Ameren

Ameren Services

August 22, 2011

CERTIFIED MAIL: 7002 3150 0001 2354 9273

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

Re: Ameren Missouri
Sioux Power Station
Response to Dewberry & Davis Final Coal Combustion Waste Impoundments
Round 7 – Dam Assessment Report

Dear Mr. Hoffman:

In the USEPA letter to Mr. Michael Menne dated July 26, 2011, the USEPA requested information on how Ameren intended to address recommendations found in the final report on the structural stability of the fly ash and bottom ash ponds at Ameren Missouri's Sioux Power Station. This report was prepared by your engineering consultant (Dewberry & Davis, LLC) based on a site visit and review of engineering documentation provided by Ameren. Your engineering consultant then provided their evaluation of the structural stability of the fly and bottom ash pond and provided recommendations in their final report dated June 2011.

In 2010 and citing investigation authority under CERCLA, USEPA instituted a review of coal ash impoundments at electric generating facilities located throughout the United States. Ameren Corporation and its operating companies cooperated fully with that investigation and provided a variety of engineering documentation and made its facilities available for site inspections performed by USEPA's engineering consultant. That limited review effort has culminated in USEPA's issuance of reports regarding the structural stability of impoundments located at our facilities. While many of the observations are routine, we do have some concerns as to the methodology and process employed in drafting the reports. As a preliminary matter, the language used by your consultant is not tied to a regulatory definition, engineering standard or protocol. As such, condition ratings such as "satisfactory", "fair", "poor", "unsatisfactory" or "unknown" lack regulatory or statutory definition. To the extent USEPA has created its own standard and/or grading system; such a process could create confusion and be misleading to members of the public who are unfamiliar with the regulatory and engineering standards applicable to these facilities.

In fact, USEPA's regulatory basis both its initial investigation, and most recent correspondence regarding structural assessments remains unclear. (As you are aware, USEPA has proposed revisions to RCRA which would allow for the direct regulation including the engineering and design of impoundments and landfills. That regulatory process, however, has not been finalized.) In fact, state regulatory authorities such as Missouri Department of Natural Resources (MDNR) traditionally have authority over the structural integrity of such facilities through their dam safety programs. Accordingly, in responding to USEPA's reports regarding the structural stability of ash ponds at our facilities, Ameren reserves its right to object to a USEPA's assertion of jurisdiction in an area that appears to be outside of its regulatory purview. To the extent that Ameren has decided to implement a recommendation, such implementation is on a voluntary basis.

Subject to the above comments and objections, below are Ameren Missouri's responses to the conclusions and recommendations provided in the Dewberry & Associates final dam safety assessment of the coal combustion waste (CCW) impoundments at the Sioux Power Station. The conclusions and recommendations from the report are presented in **bold print** and our responses are provided in regular print.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operations

The classification of the Fly Ash Pond dam is "SATISFACTORY" for continued safe and reliable operation. No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, seismic, hydrologic) in accordance with the applicable criteria. Minor maintenance items are recommended.

> Response: Ameren Missouri agrees that a "Satisfactory" rating is warranted for the fly ash pond at the Sioux Power Station. Regular maintenance of the embankments will be performed.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operations

The Bottom Ash Pond dam rating is influenced by the results of the November 2010 Ash Pond Dam Stability Analysis conducted by Reitz & Jens, Inc. Evaluation of the Bottom Ash Dam show the pond embankment does not meet the minimum required Factor of Safety for the Steady Seepage loading conditions. Therefore, the Bottom Ash Dam is currently rated "POOR". Ameren Missouri is currently monitoring this location and plans to implement a project to install an inverted filter along the seepage area in the third/fourth quarter of 2011 and to densify the seepage area. Ameren Missouri has stated that the modifications will improve the dike performance so that it meets minimum Factors of Safety. The Bottom Ash Pond dam will be rated "FAIR" for continued safe and reliable operation upon completion of the projects and demonstration that Factors of Safety are met.

> Response: Ameren Missouri plans to install an inverted filter along the seepage area in the northeast corner of the ash pond. In addition, Ameren plans to install a riprap wedge along the toe in the northwest corner and a stability berm along the toe of the north embankment. These stability improvements are recommendations from the July 29, 2011 Reitz & Jens report which provides recommendations for improving the stability of the embankments in the bottom ash pond. A copy of this report has been enclosed with this response letter. With these improvements the factor of the safety for the bottom ash pond embankment will exceed the minimum factor of safety of 1.5 as required by the MDNR regulations which was used as a benchmark for the stability analysis. Ameren plans to complete this project by the end of 2011, however, implementation of this project requires water levels in the adjacent Mississippi River to remain in the bank and requires permits be obtained from the United States Army Corp of Engineers (USACE). Until, during and after these improvements are made, the seepage and embankment slope will be monitored visually for changed conditions. Upon completion of these improvements, Ameren Missouri believes that a **"Satisfactory"** rating is warranted for the

embankments in lieu of the **"Fair"** rating indicated by the EPA's consultant based on the EPA criteria provided.

