MEMORANDUM

SUBJECT: EPA Comments on "Assessment of Dam Safety of Coal Combustion Surface Impoundments: Luminant Generation Co., LLC – Monticello Steam Electric Station, Mount Pleasant, TX

DATE: April 7, 2014

No Comments

From:	Mustafa, Golam
To:	Englander, Jana; Vargo, Steve; wsamuels@tceq.state.tx.us
Cc:	Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM; Verhalen, Frances; Adidas, Eric
Subject:	RE: Comment Request on Coal Ash Site Assessment Round 12 Draft Reports – Luminant Generation Co., LLC – Monticello and Oak Grove Steam Electric Stations
Date:	Monday, March 10, 2014 9:30:25 AM

Hi Jana,

I have read the draft report for Oak Grove SES and I agree with the recommendations included in the draft report.

Regards,
Golam

Golam Mustafa, PhD
U.S. EPA Region 6
UST/Solid Waste Section
1445 Ross Avenue
Dallas, Texas 75202-2733
214-665-6576 – Office
469-693-0928 - Cell

From: Englander, Jana
Sent: Friday, March 07, 2014 9:28 AM
To: Mustafa, Golam; Vargo, Steve; wsamuels@tceq.state.tx.us
Cc: Hoffman, Stephen; Dufficy, Craig; Englander, Jana; Kelly, PatrickM
Subject: FW: Comment Request on Coal Ash Site Assessment Round 12 Draft Reports – Luminant Generation Co., LLC – Monticello and Oak Grove Steam Electric Stations

Dear All,

We would like to offer Texas and EPA Region 6 an opportunity to comment on the Draft Assessment Report on the Coal Combustion Residual Impoundment located at the facility below. Please let me know if you intend to comment or have any questions. Comments would be appreciated within 30 calendar days of receipt of this email. Thank you!
Regards,

Jana

Jana Englander
Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

From: Englander, Jana
Sent: Friday, March 07, 2014 10:19 AM
To: Mireles, Kimberly; Spicer, Gary
Cc: Hoffman, Stephen; Kelly, PatrickM; Dufficy, Craig; Englander, Jana
Subject: Comment Request on Coal Ash Site Assessment Round 12 Draft Reports – Luminant

Generation Co., LLC – Monticello and Oak Grove Steam Electric Stations

Dear Ms. Mireles,

The draft assessment reports for Luminant Generation Co., LLC – Monticello and Oak Grove Steam Electric Stations are ready for review. EPA would appreciate it if you would review and submit your comments on this report to us within 30 calendar days of receipt of this email. **Please confirm receipt of this email and send your comments to:**

Mr. Stephen Hoffman
US Environmental Protection Agency (5304P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

If you are using overnight of hand delivery mail, please use the following address:

Mr. Stephen Hoffman
US Environmental Protection Agency
Two Potomac Yard
2733 South Crystal Drive
5th Floor, N-5237
Arlington, VA 22202-2733

You may also provide your comments by e-mail to hoffman.stephen@epa.gov and englander.jana@epa.gov.

You may assert a business confidentiality claim covering all or part of the information requested, in the manner described by 40 C. F. R. Part 2, Subpart B. Information covered by such a claim will be disclosed by EPA only to the extent and only by means of the procedures set forth in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when EPA receives it, the information may be made available to the public by EPA without further notice to you. If you wish EPA to treat any of your response as "confidential" you must so advise EPA when you submit your response.

The draft report for Oak Grove is attached.

The draft report for Monticello can be accessed at the secured link below. **The secured link will expire on March 14, 2014**.

Here is the link for the report:
http://www.hightail.com/download/elNKVWR0NmN3NUw1SE1UQw

Please let me know if you have trouble accessing the report or have any questions/requests.

Respectfully,

Jana Englander

Jana Englander
Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

From:	Warren Samuelson
To:	Englander, Jana; Mustafa, Golam; Vargo, Steve
Cc:	Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM
Subject:	RE: Comment Request on Coal Ash Site Assessment Round 12 Draft Reports – Luminant Generation Co., LLC – Monticello and Oak Grove Steam Electric Stations
Date:	Monday, March 10, 2014 9:22:58 AM

The Texas Dam Safety Program has no comments as the structures are not covered by the dam safety regulations.

Warren D. Samuelson, P. E.
Manager, Dam Safety Section
TCEQ
512/239-5195

From: Englander, Jana [mailto:Englander.Jana@epa.gov]
Sent: Friday, March 07, 2014 9:28 AM
To: Mustafa, Golam; Vargo, Steve; Warren Samuelson
Cc: Hoffman, Stephen; Dufficy, Craig; Englander, Jana; Kelly, PatrickM
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Please let me know if you have trouble accessing the report or have any questions/requests.

Respectfully,

Jana Englander

Jana Englander
Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

DRAFT REPORT

Dam Safety Assessment of CCW Impoundments

Luminant Generation Co., LLC/MONTICELLO STEAM ELECTRIC STATION

United States Environmental Protection Agency
Washington, DC

February 14, 2014

O'BRIEN & GERE
www.obg.com

DRAFT REPORT

13498/46122

Dam Safety Assessment of CCW Impoundments

Luminant Generation Co., LLC./Monticello Steam Electric Station

Prepared for:
US Environmental Protection Agency
Washington, DC

ROBERT R. BOWERS, P.E. – VICE PRESIDENT
O'BRIEN & GERE ENGINEERS, INC.

ROBERT C. GANLEY, P.E. – VICE PRESIDENT
O'BRIEN & GERE ENGINEERS, INC.

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1. INTRODUCTION

1.1. GENERAL

In response to the coal combustion waste (CCW) impoundment failure at the TVA/Kingston coal-fired electric generating station in December of 2008, the Environmental Protection Agency has initiated a nationwide program of structural integrity and safety assessments of CCW impoundments or "management units". A CCW management unit is defined as a surface impoundment or similar diked or bermed management unit or management units designated as landfills that receive liquid-borne material and are used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Management units also include inactive impoundments that have not been formally closed in compliance with applicable federal or state closure/reclamation regulations.

The U.S. EPA has authorized O'Brien & Gere to provide site specific impoundment assessments at selected facilities. This project is being conducted in accordance with the terms of BPA# EP10W000673, Order EP-B12S-00065, dated July 18, 2012.

1.2. PROJECT PURPOSE AND SCOPE

The purpose of this work is to provide Dam Safety Assessment of CCW management units, including the following:

- Identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures
- Note the extent of deterioration, status of maintenance, and/or need for immediate repair
- Evaluate conformity with current design and construction practices
- Determine the hazard potential classification for units not currently classified by the management unit owner or by state or federal agencies

O'Brien & Gere's scope of services for this project includes performing a site specific dam safety assessment of all CCW management units at the subject facility. Specifically, the scope includes the following tasks:

- Perform a review of pertinent records (prior inspections, engineering reports, drawings, etc.) made available at the time of the site visit (or shortly thereafter) to review previously documented conditions and safety issues and gain an understanding of the original design and modifications of the facility.
- Perform a site visit and visual inspection of each CCW management unit and complete the visual inspection checklist to document conditions observed.
- Perform an evaluation of the adequacy of the outlet works, structural stability, quality and adequacy of the management unit's inspection, maintenance, and operations procedures.
- Identify critical infrastructure within 5 miles down gradient of management units.
- Evaluate the risks and effects of potential overtopping and evaluate effects of flood loading on the management units.
- Immediate notification of conditions requiring emergency or urgent corrective action.
- Identify all environmental permits issued for the management units
- Identify all leaks, spills, or releases of any kind from the management units within the last 5 years.

- Prepare a report summarizing the findings of the assessment, conclusions regarding the safety and structural integrity, recommendations for maintenance and corrective action, and other action items as appropriate.

This report addresses the above issues for the Monticello Bottom Ash Pond and Scrubber Pond Management Units at the Luminant Power Monticello Steam Electric Station near Mount Pleasant, TX. This power generation facility is owned and operated by Luminant Generation Co., LLC (Luminant). In the course of this assessment, O'Brien & Gere obtained information from Luminant representatives.

2. PROJECT/FACILITY DESCRIPTION

The Monticello Steam Electric Station (SES) is located near Mt. Pleasant, Titus County, Texas (see Figure 1 for location plan). The generating facility has three units; two at 610 megawatts and one at 850 megawatts for a combined capacity of 2,070 MW. Unit 1 began operation in 1974, Unit 2 became operational in 1975, and Unit 3 became operational in 1978. The plant burns lignite obtained from a Luminant-owned mine located near the Monticello SES along with coal imported from the Powder River Basin.

quench and transport

All fly ash generated at the facility is handled in a dry manner. It is collected through electrostatic precipitators and pneumatically conveyed to silos. It is transported off site via rail cars. Other CCW is handled in "hydrobins" or dry handled at the Monticello SES. Water is used to ~~cool~~ the waste after burning the coal but the waste is not sluiced to the CCW impoundment. Rather, the CCW is separated from the ~~cooling~~ water and sent to landfills or sold at approximately 5% moisture content. The ~~cooling~~ water, which contains small amounts of CCW, is ~~discharged~~ to the Bottom Ash Pond. Water is pumped from the impoundment to the plant ~~for recycled use~~. The Scrubber Pond receives excess wastewater from the facility's flue gas desulphurization (FGD) system wet scrubber blowdown.

returned transport transport

The ponds are covered by a Texas State Pollutant Discharge Elimination System (TPDES) permit (Permit No. WQ0001528000). There is, however, no discharge structure from the ponds and site personnel indicate that, due to evaporation and water management, the ponds have never discharged any of their contents.

and reused for transports

2.1 MANAGEMENT UNIT IDENTIFICATION

The Bottom Ash Pond is located southeast of the generating facility (see Figures 1 and 2), has three hydraulically connected ponds or cells that receive CCW and an adjacent pond which collects stormwater runoff from the facility. This "Runoff Collection Pond" is not hydraulically connected to the CCW impoundment. The Bottom Ash Pond was originally constructed in 1974.

The three ponds have been referred to as the Northeast Ash Settling Pond, the West Ash Settling Pond, and the Southwest Ash Settling Pond by site personnel. However, for the purposes of this report, the identifying names used in a 2012 stability analysis report for the CCW impoundment will be used. These names are: Settling Pond (Northeast); North Pond (West); and South Pond (Southwest). The locations of the Ponds are presented on Figure 2. As shown on Figure 2, the Settling Pond forms the northeast quadrant of the Bottom Ash Pond. It is hydraulically connected only to the North Pond which forms the northwest quadrant of the Bottom Ash Pond. The North Pond is, in turn, hydraulically connected only to the South Pond which forms the southwest quadrant of the Bottom Ash Pond. Discharge from the SES is directed only into the Settling Pond. A chute in the dividing dike between the Settling Pond and the North Pond permits water to move from the Settling Pond into the North Pond. A chute in the dividing dike between the North Pond and the South Pond permits water to move from the North Pond into the South Pond. The total impoundment area of the Bottom Ash Pond is approximately 22 acres. A site plan is provided as Figure 2.

The Scrubber Pond is located south of the Bottom Ash Pond. It was designed in 1996, but its completion date was not presented in the available data. The total impoundment area of the Scrubber Pond is approximately 1.4 acres. Its location is also shown on Figures 1 and 2.

