Memorandum from the Office of the Inspector General

August 7, 2014

Brenda E. Brickhouse, BR 4A-C

REQUEST FOR FINAL ACTION – AUDIT 2013-14959 – TVA ENVIRONMENTAL RISK MANAGEMENT

Attached is the subject final report for your review and final action. Your written comments, which addressed your management decision and actions planned or taken, have been included in the report. Please notify us when final actions are complete. In accordance with the Inspector General Act of 1978, as amended, the Office of the Inspector General is required to report to Congress semiannually regarding audits that remain unresolved after 6 months from the date of report issuance.

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 or wish to discuss our findings, please contact Sylvia J. Whitehouse, Senior Auditor, at (865) 633-7374 or Lisa H. Hammer, Director, Operational Audits, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

Robert E Martin

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

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TVA

Office of the Inspector General

Audit Report

To the Vice President,
Environment

TVA ENVIRONMENTAL RISK MANAGEMENT

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ABBREVIATIONS

BMP	Best Management Practices
BU	Business Unit
CCR	Coal Combustion Residuals
CEC	Categorical Exclusion Checklist
EA	Environmental Assessment
EDMS	Electronic Document Management System
EIS	Environmental Impact Statement
ELLIS	Enterprise Lessons Learned Information System
EMS	Environmental Management System
EPA	Environmental Protection Agency
ERAL	Environmental Restricted Awards List
ERM	Enterprise Risk Management
FY	Fiscal Year
GOES	Governance, Oversight, Execution, and Support
IRP	Integrated Resource Plan
NEPA	National Environmental Policy Act
NPG	Nuclear Power Group
NRM	TVA NEPA Reference Manual
NRP	Natural Resources Plan
OIG	Office of the Inspector General
PCB	Polychlorinated Biphenyls
REE	Reportable Environmental Event
SBU	Strategic Business Unit
SME	Subject Matter Expert
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority

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APPENDIX

MEMORANDUM DATED JULY 18, 2014, FROM BRENDA E. BRICKHOUSE
TO ROBERT E. MARTIN

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Why the OIG Did This Audit

Due to the importance to the Tennessee Valley Authority (TVA) and the region of protecting the environment, we evaluated the effectiveness of TVA processes for identifying and managing actual and potential environmental issues and risks. TVA's Environmental Management System (EMS) program was established to manage environmental impacts of TVA operations and help fulfill commitments of TVA's Environmental Policy. Within this purpose, EMS plays a significant role in managing environmental risks across TVA and sustaining a high level of environmental compliance in TVA operations. We planned to identify opportunities to improve TVA's EMS program elements and strategies for managing environmental risks.

What the OIG Found

Generally, TVA has effective processes for identifying and managing actual and potential environmental issues and risks. However, we noted areas where environmental risk management processes can be strengthened. Specifically, we found environmental risks identified for business planning could be more comprehensive, more clearly identified, and integrated agency-wide in order to help ensure their recognition and resource availability. In addition, weaknesses in environmental review processes increase TVA risks and can be strengthened to demonstrate regulatory compliance and due diligence in assessing the potential environmental impacts of proposed agency decisions.

Many positive aspects of the EMS program were evident and demonstrated effectiveness of functions related to environmental risk management. However, we determined opportunities for enhancing TVA's EMS exist in communicating with regulators, coordinating planning processes, emergency response preparedness, environmental training, and sharing lessons learned.

By implementing the recommendations described in Table 1 on the following pages, TVA can improve process efficiencies that will help sustain EMS effectiveness in the face of current challenges and impacts from budget constraints.

What the OIG Recommends

We recommend process improvements related to identifying risks and integrating environmental information sources, system enhancements to strengthen environmental reviews, and enhancements to EMS functions.

EXECUTIVE SUMMARY

Table 1

Finding	Recommendation
Some environmental risks were not considered in strategic business unit risk assessments.	1. Coordinate with Operations to incorporate a process within strategic business units' risk assessments to ensure all business units with the potential for environmental impacts appropriately identify the associated risks and consider the underlying risks common to multiple sites.
Environmental risks and data tracked in segregated sources lack integration.	2. Consider cost-effective methods to integrate tracking for all known environmental risks, requirements, commitments, and issues for a more holistic approach to TVA environmental risk management and trending of risk management efforts. Improve information resource centers to provide ready reference on environmental guides, instructions, best practices, standards, regulations, lessons learned, and other data sources needed to manage TVA's environmental performance and to improve consistency and knowledge sharing across TVA.
TVA requirements and responsibilities for environmental reviews are not clear and guidance is outdated.	3. Revise TVA environmental procedures to better describe responsibilities for environmental reviews and update guidance to reflect current information. Work with TVA's Projects group to better describe requirements in project management procedures for environmental reviews. Include processes for identifying planned projects and significant work that require but have not initiated an environmental review.
Tracking system weaknesses provide opportunities for errors or incomplete documentation.	4. Enhance system controls over data integrity and reliability to improve the environmental review, documentation, and closing processes.
Communication with regulators is not clearly understood and can cause unnecessary delays.	5. Clarify roles for communicating with regulators in line with the peer-to-peer approach reflecting level of responsibility or severity of issues that includes environmental specialists on calls to regulators when possible.
Internal coordination gaps can impact planning for some processes.	6. Collaborate with personnel responsible for planning major maintenance work, property acquisitions, and idling plants to ensure environmental involvement is obtained for identifying and considering environmental risks.

Finding	Recommendation
Emergency response preparedness risks are increased at unstaffed TVA sites.	7. Collaborate with TVA personnel responsible for emergency planning to (a) identify gaps in emergency planning coverage; (b) improve plans for coordinating with local responders; and (c) identify personnel trained in emergency response for covering unstaffed, small, and remote sites if an environmental incident occurs. Leverage the work initiated to provide consistency in Power Operations emergency planning to improve emergency planning for unstaffed, small, and remote sites.
Orientation to environmental job duties is inconsistent.	8. Complete efforts to identify skills progressions for environmental representatives. Revise the environmental training program to require periodic refresher environmental awareness training for all employees and contractors who do not have regular environmental training based on job duties. Consider options to provide additional and more consistent direction to employees new to environmental positions.
Lessons learned are shared by informal methods.	9. Coordinate with TVA's Projects and Operations Support to determine whether the planned lessons learned database will provide the flexibility needed to identify environmental lessons learned, near misses, and best management practices; and how the Environment group will participate in the database implementation and communicate availability of this tool for finding potential options to prevent and address environmental issues.

TVA Management's Comments and Our Evaluation

TVA's comments on the draft of this report are included in their entirety in the Appendix. We incorporated these comments into the body of the report as applicable. TVA management generally agreed with our recommendations, except for suggested actions to address inconsistencies in emergency response preparedness and require periodic environmental awareness refresher training. The Office of the Inspector General concurs with the actions planned and taken to address our recommendations.

BACKGROUND

The Tennessee Valley Authority's (TVA) approach to environmental risk management involves enterprise level policies and strategies and a framework for managing environmental impacts from operations. This approach has set the tone for TVA's commitment to responsible environmental stewardship.

TVA ENVIRONMENTAL POLICY AND STRATEGY

In support of TVA's 2007 Strategic Plan, TVA established its Environmental Policy in 2008 ". . . to provide cleaner, reliable and still-affordable energy, support sustainable economic growth in the Tennessee Valley, and engage in proactive environmental stewardship in a balanced and ecologically sound manner." TVA established an overarching framework within the Environmental Policy to guide decision making and future strategic development of environmental stewardship focus areas and climate change mitigation. The Environmental Policy was updated to reflect TVA's 2010 restated vision ". . . to become one of the nation's leading providers of low-cost and cleaner energy by 2020." TVA's 2011 Strategic Plan stated, "TVA will continue to strengthen its industry-leading reputation in environmental stewardship of air quality, water resources, waste minimization, sustainable land use, and natural resource management."[1]

During 2011, TVA completed two parallel strategic plans to guide decisions for 20 years - the Integrated Resource Plan (IRP) to address the demand, options, and potential impacts for power in the region and the Natural Resources Plan (NRP) to guide TVA natural resource stewardship efforts and achieve the objectives of TVA's Environmental Policy. The IRP aligned with the Environmental Policy and served as a guide for TVA to fulfill its energy mission.[2] The NRP integrated the objectives of six resource areas[3] to provide the optimum public benefit, balance resource uses that sometimes conflict, and identify benefits from implementing or improving TVA programs in the resource areas. More recently, TVA has stressed environment as one of the three parts of the strategic mission along with energy and economic development. TVA's fiscal year (FY) 2014 strategic imperatives include being a responsible steward of the Valley's natural resources.

To measure corporate performance of the stewardship imperative, TVA tracks plant emissions and reportable environmental events (REEs) which indicate when site permit conditions or other regulatory requirements may be violated and

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1   "Delivering the Vision," September 2011, page 6, identified these five environmental stewardship focus areas.

2   In 2013, TVA began an IRP update effort, which we are reviewing in a separate audit. Audit 2014-15080, Integrated Resource Planning Process (IRP), was announced in a November 19, 2013, memorandum from Assistant Inspector General Robert E. Martin to TVA Executive Vice Presidents.

3   NRP resource areas are biological, cultural, and water resources; recreation; reservoir lands planning; and public engagement.

external regulators must be notified.[4] REEs are also being tracked by all Operations' business units (BU), reflecting their key role in identifying and managing environmental risks in connection with core business activities. TVA's record of REEs has improved in recent years. Specifically, TVA reported 122 environmental events from 2008 to 2010; this total dropped by approximately one-half to 60 events reported from 2011 to 2013. Two-thirds of TVA's REEs for 2011 to 2013 involved discharges to water channels, permit exceedances, and oil sheens in the river; the other one-third of REEs involved citations from regulators, missed reports or samples, sewage spills, and asbestos removal.

TVA's environmental functions have been managed by a variety of BUs during the last few years. Effective with TVA's 2012 reorganization, environmental functions formerly residing in the Environment and Technology organization were partly decentralized to TVA's Engineering, Environmental, and Support Services within the Generation strategic business unit (SBU) and to TVA's Policy and Oversight SBU. With the 2014 reorganization, most of these functions were again centralized in TVA's new Environment organization within the Operations SBU.

After redesigning the organizational structure in the current FY, TVA updated performance measures and added a measure for reputation based on both favorable and unfavorable issues reported in the media. This measure has included coverage related to the environmental damage and progress in cleanup of TVA's Kingston Fossil Plant ash spill, possible groundwater pollution around coal plants, decisions to close coal plants, increased use of hydroelectric and gas generation, and focus on renewable energy programs.