1.2.1 Recommendations Regarding the Structural Stability: The Bottom Ash Pond dam minimum Factor of Safety for Steady Seepage is not met (See section 1.1.8 of the final report). It is recommended that Ameren Missouri immediately implement its plans to install an invert filter and densify the dike to ensure minimum Factors of Safety are met. Ameren Missouri should continue to monitor the clear water seep area observed in the northeastern corner of the embankment even after implementation to ensure there is no further seepage.

Response: See response to comment 1.1.8 for the bottom ash pond above.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety: It is recommended that Ameren Missouri conduct an updated hydrologic/hydraulic safety study to reflect current conditions.

Response: A hydrologic/hydraulic analysis was completed by Reitz & Jens, Inc. August 27, 2007 and a copy of this report was provided to the EPA consultant. Ameren Missouri considers this report current and does not plan on conducting an additional hydrologic/hydraulic analysis.

1.2.3 Recommendations Regarding the Supporting Technical Documentation: Ameren Missouri should send to USEPA design information and calculations of structural stability for the seepage area assuming the filter is installed and dike densification occurs for the Bottom Ash Pond embankment.

Response: A copy of the July 29, 2011 Reitz & Jens report providing recommendations for stability improvements to the embankments in the bottom ash ponds has been enclosed with this response letter. Ameren Missouri does not plan to implement an earlier dike densification recommendation. The factor of safety of the bottom ash pond embankment will be increased to the 1.5 minimum required by the MDNR, which was used as a benchmark for the stability analysis, by installing the inverted filter, riprap wedge and stability berm as discussed in the response to 1.1.8 for the bottom ash pond above.

1.2.4 Recommendations Regarding the Description of the Management Unit (s): No recommendations appear warranted at this time.

Response: Ameren Missouri agrees with this recommendation.

1.2.5 Recommendations Regarding the Field Observations: Continue weekly monitoring of the western portion of the Bottom Ash Pond embankment for signs of erosion or wave action by adjacent channel as well as monitoring the clear water seep observed in the northeastern corner of the embankment.

Response: Ameren Missouri agrees to continue weekly monitoring of the bottom ash pond embankment and seepage area for changed conditions make repairs as appropriate to ensure embankment safety.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation: Continue to maintain existing embankment slopes to keep vegetation controlled and to allow for easy visual inspection of the dams.

Response: Ameren Missouri agrees to continue maintaining the existing embankment slopes to control vegetation and facilitate visual inspection of the embankment.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program: No recommendations appear warranted at this time.

Response: Ameren Missouri agrees to continue monitoring of the ash pond embankments as prescribed in our dam safety program for the Sioux Power Station.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation: See Sections 1.2.1 and 1.2.5 for continued monitoring until the inverted filter is installed, densification is complete, and seepage stops.

Response: Ameren Missouri agrees to continue weekly monitoring of the bottom ash pond embankment and seepage area for changed conditions make repairs as appropriate to ensure embankment safety.

Business Confidentiality Claim

We request the final Dam Safety Assessment Report for the Sioux Power Station prepared by Dewberry & Davis as well as our responses to this report remain confidential. This request is made in accordance with the procedures described in 40 CFR, Part 2, Subpart B. We also request that engineering documents and reports submitted to Dewberry & Davis for preparation of their report along with the stability analysis submitted for consideration in Ameren's response to the report be designated as Confidential Business Information.

If you need further information, please feel free to contact me at 314-554-2388.

Sincerely,

Paul R. Pike
Environmental Science Executive
Environmental Services
T 314.554.2388
F 314.554.4182
prpike@ameren.com

Enclosures

REITZ & JENS, INC.
CONSULTING ENGINEERS

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st. louis, missouri 63132
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fax: 314.993.4177
www.reitzjens.com

July 29, 2011

Mr. Matt Frerking
Managing Supervisor – Dam Safety
Ameren Missouri
3700 South Lindberg, MC F-604
Sunset Hills, Missouri 63127

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RE: Ash Pond Stability Recommendations
Sioux Power Station

Dear Mr. Frerking:

Reitz & Jens performed analyses of the Sioux Power Station ash pond embankments in November 2010, and found two areas of the Bottom Ash Pond which had factors of safety (FS) less than 1.5 for full pond ("reservoir"), steady-state seepage, and long-term (drained) shear strength properties. Ameren Missouri asked Reitz & Jens to re-analyze these areas and to provide recommendations for increasing the FS to 1.5 or greater for those areas where the FS is now less than 1.5.

Attached to this letter are graphical depictions and summaries of slope stability analyses for three cross-sections. The attached stability analyses results show the FS for the existing exterior slopes of the embankment cross-sections and, if applicable, for the modified cross-sections. The full pool was assumed to be at el. 434.5 in our analyses, with a linear phreatic surface through the embankments. The locations of the cross-sections are shown in Figure 1.

An iterative process with SLIDE 5.0 was used to evaluate slope geometries in order to achieve a minimum FS of 1.5. The FS for the existing exterior slopes and recommended modified slopes are summarized in the following table.

