

**Statement of Richard W. Moore**  
**Inspector General, Tennessee Valley Authority**  
*before the*  
**Subcommittee on Water Resources and Environment**  
*of the*  
**Committee on Transportation and Infrastructure**  
**United States House of Representatives**

Madam Chairwoman Johnson, Ranking Member Boozman, and members of the Subcommittee, I appreciate the opportunity to testify before you regarding the one year anniversary of the Tennessee Valley Authority Kingston Ash Slide. Specifically, my testimony will cover the assessment of the degree to which TVA has responded to the findings and recommendations in the recent Office of the Inspector General (OIG) reports concerning the coal ash spill, clean-up operations, and TVA's overall environmental management. In summary, we believe TVA is marching in the right direction based on the actions implemented and/or initiated to-date. However, it is too early to determine whether these will be sufficient to overcome a legacy culture resistant to change.

## **OFFICE OF THE INSPECTOR GENERAL REPORTS**

The Kingston Fossil Plant coal ash spill of December 22, 2008, in which 5.4 million cubic yards of ash poured onto adjacent land and into the Emory River, is one of the largest environmental disasters in TVA history. The TVA OIG released two reports--one in June 2009 critiquing TVA's response to the ash spill and another in July 2009 evaluating TVA's root cause analysis of the spill and TVA's ash management practices. The first report issued on June 12, 2009, focused on (1) TVA's initial emergency response, including implementation and utilization of the National Incident Management System (NIMS); (2) TVA's actions to quickly respond to the media; and (3) reparations to the victims and restoration of the affected Roane County community. Our review found that:

- TVA had not implemented NIMS in accordance with Homeland Security Presidential Directive 5 which hampered communications and delayed certain emergency response actions following the spill.
- TVA's actions for responding quickly to media and public inquiry resulted in releases of inaccurate and inconsistent information and subsequent public criticism which caused reputational harm.
- TVA had responded effectively to victims in the affected area; however, failure to communicate the claims policy and decisions in a timely manner increased settlement expectations for some.

The second report issued by the OIG on July 23, 2009, focused on (1) providing an independent peer review of TVA's commissioned root cause analysis and (2) reviewing TVA's ash management for weaknesses. TVA hired AECOM Technology Corporation (AECOM) to complete the initial root cause analysis. The TVA OIG hired Marshall Miller & Associates (Marshall Miller), a nationally-recognized engineering consulting firm, to assist with the technical aspects of the root cause peer review. Our review concluded that:

- TVA management handled the root cause analysis in a manner that avoided transparency and accountability in favor of preserving a litigation strategy. TVA elected not to publicly disclose management practices that may have contributed to the Kingston spill.
- TVA could have possibly prevented the Kingston spill if it had taken recommended corrective actions. TVA was aware of "red flags" that were raised over a long period of time signaling the need for safety modifications to TVA ash ponds.
- AECOM overemphasized the "slimes" layer as a trigger for the Kingston spill. Marshall Miller concluded that factors other than the "slimes" layer may have been of equal or greater significance.
- Despite internal knowledge of risks associated with ash ponds, TVA's formal Enterprise Risk Management process, which began in 1999, had not identified ash management as a risk. While over the years there was internal discussion about placing the ash ponds under the TVA's Dam Safety Program, ultimately, TVA did not place the ash ponds under its Dam Safety Program. Treating the ash ponds like dams would have required more rigorous inspections and engineering.
- Attitudes and conditions at TVA's fossil fuel plants that emanate from a legacy culture impacted the way TVA handled coal ash. Ash was relegated to the status of garbage at a landfill rather than treating it as a potential hazard to the public and environment.

In addition, a draft of this OIG report was presented to the TVA Board on July 14, 2009. After the OIG briefed the TVA Board on its findings, a specially-called Board meeting was held on July 21, 2009. A report prepared by McKenna Long and Aldridge (McKenna) that was commissioned by the Audit, Governance, and Ethics Committee of the TVA Board in February of 2009 was released. McKenna looked back at the spill to provide a basis for improving TVA's governance, systems, and controls to reduce the likelihood of other harmful incidents. In its report to the TVA Board of Directors, McKenna concluded that TVA did not have adequate systems, controls, and procedures in place prior to the spill and, therefore, employee performance could not be measured against acceptable performance standards.<sup>1</sup> McKenna noted that a myriad of issues, cultural and procedural, needed to be addressed. The McKenna report further noted that "history has shown that TVA can be resistant to the implementation of new directives and that progress in one area can be eroded by the legacy culture still existing in other parts of the enterprise. To be sustainable, the current remediation activities in the Fossil Power Group will need to be part of a comprehensive TVA remediation program owned by senior management under Board oversight." For more information regarding the McKenna findings, see the Appendix.

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<sup>1</sup> "A Report to the Board of Directors of the Tennessee Valley Authority Regarding Kingston Factual Findings," submitted by R. William Ide III and Joseph O. Blanco, McKenna Long & Aldridge LLP, July 21, 2009. See [http://www.tva.gov/kingston/board\\_report/mla\\_kingston\\_report.pdf](http://www.tva.gov/kingston/board_report/mla_kingston_report.pdf).

TVA management acknowledged at the meeting on July 21, 2009, many of the management failures cited by the OIG and McKenna. These admissions reflect the type of transparency and accountability for TVA that the OIG has pressed for. We applaud the TVA Board's leadership in this matter and TVA management's acknowledgement of TVA's role in the Kingston spill.

