Memorandum from the Office of the Inspector General

June 27, 2011

Robert M. Deacy, Sr., LP 5D-C

FINAL REPORT – INSPECTION 2009-12910-03 – PEER REVIEW OF THE STABILITY ANALYSIS OF ASH DISPOSAL AREAS 2 AND 3 AT THE JOHNSONVILLE FOSSIL PLANT

Attached is the subject final report for your review and action. Your written comments, which addressed your management decision and/or actions taken, have been included in the report. No further action is needed.

The Office of the Inspector General (OIG) contracted with Marshall Miller & Associates, Inc., to conduct this review. All work pertaining to this review was conducted by Marshall Miller. The OIG relied on Marshall Miller's processes and procedures for quality control in the attached report. Information contained in this report may be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

If you have any questions, please contact Deana D. Scoggins, Senior Auditor, at (423) 785-4822 or Greg R. Stinson, Director, Inspections, at (865) 633-7367. We appreciate the courtesy and cooperation received from your staff during this review.

Robert E. Martin

Robert E. Martin
Assistant Inspector General
(Audits and Inspections)
ET 3C-K

DDS:FAJ
Attachment
cc: See page 2

cc (Attachment):

Robert J. Fisher, LP 3K-C
Michael B. Fussell, WT 9B-K
Kimberly S. Greene, WT 7B-K
Peyton T. Hairston, Jr., WT 7B-K
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Wendy Williams, WT 9B-K
OIG File No. 2009-12910-03

Mr. John Montgomery, Stantec

Peer Review of Stantec Consulting Services, Inc.
Report of Geotechnical Exploration and Slope Stability Evaluation
Ash Disposal Areas 2 and 3

Tennessee Valley Authority Johnsonville Fossil Plant (JOF)
New Johnsonville, Humphreys County, Tennessee

Prepared for:

TVA Office of the Inspector General
Knoxville, Tennessee

Prepared by:

Project No.: TVA106-07

Effective Date:
September 8, 2010

Date of Issuance:
June 27, 2011

Marshall Miller & Associates, Inc.
ENERGY/ENVIRONMENTAL/ENGINEERING/CARBON MANAGEMENT

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Item 1: TITLE PAGE

Title of Report

Peer Review of Stantec Consulting Services, Inc.
Report of Geotechnical Exploration and Slope Stability Evaluation
Ash Disposal Areas 2 and 3
Johnsonville Fossil Plant
New Johnsonville, Humphreys County, Tennessee
Dated January 28, 2010

Project Location

The project site is located in New Johnsonville, Humphreys County, Tennessee, on the eastern shore of Kentucky Lake.

Effective Date of Report

September 8, 2010

Qualified Persons

William S. Almes, P.E.
Formerly:
TVA OIG Contract Manager
Senior Engineer & Director of Geotechnical Services
Marshall Miller & Associates, Inc.

Peter Lawson.
Executive Vice President
Principal-in-Charge
Marshall Miller & Associates, Inc.

Edmundo J. Laporte, P.E.
Formerly:
Senior Engineer
Marshall Miller & Associates, Inc.

Christopher J. Lewis, P.E.
Formerly:
Principal Engineer
D'Appolonia, Engineering Division of Ground Technology, Inc.

Aaron J. Antell, P.E.
Project Engineer
D'Appolonia, Engineering Division of Ground Technology, Inc.

Item 2: EXECUTIVE SUMMARY

The Tennessee Valley Authority Office of the Inspector General retained Marshall Miller & Associates, Inc. (Marshall Miller), to conduct a peer review of the report titled "*Report of Geotechnical Exploration and Slope Stability Evaluation, Ash Disposal Areas 2 and 3 (Active Ash Disposal Area), Johnsonville Fossil Plant, New Johnsonville, Tennessee*" (Johnsonville Report) prepared by Stantec Consulting Services, Inc. (Stantec), of Lexington, Kentucky. Marshall Miller reviewed the Johnsonville Report dated January 28, 2010. In summary, Marshall Miller believes that Stantec's evaluations of the Active Ash Disposal Area provide a reasonable assessment of the margin of safety associated with the evaluated conditions, which indicates that the facility is not in danger of imminent failure.