2.2. HAZARD POTENTIAL CLASSIFICATION

The State of Texas classifies dams or embankments in accordance with Title 30 Texas Administrative Code (TAC), Chapter 299, Dams and Reservoirs. The regulations are administered by the Texas Commission on Environmental Quality (TCEQ), Texas Dam Safety Program. The TCEQ Dam Safety program regulations apply to "*design, review, and approval of construction plans and specifications; and construction, operation and maintenance, inspection, repair, removal, emergency management, site security, and enforcement of dams that:*

1. *have a height greater than or equal to 25 feet and a maximum storage capacity greater than or equal to 15 acre-feet, as described in paragraph (2) of this subsection;*
2. *have a height greater than 6 feet and a maximum storage capacity greater than or equal to 50 acre-feet;*
3. *are a high- or significant-hazard dam as defined in §299.14 of this title (relating to Hazard Classification Criteria), regardless of height or maximum storage capacity; or*
4. *are used as a pumped storage or terminal storage facility.*

Dam and embankment hazard classifications are established by 30 TAC §299.14 and provide standards regarding impoundment facility structure classification:

> *The executive director shall classify dams for hazard based on either potential loss of human life or property damage, in the event of failure or malfunction of the dam or appurtenant structures, within affected developments, that are existing at the time of the classification. The hazard classification may include use of a breach analysis that addresses the incremental impact of the potential breach over and above the impact of the flood that may have caused the breach, as defined in §299.15(a)(4)(A)(i) of this title (relating to Hydrologic and Hydraulic Criteria for Dams). The classification must be according to the following.*
>
> *(1) Low. A dam in the low-hazard potential category has:*
> *(A) no loss of human life expected (no permanent habitable structures in the breach inundation area downstream of the dam); and*
> *(B) minimal economic loss (located primarily in rural areas where failure may damage occasional farm buildings, limited agricultural improvements, and minor highways as defined in §299.2(38) of this title (relating to Definitions)).*
> *(2) Significant. A dam in the significant-hazard potential category has:*
> *(A) loss of human life possible (one to six lives or one or two habitable structures in the breach inundation area downstream of the dam); or*
> *(B) appreciable economic loss, located primarily in rural areas where failure may cause:*
> *(i) damage to isolated homes;*
> *(ii) damage to secondary highways as defined in §299.2(58);*
> *(iii) damage to minor railroads; or*
> *(iv) interruption of service or use of public utilities, including the design purpose of the utility.*
> *(3) High. A dam in the high-hazard potential category has:*
> *(A) loss of life expected (seven or more lives or three or more habitable structures in the breach inundation area downstream of the dam); or*
> *(B) excessive economic loss, located primarily in or near urban areas where failure would be expected to cause extensive damage to:*
> *(i) public facilities;*
> *(ii) agricultural, industrial, or commercial facilities;*
> *(iii) public utilities, including the design purpose of the utility;*
> *(iv) main highways as defined in §299.2(33); or*

(v) railroads used as a major transportation system.

The TCEQ Dam Safety Program currently does not regulate the Bottom Ash or Scrubber Pond and, therefore, Hazard Potentials have not been previously designated. In the absence of a state-assigned classification, the FEMA guidelines, *Hazard Potential Classification System for Dams* (2004) have been applied in this assessment to recommend a hazard potential classification for the impoundment. The definitions for the four hazard potentials (Less than Low, Low, Significant and High) to be used in this assessment are included in the EPA CCW checklist found in Appendix A.

be pumped Reservoir

Based on site evaluation, both units are considered **Low** Hazard Potential. This classification assumes that no probable loss of human life and low economic and/or environmental losses would occur in the event of a dam failure. The area that would potentially be inundated by a breach of any embankment of the Bottom Ash Pond is limited to property owned by Luminant. The potential exists for some discharge to reach the Monticello Reservoir, which is also owned by Luminant. The Reservoir provides cooling water for the Monticello SES and is used for recreation, but is not a water supply reservoir. It is located adjacent to Lake Bob Sandlin, which is used for municipal and industrial water supply and for recreation. Water can ~~flow~~ from Lake Bob Sandlin into the Monticello Reservoir, ~~but water cannot enter Lake Bob Sandlin from the Monticello Reservoir~~. The Monticello Reservoir has a reported storage volume of 35,000 acre feet. The volume of water and CCWs impounded in the Bottom Ash and Scrubber Ponds is approximately 380 acre-feet. Thus, the quantity of a release from an embankment breach would represent approximately 1% of total available reservoir storage and the environmental damage would be limited to the adjacent area in the southern end of the reservoir.

and water can be mechanically released from Monticello Reservoir to Bob Sandlin Reservoir.

2.3. IMPOUNDING STRUCTURE DETAILS

The following sections summarize the structural components and basic operations of the subject impoundments. The location of the impoundments on the plant grounds is shown on Figure 2.

2.3.1. Embankment Configuration

As indicated above, the Bottom Ash Pond is comprised of three smaller ponds or cells. All cells are impounded by earthen embankments constructed above grade and are separated by dividing dikes. Concrete sluices through the dividing dikes connect the ponds hydraulically. The total embankment length is approximately 4,630 linear feet (lf) and the combined storage of the Bottom Ash Pond is approximately 375 acre-feet (ac-ft). The embankment crest design elevation is EL. 386.5, the interior toe design elevation is EL. 361.0, and the elevation of the exterior toe varies according to drawings provided by Luminant. A breakdown of embankment lengths and storage by pond is provided in Table 2.1 below:

Table 2.1 *Summary of Embankment Lengths and Pond Storage*

Pond	Embankment ID	Length (ft.)	Notes
Settling Pond	Northern	490	
	Eastern	475	
	Southern	475	Forms Dividing Dike to Runoff Collection Pond
	Western	480	Forms Dividing Dike to North Pond
	Storage	100 ac.-ft.	
North Pond	Northern	475	
	Eastern	625	Forms Dividing Dike to Settling Pond
	Southern	475	Forms Dividing Dike to South Pond
	Western	620	
	Storage	130 ac.-ft.	
South Pond	Northern	475	Forms Dividing Dike to North Pond
	Eastern	825	Forms Dividing Dike to Runoff Collection Pond
	Southern	245	
	Western	910	Distance includes curvature
	Storage	145 ac.-ft.	
Scrubber Pond	Northern	190	
	Eastern	430	
	Southern	175	
	Western	350	
	Storage	8 ac.-ft.	

The drawings also indicate that the inboard slope of the Bottom Ash Pond embankment is approximately 2.5 horizontal to 1 vertical (2.5H:1V) and the outboard slope is approximately 3H:1V. The inboard faces have a clay liner approximately three feet thick. A 4" thick concrete revetment mat was installed over the clay liner within the Settling Pond and over the clay liner on the dividing dike between the Settling Pond and the North Pond. The outboard toe varies in elevation with the natural ground, low-point elevations are not provided on the drawings. There is no discharge from the pond; water is either evaporated or pumped to the steam electric station to be recycled.

The crest elevation of the Scrubber Pond is EL. 384.0 and the interior floor elevation is EL. 371.0, according to the provided documentation. The elevation of the outboard toe varies. The design slope is shown as 2.5H to 3H:1V on the Design Drawings. The constructed slope appears to be approximately 3H:1V, based on a visual inspection of the impoundment. The inboard face of the Scrubber Pond is covered with a 100-mil HDPE liner.

2.3.2. Type of Materials Impounded

the transport

Bottom ash, which is conveyed in small amounts in ~~cooling~~ water after attempts to remove it in the hydrobins, is the principal product stored in the Bottom Ash Pond. FGD scrubber waste is the primary material that is impounded in the Scrubber Pond. Minor amounts of fly ash and other combustion by-products should be expected to be found in the ponds as well.

originally installed to allow discharge

was designed to be

2.3.3. Outlet Works

The Bottom Ash and Scrubber Ponds do not have functioning outlet works. Luminant reported that pumps are used to draw water from the impoundments as needed. A concrete chamber located south of the South Pond was ~~previously utilized when water was discharged~~ from the Bottom Ash Pond. Flow into the chamber ~~was~~ controlled by a valve housed in the South Pond. The valve is accessed via a walkway (see Photo 2). This system ~~is reportedly no longer in use~~.

has never been used

3. RECORDS REVIEW

3.1. GENERAL

A review of the available records related to design, construction, operation and inspection of the Bottom Ash and Scrubber Ponds was performed as part of this assessment. The documents provided by Luminant are listed below:

Table 3.1 *Summary of Documents Reviewed*

Document	Dates	By	Description
Texas Utilities Services, Inc. Monticello Steam Electric Station Geotechnical Investigation, Scrubber Pond	November, 1980	NFS/National Soil Services, Inc.	Subsurface investigation related to the original scrubber pond (now drained and out of service)
Contract Drawing: Monticello S.E.S. Operating Scrubber Pond	July 29, 1981	Texas Utilities Generating Co	Dwg. TUSI MO-2308 Sections, Notes and Details related to construction of operating scrubber pond
Geologic Investigation of the Monticello Steam Electric Station "West" Bottom Ash Pond	April 1985	Cook-Joyce, Inc.	Subsurface investigation of the original "West" Bottom Ash Pond
Contract Drawing: Monticello S.E.S. Bottom Ash Pond Modification. Embankment Cross Sections	December 11, 1989	Texas Utilities Generating Co	As-Built Dwg. No. 129-1009-301-01 Rev. 1 Sections and details for placement of clay liner within the Bottom Ash Pond
Contract Drawing: Monticello Steam Electric Station. Ash Disposal System. Gen Plan & Misc Det's	May 18, 1992	Ebasco Services Inc., New York	INDG-9788 G-672 As-Built PID 129-1423 Plan view of Bottom Ash Pond with proposed dividing dike. ASSUMED TO BE LATER MODIFICATIONS SHOWN ON A 1985 DRAWING RELATED TO DIVIDING THE WESTERN POND
Contract Drawings: Monticello S.E.E. Units 1, 2 & 3. Runoff Collection Pond Intake Structure. Plan, Sections & Details	May 18, 1992	Ebasco Services Inc., New York	DWG. No. 129-1423-302, Sh. 01, Rev. As-Built PID 129-1423, T#10657 Structural details for construction of intake structure
Contract Drawings: Monticello S.E.E. Units 1, 2 & 3. Ash Pond Sections & Details	May 18, 1992	Ebasco Services Inc., New York	DWG. No. 129-1423-302, Sh. 02, Rev. 3 As-Built PID 129-1423, T#10657 Sections and details for placement of concrete revetment matting within the Bottom Ash Pond

Document	Dates	By	Description
Contract Drawings: Monticello S.E.S. – Unit 3. Construct New Operating Scrubber Pond	June 4 & 5, 1996	TU Electric	Dwg. No. 123-2174-302 Sht. No. 01 – Plan and Sections Dwg. No. 123-2174-303 Sht. No. 01 – Plan and Sections Dwg. No. 123-2174-303 Sht. No. 02 – Leachate Sump Details Plan, Sections, Notes and Details related to construction of the new Operating Scrubber Pond
Monticello S.E.S. Unit 3 - Flow Diagram New Scrubber Pond Piping	Unknown	TU Electric	Dwg. No. 123-2174-401
Critical Impoundment Inspection Report for Monticello SES	March 29, 2011	Luminant	Report of annual inspection of the Bottom Ash and Scrubber Pond
Critical Impoundment Inspection Report for Monticello SES	April 26, 2012	HDR Engineering	Report of annual inspection of the Bottom Ash and Scrubber Pond
Flow Diagrams	Unknown	Luminant	Flow diagrams for Bottom Ash Pond and Scrubber Pond
Ash and Scrubber Pond Stability Investigation Report	December 2012	Golder Associates	Subsurface investigation and slope stability analyses for the Bottom Ash and Scrubber Ponds

3.2. DESIGN DOCUMENTS

3.2.1. General

Review of the available drawings and reports revealed the following:

- The Bottom Ash Pond was originally constructed in 1974 as a two-basin system. It is known that one basin was referred to as the "West Basin", the name of the other basin was not provided. Additionally, it is not known if the Runoff Basin was constructed at this time.
- No documentation related to foundation preparation for the original embankment construction was provided.
- The "West Basin" appears to have been split into the North and South Ponds in 1989.
- The Bottom Ash and Scrubber Pond embankments are constructed of sandy clay/clayey sand, presumably from an on-site borrow area.
- The original Scrubber Pond was constructed in 1989 and the "New" Scrubber Pond was designed in 1996. The completion date of the "New" Scrubber Pond is not presented in the available data.
- No breach or overtopping event of either impoundment has been reported.

