

SAFETY FACTOR ASSESSMENT PERIODIC 5-YEAR REVIEW

CFR 257.73e

Bottom Ash Complex

Mountaineer Plant
New Haven, West Virginia

October, 2021

Prepared for: Appalachian Power Company

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215



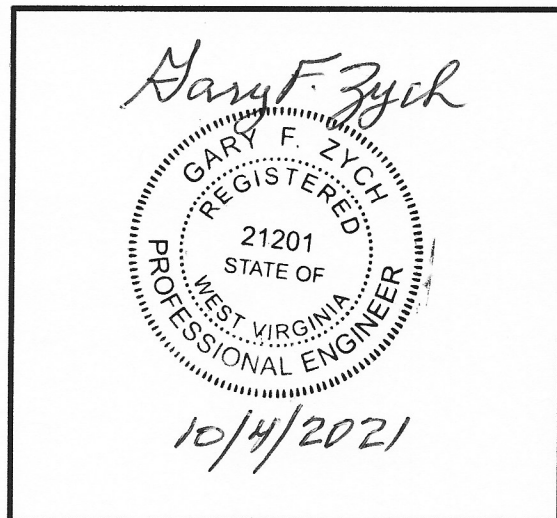
GERS-21-046

SAFETY FACTOR ASSESSMENT
PERIODIC 5-YEAR REVIEW
CFR 257.73(e)
MOUNTAINEER PLANT
BOTTOM ASH COMPLEX

PREPARED BY Brett A. Dreger DATE 9/30/2021
Brett A. Dreger, P.E.

REVIEWED BY M. A. L. DATE 9/30/2021
Mohammad A. Ajlouni, P.E.

APPROVED BY Gary F. Zych DATE 10/4/2021
Gary F. Zych, P.E.
Section Manager – AEP Geotechnical Engineering



I certify to the best of my knowledge, information, and belief that the information contained in this safety factor assessment meets the requirements of 40 CFR § 257.73(e)

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Attachment A: Geotechnical Engineering Report

1.0 OBJECTIVE

This report was prepared by AEP- Geotechnical Engineering Services (GES) section to fulfill requirements of CFR 257.73(e) for the safety factor assessment of CCR surface impoundments. This is the first periodic 5-year review of the safety factor assessment.

2.0 DESCRIPTION OF THE CCR UNIT

The Mountaineer Power Plant is located near the City of New Haven, Mason County, West Virginia. It is owned and operated by Appalachian Power Company (APCo). The facility operates one surface impoundment for storing CCR called the Bottom Ash Complex.

The Bottom Ash Complex is comprised of diked embankments on the north, east, and west sides. The south side of the Bottom Ash Complex is incised. There are six main ponds within the Bottom Ash Complex as listed below. The Bottom Ash Ponds and Wastewater Ponds were designed in tandem; one Bottom Ash Pond and one Wastewater Pond are in service at a given time.

List of Main Ponds within the Bottom Ash Complex

East Bottom Ash Pond
West Bottom Ash Pond
East Wastewater Pond
West Wastewater Pond
Reclaim Pond
Clearwater Pond

3.0 SAFETY FACTOR ASSESSMENT 257.73(e)

The periodic 5-year review was conducted to evaluate if any physical changes have been made to the earthen dike and/or operating changes that could impact the loading on the structure. The assumptions, material properties and operating pools defined in the initial assessment were reviewed. The review concluded that there have been no changes that would impact the stability analyses that were previously conducted. Therefore, the previous report and analyses are still applicable to the current conditions of the facility. The results indicate that the calculated factors of safety meet or exceed the minimum values defined in Section 257.73(e).

ATTACHMENT A

Geotechnical Engineering Report

Geotechnical Engineering Report

AEP Mountaineer Plant Bottom Ash Complex

Professional Engineering Certification

New Haven, West Virginia

December 22, 2015

Terracon Project No. N4155129

Prepared for:

American Electric Power
Columbus, Ohio

Prepared by:

Terracon Consultants, Inc.
Columbus, Ohio

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

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LIST OF EXHIBITS

Location Map	Exhibit A
Previous 2009 Stability Analyses	Exhibits B through D
Supplemental Stability Analyses	Exhibits E through G
Previous 2009 Liquefaction Analysis.....	Exhibit H
Site Reconnaissance Photographs	Exhibit I

1.0 INTRODUCTION

This report presents our conclusions and slope stability analysis results to satisfy the criteria set forth by the most recently mandated USEPA CCR rules for the AEP Mountaineer Bottom Ash Complex in New Haven, West Virginia.

2.0 PROJECT INFORMATION

In our Geotechnical Engineering Report dated March 12, 2009 H.C. Nutting (HCN), now Terracon, conducted geotechnical engineering analyses of the Mountaineer impoundment and determined the minimum upstream and downstream dike factors of safety against slope failure considering both existing and earthquake loading conditions in accordance with West Virginia Dam Safety Rule provisions (47CSR34-7.4.B.1.D.1). A hydrologic and hydraulic (H&H) analysis was not included as part of the scope for the previous project (HCN/Terracon Project No. N2095019). As part of the current project, Terracon was requested to perform the following tasks in order to certify that the existing impoundment meets the minimum requirement of the recently mandated USEPA CCR rules:

- Perform Site Visit
- Review Previous Analysis
- Perform Hydrologic and Hydraulic Analysis
- Establishment of Piezometer Action Values

The results of these tasks are summarized in the following sections. Please note that the results of the hydrologic and hydraulic analysis are being submitted in a separate report.

3.0 SITE VISIT

On July 21, 2015 the undersigned representatives of Terracon met with AEP personnel and performed a site reconnaissance of the Mountaineer Plant Bottom Ash Pond Complex. Exhibit A shows the impoundment and the three (3) slope stability cross-sections evaluated in our 2009 geotechnical report. During the site reconnaissance, the current conditions of the impoundment perimeter embankment were observed to be consistent with the conditions modeled in our previous slope stability analyses. We understand that no significant modifications have been made to the geometry of the existing impoundment perimeter embankment slopes since the time of our original investigation. A review of prior photographs at the site, taken in 2007, 2009 and 2014 during inspection visits by AEP also indicate that the geometry of the existing critical impoundment slopes have not been modified since the time of our previous 2009 subsurface investigation. Previous modifications to the perimeter embankment of the existing complex are

understood to have occurred in 2006 prior to our 2009 investigation at the site. These previous modifications included extending the slopes of the north and west dikes for construction of the gypsum conveyor system as analyzed by Shaw, Stone & Webster in their 2006 Engineering Report. Pertinent photographs from the July 21, 2015 site reconnaissance have been included in the Appendix of this report as Exhibit I.