Marshall Miller's assignment was to review the scope, procedures, and results of the subsurface exploration and laboratory testing programs and the seepage and slope stability analyses performed by Stantec for the Active Ash Disposal Area. Based on the findings of its exploration program and stability analyses, Stantec also produced a separate set of design and construction documents that contains the proposed construction improvements to improve the stability of the Northeast Dike of the Ash Disposal Area No. 2, which Marshall Miller also peer-reviewed and commented upon in a separate report.[1]

In Marshall Miller's opinion, Stantec performed a suitable subsurface exploration and laboratory testing program to characterize the engineering properties of the native foundation materials (alluvial sand and gravel, and clay and silt), heterogeneous fill,[2] clay dikes, and hydraulically placed (sluiced) ash.

Based on the review of Stantec's seepage analyses, it is Marshall Miller's opinion that Stantec followed generally accepted practices and arrived at reasonable predictions of exit gradients.[3] However, Marshall Miller believes that the calculated factors of safety against

[1] See Marshall Miller's Report entitled "Peer Review of Stantec Consulting Services, Inc. Plans for Construction – Northeast Dike Stability Improvements Ash Disposal Area No. 2, Johnsonville Fossil Plant."

[2] Fill material that is not uniform in composition, which typically results in different physical properties.

[3] Is the hydraulic gradient (a measure of energy loss when water flows through soil) near the surface where water exits a soil slope, embankment, face, or similar surface.

piping[4] in the heterogeneous fill are overstated because Stantec used high values of critical gradient[5] for the fill relative to its measured in-situ densities. This observation does not present a serious issue, as in *Appendix G*, Stantec reports factors of safety well over 3.0 for most cross-sections (except Cross-Sections A, B, and C), and Marshall Miller understands that the proposed site modifications include dewatering the sluice channel behind the northeast dike, which should reduce seepage gradients and correspondingly increase the factors of safety against piping above 3.

With regard to Stantec's development of material shear strengths, Marshall Miller found that Stantec arrived at reasonable shear strength properties for the generalized material layers and zones. Based on review of Stantec's slope stability analyses, it is Marshall Miller's opinion that Stantec performed stability analyses for static, long-term load conditions using appropriate methodologies and reasonable material properties.

Management's Response to Draft Report

To address this report, TVA management had Stantec review and respond to the findings of this report. TVA management and its contractor provided additional information on the findings and recommendations in this report. For complete responses, please see appendices A – TVA Transmittal Memo and B – Stantec's Response.

Marshall Miller Assessment of Management's Comments to Draft Report

Marshall Miller concluded that the additional information provided adequately addressed the concerns and recommendations identified in the report. For a complete response, see appendix C – Marshall Miller Response.

[4] A measure of the level of safety where piping exists.

[5] The gradient at which a soil deposit can no longer resist the forces generated by water flowing through the soil.