TVA ENVIRONMENTAL MANAGEMENT SYSTEM

To help manage the environmental impacts of TVA operations and activities for continual improvement in environmental performance and to help fulfill commitments of TVA's Environmental Policy, TVA established the TVA Environmental Management System (EMS). The TVA EMS[5] is a framework of environmental responsibilities and program elements which, according to TVA-SPP-05.0, Environmental Management System,[6] ". . . helps to ensure that resources are properly deployed and that management plays an active role in evaluating progress and making decisions towards continual improvement" and ". . . standardizes the functions performed across the TVA organizations to support both performance improvement and efficiency." The EMS applies to all TVA sites and personnel and includes all TVA activities and operations subject to TVA's Environmental Policy, such as power generation and transmission, river operations, land and reservoir management, economic development, and supporting administration. The EMS framework and program elements are depicted in Figure 1 on the following page.

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[4] For purposes of this report, we relied on REEs as reported and did not evaluate the appropriateness or completeness of reported REEs.

[5] TVA's EMS is a concept for implementing program elements, not an electronic system.

[6] Effective November 14, 2012.

Figure 1: TVA EMS Framework and Program Elements[7]
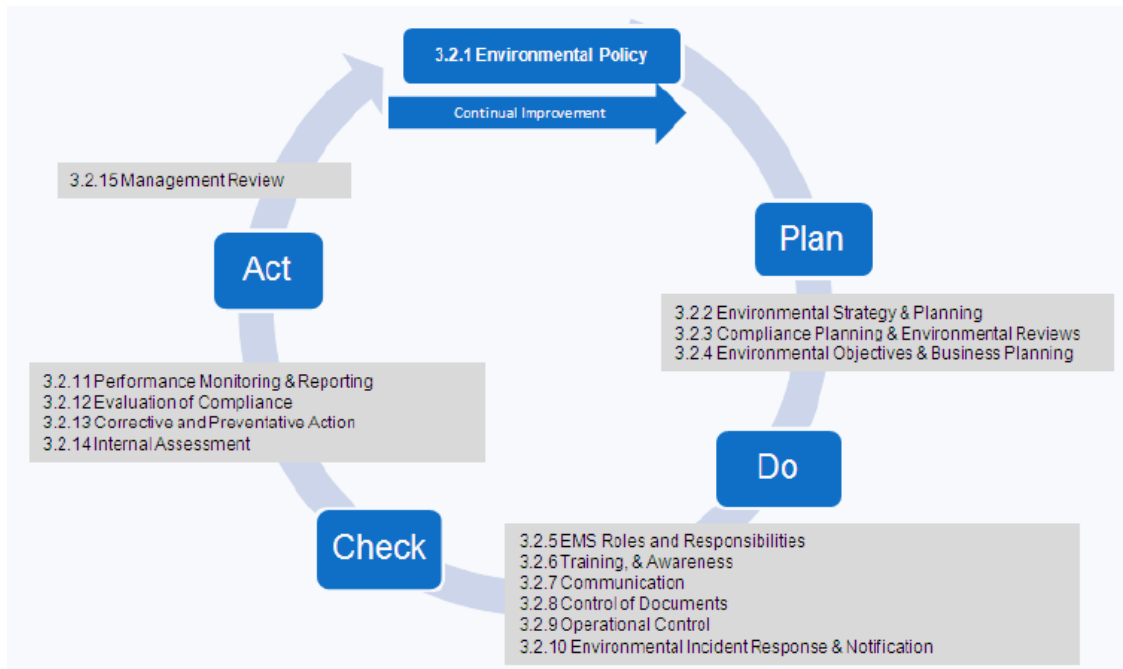
EMS defines environmental risk as the element of TVA's activities, products, or services that can interact with the environment and adversely affect the achievement of TVA's core business objectives. EMS program elements are designed to identify and manage the environmental risks of TVA operations and activities[8] and to establish and maintain programs to achieve environmental objectives in support of business planning.[9] The Environment group provides input to TVA's Enterprise Risk Management (ERM) process regarding commitments outlined in TVA's Environmental Policy and risks with the potential to significantly affect the environment. SBUs use a risk assessment process included in the ERM program to identify and rate operational risks, including environmental, and develop risk management plans for mitigating the identified risks. The ERM process considers the SBUs' assessments in ranking risks from a TVA-wide perspective. TVA's Environment group also identifies environmental risks when collaborating with BUs to track and manage site-level environmental remediation and compliance activities.

As part of the EMS Compliance Planning and Environmental Reviews program element, TVA conducts environmental reviews in order to identify potential environmental impacts of proposed actions and comply with the National Environmental Policy Act (NEPA). The NEPA legislation[10] established a national

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[7]   From TVA-SPP-05.0, §3.2, Program Elements. For purposes of this report, we utilized the Standard Programs and Processes (SPP) as a guide for environmental risk management processes and criteria for evaluating effectiveness, but did not audit compliance of TVA's EMS to all SPP requirements.

[8]   TVA-SPP-05.0, §3.2.2, Environmental Strategy and Planning.

[9]   TVA-SPP-05.0, §3.2.4, Environmental Objectives and Business Planning.

[10]   Public Law 91-190, 42 USC 4321-4370(d), as amended, and the 2005 Implementing Regulations 40 CFR Parts 1500-1508.

policy requiring federal agencies to make decisions based on understanding of environmental consequences and to take actions that protect, restore, and enhance the environment. Achievement of NEPA goals is enforced through shared responsibilities of the President, federal agencies, and the courts. TVA's environmental procedure refers to TVA Instruction IX Environmental Review,[11] which TVA adopted as implementing procedures with the approval of the NEPA oversight council.[12] TVA Instruction IX describes TVA's NEPA review requirements and is available on TVA's public Web site. TVA's environmental procedure also refers to the TVA NEPA Reference Manual (NRM),[13] which provides detailed guidance for implementing NEPA reviews and is available on TVA's EnviroNet internal Web site.

According to the NRM, NEPA reviews provide the environmental component of TVA planning and are designed to identify and minimize potential impacts to natural resources. NEPA reviews are used to manage TVA internal resources for ensuring TVA considers the impacts on the environment before making decisions on any proposed actions. The NEPA process is intended to help TVA understand potential impacts to the environment that could result from actions proposed by TVA or applicants seeking TVA approval or assistance. The majority of NEPA reviews are documented as Categorical Exclusion Checklists (CEC) for proposed actions that qualify for exclusion by being in a category of actions that normally do not have a significant impact on the environment and no exceptional circumstances exist. More thorough NEPA reviews, known as Environmental Assessments (EA) and Environmental Impact Statements (EIS), are conducted when proposed actions have the potential for significant environmental impacts or substantial public controversy. TVA uses the ENTRAC system to document CECs and track commitments[14] from all types of NEPA reviews. All new ENTRAC users must complete training on a NEPA overview.

OBJECTIVE, SCOPE, AND METHODOLOGY

Due to TVA's stewardship imperative and the importance to TVA and the region of protecting the environment, we evaluated TVA's management of environmental risks. The audit objective was to evaluate TVA's effectiveness in identifying and managing actual and potential environmental issues and risks. We also planned to identify opportunities to improve EMS program elements and strategies for managing environmental risks. We focused on environmental risks identified from 2011 to 2013 and TVA processes for managing environmental risks. Where we selected items for more detailed testing, we used nonstatistical sampling methods, except as described below, that were not intended to project

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[11] TVA Procedures for Compliance With the National Environmental Policy Act, published in August 1980 and amended in December 1982 and April 1983.

[12] The Council on Environmental Quality was established by Congress in 1969 to oversee federal agency implementation of the NEPA process.

[13] NRM Revision 01, effective April 9, 2010.

[14] NRM, §2-3.I, describes commitments as specific measures, precautions, conditions, or safeguards that will avoid, eliminate, or reduce potential environmental impacts from proposed actions.

the results to the entire population being tested. Our review occurred before and during TVA's 2014 reorganization efforts and, to the extent information was available, reflects organizational changes completed through 2nd quarter FY2014. Our audit did not include testing for compliance with environmental regulations.

To achieve our objective, we:

- Reviewed TVA guidance including TVA-SPP-05.0, other relevant SPPs, the NRM, and Instruction IX for information on policies, procedures, and control activities related to TVA environmental reviews and risk management. Although we tested some system controls relevant to our audit, we did not perform detailed testing of internal controls or evaluate compliance with all relevant TVA procedures. Our intent was simply to gain an understanding of activities and responsibilities within TVA environmental risk management processes and identify criteria for evaluating effectiveness.

- Conducted limited examination of TVA project management procedures to identify project responsibilities for conducting environmental reviews. Specifically, we reviewed instructions related to environmental reviews described in TVA procedures on project management,[15] development,[16] process,[17] closure,[18] and other processes.

- Reviewed Environmental Protection Agency (EPA) principles of environmental management[19] to identify best practices for ensuring responsible environmental performance that is proactive, flexible, cost-effective, integrated, and sustainable. Where sufficient information was obtained during the audit, we used the EPA guide as input for identifying potential improvements in use of information, emergency preparedness, environmental training, and other aspects of TVA's EMS structure and processes.

- Reviewed 2nd and 4th quarter FY2013 enterprise and SBUs' risk assessments to identify risks with potential environment impacts. We used professional judgment to identify changes in projected trends and to determine whether TVA's enterprise risk map adequately reflected environmental risks that could substantially impact TVA operations and business.

- Identified organizational changes that occurred immediately before and during our audit to assess potential impacts to environmental risk management functions.

- Identified environmental liabilities included in TVA's annual reports for FY2010 through FY2013 as indicators of legacy environmental issues and reviewed processes for identifying the liabilities and their expected costs.

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[15] TVA-SPP-34.0, Project Management, effective April 1, 2013.

[16] TVA-SPP-34.011, Project Development and Integration, effective August 27, 2012.

[17] TVA-SPP-34.019, Project Process, effective October 1, 2012.

[18] TVA-SPP-34.017, Project Closure, effective October 1, 2011.

[19] Implementation Guide for the Code of Environmental Management Principles for Federal Agencies, developed by EPA, March 1997.

- Reviewed and tested documentation for a sample of NEPA CEC reviews to determine whether the CECs were adequately documented, reviewed, and completed. For the period from FY2011 through FY2013, we identified 5,861 CECs and tested 51 CECs selected using nonstatistical sampling methods. Of the 51 CECs, 35 CECs represented reviews initiated by 27 different preparers to cover reservoir and land use permits for a variety of projects and proposed work at corporate, coal, gas, hydro, nuclear, and transmission sites. The remaining 16 CECs were coded as business sensitive and were tested because access to documentation for these reviews was restricted to designated users.

- Reviewed data from several TVA systems used to identify and track environmental risks and management activities, including commitments for reducing potential environmental impacts identified from all types of NEPA reviews, to evaluate the adequacy of tracking mechanisms. We did not assess the adequacy of NEPA reviews in this audit.