Standing water was observed along the downstream toe of the eastern dike of the East Bottom Ash Pond, which was also noted in our 2009 report. It was previously speculated that this water was the result of seepage through the dike; however, long-term groundwater readings obtained from monitoring wells located at the toe of the embankment indicate groundwater levels at a depth of about 25 feet below the existing ground surface. After further consideration, it is likely that the standing water observed in this area is the result of poor drainage and surficial grading, and that the water can likely be attributed to surficial runoff. Terracon recommends that the area in question be re-graded to improve drainage and that continued monitoring take place following the grading operations to ensure that the problem has been adequately resolved.

4.0 REVIEW OF PREVIOUS SLOPE STABILITY ANALYSES

Terracon has completed a review of the slope stability analyses performed as part of our previously submitted Geotechnical Engineering Report for the subject site. During the previous investigation, it was determined that Cross-Section A-A', located along the northeast side of the existing East Bottom Ash Pond, was the critical section with respect to slope stability. Please refer to Exhibit A in the Appendix of this report for a drawing illustrating the location of Cross-Section A-A'.

Previous analyses were performed for the following cases:

- Long Term, Steady-State at Maximum Storage Pool Elevation 617 feet – This case represents the expected maximum normal operating elevation.
- Seismic – For this case, seismic loading was applied to the “Long Term, Steady-State at Maximum Storage Pool Elevation 617 feet” case and performed using a horizontal seismic coefficient of 0.05. The 2008 (updated in October 2009) Peak Ground Acceleration (PGA) with 2% Probability of Exceedance in 50 Years for the site is 0.058 g.

The stability analyses were performed using the Modified Bishop's Method and Spencer's Method in the software package STEDWIN, which is a Windows version of the computer program STABL7 as developed by Purdue University through the support of the Indiana State Highway Commission.

Strength parameters were developed based on the results of the field and laboratory testing and engineering correlations. Soil profiles were developed based on subsurface conditions interpreted from the borings. The soil parameters used for the slope stability analyses are summarized in the following table and included on their respective slope stability summary exhibits.

Material	Unit Weight (pcf)		Effective Strength Parameters	
	Total	Saturated	ϕ (deg)	C (psf)
Clay Liner (CL)	118	125	33	0
Mine Waste (MW)	135	140	36	0
Sand Fill – Dense to Very Dense (SF)	110	115	33	0
Silty Sand/Sandy Silt – Very Loose to Loose (SM)	110	115	28	0
Poorly Graded Sand/Gravel – Dense to Very Dense (SP or GP)	120	120	34	0
Lean and Silty Clay – Stiff (CL/CL-ML)	110	115	30	0
Silty Clay – Medium Stiff (CL-ML)	105	110	28	0

The calculated factors of safety meeting the CCR rules requirements and the minimum required factors of safety for each case are presented in the following table:

Summary of Previous Stability Analysis Results – Section A-A'

Slope Stability Case	Minimum Factor of Safety from Slope Stability Analyses		Required Minimum Factor of Safety	Exhibits ²
	Upstream	Downstream		
Long-Term, Steady-State at Maximum Storage Pool Elevation 617 Feet ¹	1.91	N/P ³	1.5	B
Long-term with Seismic Loading ¹	1.48	1.24	1.0	C, D

1. Analysis performed as part of our previous 2009 Geotechnical Engineering Report.
2. Refers to exhibit designation of slope stability output included in the Appendix of this submittal.
3. Not Presented – this analysis did not meet the minimum required factor of safety.

Based on the results of the previous analyses, the minimum required factor of safety for the CCR rules was met for all of the cases except for the downstream slope under the maximum storage pool case. The results of the previous analysis for this case are not presented in this report. An updated analysis for this case is discussed in section **5.0 Supplemental Analyses**. The CCR rules also require slope stability analyses for the maximum surcharge pool, with the

water level located at the top of the embankment (elevation 621.5 feet). This analysis was not performed as part of the prior geotechnical Engineering Report.

In addition, the CCR rules require that for dikes constructed of soils with a susceptibility to liquefaction, the calculated factor of safety against liquefaction must equal or exceed a values of 1.20. As part of our previous investigation, a preliminary liquefaction analysis was performed based on the estimated groundwater levels, earthquake magnitude and peak ground acceleration values. The results of this analysis are included as Exhibit H and indicated that factor of safety values ranged from a minimum of 1.2 to over 6.0.

5.0 SUPPLEMENTAL ANALYSES

In order to certify that the impoundment meets the minimum requirements, supplementary slope stability analyses were performed to further investigate the maximum surcharge pool loading condition. Additional information was also reviewed relative to the analyses for the maximum storage pool downstream slope (water elevation 621.5 feet).

At the time of our 2009 Geotechnical Engineering Report, standing water had been observed at the downstream toe of the embankment. Our previous analyses were performed under the consideration that the standing water was attributable to seepage through the dike. Supplemental piezometer readings obtained in Piezometer PZ-09-04 since the time of our 2009 analyses indicate groundwater at the downstream toe of the embankment is located approximately 25 feet below the existing ground surface. The phreatic surface utilized in our previous analyses provides a conservative estimate of the conditions now anticipated to be occurring at the site based on the supplemental piezometric readings.

Slope/W® 2012 software developed by Geo-Slope International was utilized for the supplemental analyses employing Spencer's Method. Material properties and the subsurface profile utilized in the current analyses were the same as those utilized in our previous investigation. The phreatic surface utilized in the current analyses was updated based on the latest information available from the piezometers installed at the site during the 2009 HCN subsurface investigation, with a groundwater elevation at the toe of the embankment of 573 feet. A minimum failure depth of 5.0 feet was specified to eliminate reporting of local, surficial failure surfaces.

A summary of the resulting factors of safety against failure, along with the corresponding required minimum values for each of the supplemental analyses is presented in the following table.

Summary of Supplemental Stability Analysis Results – Section A-A'

Slope Stability Case	Minimum Factor of Safety from Slope Stability Analysis		Required Minimum Factor of Safety	Exhibits ¹
	Upstream	Downstream		
Long-Term, Maximum Storage Pool Loading	N/A ²	2.00	1.5	E
Maximum Surcharge Pool Loading	2.04	2.00	1.4	F, G

1. Refers to exhibit designation of slope stability output included in the Appendix of this submittal.
2. The previous upstream analysis met the required factor of safety. A supplemental analysis was not performed for this case.

Based on the analyses performed to date, it is the conclusion of Terracon that the subject impoundment satisfies all of the minimum slope stability factor of safety values required by the CCR rules.

6.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

As stated previously, the required hydrologic and hydraulic analysis for the Mountaineer Plant Bottom Ash Pond Complex are being submitted in a separate report.