Item 3: TABLE OF CONTENTS

ITEM 1: TITLE PAGE 1

ITEM 2: EXECUTIVE SUMMARY 2

ITEM 3: TABLE OF CONTENTS 4

ITEM 4: INTRODUCTION 5

ITEM 5: MARSHALL MILLER PROJECT TEAM 6

ITEM 6: SCOPE OF SERVICE 7

ITEM 7: BACKGROUND 8

ITEM 8: GEOTECHNICAL EXPLORATION AND LABORATORY TESTING REVIEW 9

- **8.1. FINDINGS 9**
- **8.2. RECOMMENDATIONS 9**

ITEM 9: SEEPAGE ANALYSES REVIEW 11

- **9.1. FINDINGS 11**
- **9.2. RECOMMENDATIONS 12**

ITEM 10: SLOPE STABILITY ANALYSES REVIEW 13

- **10.1. FINDINGS 13**
- **10.2. RECOMMENDATIONS 13**

APPENDICES

MEMORANDUM DATED MARCH 25, 2011, FROM ROBERT M. DEACY TO ROBERT E. MARTIN ..... APPENDIX A

MEMORANDUM DATED MARCH 24, 2011, FROM STEPHEN H. BICKEL TO JOHN KAMMEYER ..... APPENDIX B

MEMORANDUM DATED JUNE 24, 2011, FROM JOHN E. FEDDOCK AND PETER LAWSON TO GREG R. STINSON ..... APPENDIX C

Item 4: INTRODUCTION

The Tennessee Valley Authority (TVA) Office of the Inspector General (OIG) retained Marshall Miller & Associates, Inc. (Marshall Miller), to conduct a peer review of the report titled "*Report of Geotechnical Exploration and Slope Stability Evaluation, Ash Disposal Areas 2 and 3 (Active Ash Disposal Area), Johnsonville Fossil Plant, New Johnsonville, Tennessee*" (Johnsonville Report) prepared by Stantec Consulting Services, Inc. (Stantec), of Lexington, Kentucky. The TVA retained Stantec to address geotechnical issues identified during the Phase 1 facility assessment and corresponding Phase 1 report. During its engagement, Marshall Miller reviewed the Johnsonville Report dated January 28, 2010, and has documented its results herein.

This report presents the following:

- The Marshall Miller project team.
- A description of Marshall Miller's scope of service.
- Background information for the Johnsonville Fossil Plant.
- The findings and recommendations from Marshall Miller's review of Stantec's geotechnical exploration, laboratory testing, seepage analyses, and slope stability analyses.

Item 5: MARSHALL MILLER PROJECT TEAM

Marshall Miller, an employee-owned and Engineering News-Record Magazine top 500 company, began offering geologic services to the mining industry in 1975. Marshall Miller provides a range of services to the mining, utility, financial, governmental, and legal industries. Marshall Miller employs nearly 200 engineers, geologists, scientists, and other professionals who work from regional offices in ten states.

Marshall Miller retained D'Appolonia, Engineering Division of Ground Technology, Inc., of Monroeville, Pennsylvania, for its expertise with tailings dams and impoundments, problem ground conditions, and forensic investigations.

The Marshall Miller project team comprises seven professionals:

- Mr. Peter Lawson, Executive Vice President and Principal-in-Charge.
- Mr. William S. Almes, P.E., Director of Geotechnical Services and Project Manager for the TVA OIG.
- Mr. Edmundo J. Laporte, P.E., Senior Engineer.
- Mr. William M. Lupi, P.E., Project Engineer.
- Mr. Richard G. Almes, P.E., Principal Geotechnical Engineer.
- Mr. Christopher J. Lewis, P. E., Principal Geotechnical Engineer.[6]
- Mr. Aaron J. Antell, P.E., Project Engineer.[6]

[6] Christopher J. Lewis, P.E., and Aaron J. Antell, P.E., are Geotechnical Subconsultants of Marshall Miller and as of the effective date of this report were employed by D'Appolonia, Engineering Division of Ground Technology, Inc., Monroeville, Pennsylvania.

Item 6: SCOPE OF SERVICE

The OIG engaged Marshall Miller to perform a technical peer review of the geotechnical exploration, laboratory testing, and engineering analyses performed by Stantec for Ash Disposal Areas 2 and 3 (Active Ash Disposal Area) at the Johnsonville Fossil (JOF) Plant. Marshall Miller did not perform a parallel study (field exploration, laboratory testing, and engineering analyses) to the Stantec study of the existing ash disposal area conditions. Marshall Miller used the geotechnical exploration and test data provided in the Johnsonville Report to formulate the findings and recommendations herein.

Marshall Miller reviewed the Johnsonville Report dated January 28, 2010, and associated Appendices A through I, which were received in electronic format (pdf files). Marshall Miller based the professional opinions herein on the above-referenced documents and is unaware of newer versions of these documents.

In providing the professional services to compile this report, Marshall Miller used generally accepted engineering principles and practices to develop findings and recommendations. Marshall Miller reserves the right to revise this report based on additional information. If OIG, TVA, TVA's consultants, or others discover additional information pertinent to the performance of the Active Ash Disposal Area at the JOF Plant, Marshall Miller requests the opportunity to review the information for relevance to Marshall Miller's findings and recommendations herein.