- Interviewed 114 personnel from multiple environmental, support, and corporate BUs regarding activities related to identifying and mitigating environmental risks. We used the information in conjunction with supporting documents and professional judgment to identify common themes and opportunities to improve TVA environmental risk management strategies. We identified a total of 290 individuals who, as of May 15, 2013, had designated environmental duties. We interviewed 31 percent of this population in an approach that combined a sample of 71 individuals and 18 individuals working with the sites identified in Figure 2 on the following page. We also interviewed 25 personnel affiliated with the sites we visited to obtain operational perspectives. We used both random and nonstatistical methods to select our sample that were not intended to project the results to the entire population of all TVA environmental functions.

- Corroborated information described during interviews and reinforced our understanding of TVA risk management processes by:
  - Reviewing over 200 documents provided by our interview sources;
  - Reviewing internal EAs selected using nonstatistical methods to gain an understanding of the assessment process and results; and
  - Observing meetings with regulatory policy teams covering air, water, and waste media, and natural resources, an emergency drill, an environmental corrective actions review, meteorological instrumentation committee, and site environmental block training.

- Discussed TVA environmental risk management practices and remediation activities with a state and a federal regulator to gain external oversight perspectives.

- Visited a variety of TVA sites with stakes in environmental risk management to observe environmental conditions, identify ongoing actions for managing related risks, and gain site perspectives of TVA environmental functions.

We selected a nonstatistical sample consisting of the 27 TVA facilities listed in Figure 2 representing a broad cross section of TVA operations based on type, location, responsible organization, and distinguishing operational functions.

Figure 2: TVA Sites Visited

Site	Type	Location
Browns Ferry	Nuclear Plant	Alabama
Colbert	Coal and Gas Plants	Alabama
Guntersville	Hydro Plant	Alabama
Muscle Shoals	Environmental Research Center, Power Support Services, Service Center, Distribution Center, Radiological Laboratory	Alabama
Widows Creek	Coal Plant	Alabama
Blue Ridge	Hydro Plant and Generation Project	Georgia
Paradise	Coal Plant	Kentucky
Hiwassee	Hydro Plant	North Carolina
Gallatin	Coal Plant, Emergency Drill, Generation Capital Project	Tennessee
Greenway	Transmission Service Center	Tennessee
John Sevier	Coal and Gas Plants	Tennessee
Kingston	Coal Plant and Ash Recovery Project	Tennessee
Ocoee	Hydro Plants	Tennessee
Sequoyah	Nuclear Plant	Tennessee
Watts Bar	Hydro Plant, Maintenance Facility, Nuclear Capital Project	Tennessee

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

FINDINGS AND RECOMMENDATIONS

TVA processes for identifying and managing actual and potential environmental issues and risks are generally effective. However, we noted areas where processes can be strengthened for identifying environmental risks, integrating environmental risk and information sources, and reinforcing the environmental review processes.

Many positive aspects of the EMS program we observed demonstrated effectiveness of functions related to environmental risk management. However, we determined opportunities for enhancing TVA's EMS exist in communicating with regulators; coordinating planning processes for major maintenance work, property acquisitions, and idling of plants; emergency response preparedness; environmental training; and sharing lessons learned.

ENTERPRISE ENVIRONMENTAL RISKS ARE INCOMPLETE

As previously described, TVA identifies environmental risks in several ways that represent the enterprise, SBU, and site perspectives. However, environmental risks identified by SBUs in FY2013 for business planning did not adequately reflect some risks that could affect numerous TVA sites. TVA environmental risk management also relies on information from several segregated sources.

Some Environmental Risks Were Not Considered in SBU Risk Assessments
TVA's risk management program involves operational and environmental risks identified in SBUs' risk assessments and enterprise-level environmental commitments and potentially significant risks. Site-level environmental risks are identified within processes to track and manage remediation and compliance activities. At the end of FY2013, ERM ranked 142 TVA enterprise-wide risks using input from SBUs' risk assessments. We identified 36 of these risks that included some level of potential environmental impact described with the risk, emerging issues, probability, or consequences. From those 36 risks, we identified the top 10 risks with potential direct impacts to the environment and probabilities of occurrence rated higher than unlikely. These 10 risks were ranked by SBUs as high to medium and are shown in Figure 3, on the following pages, based on overall rankings from an enterprise operations perspective. With minimum costs estimated at $1.5 billion through 2025 to address 3 of these risks, the potential impacts to TVA operations are substantial. According to TVA's ERM staff, this enterprise risk perspective and TVA's risk assessment methodology are being revised during FY2014 to reflect changing operational and funding conditions and to more clearly address risk thresholds, risk tolerance, and residual risk.

Figure 3: FY2013 Highest Ranked Enterprise Environmental Risks

Risk	Relation to Environment and Potential Impact	Identifying BU[20]
Lack of wastewater treatment capability	• Inability to close ash ponds for converting to dry storage. • More stringent wastewater treatment guidelines are expected. • Estimated costs of $1.2 billion through 2022.[21]	Projects[22]
Key supplier failure to perform	• Environmental spills and hazardous waste disposal. • Harm to TVA projects, programs, and operations with potentially severe financial impact.	Supply Chain
Remediation of closed coal combustion residuals (CCR)[23] facilities	• More stringent requirements over previously closed disposal areas are expected in 2014. • Uncertainty and possible major financial impact.	Projects
Groundwater tritium	• Groundwater contamination. • Damage to public image and increased regulatory scrutiny. • Minimum estimated potential losses of $10 million per event.	Nuclear Power
Seismic remediation of CCR impoundments	• More stringent regulatory seismic requirements are possible. • Major financial impact and growing concerns around CCR.	Projects
TVA environmental compliance	• Compliance with increasing regulatory requirements. • A combination of financial, public image, and environmental impacts.	Environment
316b regulation risk (Clean Water Act)	• EPA regulatory compliance. • Estimated $250 million for TVA-wide upgrades to cooling water intake screens and systems by 2021.	Nuclear Power
Impact of environmental compliance on performance, reputation, and overall costs	• Growing costs of implementing regulations. • Increasing requirements and scrutiny of environmental compliance with impacts to costs and reputation.	Environment

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[20] The BU recognized the risk to operations and designed risk mitigation strategies. Some risks can impact operations TVA-wide or in multiple SBUs.

[21] Costs estimated for remediating the identified risk reflect project costs beyond addressing the environmental impacts.

[22] An Operations BU, formerly Generation Construction.

[23] CCR refers to the materials that remain after burning coal, commonly called coal ash, and includes fly ash, bottom ash, boiler slag, and gypsum.

Risk	**Relation to Environment and Potential Impact**	**Identifying BU**[20]
Reputational impact of Kingston-like event	• Potential environmental events. • Lingering concerns about public trust and potential for significant reputational harm.	Environment
Environmental regulatory compliance	• Violation of existing regulations. • Potential damage to the environment and financial impacts. • $8.2 million funded for automating instrumentation at coal ash impoundments in FY2014.	Projects

By considering risks included in the ERM process, identified by the Environment group from ongoing remediation activities, and described during interviews, we identified some gaps in the enterprise view of environmental risks related to omission of known risks and discrepancies in SBUs' risk ratings. It is necessary to clearly identify environmental risks in order to help ensure their recognition among competing priorities and resource availability into the future. TVA's view of environmental risks at an enterprise level should reflect identified exposures and be transparent to internal staff to demonstrate accountability and support proper planning and mitigation.

• The Transmission and Nuclear Construction[24] BUs did not expressly include risks with environmental impacts in their ERM risk assessments. Specific areas of concern for Transmission operations discussed during interviews for this audit include potential (1) impacts from the presence of sensitive species habitats when installing transmission lines and maintaining rights-of-way that cover thousands of miles per year; and (2) for spills from equipment and fuels, a risk that was rated by most other TVA groups at a medium level. In addition, the Environment group identified removal of polychlorinated biphenyls (PCB)[25] contaminated equipment among site-level risks as an ongoing system-wide Transmission risk. Similarly, the Nuclear Construction group can encounter equipment and fuel spills. Additionally, the large number of personnel and moving parts on the Watts Bar Nuclear Plant's construction site increases the potential for incidents affecting the environment.

• Similarly, Coal Operations' BUs did not adequately represent two risk areas with potential impacts to multiple sites from potential groundwater contamination and monitoring mercury emissions in their ERM risk assessment to reflect broader multi-site risks. The Environment group identified ongoing groundwater contamination risks at eight Coal Operations'

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[24] Nuclear Construction transitioned in 2014 to the Nuclear Power Group's (NPG) Watts Bar Unit 2 Construction BU.

[25] PCB refers to manufactured organic but toxic chemicals that were widely used due to their electrical insulating properties in electrical, heat transfer, and hydraulic equipment and other industrial applications. PCB manufacture was banned in 1979.

sites, which were rated with moderate to severe potential impacts such as a reportable event or regulatory violation with fines. Groundwater risks were discussed during interviews for this audit in relation to managing wells and monitoring impacts to groundwater. The Environment group also identified risks related to the lack of mercury monitors and long-term data on mercury emissions at eight coal plants, which were rated with high probability of severe potential impacts, such as violations and fines associated with changing regulations.

- Two Operations' BUs rated specific environmental risks in the ERM process lower than the expected level of exposure or probability of occurrence.

    1. River Operations rated "Compliance with Existing Environmental Regulations" as a potentially minor consequence at the end of FY2013, which was reduced from the midyear ranking of moderate. According to ERM guidelines, a minor consequence would affect TVA property only.[26] The moderate rating is justified, in our opinion, by the plants' proximity to the river system, limited staff availability at some plants where only day shifts are worked or where no personnel are assigned, and reliance on the public to report sightings of environmental issues when staff is not present to respond. These factors could also increase risks that environmental incidents will not be reported timely and will affect property other than TVA sites.

    2. NPG rated "PCB Transformers" as an unlikely probability while stating that likelihood is slightly above even odds.[27] The risk of spills from PCB-contaminated equipment was justified by the aging and degrading condition of equipment and a past PCB explosion event at one of TVA's nuclear plants. NPG's rationale supports a minimum likelihood rating of even odds for the PCB Transformers risk. In addition, the cost of remediating PCB risks across TVA by 2025 was estimated at $72.5 million.

Recommendation 1 – Coordinate with Operations to incorporate a process within SBUs' risk assessments to ensure all BUs that perform activities with the potential for environmental impacts appropriately identify the associated risks and consider the underlying risks common to multiple sites.

TVA Management's Comments – Agree; this improvement was implemented in May 2014. The Environment group shared risk matrices with each SBU/BU during business planning and continues to work with ERM and Business Planning to ensure processes and information are aligned. TVA will update its EMS by March 2015 to describe this practice.