	Factor of Safety	
Cross-section	Existing Long-term	Improved Long-term
1 (Northwest)	1.40	1.64
North (Northeast)	1.32	1.52
2 (West)	1.51	N/A

*Based on required design acceleration per MDNR 10 CSR 22-3

For cross-section 1, we recommend constructing a rock wedge along the adjacent slope of the drainage channel slope to increase the FS to 1.5. The rock wedge should be a minimum of 3 feet thick and built to a maximum 2H:1V slope where the slopes of the drainage channel are higher or steeper than the drainage channel slope shown in cross-section 2. A 17-foot wide by 4-foot thick stability berm is recommended for the north cross-section to achieve a minimum FS of 1.5. The extent of these stabilization measures should be determined by a topographic survey of the area.

Please let us know if you have any questions regarding this letter or any other slope stability aspects of the project. We appreciate this opportunity to continue our working relationship with Ameren Missouri.

Sincerely,
REITZ & JENS, Inc.

Jeffrey D. Bertel, P.E.
Project Engineer

Jeffrey L. Fouse, P.E.
Senior Project Manager

The following figures are attached and complete this report:

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Figure 1 Location of Cross-sections
Figure 2 Cross-section 1 (Northwest), Existing, Long-term
Figure 3 Cross-section 1 (Northwest), Improved, Long-term
Figure 4 North Cross-section, Existing, Long-term
Figure 5 North Cross-section, Improved, Long-term
Figure 6 Cross-section 2 (West), Existing, Long-term

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STATE OF MISSOURI
JEFF BERTEL
NUMBER PE-2010025265
07/29/2011
PROFESSIONAL ENGINEER

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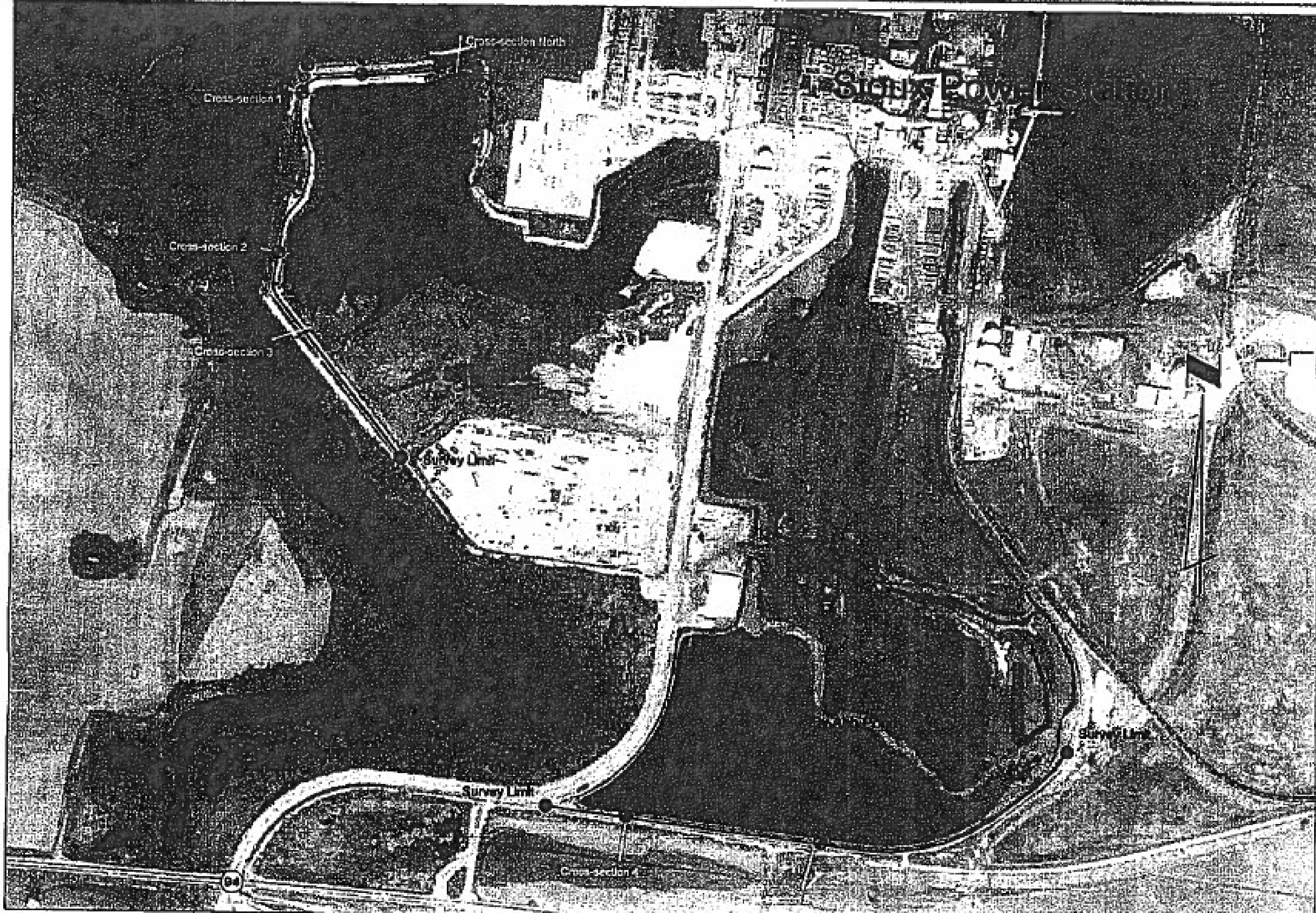