3.2.2. Stormwater Inflows

No hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow to the Bottom Ash or Scrubber Ponds. However, the impounding structures are above-grade on all sides except for the west side of the Scrubber Pond, therefore, storm runoff is limited to direct precipitation on the impoundments. Available volume provided by the normal operating freeboard is sufficient to contain a 24-hour, 100-year storm without overtopping the embankments. The 24-hour, 100-year rainfall at the site presented in Technical Paper 40 (TP-40) is approximately ten (10) inches and the generally-available freeboard is approximately three and a half (3.5) feet. Thus, the Ponds have the capacity to handle approximately 4 times the 100-year rainfall before the impoundments would be overtopped.

3.2.3. Stability Analyses

O'Brien & Gere reviewed the December 2012 Golder Associates (Golder) "Ash and Scrubber Pond Stability Investigation Report" as part of the investigation of the CCW impoundment at the Monticello Steam Electric Station. This report documents the stability analyses for the scrubber pond and the three cells of the bottom ash ponds. One cross-section, representing the existing conditions for each of the four ponds (identified as the North, South, Settling, and Scrubber Ponds), was analyzed using the slope stability software program SLIDE, version 6.019. The load cases analyzed include long term and short term steady-state seepage under both the "empty pond" and "full pond" conditions. Rapid drawdown and short term "empty pond" under seismic loading were also analyzed. All load cases analyzed were performed on the inboard slopes. The Golder stability report is included in Appendix C.

Soil shear strength parameters used in the slope stability analyses were based on a combination of laboratory testing and information obtained during the field (sampling) program. The vast majority of the fine-grained soils were sampled with pushed thin-walled steel Shelby tubes. The coarse-grained soils and a few fine-grained soil samples were obtained using Standard Penetration Tests (SPT). Selected samples were tested for grain-size analysis, Atterberg Limits, and natural moisture content. In addition, unconsolidated-undrained (UU) and consolidated-undrained (CU) triaxial compression tests were performed on undisturbed samples. The soil properties utilized for the slope stability analyses are presented in Table 3.2.

Table 3.2 *Soil Material Properties*

Location	Stratum	Description	γ_{moist} (pcf)	$\gamma_{saturated}$ (pcf)	Undrained Shear Strength		Drained Shear Strength	
					C (psf)	ϕ (°)	C (psf)	ϕ (°)
Settling Pond	I	Sandy Clay / Clayey Sand	127	132	1400	0	1000	14
North and South Pond	I	Sandy Clay / Clayey Sand	127	132	2000	0	1300	18
	II	Sand	120	125	0	30	0	30
Scrubber Pond	I	Sandy Clay / Clayey Sand	127	132	1500	0	1000	14

Based on review of the stability investigation report, it is unclear how the provided shear strength parameters (both undrained and drained) were assumed. A minimum of two specimens of the same soil, but typically three or more, must be performed at different confining pressures on each specimen for the UU tests. Similarly, a minimum of two specimens of the same soil, but typically three or more, must be performed at different consolidation stresses on each specimen for the CU tests. Multiple specimens tested at differing confining or consolidation pressures are necessary to develop Mohr strength envelopes. All of the samples presented in

see addendum letter and comments on page 16

see addendum letter and comments on page 16

Appendix C of the stability investigation report were only sheared at one confining or consolidation pressure. Therefore, it is unclear how the triaxial compression tests aided in the development of the shear strength parameters.

In addition, since only a minimal number of SPT's were conducted on the fine-grained soils, correlations with SPT N-values and published shear strength values cannot be adequately assumed. Based on an average N-value of about 18 for Stratum 2 (Sand) from the North and South Pond, a friction angle of 30 degrees is very conservative. A friction angle of 33 degrees would generally be anticipated based on published shear strength correlations with SPT N-values.

Table 3.3 below provides a summary of the minimum computed factors of safety for slope stability of the four ponds:

Table 3.3 *Summary of Minimum Computed Factors of Safety for Slope Stability*

Location	Case	Description	Factor of Safety
Settling Pond	1	North Slope; Empty Pond; Undrained Conditions	2.8
	2	North Slope; Empty Pond; Drained Conditions	3.2
	3	North Slope; Full Pond; Undrained Conditions	5.7
	4	North Slope; Full Pond; Drained Conditions	7.3
	5	North Slope; Rapid Drawdown	2.8
	6	North Slope; Empty Pond; Undrained Conditions under Seismic Loading	2.2
North Pond	7	North Slope; Empty Pond; Undrained Conditions	3.8
	8	North Slope; Empty Pond; Drained Conditions	3.4
	9	North Slope; Full Pond; Undrained Conditions	8.5
	10	North Slope; Full Pond; Drained Conditions	8.7
	11	North Slope; Rapid Drawdown	3.0
South Pond	12	West Slope; Empty Pond; Undrained Conditions	3.3
	13	West Slope; Empty Pond; Drained Conditions	3.1
	14	West Slope; Full Pond; Undrained Conditions	8.5
	15	West Slope; Full Pond; Drained Conditions	8.2
	16	West Slope; Rapid Drawdown	2.3
Scrubber Pond	17	South Slope; Empty Pond; Undrained Conditions	4.1
	18	South Slope; Empty Pond; Drained Conditions	4.1
	19	South Slope; Full Pond; Undrained Conditions	6.7
	20	South Slope; Full Pond; Drained Conditions	5.6
	21	South Slope; Rapid Drawdown	3.5

The results of the slope stability analyses indicated that the computed factors of safety exceed the minimum standard set by Golder (Factor of Safety = 1.5) for all load cases. However, it is unclear how the loading conditions were selected. Typical loading conditions analyzed for CCW impoundments include long term steady-state seepage under normal pool for the outboard slope and rapid drawdown analysis for the inboard slope. All load cases analyzed by Golder were performed on the inboard slopes. The scrubber pond and the three bottom ash ponds do not currently have a reasonable capability to undergo a sudden drawdown and, therefore, this loading condition would not be necessary, while the steady state seepage condition on the downstream slope under static and seismic loading would seem to be the more critical load case, but was not checked

see addendum letter and comments on page 16

Pseudostatic slope stability analysis was performed for the critical slope section of the Settling Pond. The results of this analysis indicated that the embankment has a factor of safety of 2.2 for the 2,500-year return period earthquake. The site soils were considered not susceptible to liquefaction based on the soil, site, and seismic conditions. However, the justification for this conclusion was not presented, which would be advisable considering zones of silty sand and poorly graded sand were encountered within the foundation soils.

In general, based on the unclear shear strength parameter assumptions and non-standard load cases, the slope stability analysis presented in the Golder report appears to be inadequate in terms of current dam safety standards.

3.2.4. Summary of Design Modifications

The 1985 "Geologic Investigation of the Monticello Steam Electric Station "West Bottom Ash Pond" by Cook-Joyce, Inc. (CJI), 1985, and the 1985 and 1992 Ebasco Contract Drawings indicate that the current North and South Ponds were originally one pond referred to as the "West Bottom Ash Pond". The Contract Drawings represent the only information related to the division of the West Bottom Ash Pond provided by Luminant. The "New" Scrubber Pond was designed in 1996, but the Pond's construction time frame is not known. The "New" Pond replaced the previous pond located directly south of the "New" structure.

3.2.5. Instrumentation

Instrumentation at the site is limited to a staff gage located on the access walkway to the non-functioning outlet control valve in the South Pond.

3.3. PREVIOUS INSPECTIONS

Two previous inspection reports were provided by Luminant. The report dated March 2011 was prepared by Luminant and the April 2012 report was prepared by HDR Engineering Inc. Inspection reports from 2009 and 2010 were referenced in the 2011 and 2012 reports, but were not provided. Similar issues related to the embankments were noted in the two reports. These include minor rutting on the crests, animal burrows on the outboard faces and near the toe, and an apparent slide of the outboard face of the West Pond embankment at the northwest corner. The condition of the slide was noted as being stable throughout the years it was inspected.

3.4. OPERATOR INTERVIEWS

Numerous plant personnel took part in the inspection proceedings along with a representative of the United States Environmental Protection Agency (USEPA). The following is a list of participants for the September 2012 assessment of the Bottom Ash and Scrubber Ponds:

Table 3.4 *Personnel Present at the Assessment of the Monticello SES CCW Impoundments*

Name	Affiliation
Jim Barton	Luminant
George Sanford	Luminant
Mark Kelly	Luminant
Jeff Jones	Luminant
Pat Marshall	Luminant
Joe Griffin	Luminant
Gary Spicer	Luminant
Golam Mustafa	USEPA
Robert C. Ganley, PE	O'Brien & Gere
Johan Anestad, PE	O'Brien & Gere

Facility personnel provided a good working knowledge of the CCW impoundments, provided general plant operation background and provided requested historical documentation. These personnel also accompanied O'Brien & Gere and the USEPA representative throughout the visual inspections to answer questions and to provide additional information as needed in the field.

3.5. SITE GEOLOGY

The 1980 and 1985 reports provide descriptions of the underlying site geology. The reports state that the Wilcox Group is the principal exposed bedrock unit in the site area. The Wilcox Group is reportedly composed of "interbedded sand, silt, silty shale, clay and lignite". This description is borne out by the results of the various subsurface investigations of the embankments and foundations. It also indicates that local borrow materials were used to construct the embankments. ~~Seismic conditions at the site were not discussed in any of the reports~~.

see addendum letter

4. VISUAL ASSESSMENT

4.1. GENERAL

A visual assessment of the Bottom Ash Pond and the Scrubber Pond was performed on September 18, 2012. The individuals listed in Table 3.3 were present during the assessment.

The weather on the date of the assessment was sunny and approximately 70 degrees. A field checklist prepared by O'Brien & Gere to summarize the visual assessment is included as Appendix A. Photographs were taken by both Luminant and O'Brien & Gere. Pertinent photos taken by O'Brien & Gere are included as Appendix B.

4.2. SUMMARY OF FINDINGS

Transport

Prior to the visual assessment, staff from Luminant provided an overview of the facility operation, including the method of fly ash handling with the help of the flow diagrams listed in Table 3.1. The fly ash is handled in a dry manner and only trace amounts are discharged to the Bottom Ash Pond. ~~Cooling~~ water discharge from the Steam Electric Station is directed to the Settling Pond and flows from there to the North and South Ponds via chutes through the dividing dikes. During the visual inspection of the Bottom Ash Pond, the full length of the crest and outboard faces of the embankment were walked and representative features observed. The following observations were made during the assessment:

Settling Pond

- Sluice water enters the pond through inflow pipes located above the water line on the northern embankment.
- Erosion gullies were observed on the northern embankment.
- The concrete revetment on the inside slopes of the pond has cracked in the southeast corner.
- Some water is retained in the Runoff Collection Pond located to the south of the Settling Pond at the toe of the southern embankment.
- Evidence of prior releases, failures or patchwork of the impoundment was not observed.