## **TVA Actions in Response to OIG Findings**

In response to the reports issued by the OIG, TVA has taken actions to not only address the aspects of the Kingston spill and reparations to victims and the community, but also in regards to (1) assessing the stability and safety of other TVA facility impoundments and (2) assessing and implementing institutional change related to emergency response, communications, and management culture. Specifically, among other actions, TVA management:

- Plans to fully implement NIMS in conjunction with improving its emergency preparedness program.
- Has reviewed its communications process and procedures and has made changes to improve communications in an emergency event.
- Continues to work with the communities and local residents to improve the communications related to TVA's efforts with property acquisition and claims process. Furthermore, significant progress has been made regarding reparations to victims and the community as well as conducting public health assessments.
- Has made significant management and philosophical changes which are driving the development and implementation of (a) more detailed and rigorous policies and procedures for storing, handling, and maintaining ash and ash disposal facilities and (b) a comprehensive program for future Coal Combustion Product remediation and conversion. In addition, TVA management is using the detailed, technical explanation of what and how the Kingston dike failure occurred to guide the safe closure of the failed cell and implement enterprise risk management improvements to better achieve the goals of the Clean Strategies and Project Development organization.
- Has implemented a cultural-focusing initiative across the agency, incorporating lessons learned from the Kingston spill.

## **Kingston Fossil Plant Ash Slide Interim Report Recommendations and TVA Management Actions**

Discussed below are TVA management's key planned, completed, and/or ongoing actions to address OIG recommendations from the *Kingston Fossil Plant Ash Slide Interim Report*.

### **NIMS**

**Recommendation:** TVA management should (1) as previously committed, consider taking all necessary actions needed for full implementation of NIMS, including but not limited to, modifying all emergency response plans to include NIMS principles and language; (2) ensure employees complete all emergency response training as required by TVA and NIMS; and (3) consider implementing the best practices identified by the Roane County Emergency Director.

In response to the Kingston Ash Spill and the concerns raised regarding the emergency action plan and the implementation of NIMS, TVA management committed to fully implementing NIMS and reviewing all emergency response plans to ensure appropriate NIMS principles and language are included. Also, management agreed that training will be required for appropriate employees and the need to implement noted best practices would be evaluated. To specifically address the issues, TVA recently began an initiative to improve TVA's non-nuclear emergency program. On November 10, 2009, TVA's Chief Operating Officer (COO) launched the Non-Nuclear Emergency Planning Improvement Initiative. TVA's COO noted in his November 10, 2009, memorandum to TVA's Business Council that:

*A prompt, thorough and rigorous response to events like the Kingston spill is important to public safety and to maintaining our credibility and trust with the public and regulators. Unlike our nuclear emergency preparedness program, which is continuously assessed against industry best practices, our non-nuclear emergency response program has not been routinely assessed.*

As part of the initiative, a small development team with representation from all appropriate TVA groups is scoping, benchmarking, and redesigning the emergency preparedness program based on best industry practices. The initiative will also address the utilization and training of NIMS. The development team has a three-month timeframe for completion. A larger team will then be assembled to implement the program according to a change management plan.

### **Communications Process and Media Releases**

**Recommendation:** To avoid accusations against TVA of engaging in defensive "spin," TVA should consider establishing a clearly defined protocol that requires verification from more than one source before releasing statements to the media. TVA should scrutinize press releases to determine if enough information is available to issue a reliable statement. The test for TVA press releases should be, "Is this the transparent truth?" We also recommend that documentation be maintained to verify that this process was followed and the media statement was approved by an appropriate TVA official.

In order to strengthen TVA's communications and relationships with public officials and other stakeholders, TVA's communications and government relations functions – previously one organization – were separated into two organizations, each reporting to the Chief Executive Officer. The TVA Board approved the hiring of a senior vice president of Communications. David Mould, formerly assistant administrator for Public Affairs with the National Aeronautics and Space Administration (NASA), joined TVA in this position. Before employment at NASA, Mr. Mould served as assistant to the U.S. Secretary of Energy and a vice president of Communications for PG&E National Energy Group. Upon his hiring, TVA's Chief Executive Officer stated that Mr. Mould, "Brings an outstanding combination of communications and business qualifications to his role, including Department of Energy and electric-utility experience."

In addition to organizational structure changes, TVA's Communications group has revised its policies and procedures to ensure that information released to the public is (a) accurate and (b) based on fact and not opinion (i.e., free of any "spin" or embellishments). Required actions include having the "source" person, as well as someone else in the responsible organization, certify the accuracy of the information. Furthermore, any errors in TVA communications must be corrected immediately in all venues in which it was released; citing the error and the corrected information. Management has also informed the OIG that the Communications staff

has been provided with TVA subject matter contact information and instructed in updated emergency communication processes. Emergency communication plans are being developed for specific scenarios which could occur at TVA facilities. These plans are to incorporate best practices, including those identified from benchmarking other power producers.

## **Reparations to Victims**

**Recommendation:** TVA should continue to work with the committees and local residents to improve the communications related to TVA's property acquisition and claims process.