Elevation Profile Survey Limits
Locations of Cross-section and Borings

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CONSULTING ENGINEERS

Figure 1

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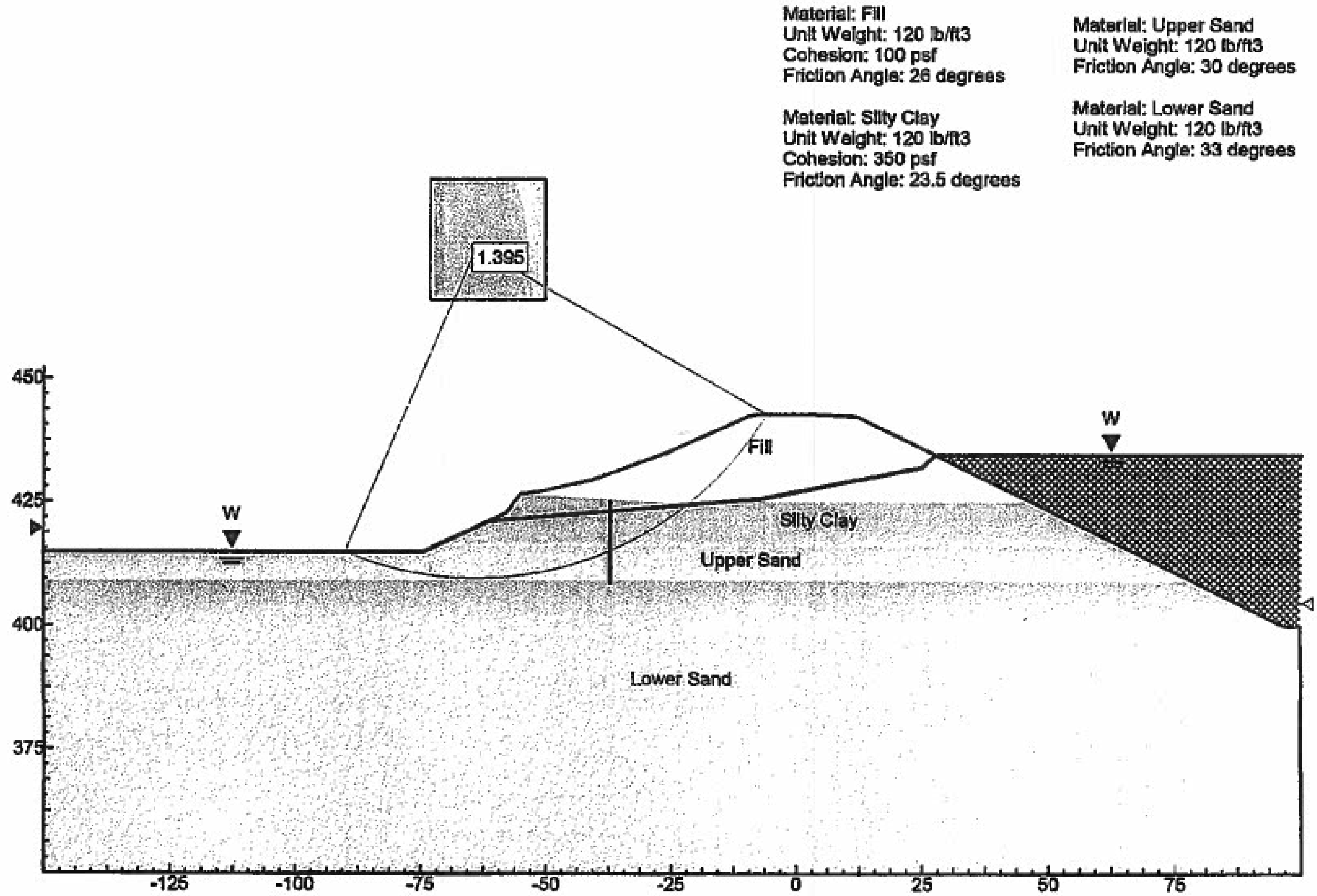

Ameren Missouri: Sioux Power Station
Steady Seepage, Full Reservior
Cross-section 1