North Pond

- Inflow to the pond is limited to flow from the Settling Pond through sluices in the dividing dike.
- Small (6-12") riprap is visible on the inboard slopes of the embankment. The riprap is not shown on the available design drawings.
- Some erosion was observed beneath the pipes located on the west side of the western embankment. This erosion has been noted previously.
- Minor sloughing/sliding was observed near the toe of the western embankment.
- The outboard slope of the northwest corner of the northern embankment appears to be steeper than the design slope of 2.5H:1V. Additionally, sliding, sloughing or possibly excavation of the embankment material was observed. Luminant representatives noted that additional fill may have been placed against the original embankment along the north side of the North and Settling Ponds and the material movement could be within the additional fill, not the embankment. The slide/slough was noted in the previous inspection reports.
- Signs of uneven settlement of the concrete revetment (grout-filled bags) were observed on the inboard slope of the eastern embankment (dividing dike to the Settling Pond).
- Minor erosion of the concrete revetment was observed near the crest at the southeast corner.

- Evidence of prior releases, failures or patchwork of the impoundment was not observed.

South Pond

- Inflow to the pond is limited to flow from the North Pond through the sluices in the dividing dike.
- Small (6-12") riprap is visible on the inboard faces of the embankment. The riprap is not shown on the available design drawings.
- Minor erosion was observed near the base of the access walkway that extends north from the southern embankment. A staff gage is located on the walkway.
- A gate operator is located at the north end of the access platform. The gate is reportedly inoperable.
- Some rutting was observed on the roadway on the embankment crest. The rutting is minor and has been noted in previous inspection reports.
- Minor erosion was observed on the outboard slope. This erosion has also been noted during previous inspections.
- Some water is retained in the Runoff Collection Pond located to the east of the South Pond at the toe of the eastern embankment.
- Evidence of prior releases, failures or patchwork of the impoundment was not observed.

FGD blowdown discharge from the Steam Electric Station is directed to the Scrubber Pond from decant basins through a pipe in the western embankment. During the visual inspection of the Scrubber Pond, the full length of the crest and outboard slopes of the embankment were walked and representative features observed. The following observations were made during the assessment:

Scrubber Pond

- A small amount of overflow from the decant basins enters the pond through a pipe in the western embankment.
- The HDPE liner appeared to be in good condition, with no signs of cracking observed.
- Evidence of prior releases, failures or patchwork of the impoundment was not observed.

5. CONCLUSIONS

Based on the ratings defined in the USEPA Task Order Performance Work Statement (Satisfactory, Fair, Poor and Unsatisfactory), the information reviewed and the visual inspection, the overall condition of Bottom Ash Pond and the Scrubber Pond is considered to be ~~**POOR**~~. Acceptable performance is expected; ~~however, some deficiencies exist that require repair and/or additional studies or investigations.~~

While the visual condition of this management unit is good, ~~this rating must be given since the stability analyses were not performed in accordance with standard methodology and unsubstantiated conclusions were presented therein. Stability analysis requirements should be verified prior to conducting investigations~~.

Minor deficiencies include the following:

- Non-standard methodology and unsubstantiated conclusions presented in the 2012 slope stability report by Golder Associates. The deficiencies include the following:
  - The stability of the outboard slopes of the embankments were not analyzed
  - ~~Selection of parameters does not follow standard methodology~~
  - A liquefaction potential analysis was not performed
- Minor erosion gullies on the northern embankment of the Settling Pond
- Sloughing/sliding of material on the outboard slope of the northern embankment of the North Pond.

items addressed with routine maintenance, regular inspections, and addendum letter.

no specific criteria were supplied by the agency. The Golder report was prepared, signed and sealed by a P.E. using accepted industry procedures, and with a knowledge and experience with construction of such impoundments.

Liquefaction was discussed on page 5 of the Dec. 2012 Golder report and analyses was deemed unnecessary because "Based on a review of soil, site, and seismic conditions, the site soils are susceptible to liquefaction." Addendum report addressing stability was finalized prior to receipt of this DRAFT report. Luminant was not informed of liquefaction concern before reading it in the DRAFT report.

6. RECOMMENDATIONS

Based on the findings of our visual assessment and review of the available historical documents for the Bottom Ash Pond and the Scrubber Pond, O'Brien & Gere is recommending further evaluation of embankment stability and continued monitoring of the two sloughs noted in the inspection on the northern embankment of the Settling Pond and at the northwest corner of the northern embankment of the North Pond.

6.1. URGENT ACTION ITEMS

None of the recommendations are considered to be urgent, since the issues noted above do not appear to threaten the structural integrity of the dam in the near term.

6.2. LONG TERM IMPROVEMENT/MAINTENANCE ITEMS

- Re-evaluate the stability of the embankments and include a liquefaction potential
- Monitor/repair erosion on the northern embankment of the Settling Pond
- Monitor/repair sloughs/slides at the northwest corner of the North Pond, unless an investigation indicates that this material was placed against the embankment post-construction and that the stability of the embankment is not dependant on any stabilizing effects of the fill.

6.3. MONITORING AND FUTURE INSPECTION

Daily visual inspections are reportedly performed and the results of annual detailed inspections have been recorded in inspection reports. Deficiencies noted during the annual inspections and in this CCW assessment report should be addressed in a timely manner to maintain dam integrity. Consideration should be given to development of an O&M Plan that would establish a firm schedule for operations, maintenance and inspection activities.

6.4. RECOMMENDED SCHEDULE FOR COMPLETION OF ACTION ITEMS

The facility should address any items noted during visual inspections in a timely manner, depending on the severity and location of the deficiency. The regular inspection schedule should be maintained.

6.5. CERTIFICATION STATEMENT

I acknowledge that the Bottom Ash Pond and Scrubber Pond management units referenced herein were personally assessed by me on September 18, 2012 and were found to be in the following condition:

SATISFACTORY

FAIR

POOR

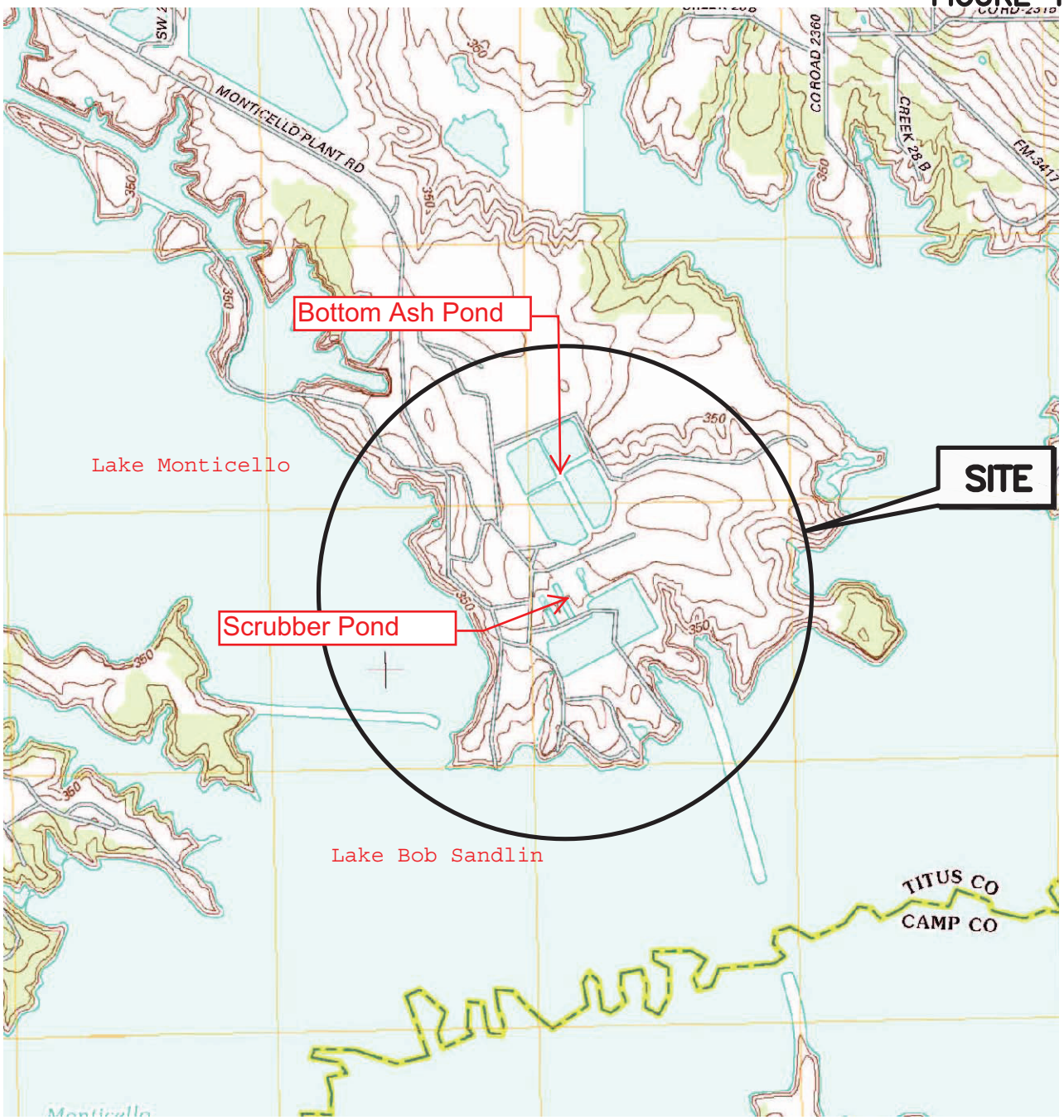
UNSATISFACTORY

Signature: _____ Date: _____

Robert C. Ganley, PE
TX PE License #

FIGURES

FIGURE 1



ADAPTED FROM: MONTICELLO QUADRANGLE, TEXAS U.S.G.S. 7.5 MIN. QUAD; 2013

QUADRANGLE LOCATION

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

MONTICELLO STEAM ELECTRIC STATION
TITUS COUNTY, TEXAS

SITE LOCATION MAP

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

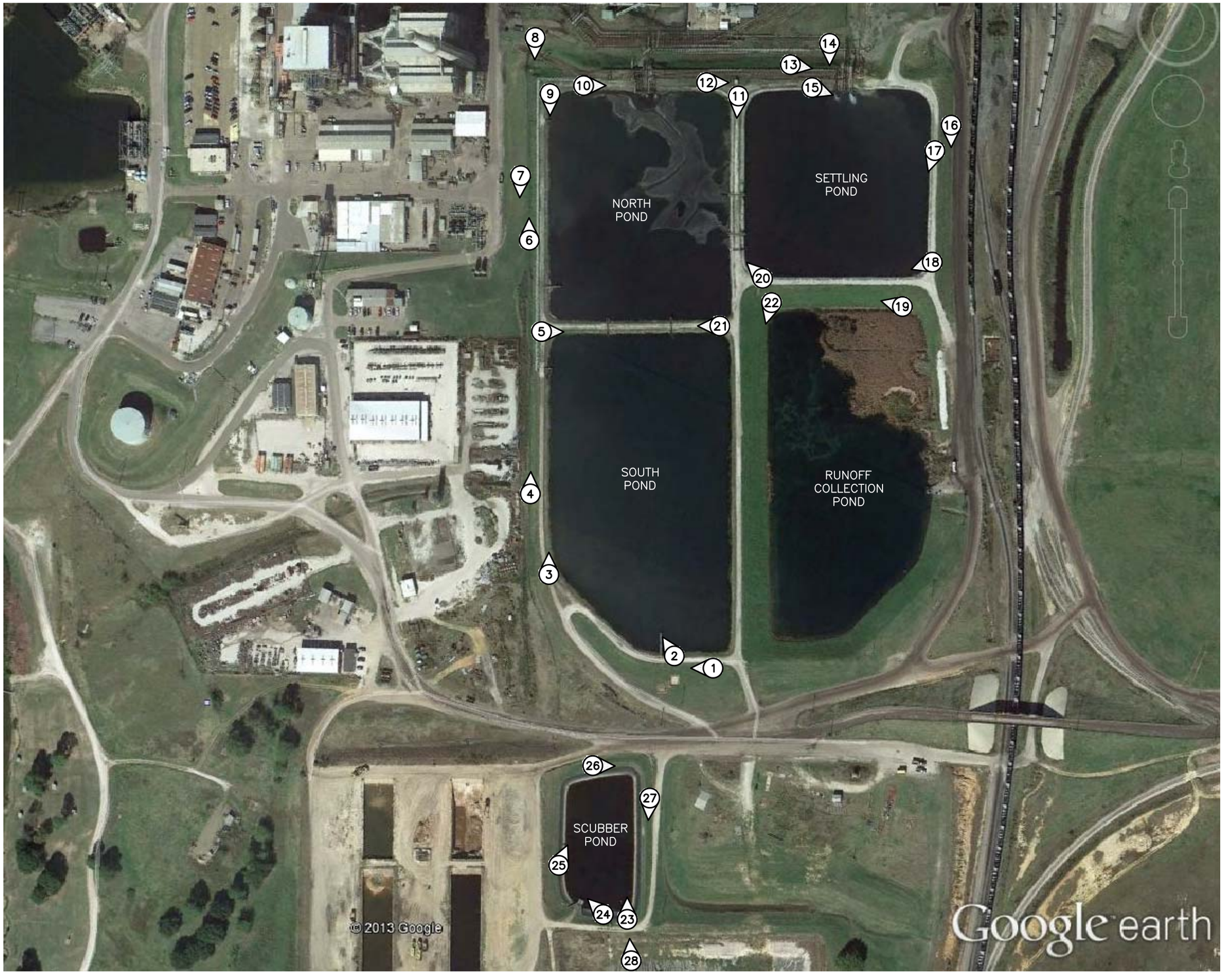
46122-MONTICELLO-F01
MAY 2013

SCALE: 1:24000

O'BRIEN & GERE

I:\US-EPA.13498\46122.ASSESS-OF-DAM-S\DOCS\DWG\SHEETS\46122-MONTICELLO-F02.DWG, 05/17/2013 4:21PM

FIGURE 2



PHOTOGRAPH NUMBER AND ORIENTATION

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS
LUMINANT ENERGY
MONTICELLO STEAM
ELECTRIC STATION
TITUS COUNTY, TEXAS

SITE AERIAL PHOTOGRAPH AND PHOTOGRAPH LOCATION MAP

1"=250' 250 0 250

FILE NO. 13498.46122.F02
MAY 2013

O'BRIEN & GERE

APPENDIX A

Visual Inspection Checklist

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Monticello Steam Electric Station	Date:	September 18, 2012
Unit Name:	SPD-4	Operator's Name:	Luminant Power
Unit I.D.:	Bottom Ash Pond - 3 Cells	Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	NJ Anestad, PE & RC Ganley, PE		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?	✓	
2. Pool elevation (operator records)?	378.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	0.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	0.0		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	383.5		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?			From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?			Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?			22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?			23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?	✓		24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

3, 4, 12, 14, 15, 16, 20: N/A. Impoundment does not have decant pipes or spillway. Water is pumped from impoundment to facility for reuse.

17, 18: Minor erosion and some sloughs observed on western embankment of the West Cell and northern embankment of the Northwest and Northeast Cells.

23: Water in the "Runoff Pond" sits against the toe of the Northeast Cell's southern embankment and the against the toe of the West Cell's eastern embankment.

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # WQ 0001528000 INSPECTOR NJ Anestad, PE & RC Ganley, PE

Date September 18, 2012

Impoundment Name SPD-4 (aka Bottom Ash Pond - 3 Cells)

Impoundment Company Luminant Power

EPA Region 6

State Agency (Field Office) Addresss 1445 Ross Avenue Dallas, Texas 75202-2733

Name of Impoundment SPD-4

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New x Update _____

	Yes	No
Is impoundment currently under construction?		x
Is water or ccw currently being pumped into the impoundment?	x	

IMPOUNDMENT FUNCTION: Temporary storage of sluice water discharged from hydrobin bottom ash/sluice water separator prior to reuse in facility.

Nearest Downstream Town : Name n/a: facility sits adjacent to Lake Monticello

Distance from the impoundment Approx. 1,500'

Impoundment Location:

Longitude 95 Degrees 02 Minutes 17 Seconds

Latitude 33 Degrees 05 Minutes 16 Seconds

State Texas County Titus

Does a state agency regulate this impoundment? YES _____ NO x

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

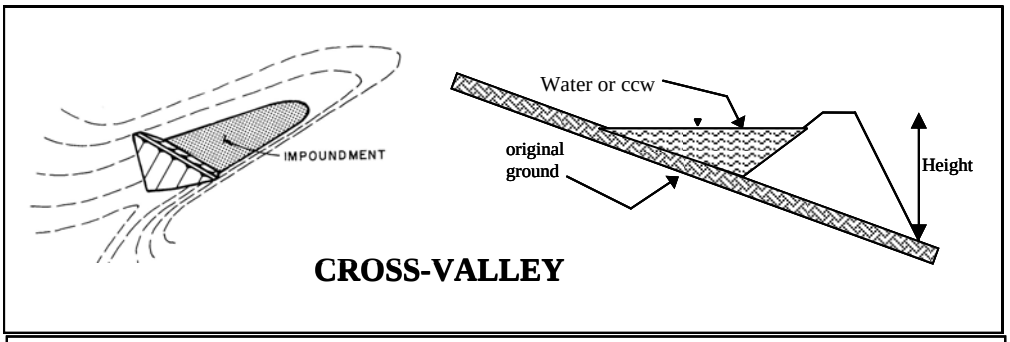
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

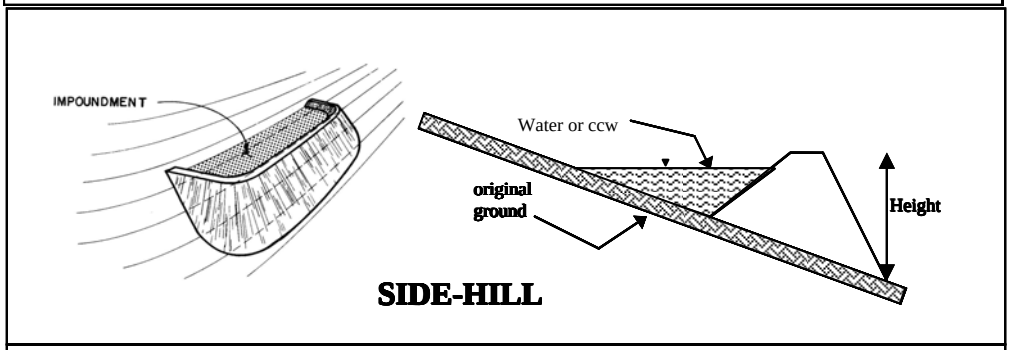
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

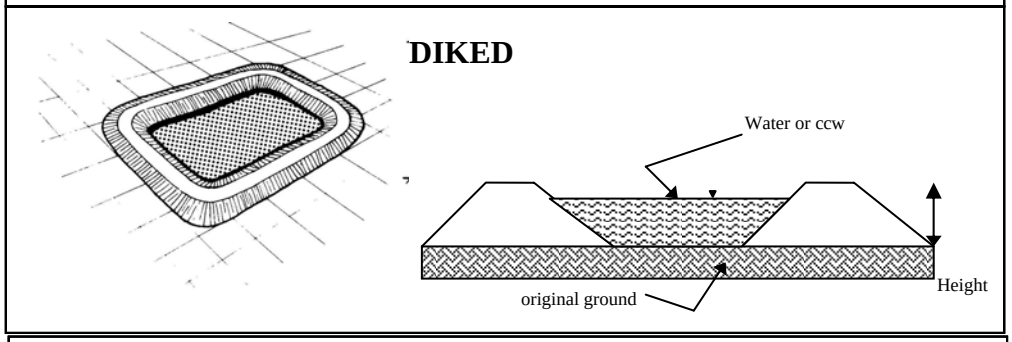
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

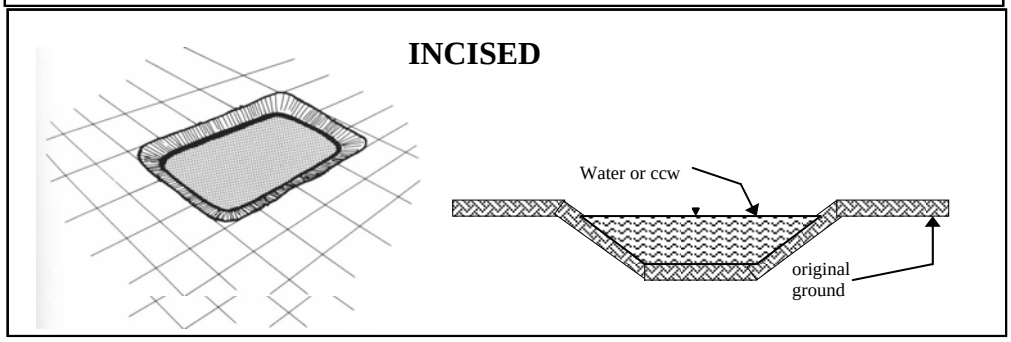
The area potentially inundated by a breach of any embankment of the CCW impoundment is limited to property owned by Luminant Power. The potential exists for some discharge to reach Lake Monticello which is also owned by Luminant Power. Environmental impacts with the waterbody are unknown due to unknown nature of stored materials constituent.

