?	☑ Yes	☐ No		9.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO$_3$ ☐ H$_2$SO$_4$ ☐ NaOH Positive for Res. Chlorine? Y N Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO$_3$, H$_2$SO$_4$, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin.	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted:

Date/Time:

Comments/Resolution:

Project Manager Review:

Date: 2/16/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10379270

Page: 01 of 01

Section A
Required Client Information:
Company: Foth Infrastructure and Environment, LLC
Address: 2314 W Altorfer Dr.
Peoria, IL 6165
Email To: mark.williams@foth.com
Phone: 309 683 1681 Fax:
Requested Due Date/TAT: Routine

Section B
Required Project Information:
Report To: Mark A. Williams
Copy To: Josh Gabehart
Purchase Order No.:
Dynegy- Edwards Antidegradation Study
Project Number: 17D005.00

Section C
Invoice Information:
Attention:
Company Name: Foth Infrastructure and Environment, LLC
Address:
Pace Quote Reference: 34036
Pace Project Manager: Tod Noltemeyer
Pace Profile #: 20102

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER________

SITE LOCATION: ☐ GA ☑ IL ☐ IN ☐ MI ☐ IC ☐ OH ☐ SC ☐ WI ☐ OTHER____

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested: As, Trivalent (Diss) Filtered (Y/N): Y	Cr, Trivalent (Diss) Filtered (Y/N): Y	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
1	River Inlet	WT	G			2/15/17	14:20	5.8 °C		1		1						x	x		001
2	North Pond	''	G			''	14:00	8.0 °C		1		1						x	x		002
3	Ash Pond Outfall Structure	''	G			''	13:18	6.9 °C		1		1						x	x		003
4	Test Pit 1	''	G			''	13:39	4.3 °C		1		1						x	x		004
5	Test Pit 2	''	G				12:23	5.4 °C		1		1						x	x		005
6	Test Pit 3	''	G				12:56	5.0 °C		1		1						x	x		006
7																					
8																					
9																					
10																					
11																					
12																					

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
/ Foth	2/15/17	16:00	PACE	2/16/17	945	4.9	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Marc Williams John Wisket
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY): 02/15/17

E-File,(ALLQ020rev.3,31Mar05), 13Jun2005

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Dec2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.20**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: FOTH – Pace GB

Project #: WO#:10379270

10379270

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:______

Tracking Number: 7096 3371 9182

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other:______ **Temp Blank?** ☒ Yes ☐ No

Thermometer Used: ☒ 151401163 ☐ 151401164 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.8 **Cooler Temp Corrected (°C):** 4.9 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** CSG 2/16/17

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No CSG 2/16/17

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No		1.
Chain of Custody Filled Out?	☑ Yes	☐ No		2.
Chain of Custody Relinquished?	☑ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		6.
Rush Turn Around Time Requested?	☐ Yes	☑ No		7.
Sufficient Volume?	☑ Yes	☐ No		8.
Correct Containers Used?	☑ Yes	☐ No		9.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin.	☐ Yes	☐ No	☑ N/A	Initial when completed:______ Lot # of added preservative:______
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):______				

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: ______ Date/Time: ______

Comments/Resolution: ______

Project Manager Review: ______ **Date:** 2/16/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

March 06, 2017

Josh Gabehart
Foth Infrastructure & Environment
2314 West Altorfer Drive
Peoria, IL 61615

RE: Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Dear Josh Gabehart:

Enclosed are the analytical results for sample(s) received by the laboratory on February 16, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tod Noltemeyer

Tod Noltemeyer
tod.noltemeyer@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: Mark Williams, Foth Infrastructure & Environment LLC

CERTIFICATIONS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

SAMPLE SUMMARY

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40145755001	**TEST PIT 1**	Water	02/15/17 09:00	02/16/17 09:05
40145755002	**TEST PIT 2**	Water	02/15/17 11:28	02/16/17 09:05
40145755003	**TEST PIT 3**	Water	02/15/17 10:16	02/16/17 09:05
40145755004	**TEST PIT 1 BLANK**	Water	02/15/17 09:11	02/16/17 09:05
40145755005	**TEST PIT 2 BLANK**	Water	02/15/17 11:45	02/16/17 09:05
40145755006	**TEST PIT 3 BLANK**	Water	02/15/17 10:27	02/16/17 09:05

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145755001	**TEST PIT 1**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145755002	**TEST PIT 2**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145755003	**TEST PIT 3**	EPA 1631E	LMS	1	PASI-G
		EPA 6020	SDW	14	PASI-G
		EPA 6020	SDW	6	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 1664A OG	AR3	1	PASI-M
		SM 2540C	TMK	1	PASI-G
		SM 2540D	DDY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		EPA 300.0	HMB	1	PASI-G
		EPA 420.4	KEO	1	PASI-M
		SM 4500-CN-E	RAB	1	PASI-K
		SM 4500-CN-G	RAB	1	PASI-K
40145755004	**TEST PIT 1 BLANK**	EPA 1631E	LMS	1	PASI-G

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145755005	**TEST PIT 2 BLANK**	EPA 1631E	LMS	1	PASI-G
40145755006	**TEST PIT 3 BLANK**	EPA 1631E	LMS	1	PASI-G

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **EPA 1631E**
Description: 1631E Mercury, Low Level
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
6 samples were analyzed for EPA 1631E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 1631E with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145755

Method: **EPA 6020**
Description: 6020 MET ICPMS
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 248613

D4: Sample was diluted due to the presence of high levels of target analytes.

- TEST PIT 1 (Lab ID: 40145755001)
  - Silver
- TEST PIT 2 (Lab ID: 40145755002)
  - Zinc

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **EPA 6020**
Description: 6020 MET ICPMS, Dissolved
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 248608

B: Analyte was detected in the associated method blank.

- BLANK for HBN 248608 [MPRP/153 (Lab ID: 1469086)
  - Lead, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145755

Method: **EPA 7470**
Description: 7470 Mercury, Dissolved
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 7470. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **EPA 1664A OG**
Description: 1664 HEM, Oil and Grease
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 1664A OG. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 461765

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10379220001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2525200)
  - Oil and Grease

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 248889

R1: RPD value was outside control limits.
- DUP (Lab ID: 1470225)
    - Total Dissolved Solids

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145755

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 248550

R1: RPD value was outside control limits.
- DUP (Lab ID: 1468583)
  - Total Suspended Solids

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248815

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145548005,40145701001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 1469829)
  - Fluoride

QC Batch: 249288

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40146113004

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 1472373)
  - Sulfate
- MSD (Lab ID: 1472374)
  - Sulfate

Additional Comments:

Analyte Comments:

QC Batch: 248815

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- TEST PIT 1 (Lab ID: 40145755001)
  - Fluoride
- TEST PIT 3 (Lab ID: 40145755003)
  - Fluoride

QC Batch: 249288

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- TEST PIT 2 (Lab ID: 40145755002)
  - Fluoride

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145755

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days,Diss
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 249123

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- TEST PIT 1 (Lab ID: 40145755001)
  - Fluoride, Dissolved
- TEST PIT 2 (Lab ID: 40145755002)
  - Fluoride, Dissolved

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **EPA 420.4**
Description: 420.4 Phenolics, Total
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for EPA 420.4. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 420.4 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 461219

B: Analyte was detected in the associated method blank.

- BLANK for HBN 461219 [WETA/301 (Lab ID: 2522309)
  - Phenol

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 461219

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10379540001,1282794003

M3: Matrix spike recovery was outside laboratory control limits due to matrix interferences.

- MS (Lab ID: 2522311)
  - Phenol
- MSD (Lab ID: 2522312)
  - Phenol

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **SM 4500-CN-E**
Description: 4500CNE Cyanide, Total
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for SM 4500-CN-E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Method: **SM 4500-CN-G**
Description: 4500CNG Cyanide, Amenable
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: March 06, 2017

General Information:
3 samples were analyzed for SM 4500-CN-G. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 1 **Lab ID: 40145755001** Collected: 02/15/17 09:00 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**1.54**	ng/L	0.50	0.20	1	02/24/17 09:00	02/27/17 12:13	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**15.2**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 07:28	7440-38-2	
Barium	**80.2**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 07:28	7440-39-3	
Boron	**4530**	ug/L	100	20.0	10	02/20/17 08:43	02/21/17 11:48	7440-42-8	
Cadmium	**0.28J**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 07:28	7440-43-9	
Chromium	**2.3**	ug/L	1.0	0.39	1	02/20/17 08:43	02/21/17 07:28	7440-47-3	
Copper	**2.1**	ug/L	1.0	0.26	1	02/20/17 08:43	02/21/17 07:28	7440-50-8	
Iron	**253**	ug/L	250	10.0	1	02/20/17 08:43	02/21/17 07:28	7439-89-6	
Lead	**1.6**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 07:28	7439-92-1	
Manganese	**6.4**	ug/L	1.0	0.18	1	02/20/17 08:43	02/21/17 07:28	7439-96-5	
Nickel	**2.7**	ug/L	1.0	0.11	1	02/20/17 08:43	02/21/17 07:28	7440-02-0	
Selenium	**22.5**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 07:28	7782-49-2	
Silver	**<0.16**	ug/L	5.0	0.16	10	02/20/17 08:43	02/21/17 07:01	7440-22-4	D4
Total Hardness by 2340B	**156**	mg/L	50.0	1.5	10	02/20/17 08:43	02/21/17 07:01		
Zinc	**7.6J**	ug/L	10.0	3.1	1	02/20/17 08:43	02/21/17 07:28	7440-66-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**0.13J**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:36	7440-43-9	
Copper, Dissolved	**1.4**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:36	7440-50-8	
Iron, Dissolved	**12.4J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:36	7439-89-6	
Lead, Dissolved	**0.091J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:36	7439-92-1	B
Nickel, Dissolved	**2.1**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:36	7440-02-0	
Zinc, Dissolved	**<3.1**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:36	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/23/17 11:05	02/24/17 10:32	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**<1.1**	mg/L	4.7	1.1	1		02/28/17 12:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**768**	mg/L	20.0	8.7	1		02/22/17 16:40		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**13.2**	mg/L	2.0	0.95	1		02/17/17 10:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**86.4**	mg/L	20.0	5.0	10		02/27/17 14:31	16887-00-6	
Fluoride	**<1.0**	mg/L	3.0	1.0	10		02/27/17 14:31	16984-48-8	D3
Sulfate	**321**	mg/L	30.0	10.0	10		02/27/17 14:31	14808-79-8	
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**<1.0**	mg/L	3.0	1.0	10		03/02/17 13:10	16984-48-8	D3

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 1 **Lab ID: 40145755001** Collected: 02/15/17 09:00 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**5.7J**	ug/L	10.0	3.4	1	02/23/17 09:15	02/24/17 13:44	108-95-2	B
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:53	57-12-5	
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:57	57-12-5	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 2 **Lab ID: 40145755002** Collected: 02/15/17 11:28 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**9.40**	ng/L	2.5	1.0	5	02/24/17 09:00	02/27/17 12:19	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**19.4**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 08:09	7440-38-2	
Barium	**105**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 08:09	7440-39-3	
Boron	**15600**	ug/L	50.0	10	5	02/20/17 08:43	02/21/17 12:16	7440-42-8	
Cadmium	**0.34J**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 08:09	7440-43-9	
Chromium	**14.5**	ug/L	5.0	2.0	5	02/20/17 08:43	02/21/17 12:16	7440-47-3	
Copper	**8.0**	ug/L	5.0	1.3	5	02/20/17 08:43	02/21/17 12:16	7440-50-8	
Iron	**1410**	ug/L	1250	50.0	5	02/20/17 08:43	02/21/17 12:16	7439-89-6	
Lead	**5.5**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 08:09	7439-92-1	
Manganese	**18.6**	ug/L	5.0	0.90	5	02/20/17 08:43	02/21/17 12:16	7439-96-5	
Nickel	**8.4**	ug/L	5.0	0.56	5	02/20/17 08:43	02/21/17 12:16	7440-02-0	
Selenium	**89.1**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 08:09	7782-49-2	
Silver	**<0.016**	ug/L	0.50	0.016	1	02/20/17 08:43	02/21/17 08:09	7440-22-4	
Total Hardness by 2340B	**985**	mg/L	25.0	0.75	5	02/20/17 08:43	02/21/17 12:16		
Zinc	**24.6J**	ug/L	50.0	15.3	5	02/20/17 08:43	02/21/17 12:16	7440-66-6	D4
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**<0.089**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:43	7440-43-9	
Copper, Dissolved	**3.3**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:43	7440-50-8	
Iron, Dissolved	**63.8J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:43	7439-89-6	
Lead, Dissolved	**0.18J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:43	7439-92-1	B
Nickel, Dissolved	**1.8**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:43	7440-02-0	
Zinc, Dissolved	**<3.1**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:43	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/23/17 11:05	02/24/17 10:53	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**<1.1**	mg/L	4.7	1.1	1		02/28/17 12:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2790**	mg/L	20.0	8.7	1		02/22/17 16:40		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**46.0**	mg/L	2.0	0.95	1		02/17/17 10:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**94.3**	mg/L	20.0	5.0	10		03/03/17 12:19	16887-00-6	
Fluoride	**<1.0**	mg/L	3.0	1.0	10		03/03/17 12:19	16984-48-8	D3
Sulfate	**1820**	mg/L	300	100	100		03/03/17 12:31	14808-79-8	
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**<0.50**	mg/L	1.5	0.50	5		03/02/17 13:22	16984-48-8	D3

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 2 **Lab ID: 40145755002** Collected: 02/15/17 11:28 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**9.8J**	ug/L	10.0	3.4	1	02/23/17 09:15	02/24/17 13:44	108-95-2	B
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:53	57-12-5	
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:57	57-12-5	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 3 **Lab ID: 40145755003** Collected: 02/15/17 10:16 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**11.9**	ng/L	5.0	2.0	10	02/24/17 09:00	02/27/17 11:31	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**30.7**	ug/L	1.0	0.099	1	02/20/17 08:43	02/21/17 08:23	7440-38-2	
Barium	**185**	ug/L	1.0	0.062	1	02/20/17 08:43	02/21/17 08:23	7440-39-3	
Boron	**8700**	ug/L	50.0	10	5	02/20/17 08:43	02/21/17 12:29	7440-42-8	
Cadmium	**0.73J**	ug/L	1.0	0.089	1	02/20/17 08:43	02/21/17 08:23	7440-43-9	
Chromium	**17.0**	ug/L	1.0	0.39	1	02/20/17 08:43	02/21/17 08:23	7440-47-3	
Copper	**18.2**	ug/L	1.0	0.26	1	02/20/17 08:43	02/21/17 08:23	7440-50-8	
Iron	**4040**	ug/L	250	10.0	1	02/20/17 08:43	02/21/17 08:23	7439-89-6	
Lead	**27.5**	ug/L	1.0	0.040	1	02/20/17 08:43	02/21/17 08:23	7439-92-1	
Manganese	**30.3**	ug/L	1.0	0.18	1	02/20/17 08:43	02/21/17 08:23	7439-96-5	
Nickel	**20.2**	ug/L	1.0	0.11	1	02/20/17 08:43	02/21/17 08:23	7440-02-0	
Selenium	**53.0**	ug/L	1.0	0.21	1	02/20/17 08:43	02/21/17 08:23	7782-49-2	
Silver	**0.029J**	ug/L	0.50	0.016	1	02/20/17 08:43	02/21/17 08:23	7440-22-4	
Total Hardness by 2340B	**217**	mg/L	5.0	0.15	1	02/20/17 08:43	02/21/17 08:23		
Zinc	**59.6**	ug/L	10.0	3.1	1	02/20/17 08:43	02/21/17 08:23	7440-66-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cadmium, Dissolved	**0.11J**	ug/L	1.0	0.089	1	02/20/17 08:10	02/21/17 04:50	7440-43-9	
Copper, Dissolved	**1.3**	ug/L	1.0	0.26	1	02/20/17 08:10	02/21/17 04:50	7440-50-8	
Iron, Dissolved	**26.8J**	ug/L	250	10.0	1	02/20/17 08:10	02/21/17 04:50	7439-89-6	
Lead, Dissolved	**0.042J**	ug/L	1.0	0.040	1	02/20/17 08:10	02/21/17 04:50	7439-92-1	B
Nickel, Dissolved	**4.3**	ug/L	1.0	0.11	1	02/20/17 08:10	02/21/17 04:50	7440-02-0	
Zinc, Dissolved	**<3.1**	ug/L	10.0	3.1	1	02/20/17 08:10	02/21/17 04:50	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury, Dissolved	**<0.13**	ug/L	0.42	0.13	1	02/23/17 11:05	02/24/17 10:56	7439-97-6	
1664 HEM, Oil and Grease	Analytical Method: EPA 1664A OG								
Oil and Grease	**1.3J**	mg/L	4.7	1.0	1		02/28/17 12:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**900**	mg/L	20.0	8.7	1		02/22/17 16:40		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**137**	mg/L	2.0	0.95	1		02/17/17 10:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**90.8**	mg/L	20.0	5.0	10		02/27/17 14:55	16887-00-6	
Fluoride	**<1.0**	mg/L	3.0	1.0	10		02/27/17 14:55	16984-48-8	D3
Sulfate	**469**	mg/L	30.0	10.0	10		02/27/17 14:55	14808-79-8	
300.0 IC Anions 28 Days,Diss	Analytical Method: EPA 300.0								
Fluoride, Dissolved	**<0.10**	mg/L	0.30	0.10	1		03/02/17 14:59	16984-48-8	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 3 **Lab ID: 40145755003** Collected: 02/15/17 10:16 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
420.4 Phenolics, Total	Analytical Method: EPA 420.4 Preparation Method: EPA 420.4								
Phenol	**5.7J**	ug/L	10.0	3.4	1	02/23/17 09:15	02/24/17 13:45	108-95-2	B
4500CNE Cyanide, Total	Analytical Method: SM 4500-CN-E								
Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:54	57-12-5	
4500CNG Cyanide, Amenable	Analytical Method: SM 4500-CN-G								
Amenable Cyanide	**<0.0016**	mg/L	0.0050	0.0016	1		02/22/17 10:58	57-12-5	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 1 BLANK **Lab ID: 40145755004** Collected: 02/15/17 09:11 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/24/17 09:00	02/27/17 10:59	7439-97-6	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 2 BLANK **Lab ID: 40145755005** Collected: 02/15/17 11:45 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/24/17 09:00	02/27/17 11:11	7439-97-6	