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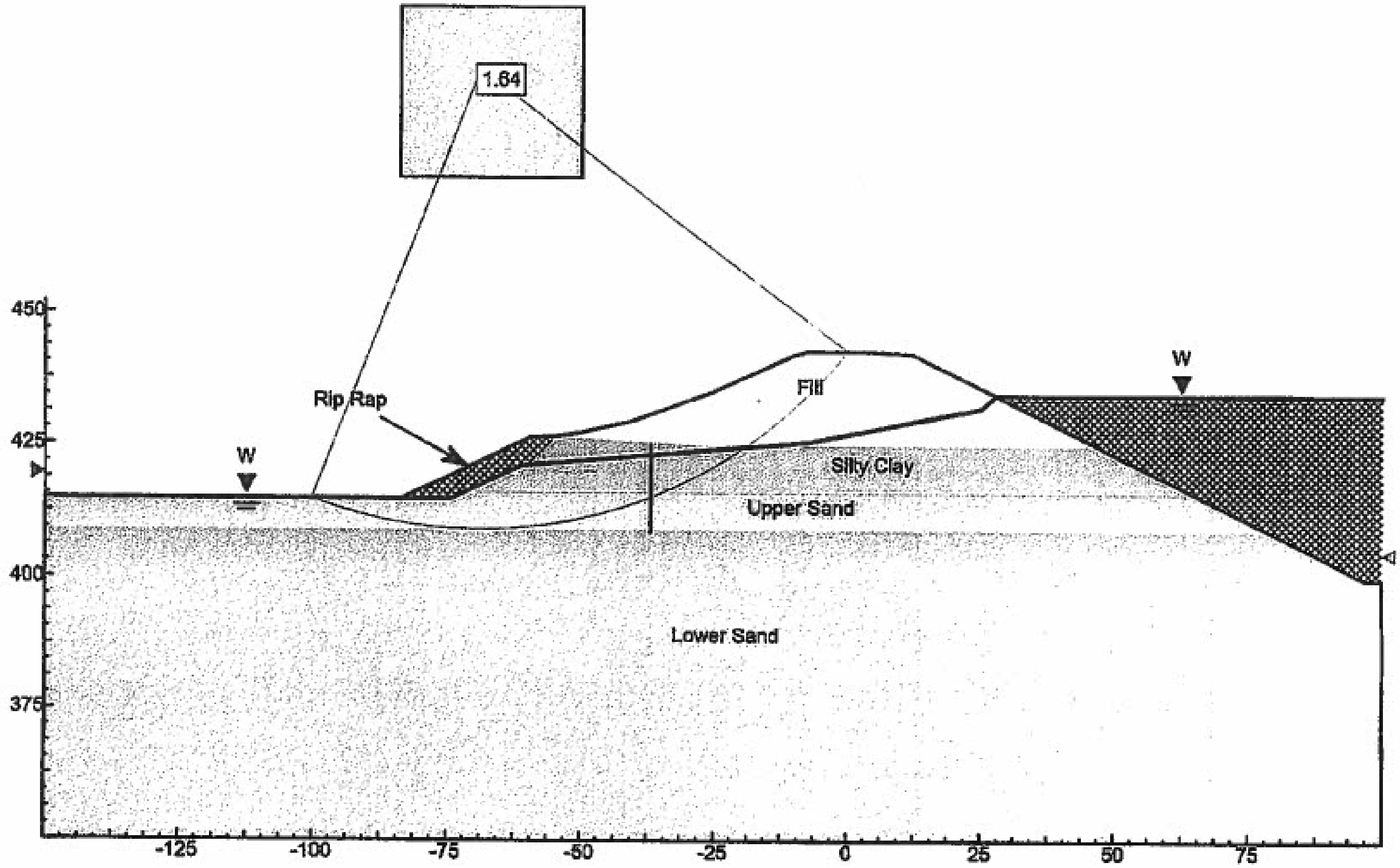
Figure 2



Ameren Missouri: Sioux Power Station
Long-term, Full Reservior
Cross-section 1

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Figure 3

Slide Analysis Information

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Document Name

File Name: x-sect 1 long term.sli

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Fill
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 100 psf
Friction Angle: 26 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Silty Clay
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 350 psf
Friction Angle: 23.5 degrees

Water Surface: Water Table
Custom Hu value: 1

<u>Material: Upper Sand</u>
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

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<u>Material: Lower Sand</u>
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

<u>Material: Rip Rap</u>
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 40 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

<u>Material Boundary</u>

-55.000	426.500
-27.000	425.000
46.800	425.000

<u>Material Boundary</u>

-71.910	416.000
64.800	416.000

<u>Material Boundary</u>

-150.000	409.000
78.800	409.000

<u>Material Boundary</u>

-83.660	414.800
-74.400	414.800
-71.910	416.000
-57.800	422.750
-55.000	426.500

<u>External Boundary</u>

96.800	400.000
78.800	409.000
64.800	416.000
46.800	425.000
12.000	442.400
2.440	442.830
0.000	442.800

-7.400	442.830
-9.600	442.400
-25.700	434.900
-41.000	429.300
-51.100	427.100
-55.000	426.500
-59.600	426.300
-83.660	414.800
-150.000	414.800
-150.000	409.000
-150.000	350.000
100.000	350.000
100.000	400.000

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Water Table

-150.000	414.800
-74.400	414.800
-61.113	421.104
-7.211	425.574
25.000	432.000
27.800	434.500
100.000	434.500