CONFIGURATION:







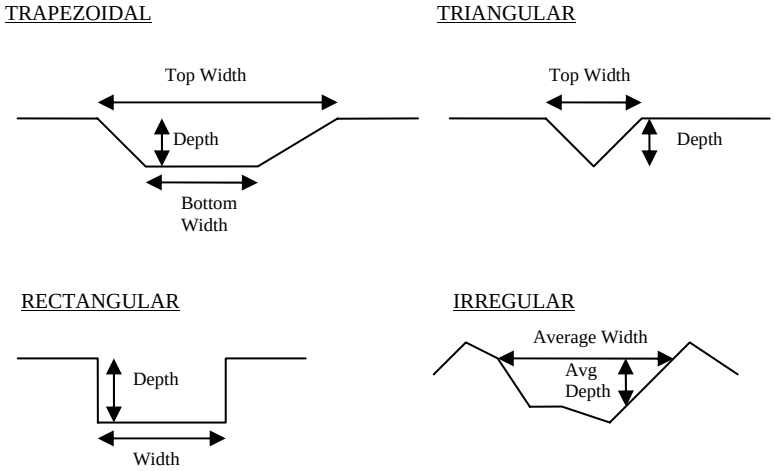


_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

Embankment Height 22.5 feet Embankment Material Native soil
Pool Area 20.23 acres Liner Clay with grout-filled bag cover
Current Freeboard Approx. 5.5 feet Liner Permeability Unknown

TYPE OF OUTLET (Mark all that apply)

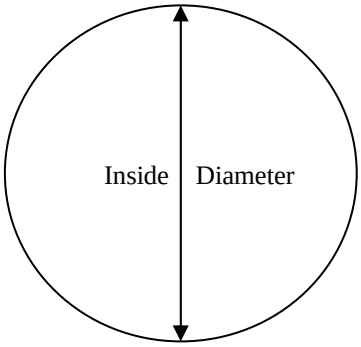
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular



_____ depth
_____ bottom (or average) width
_____ top width

_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____

__X__ **No Outlet** None: water is pumped from impoundments when needed

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Texas Utility Generating Co. (TUG Co.)

Has there ever been a failure at this site? YES _____ NO ____X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO ___X___

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____NO ___x___

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Additional Inspection Questions

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information on original embankment foundation available

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No

From the site visit or from photographic documentation, was there evidence of prior releases, failure, or patchwork on the dikes?

No

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Monticello Steam Electric Station	Date:	September 18, 2012
Unit Name:	Scrubber Pond	Operator's Name:	Luminant Power
Unit I.D.:	Scrubber Pond	Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	NJ Anestad, PE & RC Ganley, PE		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	377.5		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	0.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	0.0		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	384.0		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?			From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?			Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?			22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?			23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?	✓		24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

3, 4, 12, 14, 15, 16, 20: N/A. Impoundment does not have decant pipes or spillway. Water is pumped from impoundment if needed.

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # WQ 0001528000 INSPECTOR NJ Anestad, PE & RC Ganley, PE

Date September 18, 2012

Impoundment Name Scrubber Pond

Impoundment Company Luminant Power

EPA Region 6

State Agency (Field Office) Addresss 1445 Ross Avenue
Dallas, Texas 75202-2733

Name of Impoundment Scrubber Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Temporary storage of FGD blowdown water prior to reuse in facility.

Nearest Downstream Town : Name n/a: facility sits adjacent to Lake Monticello

Distance from the impoundment Approx. 1,500'

Impoundment Location:

Longitude 95 Degrees 02 Minutes 17 Seconds

Latitude 33 Degrees 05 Minutes 16 Seconds

State Texas County Titus

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__x__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

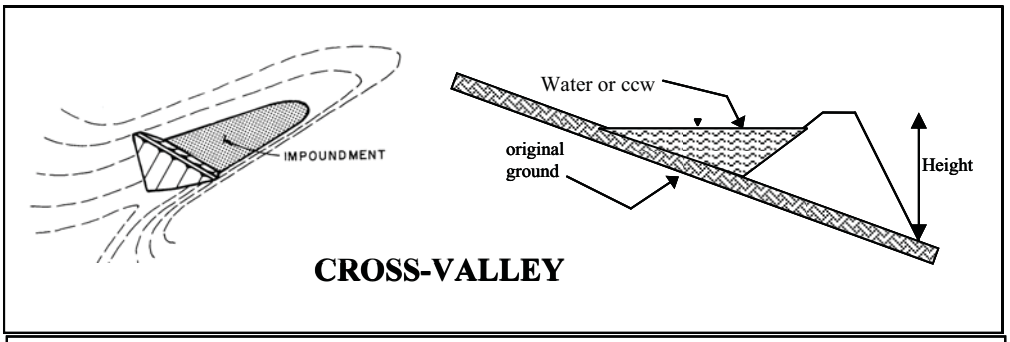
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

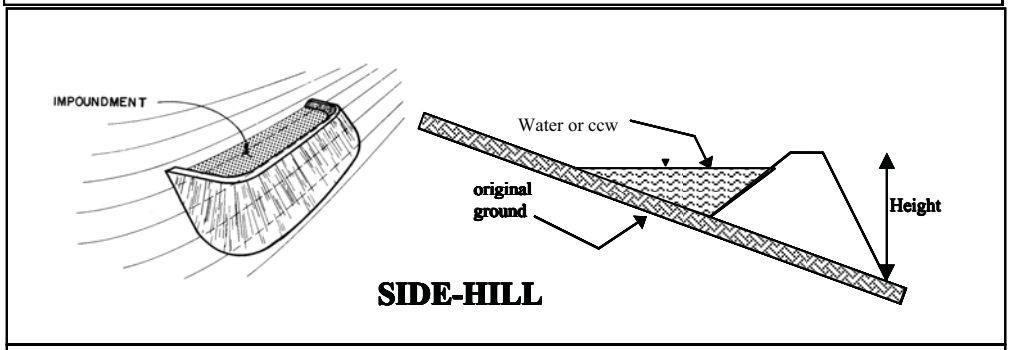
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

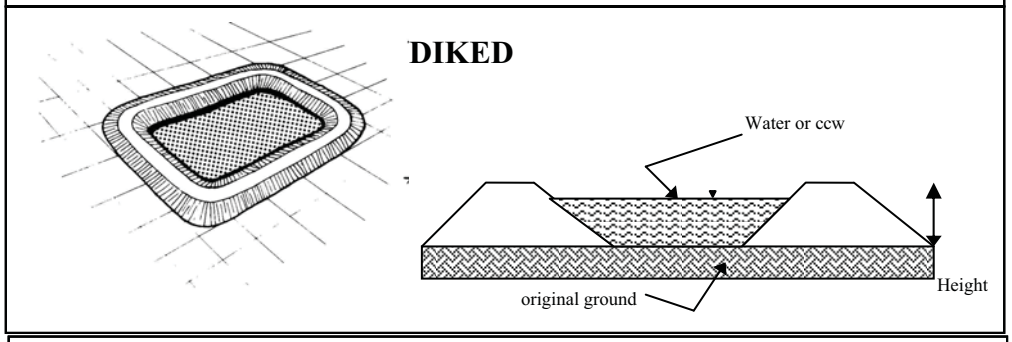
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

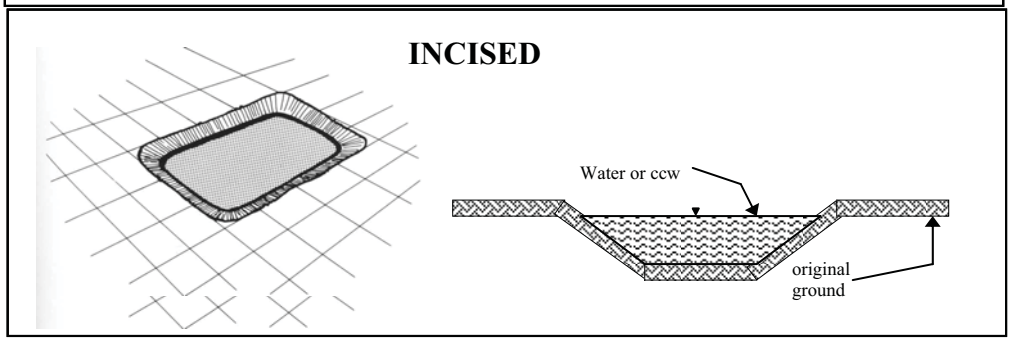
The area potentially inundated by a breach of any embankment of the CCW impoundment is limited to property owned by Luminant Power. The potential exists for some discharge to reach Lake Monticello which is also owned by Luminant Power. Environmental impacts with the waterbody are unknown due to unknown nature of stored materials constituent.

CONFIGURATION:









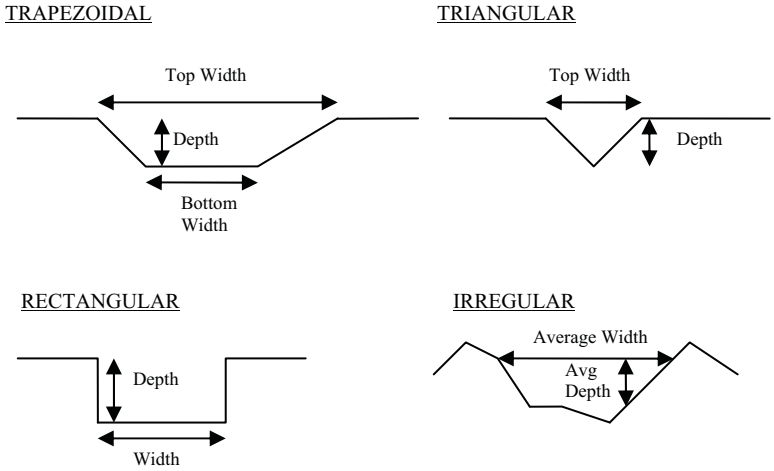
_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

Embankment Height Max. 8 feet Embankment Material Native soil
Pool Area 1.4 acres Liner 100-mil HDPE
Current Freeboard Approx. 6.5 feet Liner Permeability Unknown

TYPE OF OUTLET (Mark all that apply)

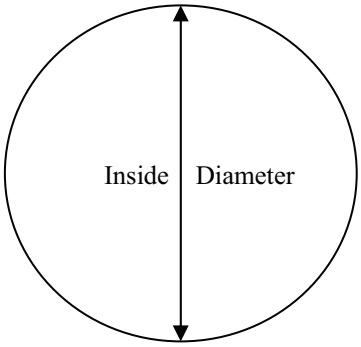
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____



_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO _____

__X__ **No Outlet** None: water is pumped from impoundment when needed

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By TU Electric
_____

Has there ever been a failure at this site? YES _____ NO ____X____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO ___X___

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___x___

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Additional Inspection Questions

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information on embankment foundation available

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No

From the site visit or from photographic documentation, was there evidence of prior releases, failure, or patchwork on the dikes?

No

APPENDIX B

Photographs

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: E

Description: Southern embankment of the South Pond.

Date: 9/18/12

Photo Number: 1

Photographer: NJA

Orientation: NW

Description: Access walkway to gate operator in the South Pond. Note staff gages.

Date: 9/18/12

Photo Number: 2

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: N

Description: Inboard face of the eastern embankment of the South Pond. Note riprap facing.

Date: 9/18/12

Photo Number: 3

Photographer: NJA

Orientation: N

Description: Western embankment of South Pond. Minor rutting observed below pipes.

Date: 9/18/12

Photo Number: 4

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: E

Description: Dividing dike between the North and South Ponds. Note equalizing channel.

Date: 9/18/12

Photo Number: 5

Photographer: NJA

Orientation: N

Description: Western embankment of North Pond

Date: 9/18/12

Photo Number: 6

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: S

Description: Western embankment of North Pond.

Date: 9/18/12

Photo Number: 7

Photographer: NJA

Orientation: S

Description: Northwest corner of the North Pond. Some erosion and slides. Owner noted that the material is additional fill placed against the original embankment. Slides have also been noted in previous inspection reports

Date: 9/18/12

Photo Number: 8

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: S

Description: Interior of North Pond. Note discharge piping, currently not in use.

Date: 9/18/12

Photo Number: 9

Photographer: NJA

Orientation: E

Description: Crest and interior of the North Pond.

Date: 9/18/12

Photo Number: 10

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: S

Description: Dividing dike between the North Pond and the Settling Pond. Note the "concrete revetment" (grout-filled bags) on the faces of the dike.