TVA states that it remains committed to restoring the community around the Kingston ash spill site and that commitment involves communicating with TVA's neighbors in the area and supporting them throughout the recovery process. Since the spill, ongoing communication efforts have included neighborhood meetings, open houses, public briefings, individual consultations, and work with public officials. TVA management informed us they have directly worked with impacted individuals and businesses to clarify the claims process and we will verify this in an upcoming follow-up review pertaining to reparations to victims. We acknowledge that specific aspects of the claims negotiation and settlement process involve sensitive and confidential information which cannot be disclosed publicly. Sensitive/confidential claim settlements coupled with pending litigation limits the communications improvement opportunities related to TVA's property acquisition and claims process. TVA has purchased 148 properties and may purchase additional properties that are directly affected by the remediation efforts moving forward.

Through OIG observations and fulfillment of our oversight responsibility, we have noted that TVA has implemented diverse communication mechanisms to address inquiries and provide information to the residents and media. Information communication sources include:

- Public Meetings – Public meetings are being held to address various questions and subjects. For example:
  - An informational public meeting hosted by TVA, the Tennessee Department of Environment and Conservation (TDEC), and the Environmental Protection Agency (EPA) was held on October 1<sup>st</sup> in Kingston. Presentations made by TVA, TDEC, and EPA are posted on the TVA Kingston Recovery Web site.
  - A Joint Availability Session hosted by TVA, TDEC, and EPA is scheduled for December 8, 2009, in Kingston. TVA subject matter experts and agency representatives from the Kingston Ash Recovery Site are to be on hand to answer questions and concerns about the cleanup.
- Opportunities for Public Comment – TVA is working with the EPA to recover the Kingston Fossil Plant ash spill site. As part of this process, two important documents have been released for public comment: (1) the Engineering Evaluation/Cost Analysis (EE/CA) Work Plan, and (2) the Draft Community Involvement Plan. These documents may be viewed at the TVA Outreach Center, Kingston Public Library, the Harriman Public Library, or online at [www.tva.gov/Kingston](http://www.tva.gov/Kingston). TVA is accepting comments by mail and e-mail.
  - The Engineering Evaluation/Cost Analysis Work Plan describes the process TVA will use to evaluate removal action alternatives at the site.

- The Draft Community Involvement Plan specifies outreach activities TVA will use to address community concerns and expectations. It also explains the opportunities for public involvement in the decision-making process at the site.
- The TVA Outreach Center – TVA’s Outreach Center opened in Kingston on January 6, 2009, to address residents’ questions and concerns and process damage claims. The Outreach Center remains open from 2 to 6 p.m., Monday through Friday. In 2010, the Outreach Center will transition to a learning library to keep people informed about site progress and other TVA initiatives.
- Oak Ridge Associated Universities (ORAU) Web site – TVA has contracted with Oak Ridge Associated Universities to provide services to the Kingston community and individuals with health concerns related to the Kingston ash spill. Oak Ridge Associated Universities is a consortium of 100 doctoral-granting academic universities that collaborate to advance scientific research and education in areas, including health issues. Oak Ridge Associated Universities, in conjunction with Vanderbilt University Medical Center, has been conducting free medical screenings. The purpose of the medical screenings is to provide concerned residents of Roane County with targeted medical testing to screen for adverse health effects potentially related to the fly ash spill. More than 260 residents have signed up.

While TVA’s Kingston Recovery Web site posts information on the health program initiative, Oak Ridge Associated Universities created a Web site to give those residents affected by the fly ash spill a place to: (1) sign-up to be contacted for medical screening; (2) ask Oak Ridge Associated Universities any questions regarding health concerns or the medical screening process itself; and (3) learn about the medical screening protocol as well as view related forms.

- News Releases and TVA’s Kingston Recovery Web site – TVA has made many news releases available to the public, many of which are linked to TVA’s Kingston Recovery Web site. For example, TVA released that it has provided a \$43 million grant to the newly established Roane County Economic Development Foundation to help offset the potentially negative impact of the spill and the site-recovery operations. The information provided by TVA includes that the foundation’s board will consist of four representatives from TVA and four elected leaders from the local partners -- Roane County, Kingston, Harriman, and Rockwood. The board will set criteria for considering requests and any project must be approved by the board before it is funded.

In addition to fact sheets, reports, and other documents (e.g., TDEC, EPA, and congressional hearing information), the TVA Kingston Recovery Web site includes:

- Environmental test results pertaining to air and water quality monitoring.
- Kingston Ash Recovery Project Weekly Reports – Examples of information topics discussed in the weekly reports include: (1) recovery highlights; (2) infrastructure and ash management; (3) ash dredging and processing; (4) ash disposition; (5) Cenosphere recovery; (6) routine air, water, and sediment sampling; (7) dike reinforcement; and (8) communications.

- Area Resident Information Updates – TVA is posting updates which include information on plant activities as well as the cleanup for area residents. For example, the November 10, 2009, update included information on:
  - Why the plume from the stack will be different based on maintenance and testing activities.
  - Why TVA will add layers of sand, stone, and riprap along Dike C.
  - Scrubber start-up and the resulting white plume.
  - The lowering of water levels in the reservoirs to winter fill levels and precautions to take to avoid direct contact with ash when performing dock maintenance.
- Message Boards – TVA continues to use electronic message boards positioned along Swan Pond Road to alert residents in the surrounding area to meetings, train crossings, road closings, etc.