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Sample: TEST PIT 3 BLANK **Lab ID: 40145755006** Collected: 02/15/17 10:27 Received: 02/16/17 09:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level	Analytical Method: EPA 1631E Preparation Method: EPA 1631E								
Mercury	**<0.20**	ng/L	0.50	0.20	1	02/24/17 09:00	02/27/17 11:24	7439-97-6	

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 249015
Analysis Method: EPA 1631E
QC Batch Method: EPA 1631E
Analysis Description: 1631E Mercury
Associated Lab Samples: 40145755001, 40145755002, 40145755003, 40145755004, 40145755005, 40145755006

METHOD BLANK: 1470997 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003, 40145755004, 40145755005, 40145755006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/27/17 09:22	

METHOD BLANK: 1470998 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003, 40145755004, 40145755005, 40145755006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/27/17 10:46	

METHOD BLANK: 1470999 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003, 40145755004, 40145755005, 40145755006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.20	0.50	0.20	02/27/17 12:06	

METHOD BLANK: 1471000 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003, 40145755004, 40145755005, 40145755006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ng/L	<0.21	0.53	0.21	02/27/17 09:29	

LABORATORY CONTROL SAMPLE & LCSD: 1471001 1471002

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Mercury	ng/L	5	5.25	5.26	105	105	79-121	0	21	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471841 1471842

Parameter	Units	40145755003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ng/L	11.9	20	20	29.6	30.4	89	92	75-125	2	24	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471843 1471844

Parameter	Units	40145755001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ng/L	1.54	2	2	3.20	3.23	83	85	75-125	1	24	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248923
Analysis Method: EPA 7470
QC Batch Method: EPA 7470
Analysis Description: 7470 Mercury Dissolved
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1470370
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	<0.13	0.42	0.13	02/24/17 10:04	

LABORATORY CONTROL SAMPLE: 1470371

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	5	5.2	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1470372 1470373

Parameter	Units	40145747003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	<0.13	5	5	4.8	5.0	96	100	85-115	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248613 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1469105 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.099	1.0	0.099	02/21/17 06:48	
Barium	ug/L	<0.062	1.0	0.062	02/21/17 06:48	
Boron	ug/L	<2.0	10.0	2.0	02/21/17 11:35	
Cadmium	ug/L	<0.089	1.0	0.089	02/21/17 06:48	
Chromium	ug/L	<0.39	1.0	0.39	02/21/17 06:48	
Copper	ug/L	<0.26	1.0	0.26	02/21/17 06:48	
Iron	ug/L	<10.0	250	10.0	02/21/17 06:48	
Lead	ug/L	<0.040	1.0	0.040	02/21/17 06:48	
Manganese	ug/L	<0.18	1.0	0.18	02/21/17 06:48	
Nickel	ug/L	<0.11	1.0	0.11	02/21/17 06:48	
Selenium	ug/L	<0.21	1.0	0.21	02/21/17 06:48	
Silver	ug/L	<0.016	0.50	0.016	02/21/17 06:48	
Total Hardness by 2340B	mg/L	<0.15	5.0	0.15	02/21/17 06:48	
Zinc	ug/L	<3.1	10.0	3.1	02/21/17 06:48	

LABORATORY CONTROL SAMPLE: 1469106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	500	516	103	80-120	
Barium	ug/L	500	507	101	80-120	
Boron	ug/L	500	526	105	80-120	
Cadmium	ug/L	500	528	106	80-120	
Chromium	ug/L	500	510	102	80-120	
Copper	ug/L	500	519	104	80-120	
Iron	ug/L	5000	5010	100	80-120	
Lead	ug/L	500	508	102	80-120	
Manganese	ug/L	500	509	102	80-120	
Nickel	ug/L	500	499	100	80-120	
Selenium	ug/L	500	554	111	80-120	
Silver	ug/L	250	263	105	80-120	
Total Hardness by 2340B	mg/L		35.2			
Zinc	ug/L	500	536	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469107 1469108

Parameter	Units	40145755001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	15.2	500	500	541	536	105	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469107 1469108

Parameter	Units	40145755001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	80.2	500	500	605	610	105	106	75-125	1	20	
Boron	ug/L	4530	500	500	5090	4960	112	85	75-125	3	20	
Cadmium	ug/L	0.28J	500	500	525	521	105	104	75-125	1	20	
Chromium	ug/L	2.3	500	500	515	508	102	101	75-125	1	20	
Copper	ug/L	2.1	500	500	506	501	101	100	75-125	1	20	
Iron	ug/L	253	5000	5000	5200	5200	99	99	75-125	0	20	
Lead	ug/L	1.6	500	500	507	497	101	99	75-125	2	20	
Manganese	ug/L	6.4	500	500	514	505	101	100	75-125	2	20	
Nickel	ug/L	2.7	500	500	491	486	98	97	75-125	1	20	
Selenium	ug/L	22.5	500	500	575	572	111	110	75-125	1	20	
Silver	ug/L	<0.16	250	250	257	255	103	102	75-125	1	20	
Total Hardness by 2340B	mg/L	156			202	190				6	20	
Zinc	ug/L	7.6J	500	500	541	535	107	105	75-125	1	20	

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QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248608
Analysis Method: EPA 6020
QC Batch Method: EPA 3010
Analysis Description: 6020 MET Dissolved
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1469086
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium, Dissolved	ug/L	<0.089	1.0	0.089	02/21/17 01:40	
Copper, Dissolved	ug/L	<0.26	1.0	0.26	02/21/17 01:40	
Iron, Dissolved	ug/L	<10.0	250	10.0	02/21/17 01:40	
Lead, Dissolved	ug/L	0.093J	1.0	0.040	02/21/17 01:40	
Nickel, Dissolved	ug/L	<0.11	1.0	0.11	02/21/17 01:40	
Zinc, Dissolved	ug/L	<3.1	10.0	3.1	02/21/17 01:40	

LABORATORY CONTROL SAMPLE: 1469087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium, Dissolved	ug/L	500	532	106	80-120	
Copper, Dissolved	ug/L	500	524	105	80-120	
Iron, Dissolved	ug/L	5000	5100	102	80-120	
Lead, Dissolved	ug/L	500	500	100	80-120	
Nickel, Dissolved	ug/L	500	507	101	80-120	
Zinc, Dissolved	ug/L	500	547	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469088 1469089

Parameter	Units	40145510001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium, Dissolved	ug/L	<1.0	500	500	504	512	101	102	75-125	2	20	
Copper, Dissolved	ug/L	<1.0	500	500	489	492	98	98	75-125	0	20	
Iron, Dissolved	ug/L	1280	5000	5000	6080	6140	96	97	75-125	1	20	
Lead, Dissolved	ug/L	<1.0	500	500	485	491	97	98	75-125	1	20	
Nickel, Dissolved	ug/L	<1.0	500	500	470	472	94	94	75-125	0	20	
Zinc, Dissolved	ug/L	<10.0	500	500	536	540	106	107	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 461765
Analysis Method: EPA 1664A OG
QC Batch Method: EPA 1664A OG
Analysis Description: 1664 HEM, Oil and Grease
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 2525198
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Oil and Grease	mg/L	<1.1	5.0	1.1	02/28/17 12:18	

LABORATORY CONTROL SAMPLE: 2525199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	40	36.4	91	78-114	

MATRIX SPIKE SAMPLE: 2525200

Parameter	Units	10379220001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	1.3J	40.4	30.5	72	78-114	M1

SAMPLE DUPLICATE: 2525201

Parameter	Units	10379074003 Result	Dup Result	RPD	Max RPD	Qualifiers
Oil and Grease	mg/L	16.5	16.0	3	18	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248889
Analysis Method: SM 2540C
QC Batch Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1470222
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	8.7	02/22/17 16:38	

LABORATORY CONTROL SAMPLE: 1470223

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	586	538	92	80-120	

SAMPLE DUPLICATE: 1470224

Parameter	Units	40145735001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	9690	9670	0	5	

SAMPLE DUPLICATE: 1470225

Parameter	Units	40145860001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	7410	8020	8	5	R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248550 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1468581 Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<0.48	1.0	0.48	02/17/17 10:10	

LABORATORY CONTROL SAMPLE: 1468582

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 1468583

Parameter	Units	40145702002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	37.6	44.4	17	5	R1

SAMPLE DUPLICATE: 1468584

Parameter	Units	40145744001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	405	408	1	5	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 249123
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions,Dissolved
Associated Lab Samples: 40145755001, 40145755002

METHOD BLANK: 1471766
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.30	0.10	02/28/17 14:36	

LABORATORY CONTROL SAMPLE: 1471767

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2	2.0	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471768 1471769

Parameter	Units	40145731001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	<0.10	2	2	2.2	2.2	109	109	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1471770 1471771

Parameter	Units	40145755002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	<0.50	10	10	10.2	10.4	102	104	90-110	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 249214
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions,Dissolved
Associated Lab Samples: 40145755003

METHOD BLANK: 1471998
Matrix: Water
Associated Lab Samples: 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.30	0.10	03/02/17 14:35	

LABORATORY CONTROL SAMPLE: 1471999

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2	2.1	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1472000 1472001

Parameter	Units	40145903001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.28J	2	2	2.3	2.4	101	105	90-110	4	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1472002 1472003

Parameter	Units	40146050013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.23J	2	2	2.3	2.4	104	107	90-110	2	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 248815
Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40145755001, 40145755003

METHOD BLANK: 1469824
Matrix: Water
Associated Lab Samples: 40145755001, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	0.50	02/23/17 10:45	
Fluoride	mg/L	<0.10	0.30	0.10	02/23/17 10:45	
Sulfate	mg/L	<1.0	3.0	1.0	02/23/17 10:45	

LABORATORY CONTROL SAMPLE: 1469825

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.7	98	90-110	
Fluoride	mg/L	2	2.0	98	90-110	
Sulfate	mg/L	20	19.6	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469826 1469827

Parameter	Units	40145548005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.3	20	20	26.1	26.3	109	110	90-110	1	15	
Fluoride	mg/L	1.3	2	2	3.5	3.5	108	109	90-110	0	15	
Sulfate	mg/L	41.7	100	100	146	141	105	99	90-110	4	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1469828 1469829

Parameter	Units	40145701001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.5J	20	20	22.6	22.9	106	107	90-110	1	15	
Fluoride	mg/L	<0.10	2	2	2.2	2.2	109	112	90-110	2	15	M0
Sulfate	mg/L	7.0	20	20	28.6	29.0	108	110	90-110	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 249288
Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40145755002

METHOD BLANK: 1472371
Matrix: Water
Associated Lab Samples: 40145755002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	0.50	03/02/17 21:30	
Fluoride	mg/L	<0.10	0.30	0.10	03/02/17 21:30	
Sulfate	mg/L	<1.0	3.0	1.0	03/02/17 21:30	

LABORATORY CONTROL SAMPLE: 1472372

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.2	106	90-110	
Fluoride	mg/L	2	2.1	104	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1472373 1472374

Parameter	Units	40146113004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.3	20	20	23.4	23.7	106	107	90-110	1	15	
Fluoride	mg/L	0.50	2	2	2.6	2.7	106	108	90-110	1	15	
Sulfate	mg/L	14.6	20	20	36.7	37.1	111	112	90-110	1	15	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 461219
Analysis Method: EPA 420.4
QC Batch Method: EPA 420.4
Analysis Description: 420.4 Phenolics
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 2522309
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phenol	ug/L	4.9J	10.0	3.4	02/24/17 13:35	

LABORATORY CONTROL SAMPLE: 2522310

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenol	ug/L	250	230	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2522311 2522312

Parameter	Units	1282794003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phenol	ug/L	ND	250	250	32.4	5.9J	12	1	90-110		20	M3

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2522313 2522314

Parameter	Units	10379540001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phenol	ug/L	ND	250	250	260	248	102	97	90-110	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch: 466227
Analysis Method: SM 4500-CN-E
QC Batch Method: SM 4500-CN-E
Analysis Description: 4500CNE Cyanide, Total
Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1908163
Matrix: Water
Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cyanide	mg/L	<0.0016	0.0050	0.0016	02/22/17 10:41	

LABORATORY CONTROL SAMPLE: 1908164

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	.1	0.10	102	69-126	

MATRIX SPIKE SAMPLE: 1908165

Parameter	Units	60238221001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	ND	.1	0.072	71	61-126	

SAMPLE DUPLICATE: 1908166

Parameter	Units	60238135002 Result	Dup Result	RPD	Max RPD	Qualifiers
Cyanide	mg/L	ND	0.0039J		46	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

QC Batch:	466308	Analysis Method:	SM 4500-CN-G
QC Batch Method:	SM 4500-CN-G	Analysis Description:	4500CNG Cyanide, Amenable

Associated Lab Samples: 40145755001, 40145755002, 40145755003

METHOD BLANK: 1908461 Matrix: Water

Associated Lab Samples: 40145755001, 40145755002, 40145755003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Amenable Cyanide	mg/L	<0.0016	0.0050	0.0016	02/22/17 10:54	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40145755

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City
PASI-M	Pace Analytical Services - Minneapolis

BATCH QUALIFIERS

Batch: 461765

[BE]	Batch extracted by solid phase extraction (SPE).

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D4	Sample was diluted due to the presence of high levels of target analytes.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
R1	RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40145755

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145755001	**TEST PIT 1**	EPA 1631E	249015	EPA 1631E	249158
40145755002	**TEST PIT 2**	EPA 1631E	249015	EPA 1631E	249158
40145755003	**TEST PIT 3**	EPA 1631E	249015	EPA 1631E	249158
40145755004	**TEST PIT 1 BLANK**	EPA 1631E	249015	EPA 1631E	249158
40145755005	**TEST PIT 2 BLANK**	EPA 1631E	249015	EPA 1631E	249158
40145755006	**TEST PIT 3 BLANK**	EPA 1631E	249015	EPA 1631E	249158
40145755001	**TEST PIT 1**	EPA 3010	248613	EPA 6020	248681
40145755002	**TEST PIT 2**	EPA 3010	248613	EPA 6020	248681
40145755003	**TEST PIT 3**	EPA 3010	248613	EPA 6020	248681
40145755001	**TEST PIT 1**	EPA 3010	248608	EPA 6020	248680
40145755002	**TEST PIT 2**	EPA 3010	248608	EPA 6020	248680
40145755003	**TEST PIT 3**	EPA 3010	248608	EPA 6020	248680
40145755001	**TEST PIT 1**	EPA 7470	248923	EPA 7470	248974
40145755002	**TEST PIT 2**	EPA 7470	248923	EPA 7470	248974
40145755003	**TEST PIT 3**	EPA 7470	248923	EPA 7470	248974
40145755001	**TEST PIT 1**	EPA 1664A OG	461765		
40145755002	**TEST PIT 2**	EPA 1664A OG	461765		
40145755003	**TEST PIT 3**	EPA 1664A OG	461765		
40145755001	**TEST PIT 1**	SM 2540C	248889		
40145755002	**TEST PIT 2**	SM 2540C	248889		
40145755003	**TEST PIT 3**	SM 2540C	248889		
40145755001	**TEST PIT 1**	SM 2540D	248550		
40145755002	**TEST PIT 2**	SM 2540D	248550		
40145755003	**TEST PIT 3**	SM 2540D	248550		
40145755001	**TEST PIT 1**	EPA 300.0	248815		
40145755002	**TEST PIT 2**	EPA 300.0	249288		
40145755003	**TEST PIT 3**	EPA 300.0	248815		
40145755001	**TEST PIT 1**	EPA 300.0	249123		
40145755002	**TEST PIT 2**	EPA 300.0	249123		
40145755003	**TEST PIT 3**	EPA 300.0	249214		
40145755001	**TEST PIT 1**	EPA 420.4	461219	EPA 420.4	461376
40145755002	**TEST PIT 2**	EPA 420.4	461219	EPA 420.4	461376
40145755003	**TEST PIT 3**	EPA 420.4	461219	EPA 420.4	461376
40145755001	**TEST PIT 1**	SM 4500-CN-E	466227		
40145755002	**TEST PIT 2**	SM 4500-CN-E	466227		
40145755003	**TEST PIT 3**	SM 4500-CN-E	466227		
40145755001	**TEST PIT 1**	SM 4500-CN-G	466308		
40145755002	**TEST PIT 2**	SM 4500-CN-G	466308		
40145755003	**TEST PIT 3**	SM 4500-CN-G	466308		

Pace Analytical™
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

40145758

Page: 01 **of** 01

MAM.