7.0 GENERAL COMMENTS

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. In the event that changes in the configuration of the impoundment as outlined in this report are

planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

8.0 REFERENCES

Documents reviewed for our evaluation include:

- Engineering Report for Appalachian Power Company, Mountaineer Bottom Ash Pond Complex – North and West Dike Modification. Prepared in support of the application for a certificate of approval from the State of West Virginia Department of Environmental Protection, Division of Water and Waste Management, Dam Safety Section. Prepared by Shaw, Stone & Webster, Centennial, Colorado 80112. Project number 1024690305. March 21, 2006.
- 2007 Dam and Dike Inspection Report for State of West Virginia Department of Environmental Protection, Division of Water and Waste Management, Dam Safety Section, Mountaineer Bottom Ash Complex (ID# 05307). Prepared for compliance with Dam Safety Rules Section 47-34-15.4c. Prepared by American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, Columbus, Ohio 43215. June 15, 2007.
- 2009 Dam and Dike Inspection Report for American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, Mountaineer Bottom Ash Complex (ID# 05307). Prepared for compliance with Dam Safety Rules Section 47-34-15.4c. Prepared by H.C. Nutting (Terracon), Columbus, Ohio 43230. Project number N2095020. February 25, 2009.
- Geotechnical Engineering Report for American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, AEP Mountaineer Bottom Ash Pond Complex. Prepared in support of the maintenance of the AEP Mountaineer Bottom Ash Pond Complex. Prepared by H.C. Nutting (Terracon), Columbus, Ohio 43230. Project number N2095019. March 12, 2009.
- Sketch of the Mountaineer Bottom Ash Pond Complex East Dike. Prepared to illustrate groundwater conditions in relation to wet area at toe of the dike. Prepared by American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, Columbus, Ohio 43215. 2009.
- 2009 Dam and Dike Inspection Report for State of West Virginia Department of Environmental Protection, Division of Water and Waste Management, Dam Safety Section, Mountaineer Bottom Ash Complex (ID# 05307). Prepared for compliance with

Geotechnical Engineering Services and P.E. Certification

Mountaineer Bottom Ash Pond Complex ■ New Haven, West Virginia

December 22, 2015 ■ Terracon Project No. N4155129

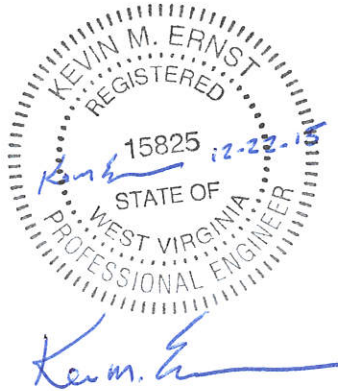


Dam Safety Rules Section 47-34-15.4c. Prepared by American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, Columbus, Ohio 43215. July 10, 2009.

- 2014 Dam and Dike Inspection Report for State of West Virginia Department of Environmental Protection, Division of Water and Waste Management, Dam Safety Section, Mountaineer Bottom Ash Complex (ID# 05307). Prepared for compliance with Dam Safety Rules Section 47-34-15.4c. Prepared by American Electric Power Service Corporation, Engineering Department, Geotechnical Engineering Section, Columbus, Ohio 43215. November 17, 2014.

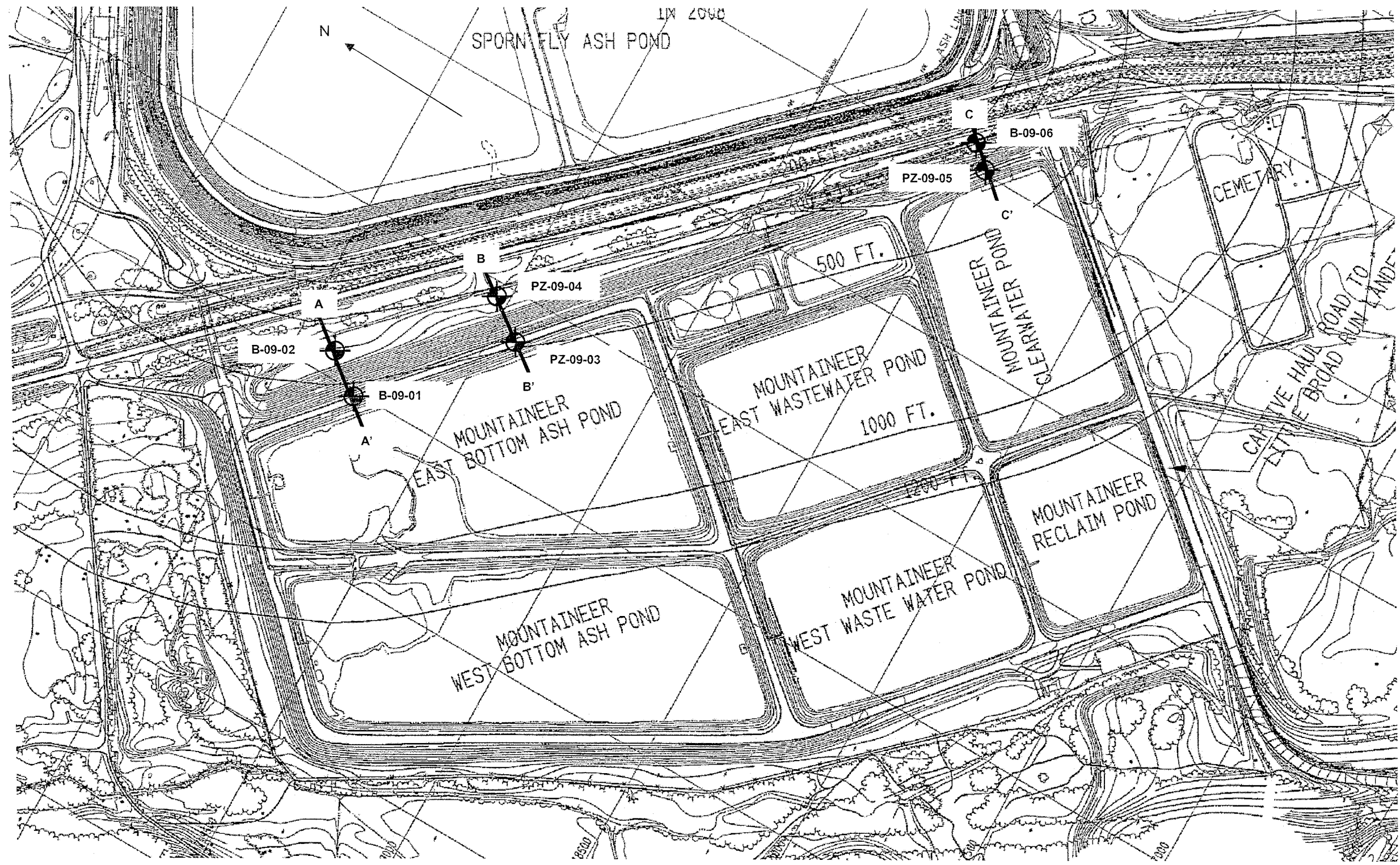
9.0 P.E. CERTIFICATION



Based on the site reconnaissance visit, review of previous analyses, field and laboratory testing, and the slope stability analysis performed by Terracon personnel, I hereby certify that the factors of safety for slope stability for the Mountaineer Plant Bottom Ash Pond Complex meet or exceed the minimum required factors of safety, in accordance with requirements of Section 257.73 of the USEPA CCR Rules.