Item 7: BACKGROUND

The JOF plant is located on the eastern shore of Kentucky Lake in New Johnsonville, Humphreys County, Tennessee, and produces 550 million kilowatt-hours of baseload energy per year. The ash disposal area is on a 125-acre island connected to the on-shore plant area by a 1,000-foot causeway. The causeway supports an asphalt paved road and pipes carrying sluiced ash from the plant to the disposal area. The Active Ash Disposal Area on the island is 87 acres and is surrounded by a two-tiered clay dike system with a crest elevation of 390 feet (El. 390), or about 30 to 35 feet above the Kentucky Lake pool level. The dike supports a perimeter access road and has outslopes measuring from 1.5H:1V on the inland side to greater than 2H:1V on the lake side.

The construction of the island that would later become Ash Disposal Areas 2 and 3 was initiated as a result of dredging for the boat harbor and condenser water inlet channels. Between 1949 and 1952, dredge spoil was hydraulically placed to form a breakwater at what is now the east dike of Ash Disposal Areas 2 and 3. The top of the breakwater was about El. 370. From the JOF Plant's completion in 1952 to the mid-1960s, TVA disposed of ash in Disposal Area 1. As a result of Disposal Area 1 reaching its maximum storage capacity, in 1968 and 1969, TVA constructed Ash Disposal Area 2 using a dike to connect the ends of the breakwater, forming an enclosed area. In 1970, TVA raised the crest of the perimeter dike to El. 378 (Lower Clay Dike) to protect the island from inundation during periods of high lake levels. In 1974, TVA raised the dike crest to El. 390 (Upper Clay Dike) to provide additional ash disposal capacity.

During the 1980s and 1990s, TVA operated additional ash disposal facilities within the JOF reservation. During operation of these additional disposal facilities, TVA sluiced ash to the island disposal area and then dredged and pumped ash to the new facilities for final disposal. The current ash disposal practice at the JOF Plant consists of sluicing ash to channels on the active island disposal area, removing ash from those channels with excavators, stacking ash for drying, and hauling ash off-site for final disposal in permitted landfills. These activities are carried out by Trans-Ash Incorporated.

Item 8: GEOTECHNICAL EXPLORATION AND LABORATORY TESTING REVIEW

Marshall Miller reviewed the scope, procedures, and results of the subsurface exploration and laboratory testing program performed by Stantec at the Active Ash Disposal Area of the JOF Plant. Marshall Miller reviewed descriptions of the exploration and testing procedures in the Johnsonville Report and appended documents, which include geotechnical drawings, boring logs, and results of laboratory testing. In Marshall Miller's professional opinion, Stantec performed a suitable subsurface exploration and laboratory testing program to characterize the engineering properties of the native foundation materials (alluvial sand and gravel, and clay and silt), heterogeneous fill, clay dikes, and hydraulically placed (sluiced) ash.

8.1. FINDINGS

Upon review of the Johnsonville Report, Marshall Miller has developed the following findings:

- In the Johnsonville Report, Stantec discusses the excavation of four inspection pits along the west dike at four of the depressions observed during the Phase 1 site reconnaissance. Stantec excluded the subsurface logs and locations for the inspection pits from the Johnsonville Report.

- The boring logs do not indicate results of field measurements using a pocket penetrometer or torvane device in clay soils. While Marshall Miller acknowledges these devices are not ideal for determination of shear strength, they indicate the consistency of cohesive soils. In its report, Stantec indicates it estimated the consistency of cohesive soils using laboratory testing and standard penetration test (SPT) N-values. Field devices like the pocket penetrometer are more appropriate for determining the consistency of cohesive soils than SPT N-values.

8.2. RECOMMENDATIONS

Marshall Miller has developed the following recommendations for consideration.

- Marshall Miller recommends providing logs and locations for the inspection pits within the Johnsonville Report. If logs and locations are not available, this should be stated in the report.

- Marshall Miller recommends, as a general practice, the use of a pocket penetrometer or torvane device in clay soils since they provide more reliable measurements of the consistency of cohesive soils than the values obtained through empirical relationships based on SPT N-values.