Date: 9/18/12

Photo Number: 11

Photographer: NJA

Orientation: N

Description: Northwest corner of the Settling Pond. Note concrete revetment. Inflow piping in background.

Date: 9/18/12

Photo Number: 12

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: E

Description: Outboard face of the northern embankment of the Settling Pond.

Date: 9/18/12

Photo Number: 13

Photographer: NJA

Orientation: S

Description: Small erosion gully at the crest of the Settling Pond.

Date: 9/18/12

Photo Number: 14

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: E

Description: Inflow of wastewater into the Settling Pond.

Date: 9/18/12

Photo Number: 15

Photographer: NJA

Orientation: S

Description: Outboard face of the eastern embankment of the Settling Pond.

Date: 9/18/12

Photo Number: 16

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: SW

Description: Inboard face of the eastern embankment of the Settling Pond.

Date: 9/18/12

Photo Number: 17

Photographer: NJA

Orientation: W

Description: Inboard face of the southern embankment of the Settling Pond. Runoff Collection Pond is visible to the left (south).

Date: 9/18/12

Photo Number: 18

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: W

Description: Outboard face of the southern embankment of the Settling Pond. This embankment serves as the dividing dike between the Settling and Runoff Collection Ponds.

Date: 9/18/12

Photo Number: 19

Photographer: NJA

Orientation: NW

Description: Southwest corner of the Settling Pond.

Date: 9/18/12

Photo Number: 20

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: W

Description: Dividing dike between the North and South Ponds.

Date: 9/18/12

Photo Number: 21

Photographer: NJA

Orientation: S

Description: Outboard face of the eastern embankment of the South Pond and the interior of the Runoff Collection Pond.

Date: 9/18/12

Photo Number: 22

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: N

Description: Interior of the Scrubber Pond.

Date: 9/18/12

Photo Number: 23

Photographer: NJA

Orientation: W

Description: Southern inboard face of the Scrubber Pond.

Date: 9/18/12

Photo Number: 24

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: N

Description: Eastern inboard face of Scrubber Pond and inflow pipe.

Date: 9/18/12

Photo Number: 25

Photographer: NJA

Orientation: E

Description: Northern embankment of the Scrubber Pond.

Date: 9/18/12

Photo Number: 26

Photographer: NJA

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.270.100
Site Name:	Monticello Steam Electric Station	Location:	Mount Pleasant. Titus County, TX

Orientation: S

Description: Eastern embankment of the Scrubber Pond.

Date: 9/18/12

Photo Number: 27

Photographer: NJA

Orientation: N

Description: Interior of abandoned Scrubber Pond and southern embankment of the "New" Scrubber Pond.

Date: 9/18/12

Photo Number: 28

Photographer: NJA

APPENDIX C

Pertinent Documentation

March 11, 2014 Project No. 12394128.002

Mr. Gary L. Spicer
Luminant Power
1601 Bryan Street
Dallas, Texas 75201

RE: ADDENDUM TO ASH AND SCRUBBER POND STABILITY INVESTIGATION REPORT, LUMINANT MONTICELLO POWER PLANT, TITUS COUNTY, TEXAS

Dear Gary:

This letter report serves as an addendum to "Ash and Scrubber Pond Stability Investigation Report, Luminant Monticello Power Plant, Titus County, Texas," issued by Golder Associates Inc. (Golder) in December 2012. This report includes additional slope stability analyses for exterior pond slopes.

Details of the field investigation, subsurface conditions, and soil material properties used in the stability analyses are included in the December 2012 report.

1.0 ADDITIONAL STABILITY ANALYSES

Additional stability analyses are presented for two exterior slope sections at the ash ponds. Stability analyses considered "full pond" conditions, which is the most critical loading case for the exterior slopes. A representative exterior slope for the settling pond is located on the north side and consists of an approximately 13-foot high, 3 horizontal to 1 vertical (3H:1V) slope. A representative exterior slope for the north and south ponds is located on the east side of the south pond and consists of an approximately 23-foot high, 3H:1V slope. The results of the analyses are provided in Table A-1. SLIDE output files are included as an attachment.

TABLE 1-A. SLOPE STABILITY FACTORS OF SAFETY

Case	Description	Factor of Safety
22	Settling pond; north exterior slope; full pond; short term (undrained) conditions	4.7
23	Settling pond; north exterior slope; full pond; long term (drained) conditions	5.2
24	South pond; east exterior slope; full pond; short term (undrained) conditions	3.6
25	South pond; east exterior slope; full pond; long term (drained) conditions	3.4

In addition, Cases 1-6 (presented in the December 2012 report) are representative of the settling pond's south exterior slope (i.e. same geometry and soil conditions). Cases 12-16 (presented in the December 2012 report) are representative of the south pond's east exterior slope. Cases 22 and 23 are a

Golder Associates Inc.
500 Century Plaza Drive, Suite 190
Houston, TX 77073 USA
Tel: (281) 821-6868 Fax: (281) 821-6870 www.golder.com

conservative representation of the scrubber pond exterior slope. In summary, our analyses indicate that the exterior slopes are stable.

2.0 CLOSING

Golder appreciates the opportunity to assist Luminant with this project. If you have any questions, or require further assistance from Golder, please contact the undersigned at (281) 821-6868.

Very truly yours,

GOLDER ASSOCIATES INC.
Texas Firm Registration Number: F-2578

STATE OF TEXAS
3/11/14
P. CHRIS MARSHALL
91893
LICENSED
PROFESSIONAL ENGINEER

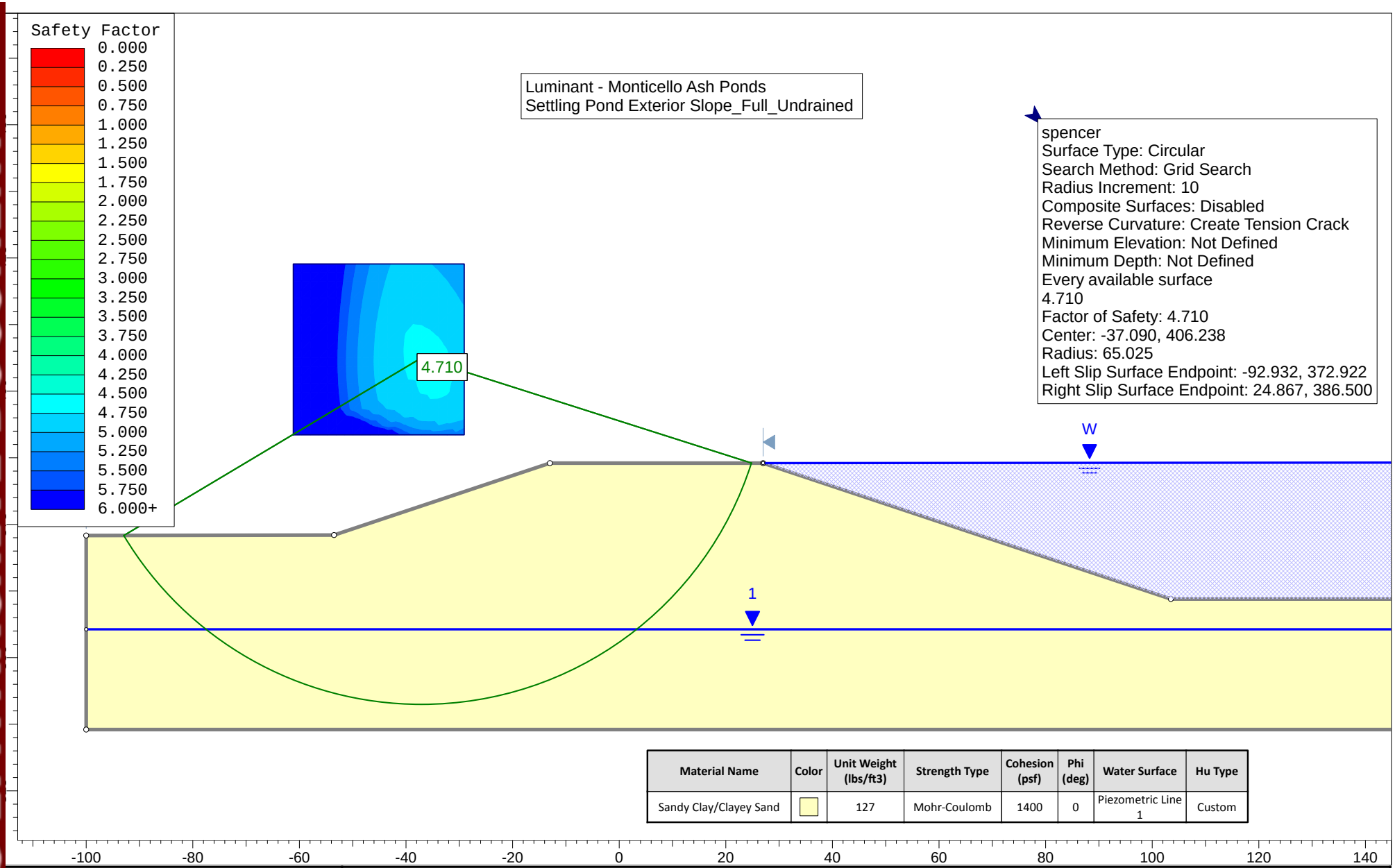
P. Chris Marshall, P.E.
Senior Project Engineer

Charles F. Rickert, P.E.
Associate

Attachments

Golder Associates

CASE 22



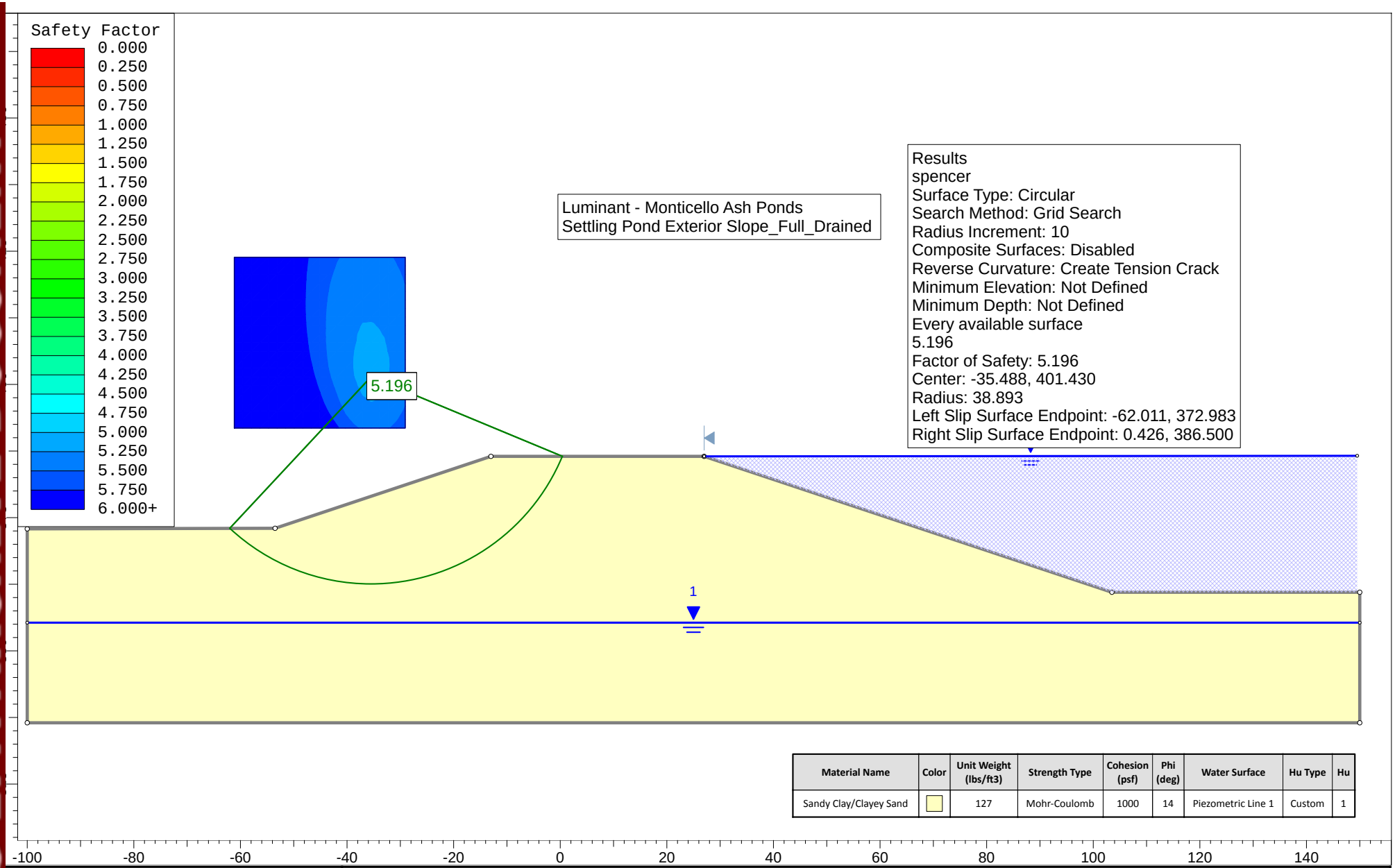
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Sandy Clay/Clayey Sand		127	Mohr-Coulomb	1400	0	Piezometric Line 1	Custom