Kevin M. Ernst, P.E.
Certifying Engineer
15825

EXHIBITS



 Approximate Boring Location
 Slope Stability Cross Section Lines

Project Mgr:	YSR
Drawn By:	YSR
Checked By:	YSR
Approved By:	

Project No.	N2095019
Scale:	NTS
File No.	N2095019
Date:	2/23/2009

Terracon
 Consulting Engineers and Scientists
 Charleston, West Virginia

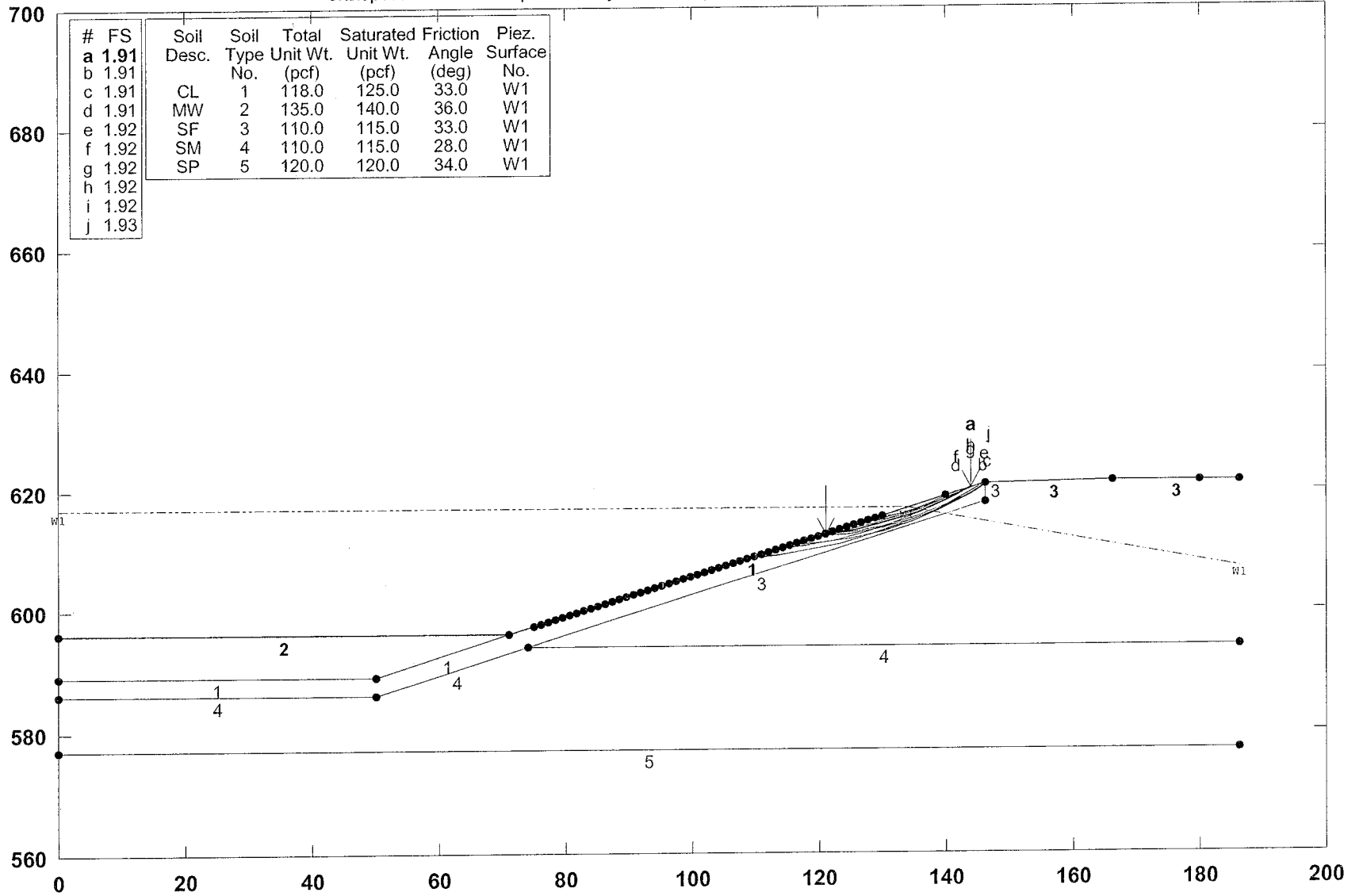
Boring Location Diagram
 Mountaineer Bottom Ash Pond Complex
 New Haven, West Virginia
 American Electric Power

Exhibit
A

AEPMTTP-000145

AEP / Mountaineer BAP Complex, C/S A-A', Upstream Slope, Long term Local

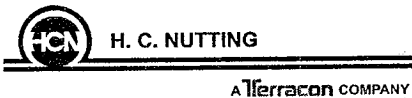
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PCSTABL7 FSmin=1.91