Item 9: SEEPAGE ANALYSES REVIEW

Marshall Miller reviewed Stantec's seepage analyses of the Active Ash Disposal Area at the JOF Plant, including the material properties and boundary conditions. In general, it is Marshall Miller's opinion that Stantec performed seepage analyses of the Active Ash Disposal Area using generally accepted practices and arrived at reasonable predictions of gradients. However, Marshall Miller believes that the calculated factors of safety against piping in the heterogeneous fill are overstated by as much as 20 percent because Stantec used high values of critical gradient for the fill relative to its measured in-situ densities. This observation does not present a serious issue, as in *Appendix G* Stantec reports factors of safety well over 3.0 for most cross-sections (except Cross-Sections A, B, and C), and Marshall Miller understands that the site modifications include dewatering the sluice channel behind the northeast dike, which should reduce seepage gradients and correspondingly increase the factors of safety against piping.

9.1. FINDINGS

Based on review of the Johnsonville Report and related appendices, Marshall Miller assembled the following findings.

- Calculated factors of safety against piping summarized in *Table 7.2* for Cross-Sections A, B, C, and C1 do not match the calculated factors of safety in *Appendix G*, Seepage Analysis Results. Calculated factors of safety in *Appendix G* for Cross-Sections A, B, and C are lower than values in Table 7.2. (Marshall Miller understands that Stantec corrected these noted discrepancies in its April 13, 2010, update of the Johnsonville Report.)

- Calculated factors of safety in *Appendix G* for Cross-Sections A and B are less than the target factor of safety of 3 adopted by Stantec and the factor of safety for Cross-Section C is equal to 3.0.

- Stantec used a critical gradient equivalent to 1.22 in its calculation of the factor of safety against piping in heterogeneous fill material beneath and lake-side of the Lower Clay Dike. A critical gradient of 1.22 corresponds to a saturated unit weight of 138.5 pounds per

cubic foot (pcf). It appears that Stantec used a void ratio equivalent to 0.42 and specific gravity of solids equivalent to 2.73 from *Table 7.1* to calculate the critical gradient for the heterogeneous fill material. The laboratory data presented indicates density results for undisturbed samples from consolidated undrained triaxial testing equal to a saturated unit weight of about 125 pcf and void ratios over 0.65. Also, Stantec used a saturated unit weight of 124 pcf for fill material in their slope stability analyses. In Marshall Miller's opinion, a saturated unit weight of 138.5 pcf for the heterogeneous fill material is high, considering the available test data on the consistency and composition of the fill material. Therefore, Marshall Miller believes that the factors of safety against piping in the fill material are overstated as much as 20 percent.

9.2. RECOMMENDATIONS

Marshall Miller has developed the following recommendations for consideration:

- Although the calculated factors of safety against piping along the northeast dike are below the target factor of safety of 3, the site modifications, proposed by TVA, include dewatering the sluice channel behind the northeast dike, which should reduce seepage gradients and correspondingly increase the factors of safety against piping. Marshall Miller recommends that the proposed site modifications be implemented by TVA accordingly.

- Marshall Miller recommends that Stantec revise the critical gradient and calculation of the factor of safety against piping in the heterogeneous fill material. It is Marshall Miller's opinion that an appropriate critical gradient for pertinent zones of the fill material is 1.0 or somewhat lower, based on a saturated unit weight equivalent to 124 pcf or a void ratio equivalent to 0.67, as per the consolidated undrained triaxial testing data for undisturbed samples.

Item 10: SLOPE STABILITY ANALYSES REVIEW

Marshall Miller reviewed Stantec's slope stability analyses, including development of material shear strength properties. With regard to Stantec's development of material shear strengths, Marshall Miller found that Stantec arrived at reasonable shear strength properties for the generalized material layers and zones. Based on review of Stantec's slope stability analyses, it is Marshall Miller's opinion that Stantec performed stability analyses for static, long-term load conditions using appropriate methodologies and reasonable material properties. Marshall Miller believes that Stantec's evaluations of the Active Ash Disposal Area provide a reasonable assessment of the margin of safety associated with the evaluated conditions, which indicates that the facility is not in danger of imminent failure.