### **Additional Information**

Following a September 18, 2009, test burn release incident, the recovery site manager and the communications team agreed to take the lead for the entire site. This includes not just the clean-up area, but also the plant. TVA has recognized that the culture at the plant must be changed to consider the visibility issues associated with plant operations and spill recovery. A site-wide communications and notification plan that includes both the Recovery Site and the plant is being developed.

In addition, to improve communications at Kingston, a Recovery Site employee attends the Plan of the Day meeting at the plant each morning and a plant employee attends the Recovery Operations meeting at the end of each day. TVA also continues to deliver information door-to-door about plant-related activities to residents who live along Swan Pond Road and who do not have the ability to receive e-mail.

### **Review of the Kingston Fossil Plant Ash Spill Root Cause Study and Observations about Ash Management**

With regard to the OIG's second report, *Review of the Kingston Fossil Plant Ash Spill Root Cause Study and Observations about Ash Management*, the OIG recommendations focus on needed culture change, process improvement, and accountability. Management's key planned, completed, and/or ongoing actions taken to address our findings and recommendations are cited below.

### **Culture that Affected Ash Management and Other TVA Programs**

**Recommendation:** Commission a dedicated cadre of professionals skilled in change management focused solely on driving compliance throughout TVA and measuring positive changes in the culture that affect ash management and other TVA programs.

As noted in our report, attitudes and conditions at TVA's fossil plants that emanate from a legacy culture impacted the way TVA handled coal ash. Cultural issues have also been identified as contributing to findings in other OIG reviews. Over TVA's more than 75-year history, cultural traits have developed that if not identified and addressed can undermine the best policies and procedures. The importance of recognizing cultural limitations cannot be overemphasized.

For TVA's continued success, we believe the culture must be accurately assessed, compliance with new policies and procedures must be faithfully measured with appropriate metrics, and employees must be educated to think differently about TVA's business, operational, and safety practices. As a result of reports from both McKenna and the OIG, TVA has recently begun implementing actions to assess the culture and drive change management. Specifically, TVA:

- Selected the firm of McKinsey & Company (McKinsey) to complete a detailed review of TVA's systems, standards, controls, and culture. The McKinsey review will include how to transform the organization, including governance and accountability, organizational structure, operating policy and procedures, and institutional capabilities.
- Created a new organization, Corporate Governance and Compliance, to focus on three issues: (1) organizational effectiveness, (2) compliance, and (3) performance analysis.
- Launched its Organization Effectiveness Initiative, which aims to strengthen TVA's organizational capabilities to deliver on its mission and strategy, as well as to improve organizational effectiveness, cooperation, and engagement within TVA.

TVA is exhibiting a determined commitment to addressing the systemic cultural issues that have been identified. Both the methodology and the focus TVA is bringing to this problem indicate how seriously the issues raised are to TVA leadership. The OIG will track and report on the progress of this effort.

### **Sound Ash Management Policies and Procedures**

**Recommendation:** Assess the culture of the Fossil Power Group to determine what changes need to be made, if any, to ensure the support for sound policies and procedures related to ash management.

In addition to the overall TVA organizational effectiveness initiatives, TVA has taken several actions management believes are necessary to ensure the support for sound policies and procedures related to ash management. In essence, these actions are deemed significant by TVA management in not only correcting failures and deficiencies but in addressing management improvement initiatives. In fiscal year 2009, the Clean Strategies and Project Development organization was established to help position TVA to meet the many challenges following the environmental event at Kingston. To strengthen the focus on TVA's coal combustion by-products and clearly establish accountability, two groups were created within Clean Strategies and Project Development:

- Coal Combustion Products and Engineering group – Responsibilities include evaluating the physical integrity of all TVA ash and gypsum disposal facilities, prioritizing projects across the system, and creating a rigorous routine inspection program.

- Coal Combustion Management group – Responsibilities include the development and implementation of a consistent fleet strategy to address handling of all TVA coal combustion products.

While it is too early to determine whether the reorganization will promote and drive culture change, it does dictate that all elements of ash management--environmental, engineering, and operations/maintenance--are now under the control of a single organization with its own standalone budget. This should provide a control mechanism to make certain that funding needed for ash management is not redirected to address other capital or operating and maintenance needs.

### **Ash Management Practices**

**Recommendation:** Assess the management practices of TVA for ash management to determine whether those practices contributed to the failure of the dike at the Kingston Fossil Plant.

Management acknowledges that the studies of the TVA OIG, McKenna, AECOM, and Stantec Consulting Services, Inc. (Stantec), resulted in the identification of failures and deficiencies, which serve as the key drivers for remediation projects and the management improvement initiatives. TVA management prepared a gap analysis based on the findings and recommendations in the reports and recommendations from the Board. The gap analysis resulted in the identification of improvement initiatives, including the need to:

- Develop a programmatic document.
- Conduct industry benchmarking and best practices assessment.
- Develop a formal communication plan and procedures.
- Improve the environmental review process.
- Update the budget process.
- Develop standardized design, construction, and operating procedures.
- Develop a formal training program.
- Implement a new organizational structure.
- Integrate ash management into Enterprise Risk Management Program.
- Manage ash ponds in compliance with the Dam Safety Program.
- Develop a robust quality assurance/quality control program.
- Develop a robust inspection and reporting program.
- Develop an instrument monitoring program.
- Complete Stantec assessments.
- Develop a cultural change management program.
- Become an industry leader in coal combustion product management.