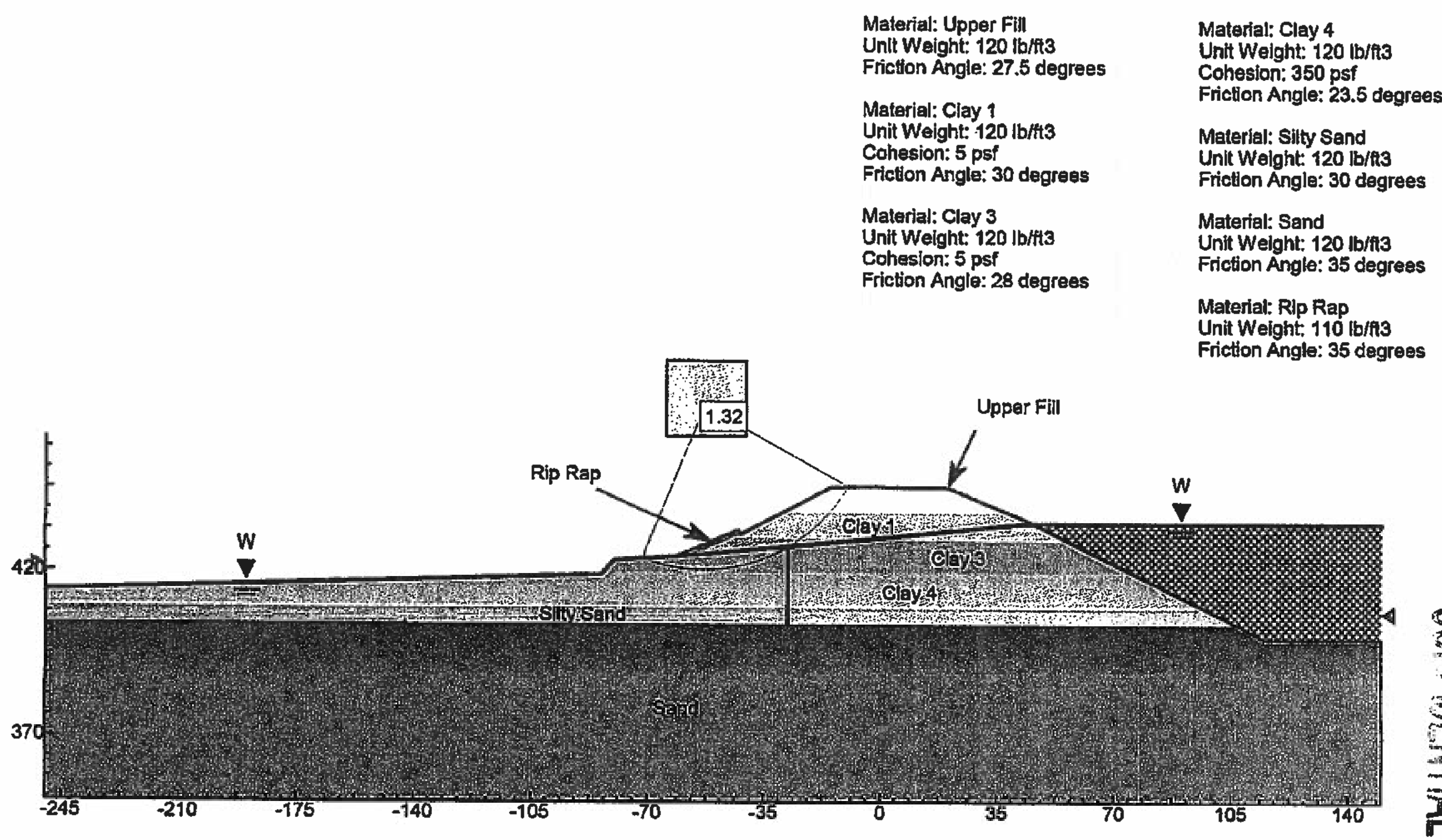
Focus/Block Search Line

-37.000	408.541
-37.000	424.998

Search Grid

-84.000	476.000
-50.000	476.000
-50.000	508.000
-84.000	508.000

Figure 3



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Ameren Missouri: Sioux Power Station
Steady Seepage, Full Reservior
North Section