10.1. FINDINGS

Marshall Miller noted the following finding during the peer review:

- In *Appendix F*, Stantec uses historical shear strength data to help formulate effective shear strength plots for the upper clay dike, lower clay dike, and heterogeneous fill materials. Pertinent excerpts of the historical data are not appended to the Johnsonville Report.

10.2. RECOMMENDATIONS

Marshall Miller has developed the following recommendation for consideration:

- Marshall Miller recommends that Stantec append the excerpts of historical documents that reflect the historical data they considered in developing material shear strength properties to the Johnsonville Report.

March 25, 2011

Mr. Robert E. Martin, ET 3C-K

TVA COMMENTS TO OIG DRAFT INSPECTION 2009-12910-03 - PEER REVIEW OF THE STABILITY ANALYSIS OF ASH DISPOSAL AREAS 2 AND 3 AT THE JOHNSONVILLE FOSSIL PLANT

Attached please find Stantec's letter to John Kammeyer dated March 24, 2011, which represents TVA comments in response to your draft inspection regarding the stability analysis of ash disposal areas 2 and 3 at the Johnsonville Fossil Plant.

We appreciate the opportunity to provide comments on this draft report. Please direct any questions to John Kammeyer at 423-280-0407.

Robert M. Deacy
Senior Vice President and Executive
Kingston Ash Recovery Project

JMD:DJC
Attachment
cc (Attachment):
Joan M. Dodd, LP 5E-C
Robert J. Fisher, LP 3K-C
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OIG File No. 2009-12910-03

Mr. John Montgomery, Stantec

Stantec Consulting Services Inc.
1901 Nelson Miller Parkway
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March 24, 2011 let_015_175559008

Mr. John Kammeyer
Vice President
Tennessee Valley Authority
1101 Market Street, LP 5G
Chattanooga, Tennessee 37402

Re: Response to Comments
Marshall Miller Review – March 3, 2011
Stantec 1/28/2010 DRAFT Report of Geotechnical Exploration
and Slope Stability Evaluation
Johnsonville Fossil Plant Ash Disposal Areas 2 and 3

Dear Mr. Kammeyer:

As requested, Stantec has completed a review of Marshall Miller and Associates (Marshall Miller) report: *Peer Review of Stantec Consulting Services Inc. Report of Geotechnical Exploration and Slope Stability Evaluation Ash Disposal Areas 2 and 3*, dated March 3, 2011. Marshall Miller's recommendations and Stantec's corresponding responses are listed below.

Item 8: Geotechnical Exploration and Laboratory Testing Review

Item 8.2 - First bullet - MM Recommendation: *Marshall Miller recommends providing logs and locations for the inspection pits within the Johnsonville Report. If logs and locations are not available, this should be stated in the report.*

Stantec Response: Concur. Test pit logs with coordinates of locations were provided in the final report that was issued on April 13, 2010.

Item 8.2 - Second bullet - MM Recommendation: *Marshall Miller recommends, as a general practice, the use of pocket penetrometer or torvane device in clay soils since they provide more reliable measurements of the consistency of cohesive soils than the values through empirical relationships based on SPT N-values.*

Stantec Response: Stantec agrees that use of pocket penetrometer and torvane devices are an option to measure consistency of cohesive soils. It is also Stantec's opinion that SPT N-value data is an acceptable method for general interpretation of strength consistency of cohesive soils.

Item 9: Seepage Analyses Review

Item 9.2 - First bullet - MM Recommendation: *Although the calculated factors of safety against piping along the northeast dike are below the target factor of safety of 3, the site modifications, proposed by TVA, include dewatering the sluice channel behind the northeast dike, which should reduce seepage gradients and correspondingly increase the factors of safety against piping. Marshall Miller recommends that the proposed site modifications be implemented by TVA accordingly.*

Stantec Response: Concur. Site modifications to relocate the sluice channel from behind the northeast dike were implemented in December, 2009. TVA also routinely pumps collected storm water from the abandoned sluice channel to maintain a dewatered condition. Additionally, construction activities to improve overall slope stability and seepage conditions for the northeast dike were completed in August, 2010. The mitigation efforts included placing a rock buttress, drainage blankets and seepage filters, and re-grading the dike slope to a flatter configuration.