Section A **Required** Client Information:	**Section B** **Required** Project Information:	**Section C** Invoice Information:
Company: Foth Infrastructure and Environment, LLC	Report To: Mark A. Williams	Attention:
Address: 2314 W Altorfer Dr.	Copy To: Josh Gabehart	Company Name: Foth Infrastructure and Environment, LLC
Peoria, IL 6165		Address:
Email To: mark.williams@foth.com	Purchase Order No.:	Pace Quote Reference: 34036
Phone: 309 683 1681 Fax:	Dynegy- Edwards Antidegradation Study	Pace Project Manager: Tod Noltemeyer
Requested Due Date/TAT: Routine	Project Number: 17D005.00	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER________

SITE LOCATION ☐ GA ☑ IL ☐ IN ☐ MI ☐ IC ☐ OH ☐ SC ☐ WI ☐ OTHER______

Section D **Required** Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Flouride Dissolved	TDS, TSS	Total Phenolics	Inorganic Total Analysis	Metals, Total Analysis	Metals, Diss Analysis	Oil and Grease	Hardness	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
Filtered (Y/N)																		Y					Y				
1	Test Pit 1 001	WT	G			2/15/17	09:00	4.3 c	1-250mL gA	7	2	2		1	1-125mL bg S		1-1L ag D	x	x	x	x	x	x	x	x	1-1	Lp A 4-250mL p A 3-250mL p DG
2	Test Pit 2 002	"	"			"	11:28	5.4 c		7	2	2		1				x	x	x	x	x	x	x	x		
3	Test Pit 3 003	"	"			"	10:16	5.0 c		7	2	2		1				x	x	x	x	x	x	x	x		
4	Test pit1 blank 004 ①					2/15/17	0911																				
5	Test pit 2 blank 005 ①					2/15/17	1145																				
6	Test pit 3 blank 006 ①					2/15/17	1027																				
7																									
8	① lab added to COC																										
9	per samples received																										
10	2/16/17																										
11																											
12																											

Additional Comments:

Inorganic Total Analysis: Cl, CN, F, Sulfate

Total Metal Analysis: As, Ba, B, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn

Dissolved Metal Analysis: Cd, Cu, Fe, Pb, Hg, Ni, Zn

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
M Williams / Foth	2/15/17	16:00			
Fed Ex	2/16/17	0905	Pace	2/16/17	0905

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
3.3 R8	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
BT 2/16/17	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Mark Williams / John Wisher

SIGNATURE of SAMPLER:

DATE Signed (MM / DD / YY) 02/15/17

E-File,(ALLQ020rev.3,31Mar05), 13Jun2005

Pace Analytical™

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #: **WO# : 40145755**
40145755

Client Name: Foth

Courier: ☒ Fed Ex ☐ UPS ☐ Client ☐ Pace Other:

Tracking #: 7856 2336 3329, 7856 2336 3330

Custody Seal on Cooler/Box Present: ☒ yes ☐ no Seals intact: ☒ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ~~no~~

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer Used SR-59 **Type of Ice:** [✓ Wet] Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 2.5, 2.5 /Corr: 3, 3 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☒ yes ☐ no

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

Person examining contents:
Date: 2/16/17
Initials: BA

Comments:

Chain of Custody Present:	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out: BH 2/16/17	~~☒Yes~~	[✓ ☒No]	☐N/A	2. lab added 004-006 per samples received BH 2/16/17
Chain of Custody Relinquished:	☒Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☒Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☒Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes	☒No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☒No	☐N/A	7.
Sufficient Volume:	☒Yes	☐No	☐N/A	8.
Correct Containers Used:	☒Yes	☐No	☐N/A	9.
-Pace Containers Used:	☒Yes	☐No	☐N/A	
-Pace IR Containers Used:	☐Yes	☐No	☒N/A	
Containers Intact:	☒Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☒Yes	☐No	☐N/A	11.
Sample Labels match COC:	☐Yes	☒No	☐N/A	12. ① each sample has seperate collect time, time on COC represents earliest collection time for that sample point. 002 1-1Lag^{b} no date BH 2/16/17
-Includes date/time/ID/Analysis Matrix: W				
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☒Yes	☐No	☐N/A	13. ☒ HNO3 ☐ H2SO4 ☒ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☒Yes	☐No	☐N/A	
exceptions: VOA, ~~coliform~~, TOC, TOX, TOH, [✓ O&G], WIDROW, [✓ Phenolics,] OTHER:	☒Yes	☐No		Initial when completed / Lab Std #ID of preservative / Date/Time:
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☒N/A	14.
Trip Blank Present:	☐Yes	☐No	☒N/A	15.
Trip Blank Custody Seals Present	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution:

If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: ① each sample point has 1-250mlP^{A} no time/date
003 1-125mlag^{S} no date
BA 2/16/17

Project Manager Review: JJ for TW **Date:** 2-16-17

F-GB-C-031-Rev.03 (9April2015) SCUR Form

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

April 06, 2017

Josh Gabehart
Foth Infrastructure & Environment
2314 West Altorfer Drive
Peoria, IL 61615

RE: Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Dear Josh Gabehart:

Enclosed are the analytical results for sample(s) received by the laboratory on March 17, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Report revised to note trivalent metals are dissolved.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tod Noltemeyer

Tod Noltemeyer
tod.noltemeyer@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: Mark Williams, Foth Infrastructure & Environment LLC

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: UST-078
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: MN00064
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia WW Certification #: 382
Wisconsin Certification #: 999407970
Wyoming via EPA Region 8 Certification #: 8TMS-L

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

SAMPLE SUMMARY

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40146879001	**TEST PIT 1B**	Water	03/16/17 13:32	03/17/17 09:30
40146879002	**TEST PIT 2B**	Water	03/16/17 15:16	03/17/17 09:30
40146879003	**TEST PIT 3B**	Water	03/16/17 14:27	03/17/17 09:30

SAMPLE ANALYTE COUNT

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40146879001	**TEST PIT 1B**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40146879002	**TEST PIT 2B**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40146879003	**TEST PIT 3B**	Pace SOP	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		SM 3500-Cr B (Online)	DEY	1	PASI-G
		TKN+NO3+NO2 Calculation	BAF	1	PASI-G
		EPA 350.1	TMK	1	PASI-G
		EPA 351.2	TMK	1	PASI-G
		EPA 353.2	DAW	1	PASI-G

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Method: **Pace SOP**
Description: LC-ICPMS Speciated Arsenic
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 464709

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 2540980)
  - Arsenic III
- LCS (Lab ID: 2540981)
  - Arsenic III
- MS (Lab ID: 2540983)
  - Arsenic III
- MSD (Lab ID: 2540984)
  - Arsenic III
- TEST PIT 1B (Lab ID: 40146879001)
  - Arsenic III
- TEST PIT 2B (Lab ID: 40146879002)
  - Arsenic III
- TEST PIT 3B (Lab ID: 40146879003)
  - Arsenic III

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 464518

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 2539971)
  - Chromium, Trivalent
- LCS (Lab ID: 2539972)
  - Chromium, Trivalent
- MS (Lab ID: 2539974)
  - Chromium, Trivalent
- MSD (Lab ID: 2539975)
  - Chromium, Trivalent
- TEST PIT 1B (Lab ID: 40146879001)
  - Chromium, Trivalent
- TEST PIT 2B (Lab ID: 40146879002)
  - Chromium, Trivalent
- TEST PIT 3B (Lab ID: 40146879003)
  - Chromium, Trivalent

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

Method: **SM 3500-Cr B (Online)**
Description: Chromium, Hexavalent
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for SM 3500-Cr B (Online). All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 250517

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40146879001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 1478798)
  - Chromium, Hexavalent
- MSD (Lab ID: 1478799)
  - Chromium, Hexavalent

Additional Comments:

Analyte Comments:

QC Batch: 250517

1q: Analyte was measured in the associated method blank at a concentration of -0.0061 mg/L.

- TEST PIT 1B (Lab ID: 40146879001)
  - Chromium, Hexavalent
- TEST PIT 2B (Lab ID: 40146879002)
  - Chromium, Hexavalent
- TEST PIT 3B (Lab ID: 40146879003)
  - Chromium, Hexavalent

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

Method: **TKN+NO3+NO2 Calculation**
Description: Total Nitrogen Calculation
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for TKN+NO3+NO2 Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Method: **EPA 350.1**
Description: 350.1 Ammonia, Distilled
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 350.1 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 251134

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40146879002,40146925001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MSD (Lab ID: 1482238)
  - Nitrogen, Ammonia

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

Method: **EPA 351.2**
Description: 351.2 Total Kjeldahl Nitrogen
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for EPA 351.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 351.2 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3 pres.
Client: FOTH INFRASTRUCTURE & ENVIRONMENT
Date: April 06, 2017

General Information:
3 samples were analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Sample: TEST PIT 1B **Lab ID: 40146879001** Collected: 03/16/17 13:32 Received: 03/17/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**<0.067**	ug/L	0.20	0.067	1		03/21/17 14:26		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		03/17/17 18:41		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		03/17/17 12:40		1q,M0
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**4.1**	mg/L	0.73	0.22	1		03/31/17 09:12	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**1.9**	mg/L	0.50	0.25	1	03/23/17 14:29	03/23/17 16:14	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**2.3**	mg/L	0.73	0.22	1	03/24/17 13:07	03/24/17 17:41	7727-37-9	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**1.8**	mg/L	0.25	0.095	1		03/20/17 13:00		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Sample: TEST PIT 2B **Lab ID: 40146879002** Collected: 03/16/17 15:16 Received: 03/17/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**0.35**	ug/L	0.20	0.067	1		03/21/17 13:43		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**0.55**	ug/L	0.50	0.23	1		03/17/17 18:32		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		03/17/17 12:40		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**1.2**	mg/L	0.73	0.22	1		03/31/17 09:12	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.80**	mg/L	0.50	0.25	1	03/27/17 14:16	03/27/17 17:10	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**1.2**	mg/L	0.73	0.22	1	03/28/17 13:06	03/28/17 17:01	7727-37-9	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**<0.095**	mg/L	0.25	0.095	1		03/20/17 13:01		

ANALYTICAL RESULTS

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Sample: TEST PIT 3B **Lab ID: 40146879003** Collected: 03/16/17 14:27 Received: 03/17/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Arsenic	Analytical Method: Pace SOP								
Arsenic III	**0.090J**	ug/L	0.20	0.067	1		03/21/17 14:05		N2
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Trivalent	**<0.23**	ug/L	0.50	0.23	1		03/17/17 18:37		N2
Chromium, Hexavalent	Analytical Method: SM 3500-Cr B (Online)								
Chromium, Hexavalent	**<0.0051**	mg/L	0.017	0.0051	1		03/17/17 12:40		1q
Total Nitrogen Calculation	Analytical Method: TKN+NO3+NO2 Calculation								
Nitrogen	**1.2**	mg/L	0.73	0.22	1		03/31/17 09:12	7727-37-9	
350.1 Ammonia, Distilled	Analytical Method: EPA 350.1 Preparation Method: EPA 350.1								
Nitrogen, Ammonia	**0.91**	mg/L	0.50	0.25	1	03/27/17 14:16	03/27/17 17:13	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**1.1**	mg/L	0.73	0.22	1	03/28/17 13:06	03/28/17 17:01	7727-37-9	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**0.12J**	mg/L	0.25	0.095	1		03/20/17 13:02		

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 464709 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 40146879001, 40146879002, 40146879003

METHOD BLANK: 2540980 Matrix: Water
Associated Lab Samples: 40146879001, 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic III	ug/L	<0.067	0.20	0.067	03/21/17 13:00	N2

LABORATORY CONTROL SAMPLE: 2540981

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic III	ug/L	10	10.2	102	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2540983 2540984

Parameter	Units	40146879001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic III	ug/L	<0.067	10	10	9.3	9.6	93	95	75-125	3	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 464518
Analysis Method: Pace SOP
QC Batch Method: Pace SOP
Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 40146879001, 40146879002, 40146879003

METHOD BLANK: 2539971
Matrix: Water
Associated Lab Samples: 40146879001, 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Trivalent	ug/L	0.25J	0.50	0.23	03/17/17 18:27	N2

LABORATORY CONTROL SAMPLE: 2539972

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Trivalent	ug/L	5	5.1	101	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2539974 2539975

Parameter	Units	40146879001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Trivalent	ug/L	<0.23	5	5	5.3	5.4	105	107	75-125	2	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 250517
Analysis Method: SM 3500-Cr B (Online)
QC Batch Method: SM 3500-Cr B (Online)
Analysis Description: Chromium, Hexavalent by 3500
Associated Lab Samples: 40146879001, 40146879002, 40146879003

METHOD BLANK: 1478796
Matrix: Water
Associated Lab Samples: 40146879001, 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	mg/L	<0.0051	0.017	0.0051	03/17/17 12:40	

LABORATORY CONTROL SAMPLE: 1478797

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	.3	0.31	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1478798 1478799

Parameter	Units	40146879001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/L	<0.0051	.3	.3	0.22	0.24	72	82	90-110	12	20	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 250940
Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1
Analysis Description: 350.1 Ammonia, Distilled
Associated Lab Samples: 40146879001

METHOD BLANK: 1480969
Matrix: Water
Associated Lab Samples: 40146879001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	<0.25	0.50	0.25	03/23/17 15:50	

LABORATORY CONTROL SAMPLE: 1480970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	9.8	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1480971 1480972

Parameter	Units	40146849002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	3.0	10	10	12.4	12.2	95	93	90-110	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1480973 1480974

Parameter	Units	40146988001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	<0.25	10	10	10.2	10.0	99	98	90-110	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 251134
QC Batch Method: EPA 350.1
Analysis Method: EPA 350.1
Analysis Description: 350.1 Ammonia, Distilled
Associated Lab Samples: 40146879002, 40146879003

METHOD BLANK: 1482233
Matrix: Water
Associated Lab Samples: 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	<0.25	0.50	0.25	03/27/17 17:09	

LABORATORY CONTROL SAMPLE: 1482234

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	9.7	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1482235 1482236

Parameter	Units	40146879002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	0.80	10	10	11.0	10.5	102	97	90-110	4	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1482237 1482238

Parameter	Units	40146925001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Ammonia	mg/L	0.50J	10	10	10.2	8.8	97	83	90-110	15	20	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 251019
QC Batch Method: EPA 351.2
Analysis Method: EPA 351.2
Analysis Description: 351.2 TKN
Associated Lab Samples: 40146879001

METHOD BLANK: 1481368
Matrix: Water
Associated Lab Samples: 40146879001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	<0.22	0.73	0.22	03/24/17 17:15	

LABORATORY CONTROL SAMPLE: 1481369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1481370 1481371

Parameter	Units	40146825001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	40.4	50	50	92.1	89.7	103	99	90-110	3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1481372 1481373

Parameter	Units	40146818002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	0.70J	5	5	5.7	5.4	99	94	90-110	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 251231
Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2
Analysis Description: 351.2 TKN
Associated Lab Samples: 40146879002, 40146879003

METHOD BLANK: 1482600
Matrix: Water
Associated Lab Samples: 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	<0.22	0.73	0.22	03/28/17 16:59	

LABORATORY CONTROL SAMPLE: 1482601

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5	4.8	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1482602 1482603

Parameter	Units	40146879003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	1.1	5	5	6.0	5.9	100	96	90-110	3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1482604 1482605

Parameter	Units	40146972001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Kjeldahl, Total	mg/L	0.57J	5	5	5.3	5.2	94	93	90-110	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

QC Batch: 250601
Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 40146879001, 40146879002, 40146879003

METHOD BLANK: 1479373
Matrix: Water
Associated Lab Samples: 40146879001, 40146879002, 40146879003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	<0.095	0.25	0.095	03/20/17 12:46	

LABORATORY CONTROL SAMPLE: 1479374

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1479375 1479376

Parameter	Units	40146873002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	<0.095	2.5	2.5	2.4	2.4	95	95	90-110	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1479377 1479378

Parameter	Units	40146930001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	11.9	2.5	2.5	14.8	14.5	119	104	90-110	3	20	P6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project:	17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.:	40146879

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

1q	Analyte was measured in the associated method blank at a concentration of -0.0061 mg/L.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 17D005.00 DYNEGY-EDWARDS ANTID
Pace Project No.: 40146879