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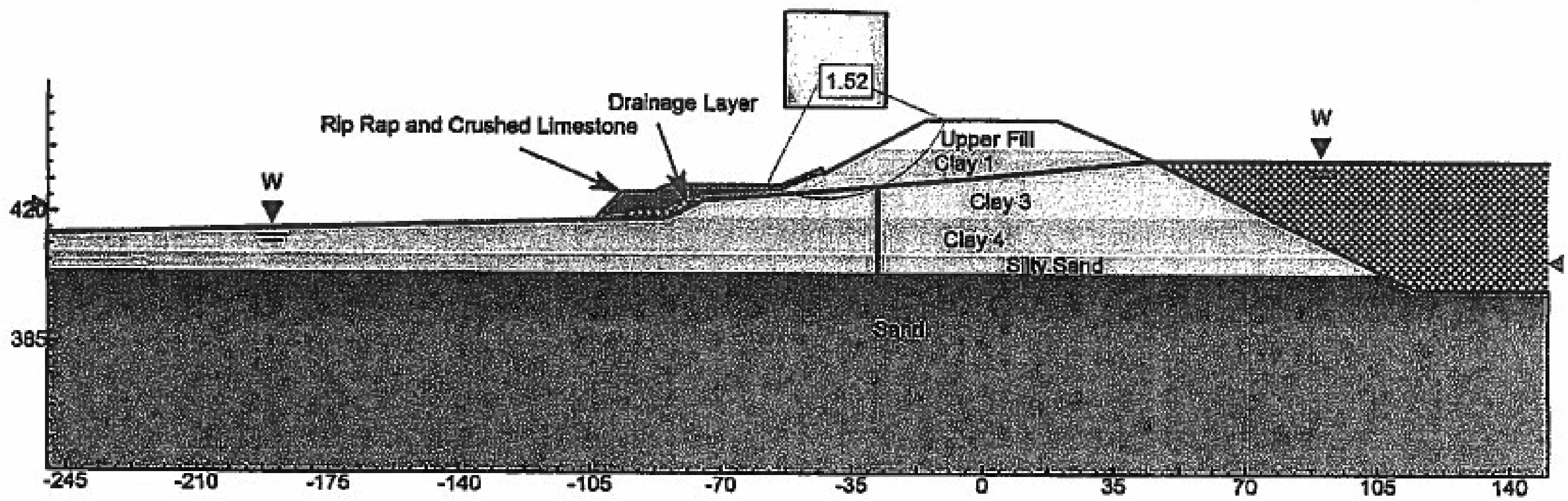
Figure 4



Ameren Missouri: Sioux Power Station
Steady Seepage, Full Reservior
North Cross-section

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Figure 5

Slide Analysis Information

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Document Name

File Name: fix x-sect north long term.sli

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Upper Fill
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 27.5 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay 1
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 5 psf
Friction Angle: 30 degrees

Water Surface: Water Table
Custom Hu value: 1

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Material: Clay 3
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 5 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay 4
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 350 psf
Friction Angle: 23.5 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Silty Sand
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Rip Rap
Strength Type: Mohr-Coulomb
Unit Weight: 110 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Drainage Layer
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

-29.264	437.995
38.340	437.800

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Material Boundary

-44.824	429.976
-41.649	429.951
56.563	429.200

Material Boundary

-72.379	419.200
76.576	419.200

Material Boundary

-250.000	409.200
96.588	409.200

Material Boundary

-250.000	404.200
106.595	404.200

Material Boundary

-57.110	424.840
-44.824	429.976
-42.350	431.010

Material Boundary

-103.960	418.330
-94.100	418.660
-84.100	418.960
-83.620	419.200
-74.420	423.800
-63.650	424.449

Material Boundary

-94.100	418.660
-94.100	420.480
-84.990	420.750
-78.890	423.800
-74.420	423.800

Material Boundary

-83.620	419.200
-72.379	419.200

Material Boundary

-63.650	424.449
-57.110	424.840

External Boundary

-15.000	445.610
-29.264	437.995
-36.374	434.200
-42.350	431.010
-42.930	432.390
-53.923	427.798
-74.420	427.800
-83.360	427.800
-85.150	427.380
-87.680	426.120
-96.780	425.840

Figure 5

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-103.960	418.330
-250.000	414.000
-250.000	409.200
-250.000	404.200
-250.000	350.000
150.000	350.000
150.000	400.000
115.000	400.000
106.595	404.200
96.588	409.200
76.576	419.200
56.563	429.200
46.557	434.200
46.036	434.461
38.340	437.800
20.000	445.450
6.000	445.450
0.000	445.760

Water Table

-250.000	414.000
-103.960	418.330
-84.100	418.960
-74.420	423.800
-61.650	424.570
0.000	430.100
42.957	434.500
150.000	434.500