Projects and supporting plans have been developed or are in the process of development to address the initiatives. The progress of each improvement project/initiative is being tracked using the gap analysis. Improvement initiatives completed include budgeting and planning processes and performance measures and metrics. With regards to inspection training, which has been raised as a key issue, TVA coal combustion product plant personnel have been trained by Stantec. TVA Police are also being trained to be used as an additional source to identify any potential issues; however, training has not been completed.

All of this information is incorporated in the Coal Combustion Products Remediation Plan. The Coal Combustion Remediation Plan was developed as a result of the TVA Board resolution to provide a formal fossil impoundments remediation plan. The plan calls for the conversion of all wet coal combustion product facilities to dry operations by 2020. According to management, as a result of (1) independent assessments performed by the TVA OIG, McKenna, AECOM, and Stantec; (2) resolutions adopted by the TVA Board of Directors directly related to the development of a formal Fossil Remediation Plan; (3) testimony provided by Mr. Kilgore to the House Subcommittee; and (4) other improvements recommended by the new organization related to systems, processes, controls, and standards, plans have been developed to support (a) management improvements, (b) operating and maintenance actions related to the ongoing engineering assessments of coal combustion product facilities, and (c) capital projects required to address near-term and long-term remediation actions.

Management's current primary focus is on reducing high hazard potential at four sites and addressing areas of risk at all locations. High hazard dams include those where failure or mis-operation will probably cause loss of human life and does not reflect the likelihood of a failure occurring. The four sites identified as high hazard by TVA include Bull Run, Colbert, Cumberland, and Widows Creek Fossil plants. Other management actions are focused on the implementation of new or enhancement of existing management tools, processes, systems, policies, procedures, and standards.

### **Assessment of All TVA Ash Storage Facilities**

**Recommendation:** Complete the assessments of TVA ash storage facilities and determine which ones are at risk of failure. The determination should be, as suggested by Marshall Miller, based on whether any of the four conditions contributing to the failure at the Kingston Fossil Plant exist sufficiently to pose a significant risk of failure. The determination should not be limited to just looking for the existence of the combination of all four contributing conditions found at the Kingston Fossil Plant.

Stantec, a third party engineering firm, was hired to conduct a four-phase approach to assessing TVA facilities. The first phase has been completed and included site walkdowns, review of inspection reports, records reviews, interviews, detailed site reconnaissance, freeboard analysis, providing recommendations for future analysis and study, and providing recommendations for short and long-term operations. Phase 2, Engineering Studies and Analysis, is ongoing and includes: (1) geotechnical explorations; (2) stability, hydrologic, and hydraulic analysis; (3) remediation engineering and workplan development; and (4) conceptual designs. Phase 3, Design and Permitting, and Phase 4, Training Program, are also ongoing. According to Marshall Miller, any overall statements on the safety of the impoundments or risk of another major failure are premature, until all exploration, testing, analyzing, modeling, checking, and peer reviews are completed.

Stantec's analysis is considering whether any of the four conditions contributing to the failure at the Kingston Fossil Plant exist, as well as other factors. Currently:

- Geotechnical drilling is complete for impoundments at 10 of 11 TVA fossil plant sites.
- Soils laboratory analysis is complete for 7 of the 11 sites.
- The Stability analysis is complete for 9 impoundments.

- Slope stability factors and factors of safety are being calculated and compared to accepted standards. Where factors of safety do not meet the desired allowable, recommendations are being made on how to remediate them. During this process, Stantec presents options of remediation for TVA comments and approval. After the strategy is approved, workplans are designed and the Factor of Safety is recalculated using the remediation design.
- Currently, draft geotechnical reports have been prepared for four impoundments and are being reviewed by TVA. The Kingston Dike C final geotechnical report has been issued and reviewed by the OIG's consultant, Marshall Miller. Marshall Miller has provided comments and questions to TVA for resolution.

The original plan was to use the data from Stantec's four-phase approach to complete a stability analysis report for each plant and then to develop corrective actions where problems or Factors of Safety of less than 1.5 were identified. This approach has changed. Currently, as critical issues are identified, workplans are being developed to address the problems and, in many cases, the actual work has or is being completed. For example:

- At Paradise Fossil Plant, because of the geotechnical and laboratory analysis, additional buttressing, armoring and flattening were initiated for the Gypsum Complex. Work has been done to stabilize the Gypsum Complex dikes due to seepage and work is ongoing.
- At Johnsonville Fossil Plant, the water level has been lowered and a seepage collection system and new spillways have been installed.
- At Shawnee Fossil Plant, the exterior dike of the intake dredge cell has been stabilized and reconstructed.
- At Widows Creek Fossil Plant, because of a very low factor of safety and seepage, slopes have been flattened and extensive stability actions have been completed.

TVA is using a combination of contractors to perform remediation activities at the TVA fossil plants. They are also being used to peer review each other's work. An extensive list of required remediation activities has been developed and is being added to as needed.

### **Ash Management Policies and Procedures**

**Recommendation:** Develop policies and procedures for the storing, handling, and maintaining of ash and ash disposal facilities.