rocscience

DEINTERPRET 6.026

Project	Luminant - Monticello Ash Ponds		
Analysis Description	Settling Pond Exterior Slope_Full_Undrained		
Drawn By PCM	*Scale* 1:300	*Company*	Golder Associates Inc.
Date 11/21/2012, 11:53:19 AM		*File Name*	Settling Pond ext_a.slim

CASE 2

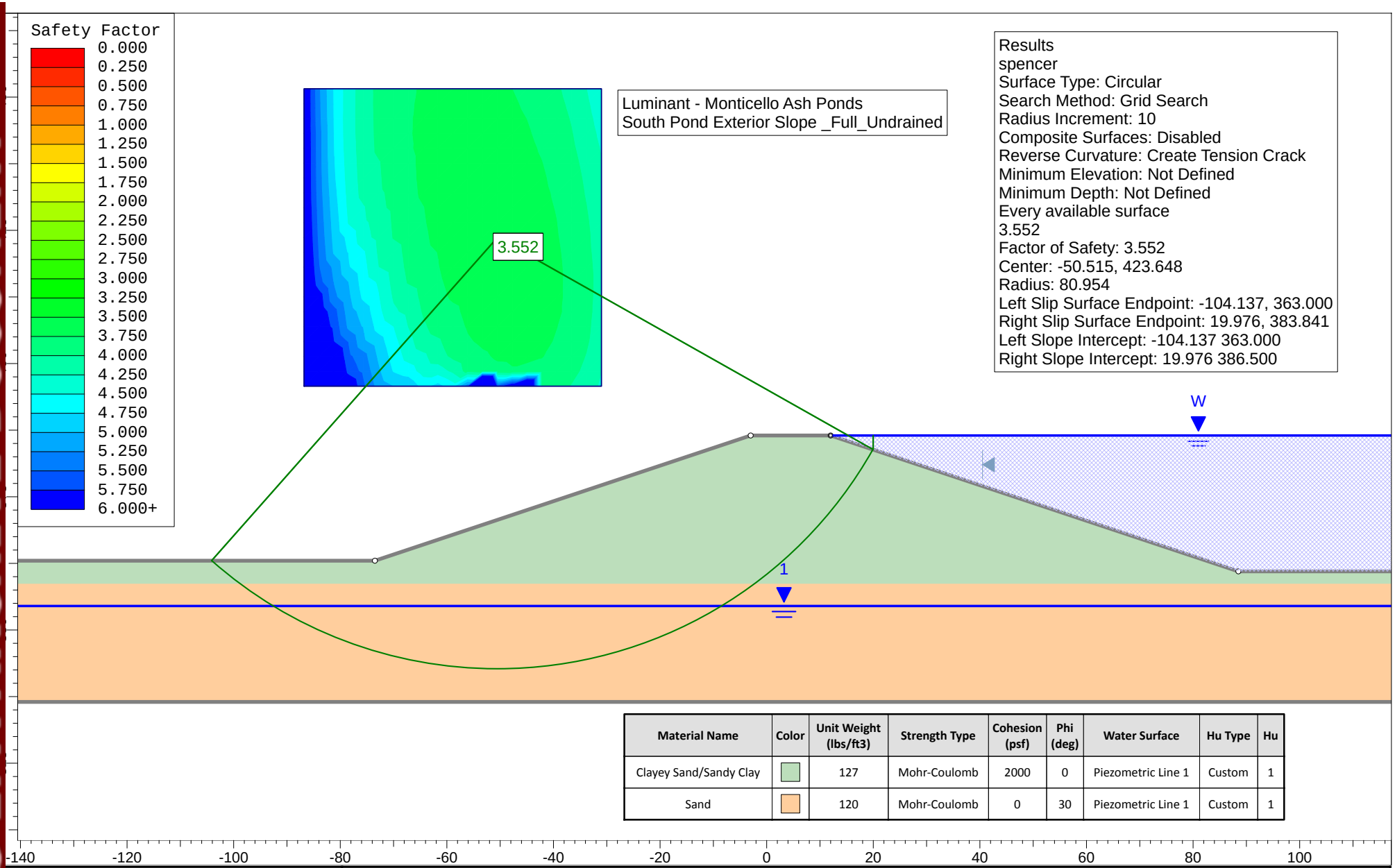


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Sandy Clay/Clayey Sand		127	Mohr-Coulomb	1000	14	Piezometric Line 1	Custom	1

Project	Luminant - Monticello Ash Ponds		
Analysis Description	Settling Pond Exterior Slope_Full_Drained		
Drawn By	PCM	Scale 1:300	Company Golder Associates Inc.
Date	11/21/2012, 11:53:19 AM		File Name Settling Pond ext_b.slim

DEINTERPRET 6.026

CASE 2



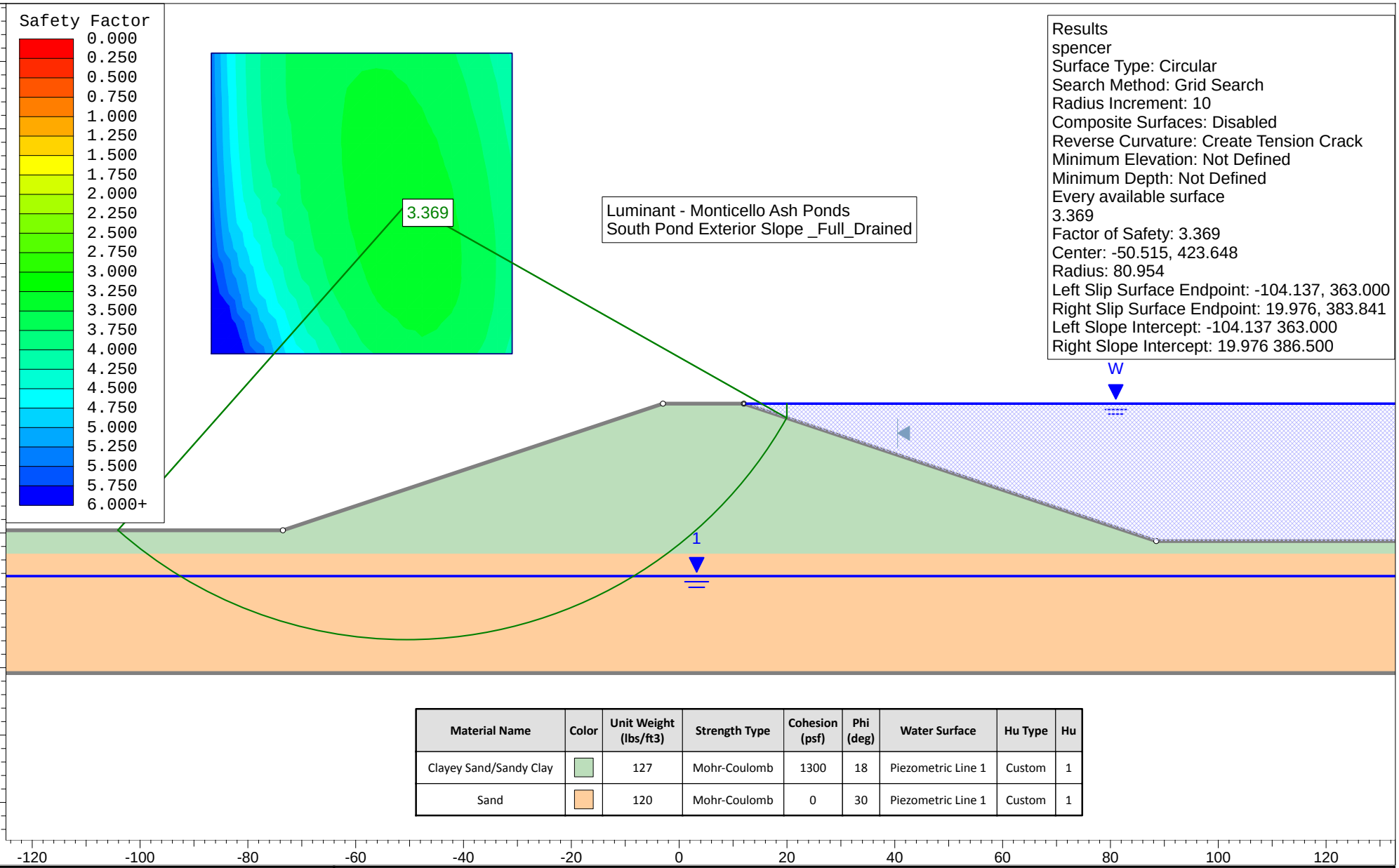
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Clayey Sand/Sandy Clay		127	Mohr-Coulomb	2000	0	Piezometric Line 1	Custom	1
Sand		120	Mohr-Coulomb	0	30	Piezometric Line 1	Custom	1

Project	Luminant - Monticello Ash Ponds		
Analysis Description	South Pond Exterior Slope _Full_Undrained		
Drawn By: PCM	Scale: 1:300	Company: Golder Associates Inc.	
Date: 11/20/2012, 6:26:53 PM		File Name: South pond ext_a.slim	

rocscience

DEINTERPRET 6.026

CASE 2



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Clayey Sand/Sandy Clay		127	Mohr-Coulomb	1300	18	Piezometric Line 1	Custom	1
Sand		120	Mohr-Coulomb	0	30	Piezometric Line 1	Custom	1

Project	Luminant - Monticello Ash Ponds		
Analysis Description	South Pond Exterior Slope _Full_Drained		
Drawn By: PCM	Scale: 1:300	Company: Golder Associates Inc.	
Date: 11/20/2012, 6:26:53 PM		File Name: South pond ext_b.slim	

DEINTERPRET 6.026