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40146879001	**TEST PIT 1B**	Pace SOP	464709		
40146879002	**TEST PIT 2B**	Pace SOP	464709		
40146879003	**TEST PIT 3B**	Pace SOP	464709		
40146879001	**TEST PIT 1B**	Pace SOP	464518		
40146879002	**TEST PIT 2B**	Pace SOP	464518		
40146879003	**TEST PIT 3B**	Pace SOP	464518		
40146879001	**TEST PIT 1B**	SM 3500-Cr B (Online)	250517		
40146879002	**TEST PIT 2B**	SM 3500-Cr B (Online)	250517		
40146879003	**TEST PIT 3B**	SM 3500-Cr B (Online)	250517		
40146879001	**TEST PIT 1B**	TKN+NO3+NO2 Calculation	251507		
40146879002	**TEST PIT 2B**	TKN+NO3+NO2 Calculation	251507		
40146879003	**TEST PIT 3B**	TKN+NO3+NO2 Calculation	251507		
40146879001	**TEST PIT 1B**	EPA 350.1	250940	EPA 350.1	250963
40146879002	**TEST PIT 2B**	EPA 350.1	251134	EPA 350.1	251163
40146879003	**TEST PIT 3B**	EPA 350.1	251134	EPA 350.1	251163
40146879001	**TEST PIT 1B**	EPA 351.2	251019	EPA 351.2	251043
40146879002	**TEST PIT 2B**	EPA 351.2	251231	EPA 351.2	251267
40146879003	**TEST PIT 3B**	EPA 351.2	251231	EPA 351.2	251267
40146879001	**TEST PIT 1B**	EPA 353.2	250601		
40146879002	**TEST PIT 2B**	EPA 353.2	250601		
40146879003	**TEST PIT 3B**	EPA 353.2	250601		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

BB

4014687

Page: of

Section A
Required Client Information:

Company: Foth Infrastructure and Environment, LLC
Address: 2314 W Altorfer Dr.
Peoria, IL 6165
Email To: mark.williams@foth.com
Phone: 309 683 1681 Fax:
Requested Due Date/TAT: Routine

Section B
Required Project Information:

Report To: Mark A. Williams
Copy To: Josh Gabehart
Purchase Order No.:
Dynegy- Edwards Antidegradation Study
Project Number: 17D005.00

Section C
Invoice Information:

Attention:
Company Name: Foth Infrastructure and Environment, LLC
Address:
Pace Quote Reference: 34036
Pace Project Manager: Tod Noltemeyer
Pace Profile #: 20102

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER________

SITE LOCATION ☐ GA ☑ IL ☐ IN ☐ MI ☐ NC
☐ OH ☐ SC ☐ WI ☐ OTHER____

Filtered (Y/N)

Section D Required Client Information
SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID		MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	TIME	COMPOSITE END/GRAB DATE	TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Chromium (Hex)	Inorganic Analysis	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
1	Test Pit 1 B	001	WT	G			3/16	13:32			1	1							x	x		2-250mlpAc
2	Test Pit 2 B	002	WT	G			3/16	15:16			1	1							x	x		↓
3	Test Pit 3 B	003	WT	G			3/16	14:27			1	1							x	x		
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Additional Comments:

Inorganic Analysis: Ammonia (NH3),
Nitrogen (as Total Kjeldahl N plus Nitrate/Nitrite)

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
/ Foth	3/16	16:30					Y/N	Y/N	Y/N
Fed Ex	3/17/11	0930		3/17/11	0930	0	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY)

Pace Container Order #224042

Addresses

Order By :
Company PASI-Wisconsin
Contact Noltemeyer, Tod
Email tod.noltemeyer@pacelabs.com
Address 1241 Bellevue Street
Address 2 Suite 9
City Green Bay
State WI Zip 54302
Phone (920)469-2436

Ship To :
Company Foth Infrastucture & Environment
Contact Mark Williams
Email tod.noltemeyer@pacelabs.com
Address 2314 West Altorfer Drive
Address 2
City Peoria
State IL Zip 61615
Phone (920) 469-2436

Return To:
Company Pace Analytical Minnesota
Contact Odujole, Oyeyemi
Email oyeyemi.odujole@pacelabs.com
Address 1700 Elm Street
Address 2 Suite 200
City Minneapolis
State MN Zip 55414
Phone (612)607-6402

Info

Project Name DYNEGY
Due Date 02/23/2017
Profile 20102
Quote
Project Manager Odujole, Oyeyemi
Return
Carrier Most Economical
Location IL

Trip Blanks

☐ Include Trip Blanks

Bottle Labels

☐ Blank
☐ Pre-Printed No Sample IDs
☒ Pre-Printed With Sample IDs

Bottles

☐ Boxed Cases
☒ Individually Wrapped
☐ Grouped By Sample

Return Shipping Labels

☐ No Shipper Number
☒ With Shipper Number

COC Options

☒ Number of Blanks 2
☐ Pre-Printed

Misc

☐ Sampling Instructions
☒ Custody Seal
☒ Temp. Blanks
☒ Coolers 2
☐ Syringes
☐ Extra Bubble Wrap
☒ Short Hold/Rush Stickers
☐ DI Water Liter(s)
☐ USDA Regulated Soils

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
7	WT	Metals - Trivalent Arsenic	250ml with EDTA	7	0	Lot Number 011617-2CYI	
7	WT	Metals - Trivalent Chromium	250mL plastic unpres	7	0	010317-2all	48hr hold

Return w/ Samples

Hazard Shipping Placard In Place : NO

*Sample receiving hours are Mon-Fri 7:30am-7:00pm and Sat 9:00am-1:00pm unless special arrangements are made with your project manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.
*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage and disposal.
*Payment term are net 30 days.
*Please include the proposal number on the chain of custody to insure proper billing.

Sample Notes

Ship Date : 02/21/2017
Prepared By: KG
Verified By:

Pace Analytical™

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #: **WO#: 40146879**

40146879

Client Name: Foth

Courier: ☒ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: ______

Tracking #: 8113 0781 4504

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Thermometer Used SR109 **Type of Ice:** [✓ Wet] Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 0 /Corr: 0 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☑ yes ☐ no

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

Person examining contents:
Date: 3/17/17
Initials: TL

Comments:

Chain of Custody Present:	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☒Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☒Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☐Yes	☒No	☐N/A	4.
Samples Arrived within Hold Time:	☒Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☒Yes	☐No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☒No	☐N/A	7.
Sufficient Volume:	☒Yes	☐No	☐N/A	8.
Correct Containers Used:	☒Yes	☐No	☐N/A	9.
-Pace Containers Used:	☒Yes	☐No	☐N/A	
-Pace IR Containers Used:	☐Yes	☐No	☒N/A	
Containers Intact:	☒Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☒N/A	11.
Sample Labels match COC:	☐Yes	☒No	☐N/A	12. collect times literal collect times
-Includes date/time/ID/Analysis Matrix: W				3/17/17TL
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☒Yes	☐No	☐N/A	13. ☐ HNO3 ☑ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☒Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes	☒No		Initial when completed TL · Lab Std #ID of preservative · Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☒N/A	14.
Trip Blank Present:	☐Yes	☒No	☐N/A	15.
Trip Blank Custody Seals Present	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution:

If checked, see attached form for additional comments ☐

Person Contacted: ______ Date/Time: ______

Comments/ Resolution: ______

Project Manager Review: AMH for TN **Date:** 3/17/17

F-GB-C-031-Rev.03 (9April2015) SCUR Form

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10382096

Page: of

Section A Required Client Information:	**Section B** Required Project Information:	**Section C** Invoice Information:
Company: Foth Infrastructure and Environment, LLC	Report To: Mark A. Williams	Attention:
Address: 2314 W Altorfer Dr.	Copy To: Josh Gabehart	Company Name: Foth Infrastructure and Environment, LLC
Peoria, IL 6165		Address:
Email To: mark.williams@foth.com	Purchase Order No.:	Pace Quote Reference: 34036
Phone: 309 683 1681 Fax:	Dynegy- Edwards Antidegradation Study	Pace Project Manager: Tod Noltemeyer
Requested Due Date/TAT: Routine	Project Number: 17D005.00	Pace Profile #: 20102

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER____

SITE LOCATION ☐ GA ☑ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER____

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Samples IDs MUST BE UNIQUE

Valid Matrix Codes MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G+GRAB C=COMP	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	#OF CONTAINERS	Preservatives Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested As, Trivalent (Diss)	Cr, Trivalent (Diss)	Residual Chlorine (Y/N)	Pace Project Number Lab I.D.
	Filtered (Y/N)																	Y	Y		
1	Test Pit 1 B	WT	C			3/16	13:12			1		1						x	x		001
2	Test Pit 2 B	WT	G			"	15:00			1		1						x	x		002
3	Test Pit 3 B	WT	G			"	14:10			1		1						x	x		003
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
M Will / Foth	1130		/ Pace	3/16/17	9:30	1.2	[✓ Y]/N	[✓ Y]/N	[✓ Y]/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed (MM / DD / YY)

E-File,(ALLQ020rev.3,31Mar05), 13Jun2005

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Dec2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.20**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Fothinfrastructure

Project #:

WO# : 10382096

10382096

Courier: ☒Fed Ex ☐UPS ☐USPS ☐Client ☐Commercial ☐Pace ☐SpeeDee ☐Other:________

Tracking Number: 7096 3372 1609

Optional: Proj. Due Date: Proj. Name:

Custody Seal on Cooler/Box Present? ☒Yes ☐No **Seals Intact?** ☒Yes ☐No

Packing Material: ☒Bubble Wrap ☐Bubble Bags ☐None ☐Other:________ **Temp Blank?** ☐Yes ☒No

Thermometer Used: ☒151401163 ☐151401164

Type of Ice: ☒Wet ☐Blue ☐None ☐Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.1 **Cooler Temp Corrected (°C):** 1.2 **Biological Tissue Frozen?** ☐Yes ☐No ☒N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** RG 3/17/17

USDA Regulated Soil (☒N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐Yes ☐No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☐No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present?	☒Yes ☐No	1.
Chain of Custody Filled Out?	☒Yes ☐No	2.
Chain of Custody Relinquished?	☒Yes ☐No	3.
Sampler Name and/or Signature on COC?	☐Yes ☐No ☒N/A	4.
Samples Arrived within Hold Time?	☒Yes ☐No	5.
Short Hold Time Analysis (<72 hr)?	☒Yes ☐No	6.
Rush Turn Around Time Requested?	☐Yes ☒No	7.
Sufficient Volume?	☒Yes ☐No	8.
Correct Containers Used? -Pace Containers Used?	☒Yes ☐No ☒Yes ☐No	9.
Containers Intact?	☒Yes ☐No	10. RG 3/17/17
Filtered Volume Received for Dissolved Tests?	☒Yes ☐No ☒N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒Yes ☐No	12.
All containers needing acid/base preservation have been checked?	☐Yes ☐No ☒N/A	13. ☐HNO_3 ☐H_2SO_4 ☐NaOH Positive for Res. Chlorine? Y N Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes ☐No ☒N/A	
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin.	☐Yes ☐No ☒N/A	Initial when completed:______ Lot # of added preservative:______
Headspace in VOA Vials (>6mm)?	☐Yes ☐No ☒N/A	14.
Trip Blank Present?	☐Yes ☐No ☒N/A	15.
Trip Blank Custody Seals Present?	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):______		

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted: ________ Date/Time: ________

Comments/Resolution: ________

Project Manager Review: ________ **Date:** 3/17/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Attachment E

Closure Alternatives Analysis Groundwater Modeling Review at the Coffeen Power Plant, Edwards Power Plant, Newton Power Plant, and Hennepin Power Plant

Expert Report of Andrew Bittner, P.E.

Prepared by

Andrew Bittner, M.Eng., P.E.

Prepared for
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January 24, 2024

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Abbreviations

AP1	Ash Pond 1
CAA	Closure Alternatives Analysis
CBR	Closure By Removal
CCR	Coal Combustion Residual
CIP	Closure In Place
DMG	Dynegy Midwest Generation, LLC
EAP	East Ash Pond
GMF GSP	Gypsum Management Facility Gypsum Stack Pond
GMF RP	Gypsum Management Facility Recycle Pond
GWPS	Groundwater Protection Standards
HELP	Hydrologic Evaluation of Landfill Performance
ID	Identification
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
IPRG	Illinois Power Resources Generating, LLC
K_d	Distribution Coefficient
mL/g	Milliliters Per Gram
NID	National Inventory of Dams
No.	Number
PAP	Primary Ash Pond
PE	Professional Engineer
SIs	Surface Impoundments
TDS	Total Dissolved Solids

1 Introduction and Background

1.1 Scope and Objectives

On behalf of Dynegy Midwest Generation, LLC (DMG); Illinois Power Resources Generating Company (IPRG); and Illinois Power Generating Company (IPGC), I have been retained to provide opinions related to the Illinois Environmental Protection Agency (IEPA) Initial Review Letters (IEPA, 2023a, 2023b, 2023c, 2023d) in response to the Construction Permit Applications for coal combustion residual (CCR) surface impoundments (SIs) at the Coffeen Power Plant, the Edwards Power Plant, the Newton Power Plant, and the Hennepin Power Plant (Golder Associates USA Inc., 2022a, 2022b, 2022c; IngenAE, LLC 2022; HDR Inc., 2022; Geosyntec Consultants, 2022). Specifically, my opinions relate to groundwater models that were developed in support of the Closure Alternatives Analysis (CAA). In their Initial Review Letters (IEPA, 2023a, 2023b, 2023c, 2023d), IEPA raised concerns regarding the adequacy of groundwater modeling that was conducted related to current and former CCR SIs located at each facility. Specifically, IEPA raised concerns regarding the sufficiency of only modeling selected CCR-related constituents at each facility, as opposed to modeling all CCR-related constituents. IEPA's Initial Review Letters indicate that "all constituents listed in Section 845.600 that have been found to be present in the CCR surface impoundment" must "be assessed in the groundwater model" (IEPA, 2023a, 2023b, 2023c, 2023d).

The opinions presented in this report are based on the information that I have reviewed and cited as of the date of this report, as well as my education and experience. I reserve the right to modify my opinions based on additional information that may become available.

1.2 Background

Part 845 of the Illinois Administrative Code (Title 35, Subtitle G, Chapter I, Subchapter j; IEPA, 2021), hereafter referred to as "Part 845", sets standards and requirements pertaining to the design, construction, operation, groundwater monitoring, corrective action, closure, and post-closure care of certain CCR SIs in the State of Illinois. In particular, Part 845 (IEPA, 2021) requires the development of a CAA (Section 845.710) prior to undertaking closure activities. One specific requirement of the CAA [845.710(d)(2)] is that the time to achieve groundwater protection standards (GWPS) must be evaluated for each closure alternative:

> The analysis for each alternative completed pursuant to this Section must… contain the results of groundwater contaminant transport modeling and calculations showing how the closure alternative will achieve compliance with the applicable groundwater protection standards (IEPA, 2021)

In response to this requirement, Ramboll developed groundwater models at selected facilities (Ramboll, 2022a, 2022b, 2022c, 2022d, 2022e) that evaluate the duration required for each closure alternative to achieve the GWPSs. In these models, selected CCR-related constituents were evaluated. Specific CCR SIs for which groundwater models were developed, and that were addressed in IEPA Initial Review Letters (IEPA, 2023a, 2023b, 2023c, 2023d), include the following:

- Ash Pond 1 (AP1; Vistra Identification [ID] Number [No.] 101, Illinois Environmental Protection Agency [IEPA] ID No. W1350150004-01, and National Inventory of Dams [NID] No. IL50722) at the Coffeen Power Plant in Coffeen, IL;
- The Gypsum Management Facility Gypsum Stack Pond (GMF GSP; Vistra ID No. 103, IEPA ID No. W1350150004-03, and NID No. IL50579) and the Gypsum Management Facility Recycle Pond (GMF RP; Vistra ID No. 104, IEPA ID No. W1350150004-04, and NID No. IL50578) at the Coffeen Power Plant in Coffeen, IL;
- The Ash Pond (Vistra ID No. 301, IEPA ID No. W1438050005-01, and NID No. IL50710) at the Edwards Power Plant near Bartonville, IL;
- The Primary Ash Pond (PAP; Vistra ID No. 501, IEPA ID No. W0798070001-01, NID No. IL50719) at the Newton Power Plant, in Newton, IL; and
- The East Ash Pond (EAP); Vistra ID No. 803, IEPA ID No. W1550100002-05, NID No. IL50363) at the Hennepin Power Plant in Hennepin, IL.

A summary of the groundwater modeling results, including an estimate of the time by which each closure alternative is expected to achieve the GWPSs, was provided to IEPA in the CAA (Gradient, 2022a; Gradient 2022b; Gradient 2022c; Gradient 2022d; Gradient 2021a) and the Groundwater Modeling Report (Ramboll, 2022a, 2022b, 2022c, 2022d, 2022e) for each facility, which in turn was included as part of the Construction Permit Application for each facility (Golder Associates USA Inc., 2022a, 2022b, 2022c; IngenAE, LLC, 2022; HDR Inc., 2022; Geosyntec Consultants, 2022).