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[26] TVA-SPP-13.17.1, Enterprise Risk Management Guidelines, effective July 19, 2011, defines a moderate environmental consequence as minor localized off-site environmental damage.

[27] ERM Guidelines define even odds as a 50-percent probability that the event will occur in the next 36 to 60 months.

Auditor's Response – The Office of the Inspector General (OIG) concurs with management's planned and completed actions.

Environmental Risks and Data Tracked in Segregated Sources Lack Integration
We identified numerous sources of information on TVA environmental risks, concerns, commitments, corrective actions, and other activities. Several sources capture TVA environmental risks at various levels and some information sources are tools actively used for managing those risks, as described in Figure 4 (see pages 13-16) along with the relevant EMS sections. However, we identified no single method or mechanism for TVA to integrate risks, commitments, and issues from the multiple sources that would provide a comprehensive view of TVA's environmental risk landscape. Completely understanding and managing TVA environmental risks is more difficult when multiple sources capture individual risks and other relevant information without being integrated or centralized. This wide array of environmental information also makes it difficult to know where to find the right information needed for specific activities.

We observed use of a variety of data sources at a wide range of levels by various BUs. Environmental risk identification, environmental process awareness, environmental procedures, corrective actions, and compliance records all serve to document TVA activities for managing environmental risks, mitigation plans, and remediation. However, many of TVA's information sources reside in individual files that require manual updates and, along with the use of desegregated share drives, fosters a silo approach to environmental management functions instead of providing the integrated approach expected in TVA's EMS. Issues and commitments for specific TVA assets and sites should be retrievable from integrated sources to improve process efficiencies and effectiveness of environmental functions. In addition, links to outdated or irrelevant information can invite unwarranted criticism from outside groups who may take elements out of context or draw inaccurate conclusions from information made public.

TVA's EMS established two primary environmental information centers, including the EnviroNet for agency-wide communication and the Electronic Document Management System (EDMS) as TVA's official repository for environmental records, among many other types of documents. EnviroNet documents cover environmental policy, procedures, and guides; roles and responsibilities; inter-agency and utility group members; scheduled assessments; and report frequencies. EDMS includes a collection of regulatory and compliance records, such as environmental permits and applications, regulator correspondence, laboratory results, management reviews, event reports, inspections, and cleanup records. During our audit, the Environment group launched the Environment Viewer, an automated tool that ties TVA facilities on an interactive map to the EDMS repository of permits, correspondence, and other environmental

documentation.[28] While EnviroNet serves to communicate environmental information and EDMS serves as a centralized repository, neither system provides the integration needed for agency-wide and site-level monitoring and trending. In addition, a central repository of best management practices (BMP) and environmental standards for supporting mitigation activities would strengthen TVA's NEPA process and TVA's overall efforts to comply with environmental requirements.

EPA best practices state information management can contribute to an organization's success when the EMS is integrated throughout the agency and provides the ability to swiftly and efficiently digest data and respond to rapidly changing conditions. Providing easy access and integration of environmental information available across TVA could help incorporate this standard for meeting TVA's environmental stewardship mission. Effective integration of environmental information and improvements in data management could increase opportunities for TVA personnel to know about possible concerns in a timely manner, prevent missing important obligations, minimize loss of knowledge, and improve chances of avoiding costly and damaging incidents.

Figure 4:   Environmental Risk and Information Sources

Source/ EMS Section	Purposes and Significance	Administering BU	Concern or Gap
SBU Risk Assessments; ERM Risk Ranking (EMS 3.2.2A)	• Identify and rank enterprise-level risks to assist SBUs' planning. • Prioritize enterprise risks to support SBUs' strategic and tactical decision making for managing risks across TVA. • 36 environmental-related risks identified for FY2013.	ERM	• Risk management by stand-alone spreadsheets. • Manual update processes.
Compliance Register (EMS 3.2.3A, EMS 3.2.12A)	• Identify regulatory, long-term, and process obligations for increased transparency of accountability for compliance across TVA. • 138 environmental obligations identified as of February 4, 2014.	Operational & Regulatory Assurance	• No easy method of identifying environmental obligations. • Does not provide links to standards or documents. • No mechanism for identifying trends. • Not a comprehensive list of regulatory requirements.

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[28]   We did not evaluate the tool's functions or effectiveness.

Source/ EMS Section	Purposes and Significance	Administering BU	Concern or Gap
Environmental Outlook Document (EMS 3.2.3C, EMS 3.2.4C)	• Provides risk-based timeline, analyses, and forecasts for changing conditions in environmental regulations over a 10-year period. • Supports business planning processes.	Environment	• Not easily incorporated with other risk sources.
Environmental Risk Compliance Matrix (EMS 3.2.4D, supports EMS 3.2.13)	• Manage site-specific environmental risks and issues collaborated between Operations and Environment groups. • Over 90% of the risks being tracked relate to Coal, Nuclear, or Gas Operations. • Share information on incidents and near misses. • 291 environmental-related risks identified FY2013.	Environment	• Risk and mitigation management by stand-alone spreadsheets. • Manual processes to identify risks and update the matrix.
Corrective Action Program; Problem Evaluation Reports (EMS 3.2.13A)	• Identify and record environmental deficiencies, issues, and corrective actions. • Document lessons learned.	Operations Support	• Difficult to obtain information for trending and analysis. • Use of keyword searches to find relevant information.
CECs; NEPA Commitments (EMS 3.2.3E)	• Identify and document commitments from NEPA reviews for mitigating environmental risks of proposed actions. • Document BMP and project instructions. • Document work activities to demonstrate compliance. • Provide basis for responding to public requests for information. • 1,438 open commitments as of January 31, 2014.	Environment	• No process to evaluate potential risks holistically over time. • Tracking completion of reviews and commitments.[29]

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[29] See related discussion on page 17 of this report.

Source/ EMS Section	Purposes and Significance	Administering BU	Concern or Gap
Financial Reports (supports EMS 3.2.2, EMS 3.2.4)	• Identify potential TVA liabilities for legacy environmental issues. Examples: − Muscle Shoals Redevelopment cleanup. − Reclamation at mining property. − Disposal of PCB-containing equipment. − Cleanup and monitoring at generation sites. • $16 million in environmental liabilities reported for FY2013; reduced from $23 million reported for FY2010.	Financial Operations & Performance	• Manual update processes.
Waste Management Database (EMS 3.2.8)	• Track waste shipments by unit, type, and source. • Provide cost and tracking reports. • Retain records for regulatory compliance.	Environment[30]	• Stand-alone database.
EDMS (EMS 3.2.8B, EMS 4.2)	• Central document repository.	Information Technology	• No mechanism to identify trends. • Complex documentation structure; "EDMS Information - Environmental Matrix" was a 13-page list as of September 2012.
Internal online sites and organizational share drives (EMS 3.2.6, EMS 3.2.7A)	• Provide information agency-wide. EnviroNet Examples: − Environmental Policy updates. − Facilities and Environmental Site Contacts. • Provide information and a means for BUs to collaborate. Example: Transmission Environmental Compliance site includes	Environment and individual BUs	• BUs often restrict access to sites and share drives which are less widely used across TVA. • Some information is outdated. EnviroNet Examples: − "Signatory Matrix" dated October 3, 2011. − TVA Reports on Executive Orders for 2002 through 2009.

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[30] Previously administered within Power Service Shops BU.

Source/ EMS Section	Purposes and Significance	Administering BU	Concern or Gap
	bulletins, procedures, and contacts, among other features.		− Environmental Footprint "Benchmark Performance" posted only for August 2010. − Bulletin Board last updated in 2008.
External online sites (EMS 3.2.1B, EMS 3.2.7A)	• Provide information to stakeholders and public. Examples: − Overview of TVA's EMS. − Environmental Reviews (NEPA).	Communications and Environment	• Some information is outdated. Examples: − Corporate Environmental Reports for 1999 through 2008. − Reservoir Monitoring data not updated after 2011.
TVA-level procedures (EMS 3.2.5, EMS 3.2.8)	• Provide TVA-wide environmental guidance. • 22 SPPs provide baseline EMS procedures. • 26 Environmental Guidance documents and Technical Instructions.	Environment	• Requirements could be forgotten or missed if not identified and managed as an integrated, comprehensive list.
Site-level or group-level instructions (EMS 3.2.5B)	• Implement compliance activities at sites or by organizations. • 408 Environmental Management guidance documents, including: − BU-level SPPs (85). − Coal & Gas Technical Instructions (187). − River Operations Maintenance Procedures and Integrated Pollution Prevention Plans (56). − Power Service Shops Process Assurance Procedures (24). • 79 additional procedures with "Environmental" in the title.	Individual BUs	• Numerous documents at varying levels. • Potential duplication or conflicting instructions. • Not widely shared between BUs.

Recommendation 2 – Consider cost-effective methods, including automated solutions, to integrate tracking for all known environmental risks, requirements, commitments, and issues for a more holistic approach to TVA environmental risk management and trending of risk management efforts. Improve information resource centers to provide ready reference on environmental guides, instructions, best practices, standards, regulations, lessons learned, and other data sources needed to manage TVA environmental performance and to improve consistency and knowledge sharing across TVA. Incorporate actions on sharing lessons learned described in Recommendation 9 of this report.

TVA Management ts are underway. TVA is aware and follows industry developments in environmental management and finds that, currently, there is not a cost-effective solution integrating "all" known environmental items listed. The Environment group is updating web resources and links and now has one organization dedicated to managing performance reporting and tools. TVA will update its EMS by March 2015 to describe this organization's responsibilities.

Auditor's Response – The OIG concurs with management's planned and completed actions. While we agree any solution to further integrate environmental information must be cost-effective, we also encourage TVA management to leverage existing and developing automation tools to improve integration of information sources at the earliest possible opportunity.

TVA NEPA PROCESS WEAKNESSES INCREASE RISKS

As described in the Background section of this report, the NEPA process is the environmental part of TVA planning and a principal element of TVA environmental risk management processes with the overarching goal of minimizing impacts to natural resources. During FY2011 through FY2013, TVA initiated 5,861 CECs and identified 1,548 commitments from NEPA reviews. Due to increased public and regulatory scrutiny and the need to withstand court challenges, it is increasingly important for TVA to have the right processes in place that demonstrate due diligence for conducting environmental reviews. Successful completion of NEPA reviews involves cooperation from environmental staff, project managers, and both operations and support personnel.

We identified weaknesses in TVA NEPA processes that increase risks and opportunities for errors due to unclear requirements and responsibilities for NEPA reviews, ENTRAC system deficiencies, and outdated instructions and fragmented standards.