Safety Factors Are Calculated By The Modified Bishop Method

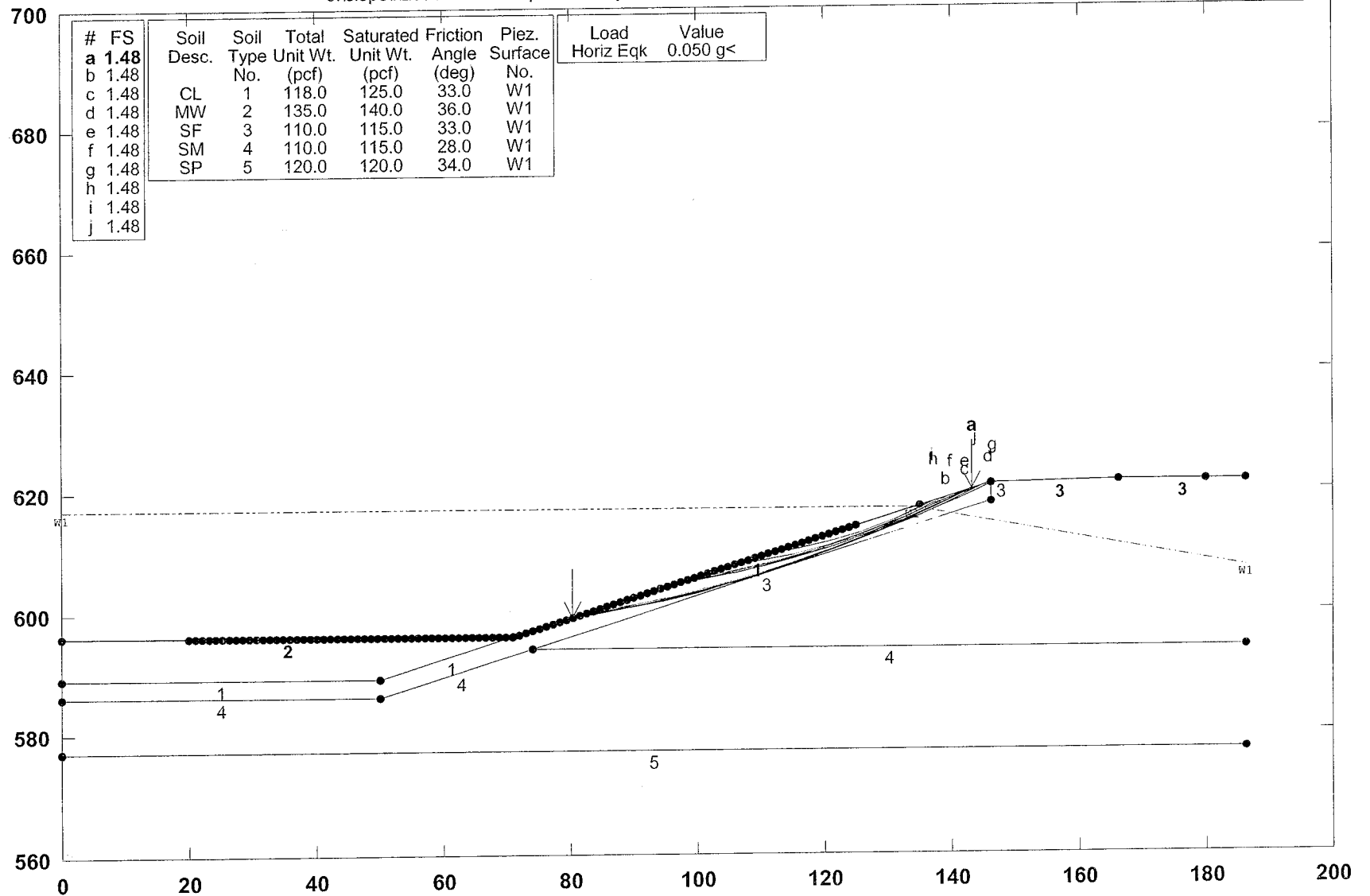
Exhibit B



AEPMTTP-000161

AEP / Mountaineer BAP Complex, C/S A-A', Upstream Slope, Long term Earthquake

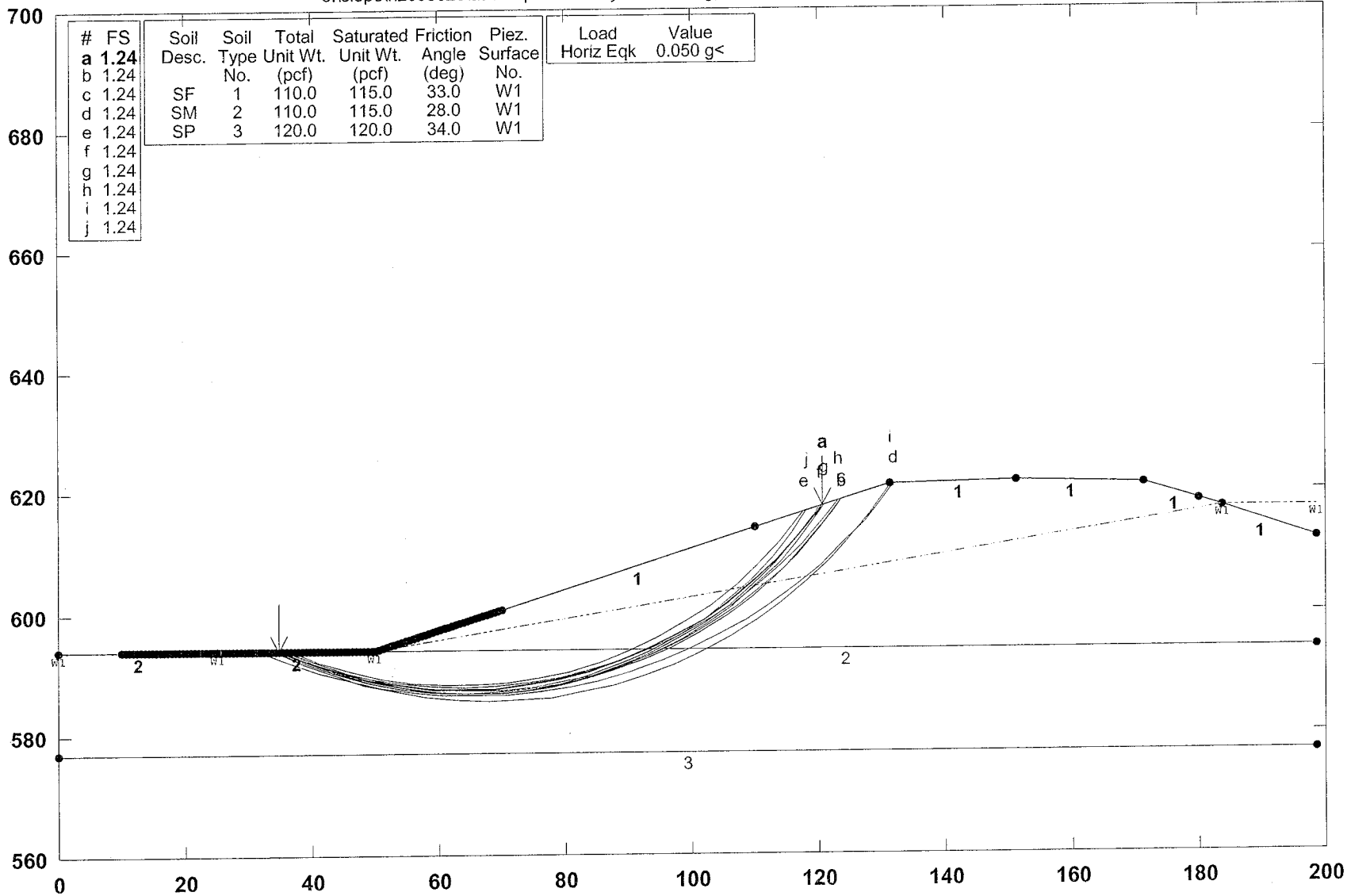
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AEPMTP-000163