1.3 Qualifications

I am a Principal at Gradient, an environmental consulting firm located in Boston, Massachusetts, and a licensed professional engineer (PE). With over 25 years of professional experience, I have consulted and testified regarding a variety of projects related to the fate and transport of constituents in the environment, hydrogeology, groundwater and surface water modeling, site characterization, and remediation system design. I have a master's degree in environmental engineering from the Massachusetts Institute of Technology and bachelor's degrees in environmental engineering and physics from the University of Michigan. A copy of my *curriculum vitae* is provided in Appendix A.

I have published and presented on a variety of topics, including groundwater and surface water fate and transport modeling of coal ash constituents, assessments of former coal-fired power plants, mass flux and mass discharge of constituents in groundwater, remedial system optimization, and the impact of environmental regulations in the United States and abroad. As a consultant during the past 25 years, I have applied my knowledge of fate and transport processes to address a range of complex challenges in the electric power, oil and gas, chemical manufacturing, pharmaceutical, mining, agrichemical, and waste disposal sectors. In particular, for the electric power industry, my experience includes projects involving regulatory comment, closure assessments, fate and transport modeling, and risk assessment. Moreover, I have worked on and been involved with projects at approximately 70 different CCR SIs.

I have served as a testifying expert and provided expert testimony, both in deposition and in front of regulatory bodies, on range of coal ash matters, including coal ash surface impoundment closure standards and the fate and transport of CCR-related constituents in the environment. A list of my prior testimony experience is provided in my *curriculum vitae* in Appendix A.

2 Summary of Opinions

A summary of my opinions that are provided in this report is provided below.

2.1 Modeling surrogate constituents is an appropriate approach to achieve model objectives in support of the CAA

Modeling selected constituents is a common approach for evaluation of environmental systems and is sufficient to achieve the model objectives in support of the CAA. All environmental models are, in some regard, simplifications of complex systems; one common model simplification is to use one or more surrogate constituents to conservatively represent the potential behavior of a larger group of constituents. During the selection of surrogate constituents, a model's objectives must be considered.

For the groundwater modeling performed in support of the CAA at the AP1, the GMF GSP, and the GMF RP at the Coffeen Power Plant, the Ash Pond at the Edwards Power Plant, the PAP at the Newton Power Plant, and the EAP at the Hennepin Power Plant, model objectives were to evaluate the effects of various closure alternatives (*i.e.*, source control measures) on groundwater quality and to specifically predict for each closure alternative the time at which GWPSs will be achieved for constituents with GWPS exceedances that are attributable to the unit. A reasonable approach to achieve this model objective is to select, as a surrogate, the constituent at each site that will likely require the longest time to achieve its GWPS. The constituents that have been detected in groundwater at the highest concentrations relative to their GWPSs and with the highest frequency of GWPS exceedances are the constituents that will likely take the longest time to achieve their GWPSs. For these objectives, it is not necessary to model all constituents that have been detected at lower concentrations relative to their GWPSs and with lower frequencies of GWPS exceedances, because these constituents will likely achieve their GWPSs faster than the selected surrogate constituent.

Based on this approach, sulfate was selected as the constituent to evaluate in the groundwater model at the AP1, the GMF GSP, and the GMF RP at the Coffeen Power Plant, and at the PAP at the Newton Power Plant; and boron was selected as the constituent to evaluate in the groundwater model at the Ash Pond at the Edwards Power Plant and at the EAP at the Hennepin Power Plant. These surrogate constituents have similar groundwater transport characteristics as the other constituents that have been detected with potential GWPS exceedances; therefore, subsurface transport during closure conditions would be similar for all of the constituents that have been detected with potential GWPS exceedances. Because each of these constituents is expected to behave in a similar manner during closure, it is appropriate to only model the surrogate constituents and use the surrogate constituents to determine when each closure alternative will likely achieve the GWPSs for all constituents.

2.2 Part 845 does not require that all constituents listed in Section 845.600 be evaluated in a groundwater model

Part 845 does not require that groundwater models developed in support of the CAA, as required by Section 845.710(d)(2) (IEPA, 2021), evaluate "all constituents listed in Section 845.600 that have been found to be present in the CCR surface impoundment" (IEPA, 2023a, 2023b, 2023c, 2023d). Part 845 requires only that groundwater modeling evaluate "how the closure alternative will achieve compliance with the applicable groundwater protection standards" (IEPA, 2021). There is no language in Part 845 suggesting that the groundwater model must evaluate all constituents that have been detected in an SI.

The surrogate constituents that were selected for evaluation in the groundwater models are the constituents that will likely take the longest under each closure scenario to decline to levels below the GWPS and, thus, are appropriate constituents to determine when each closure alternative will achieve the GWPSs, as required in Section 845.710(d)(2) (IEPA, 2021).

2.3 It would be a costly and data-intensive endeavor to model all constituents, and it wouldn't provide any additional useful information

The process of modeling all constituents in an SI would be costly and data-intensive and, ultimately, would not provide any additional information beyond that provided by only modeling the surrogates for evaluating how the closure alternative will achieve compliance with the GWPS. There are a number of CCR-related constituents that have been identified in literature. For example, Appendix III and IV of the 2015 Federal CCR Rule list 22 CCR-related constituents that must be monitored as part of detection and assessment monitoring (US EPA, 2015). Part 845.600 lists 20 CCR-related constituents for which GWPSs have been established (IEPA, 2021).

Building a groundwater model that evaluates all of these potential constituents would be an onerous process. First of all, an extensive amount of groundwater data and evaluation would be required for each constituent, including an evaluation of background groundwater quality and an evaluation of individual partitioning coefficients for each constituent. Subsequently, individual groundwater solute transport models would be need to be developed and calibrated for each constituent. Finally, separate model simulations would need to be evaluated for each closure alternative and for each constituent. Despite the significantly increased effort, the models would not result in any additional useful information for evaluating closure alternatives.

3 Overview of Groundwater Modeling

US EPA's Guidance on the Development, Evaluation, and Application of Environmental Models (US EPA, 2009) defines a model as "a simplification of reality that is constructed to gain insights into select attributes of a particular physical, biological, economic, or social system." In the case of a groundwater model, the physical system being simulated is the subsurface flow of water and the model is "a simplified representation of the complex hydrogeologic conditions in the subsurface" (Anderson *et al*., 2015). There are a variety of different types of models (NRC, 2007):

- Physical models are usually smaller-scale physical versions of the systems being modeled (*e.g.*, using laboratory tanks or columns packed with sand or other porous material) (Anderson *et al*., 2015);
- Conceptual models use visual (*e.g.*, schematics, flow-charts) or verbal descriptions of important processes and medium properties (US EPA, 1992);
- Empirical models use "statistical equations derived from the available data to calculate an unknown variable" (Anderson *et al*., 2015); and
- Numerical models, which are the types of models that were used to simulate conditions at the Coffeen Power Plant, the Edwards Power Plant, the Newton Power Plant, and the Hennepin Power Plant, involve mathematical representations of processes that govern physical processes.

Different types of numerical groundwater models are used for different applications. Groundwater flow models simulate flow of groundwater through a transmissive media (*e.g.*, soil or bedrock). Examples include hydrologic models used to manage water resources and evaluate water supply, rainfall-runoff models that simulate streamflow generation and routing, and models that simulate groundwater-surface water interactions, *etc*. (Anderson *et al*., 2015). Contaminant fate and transport models simulate movement (or "transport") of contaminants through the subsurface due to advection and dispersion[1], and their chemical alteration (or "fate") due to sorption[2] and other chemical reactions or biological processes (OhioEPA, 2007). Contaminant fate and transport models usually rely upon, and work in coordination with, a calibrated groundwater flow model (OhioEPA, 2007). Contaminant fate and transport models are often used to simulate subsurface contaminant migration from a source (*e.g.*, a waste disposal facility or a contaminant release) toward potential downgradient receptors (*e.g.*, surface water or groundwater supply well) or to support forensic investigations, (*i.e.*, to determine sources and age of contaminants present in groundwater).

"The starting point of every groundwater modeling application is to identify the purpose of the model" (Anderson *et al*., 2015). "The purpose of modeling can vary widely, and the approach used may depend on site-specific needs, current understanding of the hydrogeologic system, availability of input data, and expectation and use of the model results" (OhioEPA, 2007). Numerical groundwater models are often used for two primary purposes – to "diagnose" (*i.e.*, to re-create the conditions for a past event); or to "forecast"

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[1] Advection describes contaminant transport in the primary groundwater flow direction. Mechanical dispersion describes the multidirectional movement of constituents due to differences in flow paths along pore channels or other subsurface heterogeneities (Ramaswami *et al.*, 2005).

[2] Sorption (chemical interaction between a contaminant and soil particles) leads to a reduction in the average travel velocity of a contaminant relative to groundwater (Ramaswami *et al*., 2005). The effects of sorption can be quantified using a soil-water partition coefficient, or K_d, which is the constituent concentration that is sorbed to soil particles divided by the concentration that is freely dissolved in groundwater.

(*i.e.*, to predict the effect of a future events) (US EPA, 2009; Anderson *et al*., 2015). Some examples of groundwater modeling objectives (OhioEPA, 2007; US EPA, 1992) are listed below:

- evaluation of groundwater flow direction and velocity;
- evaluation of interaction between hydrogeologic systems;
- evaluation of potential impacts of contamination to wells or surface water;
- estimation of the extent of a contaminant plume;
- estimation of well capture zones and wellhead protection areas;
- development of water supply systems;
- evaluation of physical or hydraulic containment systems; and
- design and assessment of corrective action alternatives.

"The objectives dictate which features of the investigated problem should be represented in the model, and to what degree of accuracy" (US EPA, 1992). Thus, the modeling objective determines the level of complexity required in the model.

US EPA's guidance specifically states that "models are based on simplifying assumptions and cannot completely replicate the complexity inherent in environmental systems" (US EPA, 2009). Different simplifying assumptions can be made in a model based on the model objectives and availability of data. As noted in US EPA's guidance, "[t]he scope (*i.e.*, spatial, temporal and process detail) of models that can be used for a particular application can range from very simple to very complex depending on the problem specification and data availability, among other factors." (US EPA, 2009). Generally, "parsimony (economy or simplicity of assumptions) is desirable in a model" because "model complexity influences uncertainty" (US EPA, 2009). As discussed further in US EPA's guidance, "[m]odels tend to uncertainty as they become increasingly simple or increasingly complex. Thus complexity is an important parameter to consider… [and] the optimal choice generally is a model that is no more complicated than necessary" (US EPA, 2009).

Common simplifications made in a model relate to "the geometry of the investigated domain, the way various heterogeneities [are] smoothed out, the nature of the porous medium (*e.g.*, its homogeneity, isotropy)[3]," as well as the physical and chemical processes being simulated, and the number of constituents considered (US EPA, 1992). Some examples of simplifications that can be made in a model are listed below:

- Numerical models can either be transient (time-varying) or steady state (time-invariant). Steady state models assume that groundwater levels and/or constituent concentrations remain approximately constant over time, whereas transient models account for changing hydraulic or chemical conditions over time (Ramaswami *et al*., 2005). Steady state conditions are often assumed in models if the model is being used to represent average, long-term conditions.
- Models can be one-, two-, or three-dimensional depending "on the purpose of the model, the complexity of the hydrostratigraphy, and the flow system" (Anderson *et al*., 2015).

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[3] A porous medium is called homogeneous when its properties are constant throughout the medium. A porous medium is called isotropic if its properties are the same in all directions.

- Homogeneous and isotropic conditions are often used in groundwater models (*i.e.*, aquifer properties are assumed to be constant throughout the aquifer and in all directions, respectively).
- The number of chemical constituents modeled can be limited depending on the model objective. For example, a model application discussed in US EPA's Ground-Water Modeling Compendium (US EPA, 1994) modeled chloride to determine the maximum extent of contamination in the aquifer because chloride "is most mobile and non-retarded" and "its plume would represent the outermost limits of the plumes of the other contaminants of interest."

4 Summary of Site-Specific Groundwater Modeling for Closure Alternatives Analysis

Part 845 (IEPA, 2021) requires the development of a CAA (Section 845.710) prior to undertaking closure activities at certain SIs that contain CCRs. One specific requirement of the CAA [845.710(d)(2)] is that the time to achieve GWPSs must be evaluated for each closure alternative:

> The analysis for each alternative completed pursuant to this Section must… contain the results of groundwater contaminant transport modeling and calculations showing how the closure alternative will achieve compliance with the applicable groundwater protection standards (IEPA, 2021)

In response to this requirement, Ramboll developed groundwater flow and contaminant transport models at selected facilities (Ramboll, 2022a, 2022b, 2022c, 2022d, 2022e) to evaluate the duration required for each closure alternative to achieve the GWPSs.

The three models used by Ramboll for groundwater modeling at these sites (HELP, MODFLOW, and MT3DMS) are widely used, industry-standard models. Brief descriptions of the three models are provided below:

- Hydrologic evaluation of landfill performance (HELP) is a model developed by US EPA that simulates "water movement across, into, through and out of landfills" and "is useful for predicting the amounts of runoff, drainage, and … the buildup of leachate above the [landfill] liner" (Schroeder *et al*., 1994).
- MODFLOW is a finite difference groundwater flow model developed by USGS (Harbaugh, 2005). It is used to simulate two- or three-dimensional, "transient ground-water flow in anisotropic, heterogeneous, layered aquifer systems. It calculates piezometric head distributions, flow rates and water balances" (US EPA, 1994).
- MT3DMS is a contaminant transport model and an update to the modular three-dimensional transport model, MT3D (Zheng and Wang, 1999). MT3DMS simulates changes in contaminant concentrations in groundwater due to "advection, dispersion, diffusion and some basic chemical reactions" (Zheng and Wang, 1999).

A summary of each of these site-specific groundwater models is provided below.

4.1 Ash Pond 1 at the Coffeen Power Plant

The Coffeen Power Plant is a retired electric power generating facility operated by IPGC with coal-fired units located approximately two miles south of the City of Coffeen, Illinois. The plant operated as a coal-fired power plant from 1964 until November 2019 and has five CCR management units. AP1 is a 23-acre, unlined SI with a total storage capacity of 300 acre-feet that was used to manage CCR and non-CCR waste streams (Ramboll, 2022a; Gradient, 2022e).

Based on groundwater monitoring data collected between 2015 and 2021, potential GWPS exceedances of boron, sulfate, and total dissolved solids (TDS) were identified at groundwater monitoring wells near and downgradient of AP1 (Ramboll, 2022a)[4,5]. For boron, sulfate, and TDS, the maximum detected concentrations (based on data collected between 2015 and 2021 from 17 wells near and downgradient of AP1) were 7.5 mg/L, 2,400 mg/L, and 4,000 mg/L, respectively (Gradient, 2022e). Sulfate was the constituent detected at the highest concentration relative to its GWPS.

Ramboll prepared a groundwater modeling report (Ramboll, 2022a) for AP1 that was submitted to IEPA as part of the Construction Permit Application (Golder Associates USA Inc., 2022a). The objective of the groundwater modeling was "to evaluate the effects of closure (source control measures) for AP1 on groundwater quality," and, specifically, to predict the time to meet GWPS in the compliance wells under two proposed closure scenarios – closure in place (CIP) and closure by removal (CBR) (Ramboll, 2022a). The CIP scenario considered would involve "removal of CCR from the eastern portion of AP1, consolidation into the western portion of AP1, and construction of a cover system over the remaining CCR," whereas CBR would involve "removal of all CCR and regrading of the removal area" (Ramboll, 2022a).

Ramboll's modeling approach involved using the HELP model to estimate recharge under the different closure scenarios, using MODFLOW 2005 to simulate groundwater flow in three dimensions, and using MT3DMS model to simulate the three-dimensional transport of sulfate (Ramboll, 2022a). "Sulfate was selected for transport modeling … because: (i) it is commonly present in coal ash leachate; and (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater" (Ramboll, 2022a). Sulfate was modeled as a conservative substance that does "not significantly sorb or chemically react with aquifer solids (distribution coefficient [Kd] was set to 0 milliliters per gram [mL/g])" (Ramboll, 2022a).

4.2 GMF Gypsum Stack Pond and Recycle Pond at the Coffeen Power Plant

The GMF GSP and the GMF RP at the Coffeen Power Plant were put in operation in 2010 and were used to manage CCR and non-CCR waste streams. The GMF GSP is a 77-acre lined SI and the GMF RP is a 17-acre lined SI (Ramboll 2022b; Gradient, 2022f).

Based on groundwater monitoring data collected between 2015 and 2021, potential GWPS exceedances of boron, sulfate, and TDS were identified at groundwater monitoring wells near and downgradient of the GMF GSP and the GMF RP (Ramboll, 2022b)[6]. The maximum detected concentrations (based on data collected between 2015 and 2021 from 43 wells near and downgradient of the GMF GSP and the GMF RP) for boron, sulfate, and TDS were 4.6 mg/L, 1,800 mg/L, and 3,400 mg/L, respectively (Gradient, 2022f). Sulfate was the constituent detected at the highest concentration relative to its GWPS.