Item 9.2 - Second bullet - MM Recommendation: *Marshall Miller recommends that Stantec revise the critical gradient and calculation of the factor of safety against piping in the heterogeneous fill material. It is Marshall Miller's opinion that an appropriate critical gradient for pertinent zones of the fill material is 1.0 or somewhat lower, based on a saturated unit weight equivalent to 124 pcf or a void ratio equivalent to 0.67, as per the consolidated undrained triaxial testing data for undisturbed samples.*

Stantec Response: Stantec revised the critical gradient and factors of safety against piping as recommended. The revised factors of safety were recalculated using actual groundlines and groundwater conditions resulting from recently completed remediation projects at Johnsonville. The minimum factor of safety was recalculated to be 4.3, which is higher than the target value.

Item 10: Slope Stability Review

Item 10.2 - First bullet - MM Recommendation: *Marshall Miller recommends that Stantec append the excerpts of historical documents that reflect the historical data they considered in developing material shear strength properties to the Johnsonville Report.*

Stantec Response: The historical test results that were considered in shear strength selection are plotted and identified on the Shear Strength Selection Charts presented in Appendix F of the final report that was submitted on April 13, 2010. The historical documents and reports from which this data was taken are listed in the reference section of the report (Section 10) and are available for review.

We appreciate the opportunity to provide these responses. If you have any questions or need additional information, please call.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Stephen H. Bickel, PE
Senior Principal

/db

Cc: Roberto L. Sanchez, PE
Michael S. Turnbow

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June 24, 2011

Mr. Greg R. Stinson
Director, Inspections
Tennessee Valley Authority
Office of the Inspector General
1101 Market Street EB 2G-C
Chattanooga, TN 37402-2801

Re: Response to Comments to OIG Draft Inspection 2009-12910-03

Facility:	Johnsonville Fossil Plant
Report Title:	*Report of Geotechnical Exploration and Slope Stability Evaluation Ash Disposal Areas 2 and 3*
Firm:	Stantec Consulting Services Inc. (Stantec)
Date:	January 28, 2010

Dear Mr. Stinson:

Marshall Miller & Associates, Inc. (*Marshall Miller*) was contracted by the **Tennessee Valley Authority Office of the Inspector General (*TVA OIG*)** to provide response and rebuttal to comments prepared by **Stantec Consulting Services Inc. (*Stantec*)** dated March 24, 2011. These comments were prepared for TVA in response to Marshall Miller's Technical Peer Review of the January 28, 2010, draft report prepared by Stantec entitled *Report of Geotechnical Exploration and Slope Stability Evaluation Ash Disposal Areas 2 and 3*.

Mr. Stephen H. Bickel, PE, of Stantec reviewed Marshall Miller's peer review and provided response in a March 24, 2011, letter report. Marshall Miller's responses are provided below.

Stantec's Response to Item 8.2 – First and Second Bullets
Stantec's response is acknowledged and accepted.

Stantec's Response to Item 9.2 – First and Second Bullets
Stantec's response is acknowledged and accepted.

Stantec's Response to Item 10.2 – First Bullet

Marshall Miller recognizes Stantec's inclusion of the historical data considered in the development of the material shear strength properties in the final report dated April 13, 2010. Marshall Miller accepts the references in the report, provided the historical source documents are archived for independent review.

Thank you for the opportunity to submit a response to comments. Should you have any questions or need additional clarification, please contact Peter Lawson at (304) 255-8937

Sincerely,

MARSHALL MILLER & ASSOCIATES, INC.

John E. Feddock, P.E.
Senior Vice President

Peter Lawson
Executive Vice President
Principal-in-Charge

Attachments

cc: Mr. Robert E. Martin, Assistant Inspector General (Audits & Inspections)
Ms. Julie Lovingood, Auditor