AEP / Mountaineer BAP Complex, C/S A-A', Downstream Slope, Long term, Earthquake

o:\slope\2095020\aad1e.pl2 Run By: HC Nutting, A Terracon Company 3/5/2009 10:32AM



PCSTABL7 FSmin=1.24

Safety Factors Are Calculated By Spencer's Method

Exhibit D

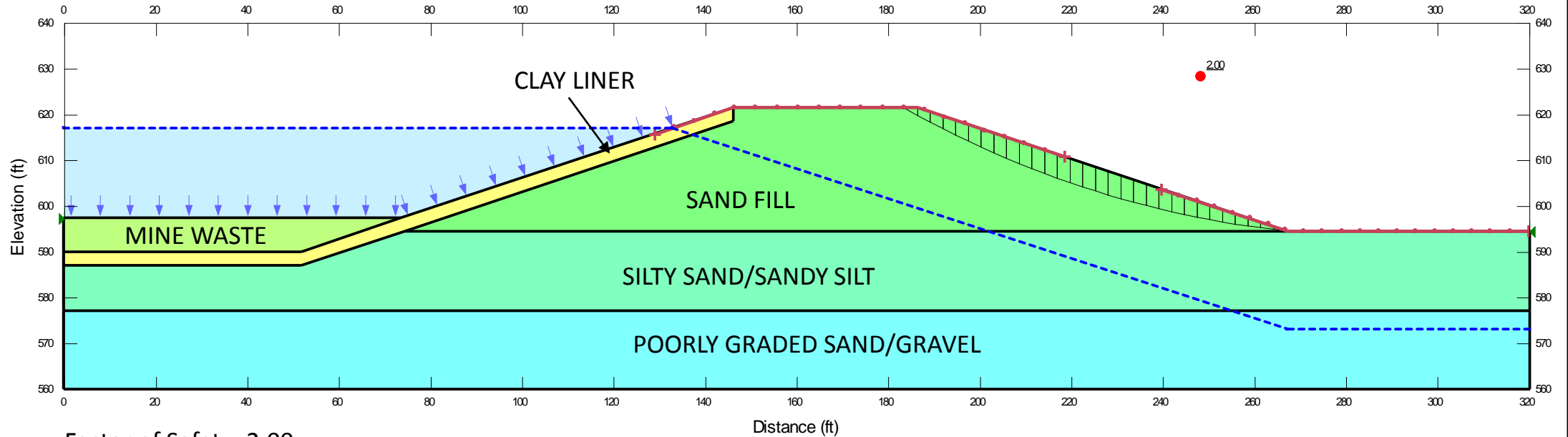


H. C. NUTTING

A Terracon COMPANY

AEPMTTP-000165

STORAGE POOL: DOWNSTREAM



Factor of Safety: 2.00

Material	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (°)
Clay Liner	125	0	33
Mine Waste	140	0	36
Sand Fill	115	0	33
Silty Sand/Sandy Silt	115	0	28
Poorly Graded Sand/Gravel	120	0	34

Method: Spencer

Project Manager:	KME	Project No.	N4155129
Drawn by:	AKB	Scale:	N.T.S.
Checked by:	KME	File Name:	N4155129
Approved by:	KME	Date:	Dec 2015

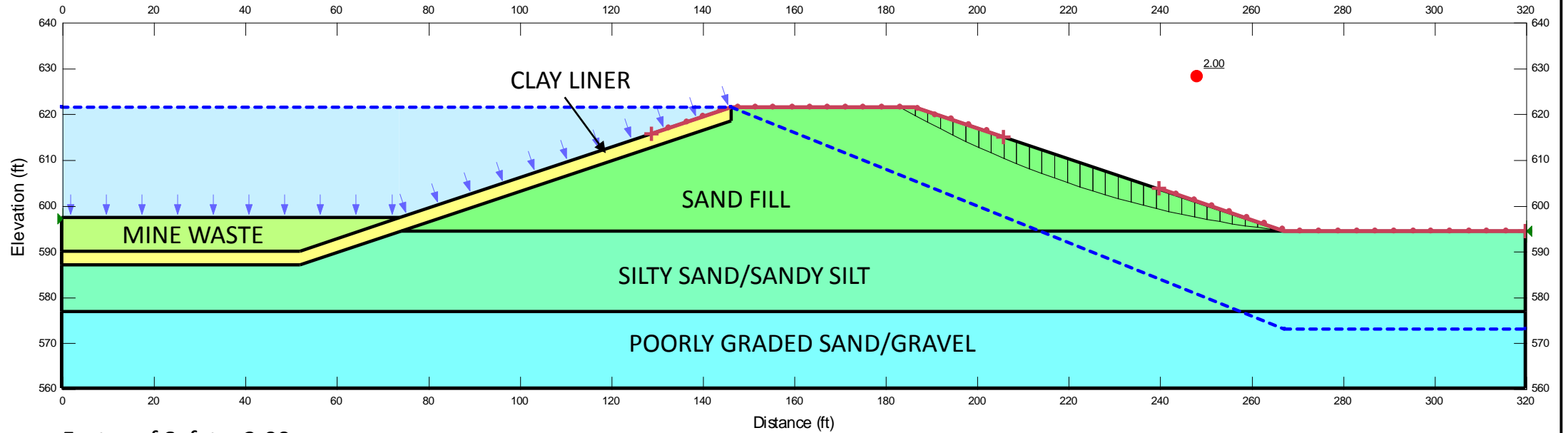
Terracon
Consulting Engineers & Scientists

800 Morrison Road Columbus, Ohio 43230
PH. (614) 863-3113 FAX. (614) 863-0475

SLOPE/W MODEL SECTION A-A'
AMERICAN ELECTRIC POWER
MOUNTAINEER BOTTOM ASH POND COMPLEX
NEW HAVEN, WEST VIRGINIA

Exhibit	E
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SURCHARGE POOL: DOWNSTREAM



Factor of Safety: 2.00

Material	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (°)
Clay Liner	125	0	33
Mine Waste	140	0	36
Sand Fill	115	0	33
Silty Sand/Sandy Silt	115	0	28
Poorly Graded Sand/Gravel	120	0	34

Method: Spencer

Project Manager:	KME	Project No.	N4155129
Drawn by:	AKB	Scale:	N.T.S.
Checked by:	KME	File Name:	N4155129
Approved by:	KME	Date:	Dec 2015