TVA management states that the vision is to modernize the fleet to become state of the art in coal combustion product management. The final development of policies and procedures for the storing, handling, and maintaining of ash and ash disposal facilities has been tasked to an independent contractor. The methodology includes incorporating information obtained from industry benchmarking and best practices assessments. Site visits have been made or are planned to dry ash handling facilities, including Reliant Energy-Seward Power Station, Duke Energy-Allen Station, and Luminant-Martin Lake Station. Site visits have been made or planned to dewatering facilities, including Synmat CUF (gypsum), British Energy-Gale Common, and Luminant-Martin Lake Station.

## **Organizational Enterprise Risk Management**

**Recommendation:** Continue the efforts to drive the ERM program further down into the organization to increase the future likelihood that known risks will be identified and addressed.

TVA has made recent changes in its ERM process and further improvements are planned. An improvement plan was approved by the TVA's Enterprise Risk Council on January 26, 2009. Key improvement plan components included:

- Formalizing risk management policies;
- Embedding the enterprise risk management process within planning processes;
- Streamlining the TVA risk governance structure by combining the Financial, Operational, and Strategic Risk Committees into one group called the Risk Management Steering Committee;
- Overhauling enterprise risk management mapping methodologies and risk assessment methodologies;
- Engaging key risk management functions and personnel in the enterprise risk management process;
- Enhancing risk analytics; and
- Making enterprise risk management information actionable.

To drive the risk management culture down into and across the organization, TVA:

- Has established TVA-wide training, "Risk Management 101";
- Has drafted enterprise risk management guidelines to be used for risk identification, assessment, and development of risk management plans;
- Started the enterprise risk assessment process with the Strategic Business Units, driving risk management further into the organization;
- Is planning to integrate risk management with major planning processes; and
- E-mailed the first issue of Enterprise Risk Management's new Risk Intelligence Update. The document contains links to stories and resources that are relevant to TVA's risks and general operating environment.

The OIG has been receiving continuous updates on the changes to the ERM processes and procedures. We have noted that ERM management structure, maps, methodologies, and definitions have been overhauled and the improvement initiative is an ongoing effort. We reviewed the detailed information from recent organizational risk assessments and have noted a significant increase in the identification of risks from an organizational perspective. In fact, the risk information was considered in the development of the fiscal year 2010 OIG Audit/Inspection Plan. The TVA Board and management are working to improve risk management through the identification of previously unidentified risks and the development of mitigation activities.

## **KINGSTON CLEAN-UP OPERATIONS**

At Kingston, the water and air quality continues to meet government standards, a Community Action Group has been established, and the dredging process continues. Certain hard spots do exist, however. For example, rain has slowed dredging and processing, onsite rail transportation has impacted the public by blocking Swan Pond Road numerous times throughout the day, timeliness of disseminating sample test results, and trust issues exist among members of the public.

TVA has taken action to address these hard spots by hiring Steve McCracken as the general manager of the Kingston Ash Recovery Project. McCracken, who most recently served as the Department of Energy assistant manager for environmental management in Oak Ridge, Tennessee, has managed three extensive environmental recovery and remediation projects for the Department of Energy.

Following are some key points identified through our attendance at Kingston Recovery Project review updates and review of TVA documents.

### **Site Remediation**

- Cumulatively, as of November 22, 2009, just over 1,989,800 cubic yards of ash have been removed from the river and east of Dike 2.
- TVA continues to take actions to increase shipments to the Arrowhead Landfill in Perry County, Alabama. TVA's current goal is to ship at least 106 to 108 rail cars per day. Actions include testing ways to dewater the dredged ash faster, including aerating and using drying agents. TVA has loaded and transported 103 unit trains to-date for a total of approximately 930,500 tons.
- Ash shipments from the site have lagged ash production. The arrival of two large dredges accelerated the river cleanup. TVA had been removing ash from the river faster than it could transport it off site.
- Ash removal increased from 50,000 cubic yards per week in August to 95,000 cubic yards per week in September. The increase was due to (1) structural improvements to rim ditch, (2) addition of a dredge to the river, (3) addition of trucks for ash removal, (4) addition of wet storage areas, (5) addition of polymer to solids recovery system, (6) new liners, and (7) improvements to conveying systems.
- Launched Safety Improvement Program which includes safety coaching sessions and the establishment of a tri-lateral safety alliance (TVA, Contractors, and Labor Representatives).
- In addition to removing ash from the spill site, as of September 24, 2009, TVA has rescued about 2,000 fish that had been trapped due to the ash spill.
- Critical milestones have been established and are being tracked.
- Oak Ridge National Laboratory, the Tennessee Wildlife Resources Agency, and TVA performed fall fish collection as part of the overall ongoing fish health study.

## WHAT THE OFFICE OF THE INSPECTOR GENERAL IS CURRENTLY DOING

### Kingston Ash Spill Environmental Review

The OIG in conjunction with Marshall Miller is currently performing an environmental review pertaining to the Kingston ash spill. The objectives are as follows:

- Determine the adequacy of the current programs, processes, and procedures being used to fully characterize the impacts to the environment as a result of the Kingston failure.
- Assess TVA's communications regarding environmental impacts and analytical results for reasonableness.
- Determine if TVA's short- and long-term environmental recovery plans are reasonable and if appropriate mitigating actions have been taken to reduce the impacts of the release.
- Review the Transportation and Disposal Plans to determine if appropriate steps have been taken to minimize any environmental impact during transportation and disposal.
- Review groundwater monitoring results for ash basins at the other fossil plants to identify processes and ongoing monitoring activities.