TVA Requirements and Responsibilities for NEPA Reviews Are Not Clear and Guidance is Outdated
Requirements and responsibilities for conducting NEPA reviews are described in TVA procedures and guidance documents. When TVA projects are subject to NEPA review, project managers get guidance from TVA project procedures and

the NRM. TVA project management procedures, which we identified on page 5 of this report, refer to environmental requirements and reviews as a project management program element and part of project scoping and engineering activities. However, TVA environmental procedures do not clearly identify some key responsibilities and steps for performing NEPA reviews and some references to environmental reviews by project management procedures are incomplete or conflict with requirements. In addition, guidance documents contain outdated information and could misdirect external applicants requesting TVA approval of actions to non-existent TVA offices. Our specific concerns are described in Figure 5 on the following pages.

As stated in the NRM, "Including the NEPA process early in the planning stages lessens the risk of costly delays and last-minute 'surprises'." Projects should include adequate time early in proposal stages to allow for regulatory processes outside of TVA control, and project procedures state BU and construction management are responsible for ensuring schedule and budget pressures do not compromise project environmental expectations, standards, and results. Several sources stated BUs that involve the Environment staff early with projects are well situated to plan for and contain environmental costs instead of incurring costly project delays if environmental requirements are not identified as part of project planning. TVA's Projects group described a current practice of including environment in the Joint Project Team during project initiation. This practice was not clearly described in project procedures, which according to TVA Projects staff are being revised in FY2014 to better clarify requirements.

Without specific instructions in TVA procedures on responsibilities for initiating, performing, and completing NEPA reviews, TVA increases risks that projects could be initiated without required reviews or encounter delays from unanticipated environmental requirements, the NEPA guides could be overlooked, or personnel could view environmental review responsibilities as ancillary rather than required. Updates in NEPA guidance, more specific instructions on NEPA responsibilities, and identification of key steps in both the environmental and project management procedures could strengthen TVA's NEPA processes to direct personnel on when and how to complete environmental reviews before projects are initiated and to document project compliance with commitments when projects are implemented. A strong NEPA process is necessary for meeting regulatory requirements to assess the potential environmental impacts of proposed agency decisions.

Figure 5: Gaps in TVA NEPA Process Guidance

Source	Areas Covered	Gaps or Concerns
Environmental Procedure	• Describes responsibilities of the Environment group[31] for conducting environmental reviews. • Identifies NEPA process guidance for internal and public audiences in the NRM and TVA Instruction IX.	• Does not identify responsibilities in other TVA groups for actively initiating or completing environmental reviews. • Does not outline key steps in the NEPA process or describe basic NEPA review requirements. • Does not identify a minimum cycle for reviewing the NRM.
Project Management Procedures	• Describe basic instructions related to environmental reviews. • Identify environmental resources such as procedures and guidance, specialists, discussions during scoping activities, inputs for the project management plan, and goals as part of project performance.	• Place environmental reviews during detailed engineering rather than as part of project study and preliminary engineering or before project initiation in line with NRM. – Draft project management plans and anticipated contract arrangements could both be completed without considering environmental requirements if environmental reviews are not conducted until later in the project process. • Identify no activities for documenting how projects meet environmental commitments.
TVA Instruction IX	• Documents TVA requirements for NEPA reviews. • Provides NEPA process overview geared to the public.	• Refers to offices and positions that no longer exist, including TVA's "General Manager," "Environmental Quality Staff," "Director of Environmental Quality," "Citizen Action Office," and "Citizen Action Line."
NRM	• Requires completing an environmental analysis before decisions are made. • Identifies detailed process steps and describes rationales to consider in the process. • Identifies the stages for triggering the NEPA process - the action proposal stage after the BU determines the proposal is technically feasible or the project	• Often repeats instructions at different places in the document. • Is lengthy and overly complex at 421 pages; provides no navigation aids such as bookmarks for users to locate what is needed. • Refers to procedures that no longer exist. Examples: – Environmental Management Procedure 7 "Communications

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[31] Formerly Environmental Permitting and Compliance.

Source	Areas Covered	Gaps or Concerns
	feasibility stage when the BU is considering alternatives.[32] • Identifies BUs' responsibilities for closing permits, documenting completed commitments, and providing environmental review documentation for a complete project administrative record.	and Stakeholder Involvement Process." − Environmental Management Procedure 11 "Performance Monitoring and Reporting Process."

Recommendation 3 – Revise TVA environmental procedures to better describe responsibilities for NEPA reviews and address the specific concerns identified in this report. Update TVA NEPA procedures and guidance to reflect current TVA structure and procedures, reduce repetition, and improve ease of use. Work with TVA Projects to better describe requirements in project management procedures for initiating, documenting, and completing environmental reviews. Include processes for identifying planned projects and significant work that require but have not initiated a NEPA review.

TVA Management's Comments – Agree. The Governance, Oversight, Execution, and Support (GOES) model developed during Detailed Design clarified these roles and responsibilities. The Environment group has begun the lengthy process of updating TVA's NEPA Instruction IX and NRM, a process governed in part by the Council on Environmental Quality; however, this process is not likely to conform to a predictable schedule. The Environment group also informally described efforts to update the EMS by March 2015 to address the concerns described above.

Auditor's Response – The OIG concurs with management's planned and completed actions and suggests TVA include in the EMS update an outline of key steps in the NEPA process and clear descriptions of responsibilities of both the Environment group and other TVA groups.

ENTRAC System Weaknesses Provide Opportunities for Errors or Incomplete Documentation
From our tests of CECs and supporting documentation, we noted several system weaknesses that expose TVA to increased risks that NEPA reviews could be performed inadequately, documentation of reviews could be missing or incomplete, and commitments for environmental mitigation could be disregarded during project implementation. System weaknesses we observed are described in Figure 6 along with potential impacts to the NEPA process and recommended system enhancements to improve ENTRAC controls and CEC performance.

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[32] NRM, §1-2E and §1-3, define (1) "feasibility stage" as when a BU has a specific goal and is actively preparing to make a decision on one or more alternatives for achieving that goal and (2) "technically feasible" as when there is sufficient certainty and project information to make a proposal feasible.

Figure 6: ENTRAC System Observations

Weakness	Potential Impact	Recommended System Enhancement
CECs can remain open indefinitely and numerous CEC commitments entered before June 2013[33] do not have due dates.	Increased risks of not completing adequate NEPA reviews, relying on documentation that is missing or incomplete, not tracking when commitments should be completed, or failing to meet NEPA requirements.	a. Implement a process for periodic review of open CECs and closing of CECs where commitments were met and documented.
CEC initial closed dates are revised to add comments or update commitments.	Misleading information on when CECs are initially completed and whether associated commitments are being tracked. Lack of data integrity on CEC completion dates.	b. Track the initial CEC concurrence date separately from the closed date to indicate when the checklist is complete and all permits and commitments are identified. Consider using the CEC closed date to indicate when all actions, including commitments, are complete.
CECs may be completed without environmental concurrence or comments on what media were evaluated.	Increased risks of not completing the right reviews or reaching the wrong conclusions.	c. Complete the planned ENTRAC enhancement to require review of CECs by at least one environmental representative. d. Include reminders in the CEC process on what reviews and concurrences signify.
CECs may identify no permits or commitments although checklist comments describe specific conditions.	Increased risk that CEC conditions may not be met during project implementation.	e. Include a process in the planned ENTRAC enhancement for the environmental representative to determine whether permits and commitments tracked in ENTRAC capture all conditions required for project implementation.
Use of business sensitive designation obscures all CEC information from general users.	Questions regarding the need for business sensitive designation. Increased risks of not completing the reviews.	f. Display the date entered and short generic identifiers for business-sensitive reviews, such as "Security Upgrade" or "ED Loan,"[34] to identify the reason for restricting view of details and trigger

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[33] ENTRAC was updated in June 2013 to require due dates for new CEC commitments.

[34] ED refers to Economic Development.

Weakness	Potential Impact	Recommended System Enhancement
		more detailed review by environmental representatives.
EA/EIS projects can be deleted by the user who created the project or the designated BU Manager.	Increased risk that projects and commitments could be deleted without justification. Process lacks accountability because deleted records are removed from ENTRAC. Cancelling or withdrawing commitments or EA/EIS projects that are no longer needed is preferred.	g. Restrict the capability of deleting NEPA review records to the ENTRAC administrator. Consider deleting only records that are initiated in error or duplicate other reviews.

Recommendation 4 – Enhance ENTRAC system controls over data integrity and reliability, considering the recommended system enhancements for items detailed above in Figure 6, to improve the NEPA review, CEC documentation, and closing processes.

TVA Management's Comments – Agree. TVA had identified and pursued ENTRAC enhancements to include better commitment management and tracking; functionality that facilitates completeness and accuracy; technical enhancements that improve usability; and system-driven process improvements concerning opening, reopening, and closing CECs; and a requirement for an environment reviewer before closure. The last of these modifications is in developmental testing stage with full implementation targeted for March 2015. TVA continues to work with Information Technology to maintain and enhance the ENTRAC tool.

Auditor's Response – The OIG concurs with management's planned and completed actions.

ENVIRONMENTAL MANAGEMENT SYSTEM IS GENERALLY EFFECTIVE BUT COULD IMPROVE

We observed many positive aspects of the EMS program which generally demonstrated the effectiveness of environmental risk management functions. However, we determined opportunities for enhancing TVA's EMS exist as related to communicating with regulators; internal coordination of planning processes; emergency response preparedness; environmental training; and sharing lessons learned. Additional areas of concern were described by sources we interviewed.

Environmental Management System Is Vital to TVA Environmental Compliance

During our audit, we observed functions that are used to implement EMS program elements and are vital to sustaining a high level of environmental compliance in TVA activities and operations. Most of these functions fall within EMS execution and support,[35] which along with other program elements and functions, provide a consistent approach for managing environmental-related activities across multiple TVA organizations and set the stage for continuous improvement. We noted that one function, Environmental Compliance Assurance,[36] fell within the oversight role by conducting independent assessments of EMS program implementation and TVA compliance with environmental requirements. TVA management responsibilities over environmental functions include providing resources to implement and maintain TVA's Environmental Policy and EMS; defining and communicating organization-level EMS roles and responsibilities; establishing and maintaining operational controls to correct deficiencies and meet environmental commitments; reviewing processes and outcomes to identify and implement needed environmental management improvements; and assessing, monitoring, and addressing environmental events. The more notable environmental functions and the values we recognized through observation and discussions are described on the following pages in Figure 7 along with the relevant EMS sections. With TVA's 2014 restructuring, some of the observed functions are transitioning to new approaches. For example, TVA is implementing a contracting model for handling hazardous wastes and plans to close the storage facility after June 2014.