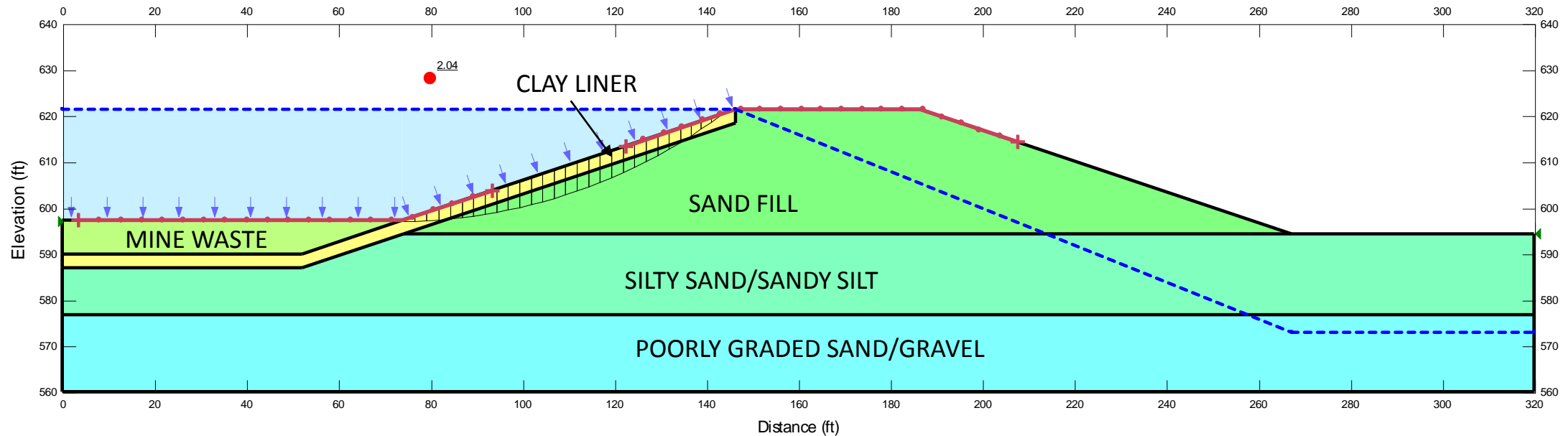
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SLOPE/W MODEL SECTION A-A'
AMERICAN ELECTRIC POWER
MOUNTAINEER BOTTOM ASH POND COMPLEX
NEW HAVEN, WEST VIRGINIA

Exhibit	F
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SURCHARGE POOL: UPSTREAM



Factor of Safety: 2.04

Material	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (°)
Clay Liner	125	0	33
Mine Waste	140	0	36
Sand Fill	115	0	33
Silty Sand/Sandy Silt	115	0	28
Poorly Graded Sand/Gravel	120	0	34

Method: Spencer

Project Manager:	KME
Drawn by:	AKB
Checked by:	KME
Approved by:	KME

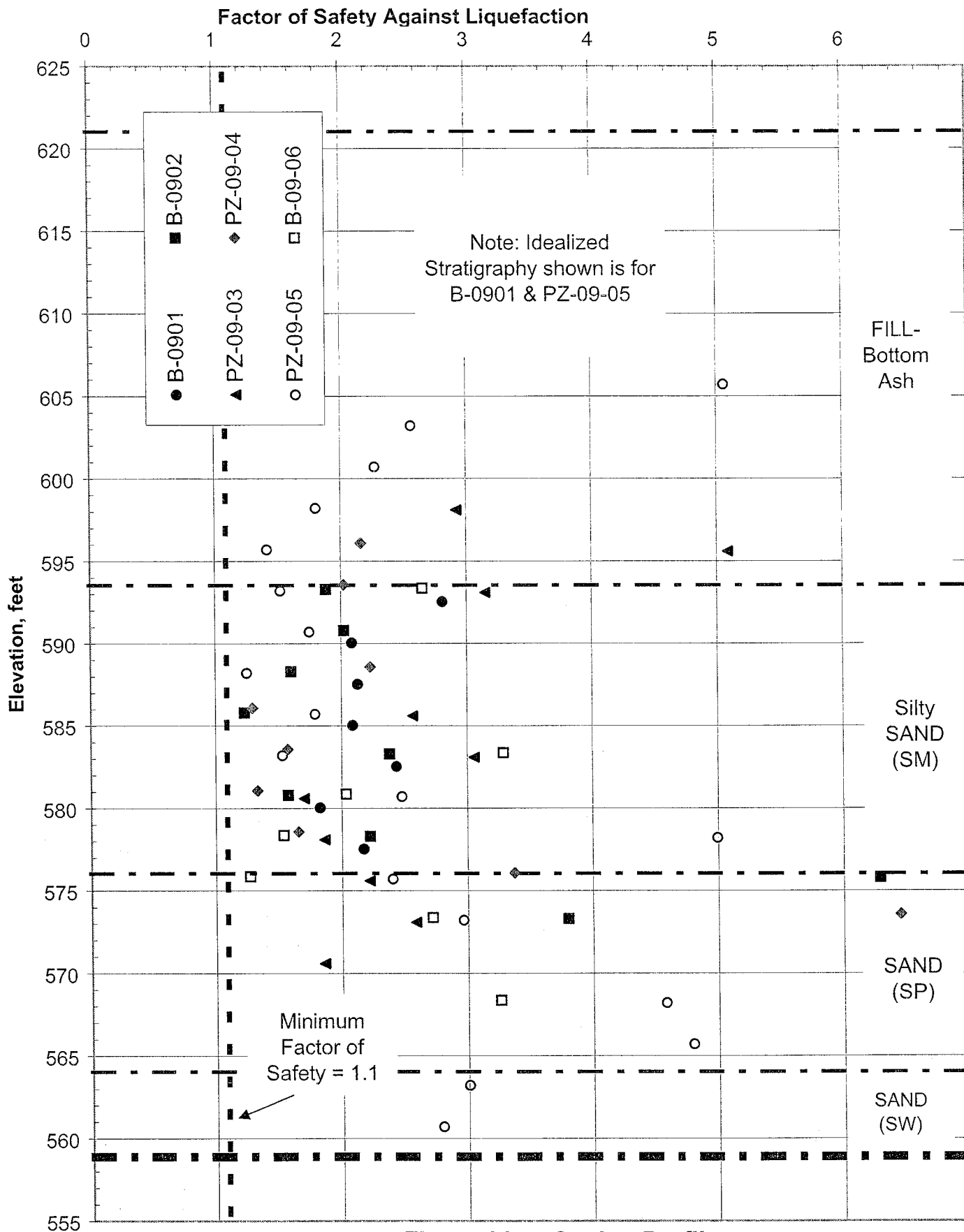
Project No.	N4155129
Scale:	N.T.S.
File Name:	N4155129
Date:	Dec 2015

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SLOPE/W MODEL SECTION A-A'
AMERICAN ELECTRIC POWER
MOUNTAINEER BOTTOM ASH POND COMPLEX
NEW HAVEN, WEST VIRGINIA

Exhibit
G



**Fig. 2. Liquefaction Profile
AEP - Mountaineer Bottom Ash Pond
New Haven, WV**

Exhibit H

Geotechnical Engineering Services

Engineering Certification for Mountaineer Plant Impoundment ■ New Haven, West Virginia
December 22, 2015 ■ Terracon Project No. N4155129



Photo 1: West Bottom Ash Pond, north dike.