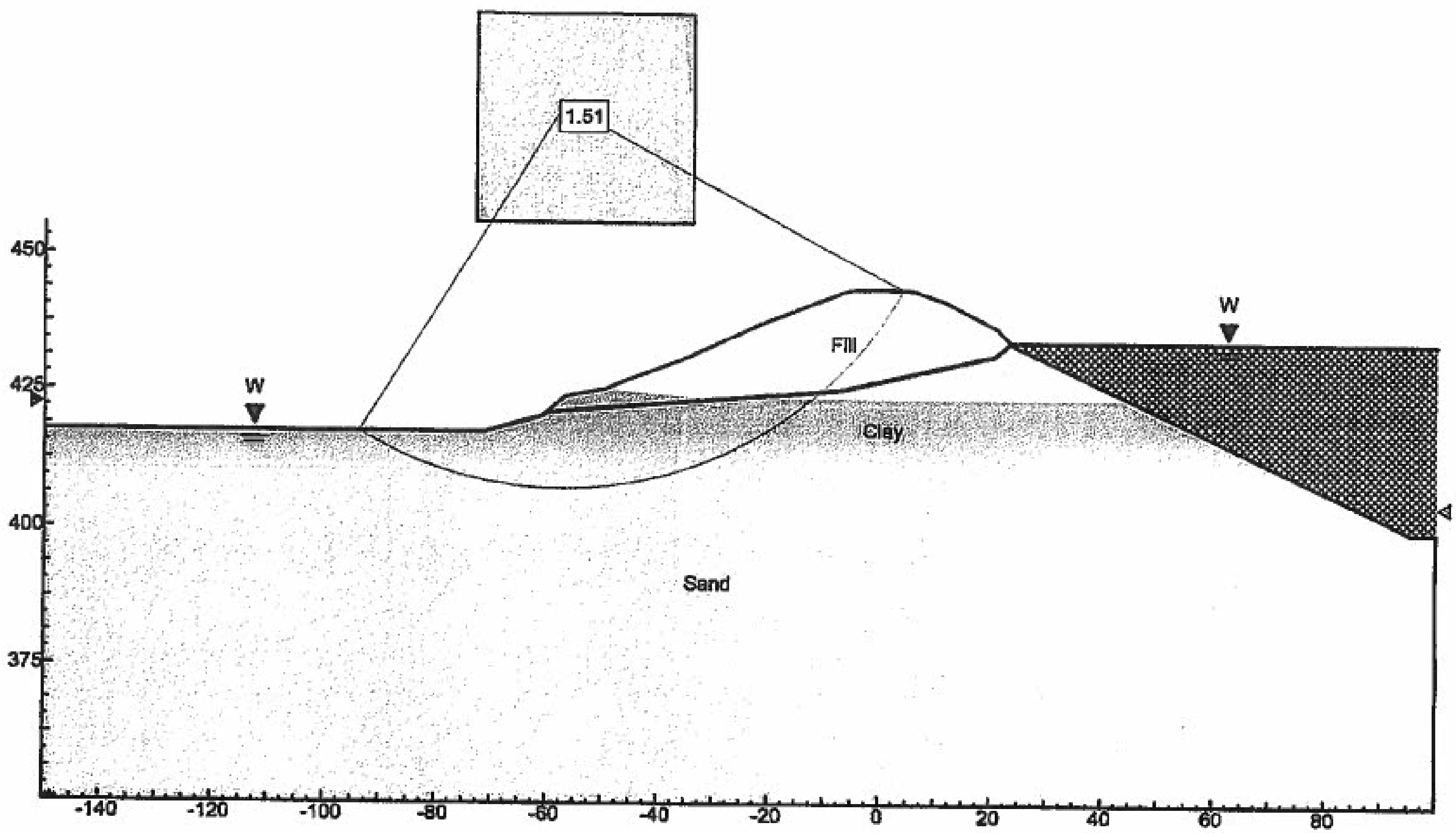
Focus/Block Search Line

-28.000	403.968
-28.000	427.210

Search Grid

-53.000	449.000
-26.000	449.000
-26.000	475.000
-53.000	475.000

Figure 5



Ameren Missouri: Sioux Power Station
Steady Seepage, Full Reservior
Cross-section2

REITZ & JENS, INC.

Figure 6

Slide Analysis Information

Document Name

File Name: x-sect 2.sli

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Fill
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 100 psf
Friction Angle: 26 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay
Strength Type: Mohr-Coulomb
Unit Weight: 112.8 lb/ft3
Cohesion: 200 psf
Friction Angle: 23.5 degrees

Figure 6

Water Surface: Water Table
Custom Hu value: 1

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Material: Sand
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

-49.700	425.500
-32.000	424.000
44.881	424.000

Material Boundary

-150.000	410.000
74.409	410.000

External Boundary

24.000	433.900
21.000	437.100
11.700	441.900
5.800	444.000
0.000	444.200
-5.100	444.000
-5.500	444.000
-7.100	443.500
-22.100	437.500
-36.200	430.800
-47.300	426.600
-49.700	425.500
-56.900	424.100
-60.800	420.600
-71.200	417.600
-150.000	417.600
-150.000	410.000
-150.000	350.000
100.000	350.000
100.000	400.000
95.500	400.000
74.409	410.000
44.881	424.000

Water Table

-150.000	417.600
-71.200	417.600
-60.800	420.600
-60.182	421.155
-7.211	425.574
20.600	432.000
23.438	434.500
27.800	434.500
100.000	434.500

Figure 6

CONFIDENTIAL

Search Grid

-73.000	456.000
-33.875	456.000
-33.875	494.000
-73.000	494.000

Figure 6

Bcc: B. H. Novotny
M. K. Frerking
M. J. Tomasovic
M.C. Birk (w/o attach)
D. V. Fox (w/o attach)
K. P. Blank (w/o attach)
S. T. Garner (w/o attach)
R. R. Meiners (w/o attach)
T. L. Hollenkamp (w/o attach)
S. B. Knowles (w/o attach)
M. L. Menne (w/o attach)
S. C. Whitworth (w/o attach)
WM 3.11.3