A specific example of the values we observed relates to how EMS oversight of TVA's Environmental Restricted Awards List (ERAL) has reduced TVA's environmental risks. As mentioned in Figure 7, TVA's Hazardous Waste Storage Facility managed the ERAL and, along with assessments conducted in the Environmental Assurance Compliance function, screened vendors for approval to handle waste disposal. By implementing ERAL, the EMS streamlined management of environmental waste disposal risks to prevent the long-term impacts TVA encountered in the past. Prior to FY2013, TVA tracked the potential liabilities from contributing since the 1970s to third party waste disposals that were later cited with regulatory violations until the liabilities were settled or resolved or did not materialize. TVA's 2013 financial report included a $1 million estimated liability for disposing of PCB-containing equipment at a third party in 1974.

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[35] The TVA accountability model incorporates GOES; Governance (who makes the rules for functions), Oversight (who oversees functional compliance with the rules), Execution (who implements the work), and Support (who supports the work).

[36] The Environmental Compliance Assurance function was a component of the Compliance and Policy Governance BU before transition in FY2014 to the Operational and Regulatory Assurance organization in the Financial Services SBU.

Figure 7: EMS Program Functions and Observed Values

Program Function/ EMS Section	Values Observed
Responsible Environmental Personnel[37] (EMS 3.1.5A.2)	• Provide direct support of site environmental compliance and permit activities. • Are closely familiar with the site and personnel. • Have broad knowledge base of operations and environment. • Provide environmental training support.
Site Management and Personnel (EMS 3.1.6)	• Own and support site environmental activities. • Implement mitigation measures to prevent incidents. • Implement corrective actions to correct deficiencies. • Monitor environmental performance. • Plan for incident response.
Media Specialists (EMS 3.1.5A.1)	• Serve as subject matter experts (SME) for selected environmental media and the regulatory landscape. • Support organizational compliance, monitoring, and reviews. • Coordinate regulator interfaces.
Technical Support (supports EMS 3.1.6, EMS 3.1.8, 3.2.11C.)	• Performs sampling, testing, analysis, inspections, and monitoring to support permitting and compliance activities and environmental reviews. • Provides modeling, analysis, data collection, and laboratory results for reporting, forecasting, and making decisions.
Hazardous Waste Storage Facility (EMS 5.0)	• Identifies proper handling of hazardous and other wastes and completes documentation and labeling according to requirements. • Collects and combines small waste quantities for shipment to approved vendors. • Coordinates direct shipments from sites with large waste quantities. • Tracks waste shipments and manages a database of shipment information. • Manages TVA's ERAL of vendors approved to perform environmental tasks.
Emergency Response Teams (EMS 3.2.10)	• Are prepared to respond to incidents at short notice. • Assist sites and personnel in preparing for environmental incidents.
Environmental Compliance Assurance (EMS 3.2.14A.)	• Independently assesses EMS program elements, site compliance, and environmental vendors. • Maintains a high level of staff qualifications and knowledge of environmental requirements. • Prepares sites for regulatory inspections and helps avoid

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[37] TVA-SPP-5.0 defines Responsible Environmental Person as "The EP&C staff responsible for site/project specific environmental compliance (e. g., Environmental Scientist, formerly known as the PA-E)." EP&C was the Environmental Permitting and Compliance BU that preceded the current Environment organization in the Operations SBU.

Program Function/ EMS Section	Values Observed
	violations. • Completed an average of 26 assessments per year across multiple sites and operations from FY2011 through FY2013.
Regulatory Policy Teams (EMS 3.2.3B.)	• Focus on changes in environmental requirements and their impact to operations. • Interact with other utilities on environmental matters in the industry. • Coordinate internal sources and experts to evaluate changing conditions.

Opportunities to Enhance TVA's Environmental Management System
We identified opportunities where TVA's EMS could be enhanced to improve external communication, coordination with other BUs, emergency preparedness, training, and sharing lessons learned. Sources expressed concerns related to a variety of environmental functions.

<u>Communication With Regulators Is Not Clearly Understood and Can Cause Unnecessary Delays</u>
EPA best practices describe maintaining effective communications with regulatory authorities as an element of environmental compliance assurance. EMS states the Environment group is the primary regulator interface, coordinates with site environmental personnel to interact with regulators regarding operational-level activities, and leads day-to-day communication with regulators for all TVA organizations. EMS describes areas of responsibility for both REPs and SMEs to work closely with regulators on permit applications, site inspections, and resolution of concerns. During our audit, we met with a federal agency Project Manager and a group of state regulators. Officials at both meetings stated TVA was doing the right things and had a good environmental program, which reflected the advance preparation sites made to prepare for regulatory oversight. The state regulators made a surprise visit at a large TVA site and identified only minor concerns to be addressed. In addition, the regulators stated the TVA site exhibited example BMP of monitoring numerous satellite collection points and locking drums to collect items for disposal. In our opinion, this experience highlights TVA's level of effectiveness in the field and the importance for TVA to maintain good relationships with regulators in a consistent manner that provides everyone the information they need.

However, inconsistencies in communication with regulators can cause unnecessary delays and frustrations. TVA's FY2014 Strategic Business Plan describes using effective peer-to-peer relationships with regulators to help enhance TVA's reputation with the public. TVA's unified voice philosophy,[38] as described in the Environment group's 4th quarter FY2013 risk assessment, suggests having a consistent message with regulators with emphasis on

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[38] Commonly called the "one voice" philosophy.

peer-to-peer relationships. However, this philosophy has been interpreted to mean only an SME should contact regulators directly even though direct contact with regulators by personnel other than an SME can sometimes resolve questions quickly. As a result, some people stated they should never contact regulators, while others were unclear about the process. For example, some sources described contacting a regulator to discuss a minor question and then being informed by other TVA personnel that direct contact with regulators is not allowed and only SMEs should contact regulators. Other individuals who met with regulators at sites resolved minor questions or clarified understanding quickly by contacting regulators directly after their visits, which demonstrated the peer-to-peer approach. In contrast, getting the information could take days by funneling requests to contact regulators through the SMEs who may have other obligations or not be available.

Recommendation 5 – Clarify roles for communicating with regulators in line with the peer-to-peer approach reflecting level of responsibility or severity of issues. Include SMEs on calls to regulators when possible so that Environment personnel are informed during the same discussion and deliver a consistent message to regulators.

TVA Management's Comments – Agree. Speaking with "one voice" is a key aspect of TVA's Environment group's roles and responsibilities. This was discussed and reinforced during most recent Environment "all hands" meetings and was further communicated in the July 2014 Vice President's newsletter to all Environment employees and each Operations executive.

Auditor's Response – The OIG concurs with management's completed actions.

<u>Internal Coordination Gaps Can Impact Planning for Some Processes</u>
EPA best practices describe effective internal communication as being necessary for both program integration and compliance assurance. In general, cooperation with TVA's Environment staff by BUs and senior management was viewed positively by personnel we interviewed. Example comments included site personnel being very receptive to input on environmental matters, relationships being better than ever, and levels of cooperation and knowledge sharing being priceless. In addition, environmental involvement with project teams was generally viewed as helping to build relationships with BUs and to make good decisions early in the project process.

However, some personnel described challenges and tensions in working with specific BUs, while others stated cooperation increased when BUs understood the importance of environmental responsibilities and why certain actions are necessary. Some personnel attributed confusion about environmental functions and difficulties in communication with having environmental responsibilities in multiple organizations. Effective coordination between BUs is key to a strong environmental program, regardless of TVA's organizational structure.

During our audit, we noted a TVA public announcement for major dam maintenance work that involved drawing the reservoir down nearly 14 feet below the normal winter level. TVA announced on November 7, 2013, that archaeological artifacts that may be exposed during the drawdown are protected resources, and it is a crime to disturb or remove those artifacts. We noted the corresponding CEC was initiated on November 15, 2013, a week after the public announcement, and clearly not completed before the project was initiated.

In addition, several sources stated TVA has had instances when a NEPA review was not conducted when it seemed evident a review was appropriate, such as for land purchases or idling plants. According to TVA's Office of the General Counsel, although these transactions do not legally require NEPA reviews until additional actions are proposed, conducting the reviews is preferred and often makes good business sense.

- Concerns over property acquisitions were attributed to the lack of environmental involvement in the purchase process. TVA has purchased properties that had environmental issues such as sinkholes, asbestos, or lead paint, resulting in unplanned cleanup or maintenance costs. A specific example was cited for the purchase of historically registered property at a coal plant. During our audit, TVA's Real Estate Strategy and Support group[39] was working on a plan to address these issues and ensure property acquisitions properly consider environmental risks.

- Concerns expressed over idling coal plants were attributed to the lack of planning for this change in TVA operations. Sources cited the example of a NEPA review being suspended for a coal plant being idled. Personnel were concerned about how environmental monitoring would be performed at idled plants with very few assigned staff and how TVA could avoid problems such as the conditions that degraded over many years at the idled Watts Bar Fossil Plant before it was dismantled in 2011.

Recommendation 6 – Collaborate with BUs responsible for planning major maintenance work, property acquisitions, and idling plants to ensure environmental involvement is obtained for identifying and considering associated environmental risks.

TVA Management's Comments – Agree. The specific issues noted were identified and addressed either at the time they occurred or subsequently through the Environment group's new organization GOES model. TVA will continue to follow EMS practices including continuous improvement.

Auditor's Response – The OIG concurs with management's completed actions. The OIG suggests the Environment group take additional actions to better define environmental requirements for property acquisitions and planning for idled

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[39] In the Shared Services SBU.

plants. These actions may be reflected in the planned EMS update or in direct communications with responsible BU.

Emergency Response Preparedness Risks Are Increased at Unstaffed TVA Sites
EMS states the purpose of the program element Environmental Incident Response and Notification ". . . is to maintain a process to identify and respond to emergency situations that can impact the environment." Emergency preparedness is also identified by EPA as a best practice that makes good business sense and relies on properly maintained facilities and trained personnel to help limit property damage, lost-time injuries, and process down time. As described by EPA, personnel should understand the use of equipment and know who to call, where to go, what to do, and most importantly, what not to do in emergency situations. Sources agreed TVA is prepared to respond to environmental emergencies at sites where emergency drills are conducted. As we observed at Gallatin Fossil Plant, emergency drills use scenarios to practice response activities, understand and reinforce response roles, and discuss potential process improvements.

However, unstaffed sites and other sites without emergency drills are at increased risk of not being able to respond adequately in emergency situations. At unstaffed, small, and remote sites, TVA depends on the public to report potential incidents and on local responders for emergency dispatch. As a result, risk is increased that environmental emergency events at these locations will not be identified or responded to before significant contamination starts to occur. Concerns were also expressed about (1) TVA's ability to respond to after-hours emergencies at sites that are staffed only during core business hours and (2) whether enough site personnel are being trained on responding to emergencies and managing and coordinating incidents.