Photo 2: West Bottom Ash Pond, north dike.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 3: Bottom Ash Ponds, splitter dike: bottom ash inlet pipes.



Photo 4: East Bottom Ash Pond, north/east dikes.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 5: East Bottom Ash Pond, north/east dikes.



Photo 6: West Bottom Ash Pond: inlet structure.



Photo 7: West Bottom Ash Pond: inlet structure sluice gate.



Photo 8: Bottom Ash Ponds: bottom ash inlet pipes and inlet structure.



Photo 9: Bottom Ash Ponds: evidence of movement along bottom ash inlet pipes due to thermal expansion.



Photo 10: East Bottom Ash Pond: inlet structure.

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Photo 11: Bottom Ash Ponds, splitter dike: bottom ash inlet pipes.



Photo 12: Bottom Ash Ponds, north dike: gypsum conveyor.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 13: Bottom Ash Ponds, north dike: gypsum conveyor.



Photo 14: Bottom Ash Ponds, north dike: exterior slope.

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Photo 15: Bottom Ash Ponds, north dike: exterior slope.



Photo 16: Bottom Ash Ponds, north dike: water near the exterior toe.

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Photo 17: Bottom Ash Ponds, north dike: water near the exterior toe.



Photo 18: Bottom Ash Ponds, north dike: water near the exterior toe.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 19: Bottom Ash Ponds, north dike: exterior slope.



Photo 20: Bottom Ash Ponds, north dike: exterior slope.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 21: Bottom Ash Ponds, north dike: exterior slope.



Photo 22: West Bottom Ash Pond, west dike: exterior slope.

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Photo 23: West Bottom Ash Pond, west dike: water near the exterior toe.



Photo 24: West Bottom Ash Pond, west dike: water near the exterior toe.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 25: West Bottom Ash Pond, west dike.



Photo 26: West Waste Water Pond, north dike.

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Engineering Certification for Mountaineer Plant Impoundment ■ New Haven, West Virginia
December 22, 2015 ■ Terracon Project No. N4155129



Photo 27: West Waste Water Pond, east dike.



Photo 28: West Waste Water Pond, west dike.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 29: West Waste Water Pond, west dike.



Photo 30: Reclaim Water Pond, south dike.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 31: Reclaim Water Pond, east dike.



Photo 32: Reclaim Water Pond, east dike.

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December 22, 2015 ■ Terracon Project No. N4155129



Photo 33: Clearwater Pond, west dike.



Photo 34: Clearwater Pond, outlet weir.

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Photo 35: Clearwater Pond, outlet weir.



Photo 36: Clearwater Pond, west dike.

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Photo 37: Clearwater Pond, north dike.



Photo 38: Clearwater Pond, east dike.

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Photo 39: Clearwater Pond, east dike.



Photo 40: Clearwater Pond, east dike: exterior slope.

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Photo 41: Clearwater Pond, east dike.



Photo 42: Leachate Surge Pond.

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Photo 43: East Wastewater Pond, east dike: piping along exterior slope.



Photo 44: East Wastewater Pond, east dike.

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Photo 45: East Wastewater Pond, east dike: piping along exterior slope.



Photo 46: East Wastewater Pond, east dike: water along exterior toe.



Photo 47: East Wastewater Pond, east dike: water along exterior toe.



Photo 48: East Bottom Ash Pond, east dike: exterior slope.

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Photo 49: East Bottom Ash Pond, east dike: water along exterior toe.



Photo 50: East Bottom Ash Pond, east dike: exterior slope.

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Photo 51: East Bottom Ash Pond, north dike: bottom ash inlet pipes.



Photo 52: East Bottom Ash Pond, north dike.

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Photo 53: East Bottom Ash Pond.



Photo 54: East Bottom Ash Pond, south dike: outlet structure.

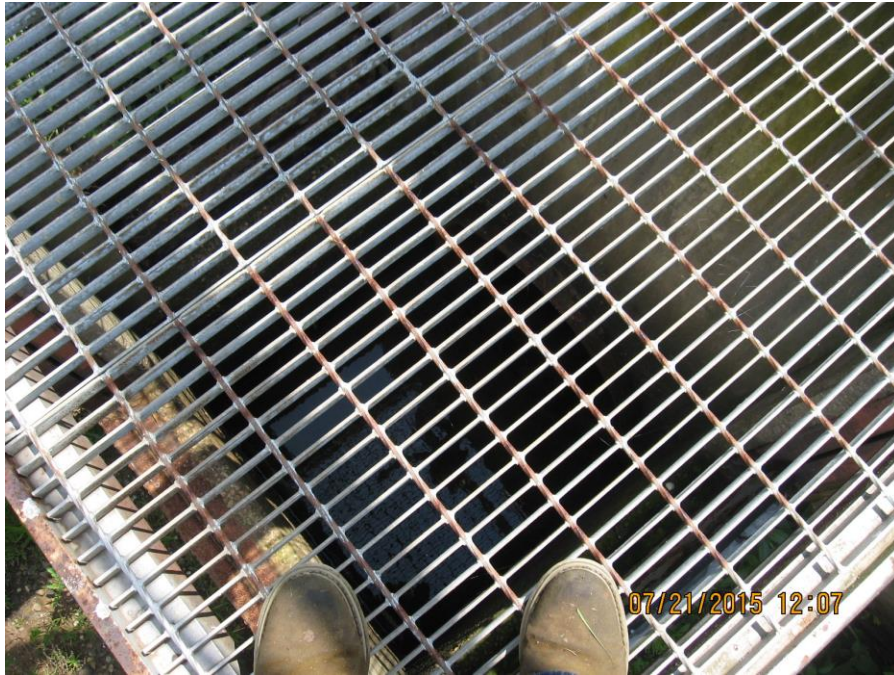


Photo 55: East Bottom Ash Pond, south dike: outlet structure.



Photo 56: East Waste Water Pond: outlet structure.

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Photo 57: Leachate Surge Pond.



Photo 58: Waste Water Ponds: valve outlet structure.

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Photo 59: Waste Water Ponds: valve outlet structure.



Photo 60: Clearwater Pond: outlet structure.

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Photo 61: Ohio River outlet structure.