Ramboll prepared a groundwater modeling report (Ramboll, 2022b) for the GMF GSP and the GMF RP that was submitted to IEPA as part of the Construction Permit Application (Golder Associates USA Inc., 2022b, 2022c). The objective of the groundwater modeling was "to evaluate the effects of closure (source

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[4] Cobalt and pH were also detected in groundwater downgradient of AP1 at concentrations in excess of their respective GWPSs, but investigations provided at the time of modeling concluded that these constituents are not related to AP1 (Ramboll, 2022a).

[5] Due to the conservative nature of the site-specific risk assessment that was conducted at AP1 and the attempt to "screen-in" rather than "screen-out" constituents (Gradient, 2022e), risks were calculated for constituents at concentrations that may not be associated with AP1 and may not have been identified as potential groundwater exceedances, which are based on statistical evaluations of the full dataset rather than single measurements.

[6] Due to the conservative nature of the site-specific risk assessment that was conducted at GMF GSP and GMF RP and the attempt to "screen-in" rather than "screen-out" constituents (Gradient, 2022f), risks were calculated for constituents at concentrations that may not be associated with GMF GSP and GMF RP, and may not have been identified as potential groundwater exceedances, which are based on statistical evaluations of the full dataset rather than single measurements.

control measures) for the GMF GSP and GMF RP on groundwater quality," and, specifically, to predict the time to meet GWPS in the compliance wells under two proposed closure scenarios – CIP and CBR (Ramboll, 2022b). The CIP scenario considered would involve "removal of CCR from the GMF RP and the southern portion of the GSP, consolidation into the northern portion of the GSP, and construction of a cover system over the remaining CCR," whereas CBR would involve "removal of all CCR and SI liner and regrading of the removal area for both GMF GSP and GMF RP" (Ramboll, 2022b).

Ramboll's modeling approach involved using HELP to estimate recharge under the different closure scenarios, using MODFLOW 2005 to simulate groundwater flow in three dimensions, and using MT3DMS to simulate the three-dimensional transport of sulfate (Ramboll, 2022b). "Sulfate was selected for transport modeling … because: (i) it is commonly present in coal ash leachate; and (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater" (Ramboll, 2022b). Sulfate was modeled as a conservative substance that does "not significantly sorb or chemically react with aquifer solids (distribution coefficient [Kd] was set to 0 milliliters per gram [mL/g])" (Ramboll, 2022b).

4.3 Ash Pond at the Edwards Power Plant

The Edwards Power Plant is a retired electric power generating facility operated by IPRG with coal-fired units located near Bartonville, Illinois. The plant began operations in 1960 and ceased operations in December 2022. The facility has one SI for CCR storage known as the Ash Pond which covers approximately 91 acres (Ramboll, 2022c; Gradient, 2022g).

Based on groundwater monitoring data collected between 2015 and 2021, potential GWPS exceedances of boron, sulfate and TDS were identified at groundwater monitoring wells near and downgradient of the Ash Pond (Ramboll, 2022c)[7,8]. For boron, sulfate, and TDS, the maximum detected concentrations (based on data collected between 2015 and 2021 from 28 wells near and downgradient of the Ash Pond) were 12 mg/L, 570 mg/L and 2,600 mg/L, respectively (Gradient, 2022g). Boron was the constituent detected at the highest concentration relative to its GWPS.

Ramboll prepared a groundwater modeling report (Ramboll, 2022c) for the Ash Pond that was submitted to IEPA as part of the Construction Permit Application (IngenAE, LLC 2022). The objective of the groundwater modeling conducted by Ramboll was to "evaluate the effects of closure (source control) measures (CCR consolidation and CIP and CBR scenarios) for the Ash Pond on groundwater quality following initial corrective action measures, which includes removal of free liquids from the Ash Pond" (Ramboll, 2022c). More specifically, the objective of groundwater modeling was to predict the time to meet GWPS under two proposed closure scenarios – CIP and CBR. The CIP scenario considered would involve "CCR removal from the northwest areas of the Ash Pond, consolidation to the northeast, central and southern areas of the Ash Pond, and construction of a cover system over the remaining CCR" (Ramboll, 2022c).

Ramboll's modeling approach involved using HELP to estimate recharge under the two closure scenarios, using MODFLOW 2005 to simulate groundwater flow in three dimensions and using MT3DMS to simulate the three-dimensional transport of boron (Ramboll, 2022c). "Boron was selected for transport modeling …

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[7] Barium, lithium, and chloride were also detected in groundwater downgradient of the Ash Pond at concentrations in excess of their respective GWPSs, but investigations provided at the time of modeling concluded that these constituents are not related to the Ash Pond (Ramboll, 2022c).

[8] Due to the conservative nature of the site-specific risk assessment that was conducted at the Ash Pond and the attempt to "screen-in" rather than "screen-out" constituents (Gradient, 2022g), risks were calculated for constituents at concentrations that may not be associated with the Ash Pond and may not have been identified as potential groundwater exceedances, which are based on statistical evaluations of the full dataset rather than single measurements.

because: (i) it is commonly present in coal ash leachate; (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater; and (iii) it is less likely than other constituents to be present in background groundwater from natural or other anthropogenic sources. The only significant source of boron is the Ash Pond" (Ramboll, 2022c). Boron was modeled as a conservative substance that does "not significantly sorb or chemically react with aquifer solids (distribution coefficient [Kd] was set to 0 mL/g)" (Ramboll, 2022c).

4.4 Primary Ash Pond at the Newton Power Plant

The Newton Power Plant is an electric power generating facility operated by IPGC with coal-fired units located near Newton, Illinois. The plant began operating in approximately 1977 and has one SI for CCR storage known as the PAP which covers approximately 404 acres (Ramboll, 2022d; Gradient, 2022h).

Based on groundwater monitoring data collected between 2015 and 2021, potential GWPS exceedances of lithium, sulfate, and TDS were identified at groundwater monitoring wells near and downgradient of the PAP (Ramboll, 2022d)[9,10]. For lithium, sulfate, and TDS, the maximum detected concentrations (based on data collected between 2015 and 2021 from 29 wells near and downgradient of the PAP) were 0.3 mg/L, 3,200 mg/L, and 5,500 mg/L, respectively (Gradient, 2022h). Sulfate was the constituent detected at the highest concentration relative to its GWPS.

Ramboll prepared a groundwater modeling report (Ramboll, 2022d) for the PAP that was submitted to IEPA as part of the Construction Permit Application (HDR Inc., 2022). The objective of the groundwater modeling conducted by Ramboll was "to evaluate the effects of Closure (source control measures) for the PAP on groundwater quality," and specifically, to predict the time to meet GWPS in the compliance wells under two proposed closure scenarios – CIP and CBR (Ramboll, 2022d). The CIP scenario considered would involve "removal of CCR from the southern portion of the PAP, consolidation into the northern portion of the PAP, and construction of a cover system over the remaining CCR," whereas CBR would involve "removal of all CCR and regrading of the removal area" (Ramboll, 2022d).

Ramboll's modeling approach involved using HELP to estimate recharge under the different closure scenarios, using MODFLOW 2005 to simulate groundwater flow in three dimensions, and using MT3DMS to simulate the three-dimensional transport of sulfate (Ramboll, 2022d). "Sulfate was selected for transport modeling … because: (i) it is commonly present in coal ash leachate; and (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater" (Ramboll, 2022d). Sulfate was modeled as a conservative substance that does "not significantly sorb or chemically react with aquifer solids (distribution coefficient [Kd] was set to 0 milliliters per gram [mL/g])" (Ramboll, 2022d).

4.5 East Ash Pond at the Hennepin Power Plant

The Hennepin Power Plant is a retired electric power generating facility operated by DMG with coal-fired units located in Hennepin, Illinois. The plant began operations in the early 1950s and was retired in 2019.

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[9] pH was also detected in groundwater downgradient of the PAP outside of its acceptable range, but investigations provided at the time of modeling concluded that pH impacts to groundwater are not related to the PAP (Ramboll 2022d).

[10] Due to the conservative nature of the site-specific risk assessment that was conducted at the PAP and the attempt to "screen-in" rather than "screen-out" constituents (Gradient, 2022h), risks were calculated for constituents at concentrations that may not be associated with the PAP and may not have been identified as potential groundwater exceedances, which are based on statistical evaluations of the full dataset rather than single measurements.

CCRs associated with plant operation were stored in several ponds including the EAP, which covers approximately 21 acres (Ramboll, 2022e; Gradient, 2021b).

Based on groundwater monitoring data collected between 2015 and 2021 at 13 wells near and downgradient of the EAP, no potential GWPS exceedances attributable to the EAP were identified (Ramboll, 2022e; Gradient, 2021b)[11]. Ramboll prepared a groundwater modeling report (Ramboll, 2022e) for the EAP that was submitted to IEPA as part of the Construction Permit Application (Geosyntec Consultants, 2022). The objective of the groundwater modeling conducted by Ramboll was "to simulate future conditions and groundwater concentrations of boron for proposed closure alternatives for the EAP. Boron was selected for modeling because it is one of the most common and mobile CCR-related constituents. A total of three scenarios were simulated: no action, EAP CIP, and EAP CBR" (Ramboll, 2022e). The no action scenario assumed "no closure at the EAP (current conditions retained)" (Ramboll, 2022e). Under the CIP scenario, the EAP was assumed to "be graded and covered with a geomembrane and soil layers," whereas the CBR scenario assumed that "CCR materials from the EAP will be removed" and "[t]he existing liner system and 1 foot of material beneath the side slope and bottom liner will be excavated" (Ramboll, 2022e). The three scenarios also assumed closure of the Coal Combustion Waste Landfill, which is located adjacent to and north of the EAP (Ramboll, 2022e).

Ramboll's modeling approach involved using HELP to estimate recharge under the different closure scenarios, using MODFLOW to simulate groundwater flow in three dimensions and using MT3DMS to simulate the three-dimensional transport of boron (Ramboll, 2022e). "Boron was selected for groundwater transport modeling … because: (i) it is commonly present in coal ash leachate; (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater; and (iii) it is less likely than other constituents to be present in background groundwater from natural or other anthropogenic sources" (Ramboll, 2022e). Boron was modeled as a conservative substance that "minimally adsorbs and does not decay, and mixing and dispersion are the primary attenuation mechanisms in groundwater" (Ramboll, 2022e).

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[11] Due to the conservative nature of the site-specific risk assessment that was conducted at the EAP and the attempt to "screen-in" rather than "screen-out" constituents (Gradient, 2021b), risks were calculated for constituents at concentrations that may not be associated with the EAP and may not have been identified as potential groundwater exceedances, which are based on statistical evaluations of the full dataset rather than single measurements.

5 Modeling surrogate constituents is an appropriate approach to achieve model objectives in support of the CAA.

All environmental models are, in some regard, simplifications of complex systems, and it is common to make simplifications to models based on the model objectives. Using one or more surrogate constituents to represent the potential behavior of a larger group of constituents, with the surrogate constituents selected in accordance with the model objectives, is a simplification that is commonly made in environmental models.

For the groundwater modeling performed in support of the CAAs at AP1, the GMF GSP, and the GMF RP at the Coffeen Power Plant, the Ash Pond at the Edwards Power Plant, the PAP at the Newton Power Plant, and the EAP at the Hennepin Power Plant, the model objectives were to evaluate the effects of various closure alternatives on groundwater quality and to specifically predict the time at which GWPSs will be achieved for each closure alternative. For each of these SIs, the constituent with the highest concentration relative to its GWPS (*i.e.*, "Exceedance Ratio"; Table 5.1) was selected for transport modeling because it will likely be the constituent that takes the longest time to achieve its GWPS. It is not necessary to model other constituents that have been detected at lower concentrations relative to their GWPSs because these constituents will likely achieve their GWPSs faster than the surrogate constituent. Thus, the approach of modeling the constituent with the highest concentration relative to its GWPS is reasonable and sufficient to achieve the model objectives.

Table 5.1 Summary of Potential GWPS Exceedances at Downgradient Monitoring Wells Between 2015 and 2021

Constituents with a Detected Potential GWPS Exceedance	Maximum Detected Concentration (mg/L)	GWPS (mg/L)	Exceedance Ratio	Surrogate Constituent (Modeled in Support of CAA)
Coffeen Ash Pond 1				
Boron	7.5	2	3.8	Sulfate
Sulfate	2,400	400	**6.0**	
TDS	4,000	1,200	3.3	
Coffeen GMF Gypsum Stack Pond and Recycle Pond				
Boron	4.6	2	2.3	Sulfate
Sulfate	1,800	400	**4.5**	
TDS	3,400	1,200	2.8	
Edwards Ash Pond				
Boron	12	2	**6.0**	Boron
Sulfate	570	400	1.4	
TDS	2,600	1,200	2.2	
Newton Primary Ash Pond				
Lithium	0.3	0.04	7.5	Sulfate
Sulfate	3,200	400	**8.0**	
TDS	5,500	1,200	4.6	

Constituents with a Detected Potential GWPS Exceedance	Maximum Detected Concentration (mg/L)	GWPS (mg/L)	Exceedance Ratio	Surrogate Constituent (Modeled in Support of CAA)
Hennepin East Ash Pond				
Boron[a]	1.41	2	0.7	Boron

Notes:

Sources: Ramboll (2022a, 2022b, 2022c, 2022d, 2022e); Gradient (2022e, 2022f, 2022g, 2022h, 2021b).

CAA = Closure Alternatives Analysis; CCR = Coal Combustion Residual; GMF = Gypsum Management Facility; GWPS = Groundwater Protection Standards; TDS = Total Dissolved Solids.

(a) No GWPS exceedances were identified for the Hennepin East Ash Pond but Boron was selected as the constituent for transport modeling because boron is one of the most common and mobile CCR-related constituents (Ramboll, 2022e).

Model surrogate constituent selection also considered the number of locations where a GWPS was exceeded and the size of each constituent's footprint in groundwater. In general, constituents with the highest frequency of GWPS exceedances correlated with constituents that were detected at the highest concentrations relative to their GWPSs. Thus, the approach of modeling the constituent with the highest concentration relative to its GWPS is reasonable and sufficient to achieve the model objectives.

Based on this approach, the following constituents were selected as the surrogate constituents to be evaluated in the groundwater model:

- sulfate at the AP1 at the Coffeen Power Plant;
- sulfate at the GMF GSP, and the GMF RP at the Coffeen Power Plant;
- boron at the Ash Pond at the Edwards Power Plant;
- sulfate at the PAP at the Newton Power Plant; and
- boron at the EAP at the Hennepin Power Plant.

Moreover, the other constituents with potential GWPS exceedances that have been identified – boron and TDS at AP1, the GMF GSP, and the GMF RP at the Coffeen Power Plant; sulfate and TDS at the Ash Pond at the Edwards Power Plant; and lithium and TDS at the PAP at the Newton Power Plant (Table 5.1) – have similar groundwater transport characteristics to the selected surrogate constituents. Specifically, the surrogate constituents have a similar propensity to sorb to soils as the other constituents with potentially identified GWPS exceedances (*i.e.*, all constituents have relatively small values of K_d; Table 5.2); therefore, subsurface transport during closure conditions would be similar for all of the constituents that have been detected with potential GWPS exceedances. Because each of these constituents is expected to behave in a similar manner during closure, it is appropriate to only model the surrogate constituents and use the surrogate constituents to determine when each closure alternative will achieve the GWPSs for all constituents.

Table 5.2 Soil-Water Partition Coefficient (K_d) for Constituents with GWPS Exceedances

Chemical Constituent	Soil-Water Partition Coefficient, K_d (L/kg)
Boron[a]	1.1×10^{-5}
Lithium[b]	0
Sulfate[c]	0
TDS[c]	0

Notes:

GWPS = Groundwater Protection Standards; TDS = Total Dissolved Solids; US EPA = United States Environmental Protection Agency.

(a) US EPA (2014) reported select percentiles of chemical-specific K_d values for SIs containing combined ash. The 50th percentile value of K_d in saturated zone is used here.

(b) US EPA (2014) noted that "lithium does adsorb weakly to clay soils" but "sufficient information was not available to develop chemical-specific K_d values for lithium," and a K_d of 0 was used "to estimate lithium fate and transport".

(c) Ions such as "[c]alcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, nitrate, and silica typically make up most of the dissolved solids in water" (USGS, 2014). These ions do not significantly sorb to soil and their K_d is generally assumed to be zero. For example, US EPA (2014) used a K_d of 0 for chloride.

6 Part 845 does not require that all constituents listed in Section 845.600 be evaluated in CAA models.

In its Initial Review Letters, IEPA raised concerns regarding the sufficiency of only modeling selected constituents at each facility by noting that "[t]he Agency requires all constituents listed in Section 845.600 that have been found to be present in the CCR surface impoundment to be assessed in the groundwater model" (IEPA, 2023a, 2023b, 2023c, 2023d; emphasis added). However, there is no language in Part 845 suggesting that the groundwater model must evaluate all constituents that have been detected in an SI. Part 845 requires only that groundwater modeling evaluate "how the closure alternative will achieve compliance with the applicable groundwater protection standards" for each closure alternative (Section 845.710(d)(2) in IEPA, 2021).