In a 2012 evaluation of Coal and Gas Operations emergency preparedness,[40] we identified similar concerns attributed to inconsistencies in the emergency preparedness program, awareness, and training.   TVA management provided a plan for the Generation Emergency Preparedness and Response Program to address our recommendations for improving consistency in Coal and Gas Operations' emergency preparedness, off-site collaboration, and training.

Recommendation 7 – Collaborate with TVA personnel responsible for emergency planning at unstaffed, small, and remote sites to (a) identify gaps in emergency planning coverage; (b) improve plans for emergency response, particularly to coordinate with local responders where agreements may not exist; and (c) identify personnel trained in emergency response for covering unstaffed, small, and remote sites if an environmental incident occurs. Leverage the work initiated for improving consistency in Power Operations' emergency planning to improve emergency planning for unstaffed, small, and remote sites.

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[40]   Evaluation 2012-14523, Review of Coal and Gas Operations Emergency Preparedness and Response, issued May 14, 2013. Coal and Gas Operations transitioned to Power Operations in 2014.

TVA Management's Comments – Disagree. TVA has varying levels of emergency planning and practice as required by both regulation and relative risk. Sites with greater environmental risks require and demand more elaborate plans and specific staffing assignments. Alternatively, small "unstaffed" sites store lower volumes of oil with barriers and/or instrumentation appropriately matched to the level of risk. Further, the Environment group's Regional Model provides site support within a reasonable travel/response distance. Spill Prevention, Control, and Countermeasure Plans and Tier 2 Reports serve to engage local responders. Operations Support identifies and trains emergency responders as appropriate. TVA will continue current practices described in its EMS.

Auditor's Response – The OIG recognizes the need for TVA to balance mitigation actions with risk exposure. We believe keeping all TVA sites safe from environmental risks is important and we encourage the Environment group to work with Emergency Preparedness personnel to look for ways to further mitigate those risks where possible.

<u>Orientation to Environmental Job Duties Is Inconsistent</u>
EMS states the purpose of the Training and Awareness ". . . program element is to ensure all TVA staff and contractors who can impact the environment receive required environmental training and maintain awareness of environmental compliance and EMS requirements." EPA also identified environmental training as a best practice that should be extended to all employees as appropriate. TVA offers general environmental awareness as a one-time online course for most personnel and supplemental general and technical training on a variety of environmental topics.[41] However, TVA does not require general environmental awareness on a regular basis to reinforce knowledge and communicate program and regulatory changes, and approaches for orienting new employees are not consistent. We identified three ways that make environmental training useful to personnel in the performance of their duties.

- All personnel have some level of responsibility to be able to recognize environmental problems where they work and to know where to report such problems or where to get help. Without periodic awareness training, personnel are less likely to handle situations appropriately and, amplified by changes in organizations and resources over time, are more likely to be unfamiliar with processes and personnel who can provide help with environmental issues.

- Environmental representatives and technicians may be oriented to their position on the job or by mentoring with others. TVA provides skills enhancement to support technical certifications and individual development plans. Some groups have worked on progression plans and used training checklists. Other groups used a combination of individual development plans, coaching, and training on the job. However, several sources stated

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[41] For purposes of this report, we did not evaluate the adequacy of content covered in TVA environmental training or identify specific compliance issues attributed to inadequate training.

orientation of new personnel for environmental positions is informal and additional coaching would have helped. Sources also stated new employees have needed additional direction, training, or mentoring; or when filling positions, BUs require experienced personnel because of the job demands or lack of mentors. Some sources stated new employees just get thrown into the job or learn by fire, and it can take up to 2 years to adequately learn the duties. Although training needs are best met when tailored to individuals, an inconsistent approach to orientation can frustrate new employees or place them on the job without the confidence and knowledge needed to perform new duties efficiently and effectively.

- Site representatives also provide site-specific training, orientation, and block training on environmental topics for operations personnel and contractors. These activities allow personnel with a variety of job duties to gain insights and reinforce knowledge of environmental issues that are specific to the sites and to better understand their roles related to the environment. TVA could improve knowledge sharing by making information used for informal training events available in a common repository.

Recommendation 8 – Complete efforts to identify skills progressions for environmental representatives. Revise the environmental training program to require periodic refresher environmental awareness training for all employees and contractors who do not have regular environmental training based on job duties. Consider options to provide additional and more consistent direction to employees new to environmental positions.

TVA Management's Comments – Agree. The new Environment group has clear roles and responsibilities including revised job descriptions where needed. For individuals in new roles, "fast-start" individual development plans include identifying necessary competencies, training, and other activities for appropriate orientation. TVA will continue workforce development designed to ensure engagement and performance. Upon request, TVA management stated, "We do not agree with the recommendation that every employee should be required to take periodic refresher on environmental awareness." TVA's Technical Training group stated performance specific environmental training is provided to responsible employees for tasks that do require refresher training, and a job task analysis could be conducted to develop specific curricula necessary for new job orientation.

Auditor's Response – The OIG concurs with TVA's completed actions and suggests completing the new job orientation analysis and curricula development to support ongoing use of the "fast-start" individual development plans.

Lessons Learned Are Shared by Informal Methods

TVA defines lessons learned as "knowledge gained from experience, successful or otherwise, that is captured and shared to promote repeat application, if successful, or to avoid recurrence."[42] Interview comments indicated lessons learned are managed in different ways by different TVA organizations and there is little or no standardization of the process. In a 2011 audit of lessons learned during construction,[43] we identified similar concerns related to documenting and sharing lessons learned. After our audit, several BUs implemented lessons learned databases with access through the TVA Project Management internal Web site. We noted active use of these databases for Operations BUs including Transmission, Projects, and Nuclear Construction.

Sources stated organizations share lessons to varying degrees using e-mails, phone calls, morning meetings, team meetings, informal discussions, written lists, spreadsheets, group bulletins and communiques, monthly reports, training presentations, the corrective action program, and other informal methods. All of these methods can be used to share information on a case-by-case basis. Some individuals stated informal communication among peers works well and Operations groups generally do a good job sharing within their BUs. However, other individuals stated lessons could be better shared across organizations and performance could be improved with a more centralized and standardized way to capture lessons learned, near misses, and BMP. In particular, the Operations Projects' lessons learned repository was considered a model for other TVA groups and may be an appropriate design for capturing environmental lessons learned from all types of projects. TVA's Projects and Operations Support groups have been working on a unified TVA lessons learned program and database with targets to initiate the new database for the Projects group in June 2014 and for all TVA Operations in September 2014. This tool may provide a standardized way to capture and share environmental lessons learned, so that future team members and TVA as a whole can benefit more fully from the experience-based knowledge.

Recommendation 9 – Coordinate with TVA's Projects and Operations Support to determine whether the planned lessons learned database will provide the flexibility needed to identify environmental lessons learned, near misses, and BMP; and how the Environment group will participate in the database implementation and communicate availability of this tool for finding potential options to prevent and address environmental issues.

TVA Management's Comments – Agree. The Environment group will participate fully in the new Enterprise Lessons Learned Information System (ELLIS), which serves as a unified TVA lessons learned program and database. There is enough flexibility to allow for different groups to submit and search

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[42] TVA-SPP-34.016, Project Lessons Learned Management, effective October 1, 2011.

[43] Audit 2011-13781, Lessons Learned at Lagoon Creek Combined Cycle Plant, issued September 21, 2012.

lessons learned as they need as well as searching all lessons together or searching by group. The Environment group will begin using ELLIS in FY2015.

Auditor's Response – The OIG concurs with TVA's planned and completed actions.

<u>Common Themes From Interview Comments Identify Concerns</u>
Interview comments generally fell within program areas of communication, program effectiveness, organization and resources, contractor performance, emergency preparedness, lessons learned, the NEPA process, coordination with other TVA groups, interactions with external regulators, tracking data and issues, training, and specific environmental media. We heard common themes about professionals doing good environmental work and a culture where it is only acceptable to do what is necessary to protect the environment and to ensure TVA activities do not adversely impact the natural resources in our region.

We also heard many comments expressing concerns about the viability of TVA's EMS and the ability to meet the challenges directly in a productive and proactive way that best serves the Valley. Individuals expressed the need to move to prevention and to work smarter so the environment is considered an integral part of daily business. Concerns expressed during our audit also highlighted potential problems in TVA's environmental risk management processes.

During interviews, we asked 101 individuals about potentially compromising situations where individuals working on environmental issues may have received pushback, been pressured to overlook an issue, or been blocked by lack of resources. The overall results of these discussions as shown in Figure 8, on the following page, were predominantly positive about attitudes and integrity when dealing with environmental issues. Negative responses reflected:

1. Pressured to overlook an environmental issue a couple of years ago.

2. Situations of resistance from a manager who later left TVA, expanded issues of past poor maintenance, operational needs taking priority, changes thought to be unnecessary, uncertainty about the future, and disregard for guidance.

3. Resource limits relating mostly to budget constraints and insufficient staff or resource cuts; two responses mentioned lack of executive support and inadequate planning. Trouble spots included the budget and planning for coal plants being idled and insufficient staff to manage environmental impacts associated with the Muscle Shoals Redevelopment project.

Figure 8: Responses to Questions on Potentially Compromising Situations

Interview Question[44]	Positive Responses	Negative Responses
1. Do you know of instances when someone was pressured to overlook an environmental issue?	98% No	2% Yes
2. Are you aware of situations where personnel, including management, resisted implementing remediation or impeded actions to correct environmental issues?	87% No	13% Yes
3. Do you get the support and resources needed to correct environmental issues?	85% Yes	15% No

Many personnel stated TVA does a good job identifying and prioritizing environmental risks, providing support and resources, orienting contractors to site environmental requirements, and communicating regulatory changes. Sources described the close relationship and parallel priorities of environmental awareness to safety matters, the ongoing efforts to implement corrective actions, good relationships between Environment staff and other groups, and good cooperation and support from BUs. More specifically, Generation Engineering starts the NEPA process early in project timelines and Environment is involved in planning and permitting for every project phase.

Sources also described areas of concern related to insufficient staffing and excessive turnover, budget constraints, organizational changes and culture, inability to adequately cover or inspect some TVA sites, the need to better communicate contractor expectations, plant closures, effects of poor or reduced equipment maintenance, PCB management, ash management, water management operating procedures and abandoned wells, the lack of adequate databases, and the inability to archive historical data. Other individuals expressed concerns about the NEPA process related to the timing of environmental reviews to support informed decision making, overreliance on contractors to perform the reviews, and some tensions between project and NEPA groups over impacts to project schedules. Functional gaps were identified related to water quality sampling, aquatic monitoring, and land surveying.