Marshall Miller's interim progress report is summarized below.

### **Marshall Miller Interim Progress Report**

At the request of the OIG, Marshall Miller prepared an interim progress report summarizing its review of the environmental response and ongoing environmental monitoring program by TVA at its Kingston Fossil Plant. Marshall Miller has not yet completed its review of all relevant data.

### Background and Objective

Marshall Miller reviewed the adequacy and completeness of TVA's environmental recovery plans in response to the December 22, 2008, ash release. The intent of Marshall Miller's review is to evaluate whether TVA's ongoing response and planning are providing comprehensive and effective measures to mitigate the short- and long-term impacts from an estimated 5.4 million cubic yards of coal ash that spilled from the on-site dredge cell into the nearby Emory, Clinch, and Tennessee Rivers and their tributaries. Thus far, the evaluation has included a review of relevant documentation related to sampling of the various media, interviews with key team members from TVA and subcontractors overseeing the cleanup, and observations of sampling and data collection procedures during site visits conducted on November 18, 19, and 20, 2009. The evaluation focused on the following media:

- Air (fugitive dust originating from coal ash accumulations);
- Surface water and raw water intakes for nearby water treatment plants;
- Stormwater (effluent from ash impacted areas and from dewatering);
- Sediment;
- Groundwater (includes domestic water supply wells); and
- Biological (biota).

All of these media comprise important migration pathways, which have the potential to expose human and ecological populations in the vicinity of the spill. The inherent instability and mobility of coal ash contributes to its rapid dispersal throughout the environment, mandating the need for a rapid response program that originally included measures to: (1) evacuate nearby residents from the path of the spill; (2) protect downstream drinking water intakes; (3) alert the broader community regarding potential impacts to air and drinking water; (4) rescue wildlife; (5) restore roads, railroads, and other infrastructure; (6) protect the ability of the Kingston Fossil Plant to continue providing electrical power to the region; and (7) implement containment measures to contain and control as much of the spilled material as possible.

As initial abatement measures were implemented, TVA, along with TDEC, EPA, and local government agencies jointly responded to the spill in part, by providing sampling and analyses of impacted media. While the common purpose of these efforts was to protect public health from the immediate impact of substances found in the coal ash, it was apparent that the longer term response would require a more comprehensive program to assess the size and scope of impacts resulting from the release. To this end, TVA is taking the lead in developing an integrated plan to address both short- and long-term impacts to human and ecological populations.

On May 11, 2009, TVA entered into an Administrative Order and Agreement on Consent (Order) with EPA Region IV, which directs all response activities under the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA). The Order imposes requirements for TVA to develop short- and long-term plans for mitigating off-site spill impacts through a process of continued investigation, analysis, and evaluation to determine the extent of affected media and to assess potential impacts to human and ecological receptors. The Order also requires that TVA address the short- and long-term management of the coal ash including TVA's clean-up of ash from off-site areas and final containment within the original confines of the Kingston facility.

### Conclusions

At this stage of its review, Marshall Miller finds no significant deficiencies in the plans or procedures used by TVA or its contractors in characterizing impacts resulting from the ash release or recovery efforts. Although the procedures used early in the recovery process could not, in some cases, pass the rigorous QA/QC checks now in place, there is no indication that decisions regarding clean-up were made using data of poor quality. Follow-up planning documents prepared by TVA and its recovery contractors appear to be well conceived and are substantially in compliance with applicable regulatory requirements including those stated in EPA's Order.

### **Peer Reviews of TVA/Stantec's Stability Analyses of All TVA Ash Impoundments**

The OIG, along with Marshall Miller, is conducting a peer review of the stability evaluations pertaining to TVA ash storage facilities performed by Stantec. The OIG is working with TVA to review work as it is being completed.

- Stability analysis report for Kingston Dike C has been completed and our peer review is ongoing.
- Some stability evaluations for TVA sites are nearing completion, and we are in the process of scheduling briefings and starting the peer reviews. The stability evaluations include:

- Johnsonville Fossil Plant
  - Paradise Fossil Plant
  - Widows Creek Fossil Plant
- We have obtained the stability analysis completion schedule and are allocating Inspections' resources accordingly.
  - We are attending the Stantec/TVA biweekly update/working meeting pertaining to the stability analyses and corresponding corrective actions.

### **Reparations to Victims and Other Corrective Actions**

The OIG has committed to performing a follow-up review with regards to reparations to victims. We also plan to assess TVA's actions, as they are completed, in relation to recommendations in prior OIG reports on the Kingston ash spill.

## **Conclusion**

Based on TVA's actions identified in response to our findings and recommendations, it appears TVA is marching in the right direction. The OIG has perhaps been TVA's harshest critic in terms of how they handled coal ash storage and how they handled the crisis after the fact. Our impression now, however, is that TVA management is not just reacting to criticism to get out of a crisis, but they are committed to transforming TVA.