The surrogate constituents that were selected for evaluation in the groundwater model for each SI are the constituents that will likely take the longest time to achieve their GWPS and, thus, are appropriate choices to achieve the CAA modeling objectives and to fulfill the requirements of Section 845.710(d)(2) (IEPA, 2021). All of the other constituents that have been detected in the SI are either already at levels below their respective GWPSs or will likely achieve their GWPSs faster than the surrogate constituent. Therefore, for each SI, the groundwater modeling performed by Ramboll predicted the time at which all of the constituents will likely have achieved compliance with the GWPSs for each closure alternative (*i.e.*, the time at which each closure alternative will achieve compliance with GWPSs), thereby satisfying Part 845 requirements.

7 It would be a costly and data-intensive endeavor to model all constituents, and it would not provide any additional useful information.

A number of CCR-related constituents have been identified in literature. For example, Part 845.600 lists 20 CCR-related constituents for which GWPSs have been established (IEPA, 2021) and Appendix III and IV of the 2015 Federal CCR Rule list 22 CCR-related constituents that must be monitored as part of detection and assessment monitoring (US EPA, 2015). The process of modeling all of these constituents would be significantly more data-intensive and costly than the process of modeling a single constituent.

Building a groundwater model that evaluates the time to achieve GWPSs for all constituents detected in an SI would involve collection of a large amount of data for each constituent (*e.g.*, to evaluate background groundwater quality, to determine whether observed concentrations are related to the SI or to an alternative source, to evaluate individual partitioning coefficients, *etc*.). Subsequently, individual groundwater solute transport models would need to be developed and calibrated for each constituent, and separate model simulations would need to be performed for each closure alternative with each constituent. The overall effort will likely scale with the number of constituents being considered (*i.e.*, the effort will be 20 times higher if 20 constituents are being evaluated instead of one), and the process would be onerous.

Despite the significantly increased effort, the models would not result in any additional useful information for meeting the CAA objectives that could not be obtained by modeling just the surrogate constituent. The predicted time to achieve GWPSs will likely be the longest for the constituent detected at the highest concentration relative to its GWPS (*i.e.*, the surrogate constituent) as the other constituents will either already be present at levels below their GWPSs or will likely achieve their GWPSs faster than the surrogate constituent. Thus, the additional information obtained from modeling all constituents (*i.e.*, the predicted time to achieve GWPSs for each constituent) will likely not affect the time at which all the constituents achieve compliance with the GWPSs for each closure alternative, which is the primary objective of the groundwater modeling performed in support of the CAA.

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Gradient. 2021b. "Human Health and Ecological Risk Assessment, East Ash Pond, Hennepin Power Plant, Hennepin, Illinois (Draft)." 46p., November 8.

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Gradient. 2022f. "Human Health and Ecological Risk Assessment, Gypsum Management Facility Gypsum Stack Pond and Gypsum Management Facility Recycle Pond, Coffeen Power Plant, Coffeen, Illinois." 63p., July 28.

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Appendix A

Curriculum Vitae and Testimony History of Andrew Bittner, M.Eng., P.E.

Andrew B. Bittner, M.Eng., P.E.

Principal

(he/him)

abittner@gradientcorp.com

Areas of Expertise

Contaminant fate and transport in porous and fractured media, migration of coal ash combustion products in groundwater and surface water, non-aqueous phase liquid (NAPL) transport, surface water and groundwater hydrology, groundwater and surface water modeling, remedial investigation design, remedy evaluation and optimization, cost allocation, international regulatory compliance and remediation.

Education & Certifications

M.Eng., Environmental Engineering and Water Resources, Massachusetts Institute of Technology, 2000

B.S.E., Environmental Engineering, University of Michigan, 1997

B.S., Physics, University of Michigan, 1997

Licensed Professional Engineer: Idaho, New Hampshire

Professional Experience

2000 – Present GRADIENT, Boston, MA
Environmental Engineer. Specializes in the fate and transport of contaminants in groundwater and surface water, coal combustion products, groundwater hydrology, groundwater flow and contaminant transport modeling, NAPL transport, and remedial investigation and design. Has served as principal-in-charge, testifying expert, and consulting expert on large, multi-disciplinary projects at coal combustion product surface impoundments and landfills, pharmaceutical facilities, automotive facilities, manufacturing plants, dry cleaning facilities, and Superfund sites. Extensive experience in South America and at other international sites.

1997 – 1999 PARSONS ENGINEERING SCIENCE, Canton, MA
Environmental Engineer. Specialized in industrial wastewater treatability. On-site supervisor for bioremediation bench scale treatment and laboratory study for a major pharmaceutical company. Built hydraulic models for pharmaceutical wastewater treatment facilities. Designed hazardous waste treatment systems for a major pharmaceutical company. Performed site investigations to delineate NAPL plumes and design remedial recovery plans.

12/7/2022

Professional Affiliations

National Ground Water Association; Chi Epsilon – Environmental Engineering Honor Society

Technical Session Chair:

- World of Coal Ash Conference. Lexington, KY. May 8-11, 2017. Session title: "Groundwater."
- Battelle Conference on Remediation of Chlorinated and Recalcitrant Compounds. Palm Springs, CA. May 23-26, 2016. Session title: "Coal Ash Facility Restoration".
- Battelle Conference on Remediation of Chlorinated and Recalcitrant Compounds. Monterey, CA. May 21-24, 2012. Session title: "Environmental Remediation in Emerging Markets."
- Defense Research Institute. Panelist for session titled "Groundwater-Surface Water Connectivity and the Clean Water Act." New Orleans, LA. May 13-14, 2019.
- World of Coal Ash Conference. St. Louis, MO. May 13-16, 2019. Session title: "Project-Specific Case Studies."
- World of Coal Ash Conference. Covington, KY. May 16-19, 2022. Session title: "Regulatory."

Projects – *Coal Combustion Products*

Electric Power Research Institute: Modeled groundwater impacts from coal combustion product (CCP) surface impoundments with intersecting groundwater conditions and evaluated hydrogeological factors and other characteristics that influence risks to human health and the environment (HHE).

Utility Client: Served as litigation consulting expert regarding the fate and transport of metal constituents in groundwater from 18 different coal combustion residual (CCR) disposal facilities at 7 sites in the Midwest.

Utility Client: Prepared expert report and provided testimony related to the fate and transport of metal constituents in groundwater from 11 different coal combustion residual (CCR) disposal facilities at 6 sites in West Virginia, Virginia, and Ohio.

Utility Client: Prepared expert report in support of "Petition for a Finding of Inapplicability or, in the Alternative, an Adjusted Standard from 35 ILL. Admin. Code Part 845". Report assessed current risks to human and environmental receptors and evaluated net environmental benefits (*i.e.*, NEBA) of potential closure options at a former CCR disposal facility.

Utility Client: Prepared Closure Alternatives Assessment (CAA), Corrective Measures Assessment (CMA), and Corrective Action Alternatives Analysis (CAAA) for multiple CCR surface impoundments located at a series of Midwestern power plants. Reports were prepared consistent with requirements of 35 ILL. Admin. Code Part 845.

Utility Client: Evaluated risks to human health and the environment associated with CCR surface impoundments at six coal fired power plants in the Southern US. Evaluations included assessing CCR constituent migration in groundwater and the flux of constituents into nearby surface waters.

Utility Client: Calculated alternative groundwater protection standards (GWPSs) at a coal fired power plant facility in the Midwestern US. Alternative standards were calculated based on site-specific human and ecological receptors and attenuation factors.

Utility Client: Prepared expert report and testified before state pollution control board regarding proposed coal ash disposal regulations.

Electric Power Research Institute: Evaluated the performance of alternative liners, including engineered clay liners, natural clay liners, and geomembrane composite-lined systems at CCP impoundments. Used a probabilistic approach to model the flux of CCP constituents through each liner and the subsequent transport of constituents through the underlying vadose and saturated zone.

Industry Research Group: Developed methodology to evaluate performance equivalency of various surface impoundment liner systems. The methodology, which was submitted to US EPA in order to inform future rulemakings, presented a process to evaluate and compare hydraulic flux and travel times through different liner systems including geocomposite, compacted clay, and natural clay liners.

Confidential Client: Developed a screening level risk assessment for a manufacturing facility beneficially using coal fly ash as a soil stabilizer. The risk assessment compared estimated coal ash constituent exposure concentrations in soil, groundwater, and surface water to relevant benchmarks protective of human health and the environment.

Manufacturing Client: Performed beneficial use risk assessments consistent with US EPA Federal Coal Combustion Residual (CCR) Rule and Secondary Use Guidance for multiple commercial and construction products containing coal ash – including carpet backing, interior and exterior trim, and backer board. Analysis evaluated risks to groundwater, surface water, indoor air, and soil. Evaluation also considered exposure pathways for residents, construction workers, and landfill workers associated with installation of products, active life of the installed products, and post-life disposal in a landfill.

Electric Power Research Institute: Developed framework for creating alternative groundwater standards at CCP storage sites. The framework considers the development of alternative standards for the protection of human health and the environment, current and future uses of groundwater near CCP management units, and potential attenuation that may occur between the current point of compliance and a relevant point of exposure.

Utility Client: Prepared expert report and provided testimony related to the fate and transport of metal constituents in groundwater, including sulfate, boron, and arsenic, from over 30 different coal combustion residual surface impoundments at 15 sites in North Carolina and South Carolina.

Industry Research Group: Prepared technical comments regarding proposal to add boron to list of Appendix IV constituents to the Federal CCR Rule. Evaluated technical practicability and cost implications associated with the potential boron addition.

Industry Research Group: Prepared technical comments regarding portion of Federal CCR Rule that requires the groundwater protection standard (GWPS) of Appendix IV constituents with no MCL to be the background concentration. Evaluated technical practicability, cost implications, and potential benefits associated with the requirement for the four current Appendix IV constituents with no established MCL - cobalt, lithium, molybdenum, and lead.

Confidential Client: Developed a screening level risk assessment for a steel production and recycling facility that is beneficially using coal fly ash as a soil stabilizer. The risk assessment addressed a requirement in the Federal Coal Combustion Residuals (CCR) Disposal Rule for a characterization of risk from unencapsulated beneficial use of CCR. Used the Industrial Waste Evaluation Model (IWEM) to evaluate potential transport of coal ash constituents, including arsenic, in groundwater as a result of the beneficial reuse.

Utility Client: Prepared expert report interpreting data produced during a field investigation performed at a large Midwestern coal ash landfill.

Utility Client: For litigation support, modeled the fate and transport of arsenic and other coal ash related constituents in groundwater and surface water downgradient of a large Midwestern coal ash surface impoundment located in a karst environment. Model simulations compared potential impacts to groundwater and surface water resulting from potential surface impoundment closure scenarios.

Manufacturing Client: Performed beneficial use risk assessments consistent with US EPA Federal Coal Combustion Residual (CCR) Rule and Secondary Use Guidance for multiple commercial and construction products containing coal ash. Analysis evaluated risks to groundwater, surface water, indoor air, worker safety, and residential safety. Evaluation also considered exposure pathways associated with installation of products, active life of the installed products, and post-life disposal in a landfill. Used the Industrial Waste Evaluation Model (IWEM) to evaluate potential transport of coal ash constituents, including arsenic, in groundwater as a result of the beneficial reuse.

Industry Research Group: Developed a groundwater fate and transport model to evaluate the level of groundwater protection provided by various coal ash surface impoundment closure options, including closure in place and closure by removal. Model simulated transport of arsenic (III) and arsenic (V) in groundwater downgradient of coal ash disposal facilities. Model results are being used by utilities in support of closure planning which is required by Federal Coal Combustion Residual Rule.

Confidential Client: Prepared expert report on human health and ecological risks due to a potential spill of barged coal combustion byproducts (CCBs) on a large Midwestern river. Modeled the fate and transport of key CCB constituents, including arsenic, in surface water for a range of spill scenarios and river flow conditions and estimated potential downstream concentrations at drinking water intake locations.

Industry Research Group: Evaluated technical approach used by United States Environmental Protection Agency (US EPA) to simulate the migration of arsenic, selenium, and other metals in groundwater from overlying coal combustion storage units. Model analyses were included in regulatory comments submitted in response to US EPA's 2010 Coal Combustion Product Risk Assessment.

Industry Research Group: Developed relative risk framework to assess impacts to groundwater associated coal combustion product (CCP) surface impoundment closure scenarios. Framework identified potential deterministic and probabilistic modeling approaches to simulate potential migration of CCP constituents, including arsenic, boron, selenium, and molybdenum through the vadose and saturated zones for each closure alternative.

Industry Research Group: Modeled the downward migration of leachate from unlined coal combustion product surface impoundments using a probabilistic framework for a wide range of climatic and site conditions. Model results provided estimated durations for interactions between the impoundment leachate and nearby surface and groundwater.

Industry Research Group: As part of a relative risk framework, performed detailed sensitivity analysis of all factors associated with a coal ash surface impoundment closure that may impact the fate and transport of constituents in groundwater. Factors analyzed included surface impoundment characteristics (*e.g.*, volume, depth, and leachate quality), hydrogeological conditions (*e.g.*, hydraulic conductivity, hydraulic gradient, soil type, depth to groundwater, and surface water proximity), climatic characteristics (*e.g.*, precipitation), and closure details (*e.g.*, closure type and duration).

Projects – *Fate & Transport and Modeling*

Manufacturing Client: Consulting expert for a class certification case. Evaluated PFAS transport from known and potential sources.

Natural Gas Processing Facility: Prepared an expert report evaluating the hydrogeological conditions at and downgradient of a natural gas processing plant and provided assessment of the fate and transport over time of light non-aqueous phase liquids (LNAPLs) released from the plant and associated pipelines.

Confidential Client, Rhode Island: Designed and calibrated a groundwater flow and solute transport model for multiple chlorinated organic constituents at a Northeastern Superfund Site. Used one year long tracer test to calibrate model. Model was used to predict the future effectiveness of various remedial alternatives.

Confidential Client: Designed and calibrated a groundwater flow and solute transport model for a Superfund site that has groundwater impacted with volatile organic compounds including benzene, tetrachloroethylene, trichloroethylene, and vinyl chloride. The model was used successfully to present the case to US EPA for shutting down the source remedy.

Confidential Client, Brazil: Developed 3-D numerical groundwater and solute transport model using MODFLOW and MT3D for volatile organic compounds and pesticides. Used model to evaluate and design remediation alternatives. Managed multiple site investigation and characterization studies. Projects involved calculation of risks to human health from exposure to soils, groundwater, indoor air, and outdoor air.

Savage Well Superfund Site: For a potentially responsible party (PRP) group, managed the development of a 3-D numerical groundwater and solute transport model for tetrachloroethylene (PCE) at a Superfund site in New Hampshire. Calibrated the model using approximately 10 years of data with review and oversight by US EPA and United States Geological Survey (USGS). Designed an optimization algorithm to develop the optimal groundwater pump and treat system.

Confidential Client, Massachusetts: Developed a 2-D contaminant transport model for PCE to demonstrate that contaminant contribution from a dry cleaning operation to the town water supply wells was insignificant compared to contribution from other potential sources. Managed the installation and operation of a pump and treat system at the Site.

Confidential Client, Argentina: Developed a 2-D numerical groundwater and solute transport model using MODFLOW and MT3D. Used the calibrated model to design a hydraulic barrier system to control off-site migration.

Confidential Client: Performed site-specific vapor intrusion modeling using the Johnson-Ettinger model at a pharmaceutical facility. Performed a detailed sensitivity analysis for each model input parameter.

Confidential Client: Performed NAPL transport and travel time calculations through porous media vadose and saturated zones and clay confining layers.

Confidential Client: Wrote critique of US EPA geochemistry model.

Projects – *Remediation*

Confidential Client: Evaluated potential liabilities related to range of issues including waste surface impoundment closure, groundwater remediation, and regulatory compliance at sites around the world that were involved in a corporate transaction.

Manufacturing Client, New Hampshire: Served as consulting expert for a case related to a failed groundwater remedy. Evaluated remedy design and installation and performed probabilistic modeling to determine appropriate design factors.

PRP Group, Nevada: Provided hydrogeological support at an industrial site with groundwater impacts due to benzene, chlorobenzene, chloroform, perchlorate, and chromium. Evaluated and critiqued a Remedial Investigation (RI) Report related to a neighboring property and developed a conceptual site model (CSM) describing the fate and transport mechanisms of constituents in groundwater. Prepared submittals and presented conclusions at meetings with the State Environmental Agency.

Confidential Client, Brazil: Designed and implemented nano-scale zero valent iron remedy to prevent off-site arsenic migration. Upon completion of remedy, negotiated site closure with state of Rio de Janeiro environmental agency.

Confidential Client, Brazil: Designed and implemented a pilot scale enhanced *in-situ* bioremediation remedy for groundwater impacted with chlorinated organic compounds at a former agricultural product manufacturing facility.

Confidential Client, New Hampshire: As an independent third party, performed a review of a proposed Electrical Resistive Heating remedy for a chlorinated solvent dense non-aqueous phase liquid (DNAPL) source zone.