We provided a list of common remarks and concerns to the Environment group[45] for consideration in risk management activities and improving the EMS program. Accordingly, we made no specific recommendations to address the information provided.

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[44] Wording is representative; questions were asked in a variety of ways to fit the individual's role related to environmental functions.

[45] Identities of sources were not identified with the list of remarks.

<u>CONCLUSION</u>

Generally, TVA has effective processes for identifying and managing actual and potential environmental issues and risks. However, TVA organizational changes described in this report include budget cuts that impact human capital, may impact many of TVA's environmental management functions, and heighten potential impacts from reduced funding. When budget cuts were being considered in FY2012 business planning, potential impacts from reduced EMS funding were identified as increased environmental risks and potential REEs, elimination of water quality monitoring, loss of advanced outlook on new regulations, less expertise to shape regulations or support enforcement, increased compliance costs, increased litigation risks, and loss of compliance support for environmental programs. In order to meet TVA's environmental stewardship mission in this time of increased scrutiny and into the future, TVA must be able to demonstrate environmental compliance in all operations and not just react to incidents.

In order to continue the level of performance demonstrated in the last several years, TVA must increase process efficiencies. As described and observed during our audit, improvements have been due largely to TVA's collective knowledge base and the dedication of individuals to fulfilling their responsibilities and doing the right things to make sure TVA addresses risks to the environment. When TVA finds its new "operating normal" after the current restructuring, it will become increasingly important to have that knowledge well documented to help sustain the EMS and facilitate efficient and effective environmental activities.

Because of the importance of environmental functions to EMS program effectiveness, it is essential for TVA to ensure adequate resources are available for these functions into the future. If effectiveness materially erodes for the functions described in this report, TVA increases the risks that environmental concerns could be overlooked, issues could be handled improperly which could increase violations, or operations may not be prepared to meet regulatory changes. Factors elevating these risks include potential contamination, violations, fines and penalties, lawsuits, heightened scrutiny from regulators and the public, reputational damage, changing regulations, aging equipment, and the possibility that the combination of one or more factors occurring in a single incident or a series of similar incidents could significantly elevate risks and exposures from those incidents and to TVA's overall environmental performance. Because many of these factors are externally driven, TVA must manage environmental risks proactively within operational control to ensure the future viability and effectiveness of TVA environmental functions needed to demonstrate proper environmental stewardship in line with TVA's mission, lead by example, and work toward continuous improvement. By implementing the recommendations in this report, TVA can improve process efficiencies that will help sustain EMS effectiveness in the face of current challenges and impacts from budget constraints and operational pressures.

MANAGEMENT'S RESPONSE AND OUR EVALUATION

In response to a draft of this report, TVA management described actions taken during FY2014 and planned to improve environmental risk management processes. We incorporated their comments throughout this report where appropriate and included their entire response in the Appendix. TVA management stated they will use the insights and information provided in this report for continuous improvement and program evolution. In general, TVA management agreed with our recommendations, except for suggested actions to address inconsistencies in emergency response preparedness and require periodic environmental awareness refresher training for TVA's general population. The OIG concurs with the actions planned and completed to address our recommendations.

TVA

Tennessee Valley Authority, 1101 Market Street, BR4A, Chattanooga, Tennessee 37402

July 18, 2014

Mr. Robert E. Martin
Assistant Inspector General
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Dear Mr. Martin,

COMMENTS - DRAFT AUDIT 2013-14959 - TVA ENVIRONMENTAL RISK MANAGEMENT

Recognizing that Environment is responsible for governance, oversight and support via programs and expertise, while TVA's operating business units are ultimately responsible for compliance, we are pleased with your assessment that TVA has effective processes for identifying and managing actual and potential environmental issues and risks. We appreciate the OIG's insights and information provided in this audit report and associated materials and conversations. Notwithstanding this audits' duration spanning organizational change and its anecdotal nature, we will use this report to inform continuous improvement and program evolution.

Specific responses, including comments and actions, pertaining to each finding and recommendation are provided below:

Finding: Some environmental risks were not considered in SBU risks assessments.
Recommendation: Coordinate with Operations to incorporate a process within SBUs risk assessments to ensure all BUs with the potential for environmental impacts properly identify the associated risks and consider the underlying risks common to multiple sites.
Response: Agree; improvement implemented in May 2014. Environment maintains risk matrices for each SBU/BU and shared them during business planning with each SBU/BU. Environment continues to work with Enterprise Risk Management and Business Planning to ensure processes and information are aligned.
Action: TVA will update its EMS by March 2015 to describe this practice.

Finding: Environmental risks and data are tracked in segregated sources and lack integration.
Recommendation: Consider cost-effective methods to integrate tracking for all known environmental risks, requirements, commitments, and issues for more holistic approach to TVA environmental risk management efforts. Improve information resource centers to provide reference on environmental guides, instructions, best practices, standards, regulations, lessons learned, and other data sources needed to manage TVA's environmental performance and to improve consistency and knowledge sharing across TVA.

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Response: Agree; improvements underway. TVA routinely considers and implements improvement opportunities to be more efficient and effective. TVA is aware and follows industry developments in environmental management and finds that, currently, there is not a cost-effective solution integrating "all" known environmental items listed. Environment is in the process of updating web resources and links (EnviroNet, Environmental Viewer, SharePoint, etc.) and now has one organization dedicated to managing performance reporting and tools.
Action: TVA will update its EMS by March 2015 to describe this organization's responsibilities.

Finding: TVA requirements and responsibilities for environmental reviews are not clear and guidance is outdated.
Recommendation: Revise TVA environmental procedures to better describe responsibilities for environmental reviews and update guidance to reflect current information. Work with TVA's Projects' group to better describe requirements in project management procedures for environmental reviews. Include processes for identifying planned projects and significant work that require but have not initiated environmental review.
Response: Agree. The Governance, Oversight, Execution and Support (GOES) model developed during Detailed Design clarified these roles and responsibilities. Environment has already begun the lengthy process of updating TVA's NEPA Instruction and Reference Manual, a process which is governed in part by CEQ; however, this process is not likely to conform to a predictable schedule.
Action: TVA will update its EMS by March 2015 to clarify these roles and responsibilities.

Finding: Tracking system weaknesses provide opportunities for errors or incomplete documentation.
Recommendation: Enhance system controls over data integrity and reliability to improve the environmental review, documentation, and closing processes.
Response: Agree. TVA had identified and pursued a number of ENTRAC enhancements. These improvements complete and underway include better commitment management and tracking; functionality that facilitates completeness and accuracy; technical enhancements that improve usability; and system-driven process improvements concerning opening, re-opening, and closing CECs (ENTRAC changes have been made that will require the addition of an environment reviewer to CECs before closure). The last of these modifications are currently in the developmental testing stage targeted to be complete by December 2014. A change management plan followed by full implementation is targeted for March 2015. Additionally Environment has Program Managers in place for support and oversight.
Action: Complete. TVA continues to work with IT to maintain and enhance the ENTRAC tool.

Finding: Communication with regulators is not clearly understood and can cause unnecessary delays.
Recommendation: Clarify roles for communicating with regulators in line with the peer-to-peer approach reflecting level of responsibility or severity of issues that includes environmental specialists on calls to regulators when possible.

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Response: Agree. Speaking with "one voice" is a key aspect of TVA's Environment organization's roles and responsibilities; this was discussed during most recent Environment "all hands" meetings to reinforce and address this finding.
Action: Complete. This was further communicated in the July 2014 VP's newsletter sent to all Environment employees and each Operations executive.

Findings: Internal coordination gaps can impact planning for some processes.
Recommendation: Collaborate with personnel responsible for planning major maintenance work, property acquisitions, and idling plants to ensure environmental involvement is obtained for identifying and considering environmental risks.
Response: Agree. The specific issues noted in the audit have been identified and addressed either at the time they occurred or subsequently through Environment's new organization GOES model.
Action: Complete. TVA will continue to follow practices described in its EMS including continuous improvement.

Findings: Emergency response preparedness risks are increased at unstaffed TVA sites.
Recommendation: Collaborate with TVA personnel responsible for emergency planning to (a) identify gaps in emergency planning coverage; (b) improve plans for coordinating with local responders; (c) identify personnel trained in emergency response for covering unstaffed, small, and remote sites if an environmental incident occurs. Leverage the works initiated to provide consistency in Power Operations emergency planning to improve emergency planning for unstaffed, small and remote sites.
Response: Disagree. TVA has varying levels of emergency planning and practice as required by both regulation and relative risk. Sites with greater environmental risks require and demand more elaborate plans and specific staffing assignments. Alternatively, small "unstaffed" sites store lower volumes of oil with barriers and/or instrumentation appropriately matched to the level of risk. Further, Environment's Regional Model provides site support within a reasonable travel/response distance. SPCC Plans and Tier 2 Reports serve to engage local responders. Operations Support identifies and trains emergency responders as appropriate.
Action: Complete. TVA will continue current practices described in its EMS.

Findings: Orientation to environmental job duties is inconsistent.
Recommendation: Complete efforts to identify skills progressions for environmental representatives, Revise the training program to require periodic refresher environmental awareness training for all employees and contractors who do not have regular environmental training based on job duties. Consider options to provide additional and more consistent direction to employees new to environmental positions.
Response: Agree. The new Environment organization has clear roles and responsibilities including revised job descriptions where needed. For individuals in new roles, "fast-start" individual development plans include identifying necessary competencies, training, and other activities to appropriately orient.
Action: Complete. TVA will continue workforce development designed to ensure engagement and performance.

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<u>Findings</u>: Lessons learned are shared by informal methods.
<u>Recommendation</u>: Coordinate with TVA Projects and Operations Support to determine whether the planned lessons learned database will provide the flexibility needed to identify environmental lessons learned, near misses, and best management practices; and how the Environment group will participate in the database implementation and communicate availability of this tool for finding potential options to prevent and address environmental issues.
<u>Response</u>: Agree. Environment is included and will participate fully in the new Enterprise Lessons Learned Information System (ELLIS). Operations Support has participated in the development of the lessons learned site with the goal of using a unified TVA lessons learned program and database. There is enough flexibility to allow for different groups to submit and search lessons learned as they need (Projects, Operating Plants, Environment Group, etc.), but the system also allows for the searching of all lessons together or searching by group (Projects, Operating Plants, Environment Group, etc.).
<u>Action</u>: Complete. TVA Operations (including Environment) will begin using ELLIS in FY15.

If you have any questions about these responses and action plans, please let me know. We look forward to continuing to work with your office to improve TVA and our environmental risk management.

Sincerely,

Brenda E. Brickhouse
Vice President
Environment

BEB:LDC
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