Despite having a legacy culture that is resistant to change, the OIG remains optimistic that the current efforts to effect meaningful changes at TVA will be successful for these reasons: (1) the kinds of reforms being implemented at TVA are system-wide process changes that have worked well in private sector companies that have not had the system failures TVA has experienced; (2) TVA management has demonstrated a willingness to get input from culture experts outside the Valley, and they seem to be taking all of this very seriously; (3) TVA management has recently gone through an extremely robust evaluation of risks that is unparalleled in TVA history; and (4) TVA management has made personnel changes that to OIG is credible evidence of a commitment to do whatever it takes to get this right.

The OIG will continue to provide an oversight role and measure the progress that TVA makes. We appreciate this Subcommittee's efforts to protect the citizens of the Tennessee Valley by focusing on these important issues. We will work with this Subcommittee to track TVA's progress in clean-up, remediation, and risk reduction efforts.

## McKenna Long and Aldridge LLP Findings

After the December 22, 2008, ash spill at the Kingston Fossil Plant, the TVA Board of Directors hired the law firm of McKenna Long & Aldridge LLP (McKenna) to, among other things, investigate and report the facts surrounding the spill. As noted previously, in its July 21, 2009, report to the TVA Board of Directors, McKenna concluded that TVA did not have adequate systems, controls, and procedures in place prior to the spill and, therefore, employee performance could not be measured against acceptable performance standards. McKenna noted that a myriad of issues, cultural and procedural, needed to be addressed.

The McKenna report cited the following findings to support its conclusion that necessary systems, controls, standards, and culture were not in place:

**Lack of Clarity and Accountability for Ultimate Responsibility.** The number of groups sharing responsibility for managing the coal byproduct retention ponds, combined with frequent reorganizations, created a lack of accountability. For example, while the Fossil Engineering Division was tasked with ultimate responsibility for the safety of the ponds, the Coal Combustion Byproducts Division considered any order to stop dredging from Fossil Engineering as merely a recommendation.

**Lack of Standardization, Training, and Metrics.** TVA did not have in place standard procedures regarding operations and maintenance of its five wet ash ponds. Instead, the activities at each location were determined by local personnel. Moreover, TVA did not have standardized training for the engineers performing annual inspections of the retention ponds or for the individuals performing daily inspections. While manuals for ash handling were developed for each facility in 2006, they were never updated and were difficult for a non-engineer to comprehend and implement.

**Siloed Responsibilities and Poor Communication.** Four separate TVA divisions shared responsibilities related to ash retention facilities. Although the responsibilities overlapped and were interdependent, communication between the groups was poor. For example, the ash handlers at Kingston continued dredging in the fall and winter of 2008, despite having been stopped in mid-November of 2007 under engineers' orders because of danger from excessive water from rain in the winter.<sup>1</sup> The ash handlers at Kingston continued dredging in the fall of 2008 because the engineers had not instructed them to stop. The engineers, on the other hand, noted that no one had asked about continuing the dredging into the fall and winter of 2008.

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<sup>1</sup> The 2009 Annual Inspection Report for Kingston, which was based on the physical inspection performed on October 20, 2008, contained the following: "Dredging to these cells was stopped in mid-November 2007 based on recommendations from EDS and Geosyntec Consultants, Inc. This preventative measure was taken to reduce water levels in the dredge cell through the winter months. Dredging restarted in March 2008 and was still in operation at the time of the inspection [October 2008]."

**Lack of Checks and Balances.** After completing the initial dikes for a new coal byproduct retention pond, TVA did not perform routine inspections to ensure that the pond was constructed in accordance with engineered specifications. Because TVA lacked a strong Quality Assurance/Quality Control plan, when a deviation was uncovered, there was significant disagreement over the appropriate response resulting in a failure to act on a proper corrective action. This created an environment where employees felt empowered to ignore engineers and “build it better” than the drawings.

**Lack of Prevention Priority and Resources.** The individual plants were responsible for the budget for routine maintenance of coal byproduct retention ponds, such as regular mowing and performing any “fixes” outlined in the annual inspection reports. The TVA budget process was an impediment to the upkeep of the ponds because it was not formalized and tended to prioritize regulated assets over unregulated assets and then generating assets over non-generating assets. The funds allocated by TVA’s ad hoc approach were inadequate for routine maintenance, creating a situation in which adequate inspections were impossible because the sides of the dikes were overgrown and maintenance needs compounded over time. When byproducts was reorganized after the Kingston Spill, two retention ponds were identified where, under current operating conditions, the capacity to take additional byproduct could be exhausted within two years, but there were no plans in place for addressing those situations.

**Reactive Instead of Proactive.** In 2003 and 2006, seeps along the west side of the Kingston dredge cells were discovered. TVA’s response was limited to patching the specific leaks. Investigating the cause of incidents such as the seeps is fundamental to a robust safety program. The system failings identified by McKenna were not detected in conjunction with these seeps, and no effort was made to leverage the lessons learned across TVA’s Fossil Fleet. Moreover, in 2000, Widows Creek experienced an incident very similar to its highly publicized gypsum spill that occurred in January 2009. Plant personnel determined that the 2000 incident was caused by the failure of a sealed abandoned weir. The fix was to remove the failed weir without addressing the other abandoned weirs at Widows Creek (such as the abandoned weir that gave way in 2009), or any other TVA facility. Additionally, an August 2005 incident in Pennsylvania during which 100 million gallons of fly ash spilled into the Delaware River through a breached plug in an ash settling pond did not prompt any response or study within TVA of TVA’s own potential ash pond risks.