Confidential Client, New York: Provided regulatory comments regarding a US EPA Proposed Remedial Action Plan at a Region II Superfund Site on Long Island. Provided support during mediation and during negotiations with US EPA.

Confidential Client, New Jersey: Provided regulatory comments regarding a US EPA Proposed National Priorities List (NPL) listing at a Region II Superfund Site.

Confidential Client, Brazil: Managed multiple conceptual and detailed engineering remedial design projects for a soil vapor extraction system, dual-phase extraction system, and a pump and treat system. Remediation efforts focused on soil and groundwater contamination by pesticides and chlorinated solvents.

Confidential Client, Brazil: Managed site remediation projects to operate and maintain a soil vapor extraction system, dual-phase extraction system, and a hydraulic barrier system.

Confidential Client, Argentina: Managed conceptual and detailed engineering remedial design project for dual-phase extraction system focused on the remediation of volatile organic compounds in soil and groundwater.

Confidential Client: On-site supervisor for bioreactor bench scale study at a pharmaceutical wastewater treatment plant. Performed an in-depth investigation on the bio-inhibitory effects due to the chronic exposure of biomass to manganese. Performed laboratory work required to support the bioreactors including tests for mixed liquor volatile suspended solids (MLVSS), total suspended solids (TSS), chemical oxygen demand (COD), dissolved oxygen (DO), ammonia (NH_3~~)~~, and respirometry.

Confidential Client: Lead environmental engineer for a belt filter press replacement project for a pharmaceutical company wastewater treatment plant. Designed and sized polymer addition system.

Projects – *Site Characterization*

Confidential Client, Brazil: Provided strategic oversight for a series of environmental investigations, remedial actions, and agency negotiations for an automotive facility located in São Paolo.

Confidential Client: Managed large-scale cost allocation at a Midwestern Superfund site. Forensically evaluated the sources of tar to river sediments considering site industrial operational history, contaminant fate and transport, chemistry, site modification and filling history, and observed contaminant patterns. Calculated the mass of tar present in the environment using both visual observations and analytical data.

Confidential Client, Brazil: Managed large-scale site investigations and human health risk assessment projects at a former pharmaceutical facility located in São Paulo. Key compounds were petroleum hydrocarbons and volatile organic compounds.

Confidential Client, New York: Served as consulting expert for large cost allocation involving over 16 responsible parties and chlorinated organic groundwater plumes extending for nearly 2 miles. Evaluated lateral and vertical groundwater flow direction, chemical usage history, and groundwater chemistry to support a *de minimis* contribution argument for our client.

Confidential Client, Ohio: Served as consulting expert for cost allocation project at a Midwestern landfill. Evaluated differences in toxicity and risk associated with municipal solid waste and industrial hazardous waste. Used data to devise risk-weighted allocation approach for remedy costs.

Confidential Client, Brazil: Managed site investigation to evaluate groundwater responses due to seasonal precipitation events and their effect on potential contaminant fate & transport.

Confidential Client: Managed site investigation project identifying sources of PCE present at a former electrical resistor manufacturing facility. Soil, groundwater, and soil gas data were evaluated and used to identify individual sources of PCE to the subsurface. The impact of each source on remediation costs related to the site was evaluated and successfully used as a tool to mediate between responsible parties. Served as consulting expert during mediation between responsible parties.

Confidential Client, New Jersey: Delineated NAPL plumes and investigated spill history, sewer maps, and gas chromatography fingerprint results at East Coast Superfund Site. Designed French Drain to recover NAPL from subsurface.

City of Pittsfield, Massachusetts: Technical consultant to the city for mediation between General Electric (GE) and governmental agencies. Evaluated reports and clean-up standards, and attended mediation sessions on behalf of the city.

Projects – *Clean Water Act*

Municipal Client, Ohio: Consulting expert for significant nexus evaluation to determine whether wetlands and surface water tributaries are jurisdictional waters of the United States.

Publications/Presentations

Radloff, KA; Lewis, AS; Bittner, AB; Zhang Q; Minkara, R. 2022. "A Risk Evaluation of Controlled Low-Strength Materials (CLSM) Containing Coal Combustion Products (CCPs) in Construction Projects." Presented at the World of Coal Ash (WOCA) Conference, Covington, KY. May 17.

Kondziolka, J; Radloff, KA; Bittner, AB. 2022. "Emerging Clean Water Act Issues for CCR Surface Impoundments." Presented at the World of Coal Ash (WOCA) Conference, Covington, KY. May 17.

Bittner, AB; Kondziolka, J. 2022. "Alternative Liner Performance Demonstrations – A Science-Based Approach to Inform Policy Development ." Presented at the World of Coal Ash (WOCA) Conference, Covington, KY. May 18.

Bittner, AB. 2022. "Decision Analysis Applied to CCR Surface Impoundment Closure and Corrective Action." Presented at the World of Coal Ash (WOCA) Conference, Covington, KY. May 18.

Lewis, AS; Bittner, AB; Radloff, KA. 2022. "Using Human Health and Ecological Risk Assessment at Coal Combustion Product (CCP) Sites to Meet Closure Objectives ." Presented at the World of Coal Ash (WOCA) Conference, Covington, KY. May 18.

Radloff, KA; Lewis, AS; Bittner, AB. 2021. "Challenges Using Data Generated by LEAF Methods in Risk Evaluations." Presented at the USWAG CCR Webinar. August 5.

Register, JR; Bittner A. 2020. "USEPA Reconsideration of CCR Regulations Impacting the Geosynthetic Industry." Presented to the Fabricated Geomembrane Institute. October 8.

Dale, A, Kondziolka, J, de Lassus, C, Bittner, A, Hensel, B. 2020. "Probabilistic Modeling of Leaching from Coal Ash Impoundment Liners: A Case Study in Science Informing Policy Development." Presented at the International Society of Exposure Science Virtual Meeting, California, September 21.

Briggs, N; Lewis, AS; Bittner, AB. 2020. "Evaluating Climate Change Impacts on CCP Surface Impoundments and Landfills." Presented at the World of Coal Ash (WOCA) Conference, St. Louis, Missouri, May 16.

Bittner, AB; Lewis, AS. 2020. "Beneficial use assessment of building materials containing CCPs." *Gradient Trends: Risk Science and Application* 77 (Winter):3,5.

Register, JR; Bittner A. 2019. "Insane in the Geomembrane." Presented to the Fabricated Geomembrane Institute. August 6..

Bittner, AB; Spak, MS; Cox, WS. 2019. "Carving out the Contours: The Clean Water Act and the Migration of Affected Groundwater to Waters of the United States." *For the Defense* 61(6):55-59.

Bittner, A. Lewis, A. 2019. "CCP Beneficial Use Risk Assessment: Case Studies for Three Different Applications." Presented at the World of Coal Ash (WOCA) Conference, St. Louis, Missouri, May 14.

Lewis, A. Bittner, A. 2019. "Risk Based Considerations for Establishing Alternative Groundwater Standards at Coal Combustion Product Sites." Presented at the World of Coal Ash (WOCA) Conference, St. Louis, Missouri, May 15.

Lewis, AS; Bittner, A. 2018. "Risk-Based Approaches for Establishing Alternative Standards at Coal Combustion Sites." Presented at the World of Coal Ash (WOCA) Ponded Ash Workshop, Louisville, Kentucky, October 30-31.

Lewis, AS; Bittner, A. 2017. "The Relative Impact Framework for Evaluating Coal Combustion Residual Surface Impoundment Closure Options: Application and Lessons Learned." *Coal Combustion and Gasification Products (CCGP)* 9:1-3.

Lewis, AS; Dube, EM; Bittner, A. 2017. "Key role of leachate data in evaluating CCP beneficial use." *ASH at Work* 1:32-34.

Lewis, AS; Bittner, AB; Lemay, JC. 2017. "Achieving Groundwater Protection Standards for Appendix IV Constituents: The Problem with Using Background Concentrations in the Absence of Maximum Contaminant Levels (MCLs)." Presented at the 2017 World of Coal Ash Conference (WOCA), Lexington, KY, May 8-11.

Bittner, A. 2017. "Evaluation of Groundwater Protectiveness of Potential Surface Impoundment Closure Options." Presented at the American Coal Ash Association's 7th Annual World of Coal Ash Conference, Lexington, KY, May 11.

Lewis, A; Bittner A; Radloff, K; Hensel, B. 2017. "Storage of coal combustion products in the United States: Perspectives on potential human health and environmental risks." In *Coal Combustion Products (CCPs): Characteristics, Utilization and Beneficiation, 1st Edition*. Woodhead Publishing, May 2.

Bittner, AB; Kondziolka, JM; Lewis, A; Hensel, B; Ladwig, K. 2016. "Groundwater Assessment Framework for Evaluating the Relative Impacts of Coal Ash Surface Impoundment Closure Options." Presented at Battelle's Tenth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA, May 22-26.

Bittner, AB; Kondziolka, JM; Sharma, M; Nangeroni, P; McGrath, R. 2016. "Using Tracer Test Data to Calibrate a Groundwater Flow and Solute Transport Model." Presented at Battelle's Tenth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA, May 22-26.

Bittner, A. 2016. "A Retrospective Look at Remediation in the State of Rio de Janeiro, Brazil: And What Lessons We Can Apply to Remediation Projects in Other Emerging International Markets." Presented at Battelle's Tenth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA, May 22-26. 17p.

Bittner, A. 2016. "The Federal CCR Rule and How it is Impacting Coal Ash Disposal." Presented at Battelle's Tenth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA, May 22-26. 17p.

Bittner, A. 2016. "Coal Ash Beneficial Reuse Assessment Consistent with Requirements of the 2015 Federal CCR Rule." Presented at EUCI's Sixth Annual Coal Combustion Residuals and Effluent Limitation Guidelines Conference, Charlotte, NC, March 30-31. 30p.

Herman, K; Flewelling, S; Bittner, AB; Tymchak, M; Swamy, M. 2015. "Alternate Endpoints for Remediating NAPL-Impacted Sites." Presented at the EPRI/AWMA Env-Vision Conference, Crystal City, VA, May 14.

Lewis, A; Bittner, AB; Herman, K; Dubé, E; Long, C; Hensel, B; Ladwig, K. 2015. "Framework for Evaluating Relative Impacts for Surface Impoundment Closure Options." Presented at the 2015 World of Coal Ash Conference, Nashville, TN, May 8.

Bittner, AB. Lewis, A; Herman, K; Dubé, E; Long, CM; Kondziolka, K, Hensel, B; Ladwig, K. 2015 "Groundwater Assessment Framework to Evaluate Relative Impacts of Surface Impoundment Closure Options." Presented at the 2015 World of Coal Ash Conference, Nashville, TN, May 7.

Bittner, AB. 2014. "Evolving environmental regulations in Brazil." *Gradient Trends: Risk Science and Application* 59 (Winter):4.

Bittner, AB. 2013. "Modeling Mass Discharge from the Source Zone." Presented at Second International Symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL, June 11.

Bittner, AB. 2013. "Successful Implementation of a Risk-based Remedial Solution in Brazil." Presented at the 2013 NGWA Groundwater Summit, San Antonio, TX, April 28.

Bittner, AB. 2013. "Evolving methods for evaluating vapor intrusion." *Gradient Trends: Risk Science and Application* 57(Spring): 4.

Esakkiperumal, C; Bittner, A. 2013. "Use of Mass-Flux Based Approach to Optimize the Design of a Hydraulic Containment System." Presented at the 2013 NGWA Groundwater Summit, San Antonio, TX, April 28.

Bittner, A. 2010. "A Weight-of-Evidence Approach to Assess NAPL Mobility." Presented at the 7th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 27.

Herman, K; Bittner, A. 2010. "How Much Tar is In the Mud? – Reducing Uncertainty in Characterizing the Distribution and Mass of DNAPL in Sediments." Presented at the EPRI MGP 2010 Symposium, January 28.

Bittner, AB. 2009. "Is your NAPL mobile?" *Gradient Trends: Risk Science & Application* 45(Spring):3.

Herman, K; Bittner, A. 2008. "Reducing Uncertainty in DNAPL Characterization." Presented at the 24th Annual International Conference on Soils, Sediments, and Water, October 23.

Bittner, AB; Baffrey, RN; Esakkiperumal, C. 2006. "Using Sediment Transport Modeling to Support Environmental Forensic PCB Analyses." Presented at Society of Environmental Toxicology and Chemistry Conference, Montreal, Canada, November 8.

Bittner, AB. 2006. "Groundwater and Air Modeling Used to Support Forensic Analyses." Presented at the Gradient Breakfast Seminar Titled: Forensic Chemistry – The Intersection of Science and Law, May 16.

Bittner, AB. 2006. "M&A emerging issues and requirements." *Gradient Trends: Risk Science & Application* 36(Spring):4.

Sharma, M; Saba, T; Bittner, A. 2003. "Optimization of Groundwater Pump and Treat Systems." Presented at the 19th Annual International Conference on Contaminated Soil, Sediments and Water, Amherst, MA, October 23.

Sharma, M; Saba, T; Bittner, A. 2003. "Optimization of Groundwater Pump and Treat Systems Using Numerical Modeling and the Monte Carlo Approach." Presented at the National Ground Water Association Mid-South Focus Conference, Nashville, TN, September 19.

Bittner, AB; Halsey, P; Khayyat, A; Luu, K; Maag, B; Sagara, J; Wolfe, A. 2002. "Drinking water quality assessment and point-of-use treatment in Nepal." *Civil Eng. Practice* 17:5-24.

Bittner, AB. 2000. "Drinking Water Quality Assessment in Nepal: Nitrates and Ammonia [Thesis]." Submitted to Massachusetts Institute of Technology.

ANDREW BITTNER, P.E.

Testimony Experience

Mr. Bittner has provided testimony in the following matters.

1. MACTEC Engineering & Consulting, Inc. v. Hitchiner Manufacturing Co., Inc., and Thomas & Betts Corporation vs. Dragin Drilling, Inc. and Windham Environmental Corporation, d/b/a Remede Products and d/b/a Redux Technology. American Arbitration Association No. 111920064106. Provided testimony (2007) in deposition related to contaminant fate and transport and groundwater flow modeling.

2. Ernest Hardy, et al. v. Cheshire Oil Company, Inc. and Gabrielle Realty, LLC. Prepared expert report (2008) regarding the fate and transport of methyl tertiary butyl ether in groundwater. Case settled prior to deposition.

3. Sierra Club v. Pennsylvania Department of Environmental Protection and FirstEnergy Generation, LLC, Permittee. Commonwealth of Pennsylvania, Environmental Hearing Board Docket No. 2015-093-R. Prepared expert report (2017) in support of permittee regarding the fate and transport coal combustion constituents in surface water. Case settled prior to deposition.

4. Davis Gas Processing, Inc. *et al*. v. Western Gas Resource, Inc. *et al*. Railroad Commission of Texas Hearings Division. Oil and Gas Docket No. 09-0304555. Prepared expert report (2018) titled "Evaluation of Groundwater Hydrogeology and LNAPL Fate and Transport at the Davis Gas Processing Plant and Surrounding Area in Bowie, Texas." Case Settled prior to deposition.

5. The Estate of Bobby Clary *et al*., v. American Electric Power Co. Inc. *et al*. Gavin Landfill Litigation. Circuit Court of Raleigh County, West Virginia. Civil Action No. 16-C-8000. Prepared expert report (2018) titled "Assessment of January 2017 Field Investigation and Results at the Gavin Landfill in Cheshire, Ohio." Case Settled prior to deposition.

6. Duke Energy Carolinas, LLC and Duke Energy Progress, LLC *v*. AG Insurance SA/NV (f/k/aL'Etoile S.A. Belge d'Assurances) *et al*. Prepared export report (April 2020), rebuttal report (May 2020), and surrebuttal report (June 2020). Provided testimony (September 2020) in deposition related to fate and transport of coal combustion product constituents at multiple coal ash disposal facilities and coal-fired power plants.

7. Provided pre-filed testimony (August 2020) related to the Illinois Environmental Protection Agency (IEPA) Proposed Part 845 Rulemaking of the Illinois Administrative Code (Title 35, Subtitle G, Chapter I, Subchapter j). Provided oral testimony (September 2020) related to the proposed rule before the Illinois Pollution Control Board.

8. Draft Allocation for the Lower Passaic River. Prepared expert rebuttal report "Comments on the Draft Allocation Recommendation for TFCFA" (November 2020).

9. Expert Report submitted in support of "Petition for a Finding of Inapplicability or, in the Alternative, an Adjusted Standard from 35 ILL. Admin. Code Part 845." "Human Health and Ecological Risk Evaluation and Relative Impact Assessment. Joppa Generating Station – Joppa West, Joppa, Illinois" (May 11, 2021).

10. AEP Generation Resources Inc. *et al*. *v*. AG Insurance SA/NV (f/k/a AG de 1830 Compagnie Belge and as Successor to L'Etoile S.A. Belge d'Assurances and Transferor to Bothnia International

Insurance Company Ltd.) *et al*. Prepared export report (June 2022) and rebuttal report (September 2022) related to fate and transport of coal combustion product constituents at multiple coal ash disposal facilities and coal-fired power plants. Provided testimony (October and November 2022) in deposition.