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| Description of document: | Six (6) Tennessee Valley Authority (TVA) Office of the Inspector General (OIG) reports. 2009 - 2014 |
| Requested date: | 22-May-2016 |
| Released date: | 14-February-2017 |
| Posted date: | 18-December-2017 |
| Source of document: | FOIA Request<br>TVA FOIA Officer: Denise Smith<br>400 West Summit Hill Dr. WT 7D<br>Knoxville, TN 37902-1401<br>Fax: (865) 632-6901 |

**Tennessee Valley Authority**, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

February 14, 2017

This responds to your letter dated May 22, 2016, requesting information under the Freedom of Information Act (FOIA) (5 U.S.C. § 552). You requested copies of eight TVA Office of the Inspector General (OIG) reports. Your request was processed under tracking number #4859.

Enclosed is a disc with six of the reports you requested. We have redacted some information from two of the enclosed reports (Contract for Research and Development Services, September 23, 2009, and Review of Recreational Land Transactions, September 15, 2010) pursuant to FOIA exemption 4.

Exemption 4 protects confidential commercial and financial information submitted to the government by an outside source if the release of such information is likely to cause substantial competitive harm to the submitter.

We are withholding report Proposal for Hydro Modernization and Unit Rehabilitation, August 2015, in its entirety pursuant to FOIA exemptions 3 and 4. We are withholding report Firearms and Ammunition, July 24, 2015, in its entirety pursuant to FOIA exemptions 5 and 7.

Exemption 3 protects information that is prohibited from release by other statutes. The Federal Property and Administrative Services Act (41 U.S.C. § 4702) prohibits agencies from disclosing proposals or information contained in proposals submitted to the government in response to a competitive procurement. The report Proposal for Hydro Modernization and Unit Rehabilitation contains such information. This report is also withheld pursuant to FOIA exemption 4.

The deliberative process privilege under exemption 5 protects, among other things, pre-decisional deliberative information, such as opinions and recommendations, that are part of an agency's decision-making processes. Exemption 7(e) protects information that would reveal techniques, procedures or guidelines for law enforcement investigations or prosecutions, when such disclosure could reasonably be expected to risk circumvention of law. The report Firearms and Ammunition, July 24, 2015, contains information protected by exemptions 5 and 7.

If you have questions about this response, you may contact me at (865) 632-6945 or by email to dsmith@tva.gov. In addition, FOIA mediation services are available through the Office of Government Information Services (OGIS) and TVA. Enclosed is contact information for those services.

You may appeal this initial determination of your FOIA request by writing to Ms. Janet J. Brewer, Senior Vice President, Chief Communications & Marketing Officer, Communications & Marketing, Tennessee Valley Authority, 400 W. Summit Hill Drive (WT 7C), Knoxville, TN 37902-1401. Any appeal must be received by Ms. Brewer within 90 days of the date of this letter.

Sincerely,

Denise Smith
TVA FOIA Officer

Enclosure

## NOTICE

As part of the 2007 FOIA amendments, the Office of Government Information Services (OGIS) was created to offer mediation services to resolve disputes between FOIA requesters and Federal agencies as a non-exclusive alternative to litigation, Using OGIS Services does not affect your right to pursue litigation. If you are requesting access to your own records (which is considered a Privacy Act request), you should know that OGIS does not have authority to handle requests made under the Privacy Act of 1974. You may contact OGIS in any of the following ways:

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8601 Adelphi Road
College Park, MD 20740-6001
Email ogis@nara.gov
Telephone: 301-837-1996
Facsimile: 301-837-0348
Toll-free: 1-877-684-6448

FOIA Liaison mediation services are also available through the TVA Ombudsman. You may contact the Ombudsman in any of the following ways:

Mr. Wilson Taylor
Ombudsman and TVA FOIA Liaison
Tennessee Valley Authority
400 W. Summit Hill Drive (WT 7D)
Knoxville, TN 37902-1401
Email tvainfo.com
Telephone: (865) 924-1418

Office of the Inspector General

*Audit Report*

To the Vice President,
Supply Chain

# ELECTRIC POWER RESEARCH INSTITUTE - CONTRACT NO. 99999868

Audit Team
Gregory K. Strach
Laura E. Huffine

Audit 2008-11999
September 23, 2009

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## APPENDICES

# EXECUTIVE SUMMARY

We audited the costs billed to Tennessee Valley Authority (TVA) by the Electric Power Research Institute (EPRI) for providing supplemental research and development activities related to the generation, delivery, and use of electricity under Contract No. 99999868. The scope of our review included payments of $25 million TVA made to EPRI under the contract for costs billed from January 1, 2002, to August 11, 2008.

In summary, we found:

- TVA made invoice payments in advance to EPRI before work was performed, thus losing an estimated $1,125,000 in interest over the audit period.
- Project status reports submitted by EPRI were incomplete and inaccurate.
- TVA was delinquent in recovering overfunded project amounts from EPRI.

We recommend TVA management (1) discontinue the use of advanced payments unless EPRI is required to pay interest on the advanced payments; (2) require EPRI to provide a final status report for all projects worked under Contract No. 99999868, and (3) recover all unspent funds and institute procedures for ensuring the timely collections of all future overpayments.

In response to our draft audit report:

- EPRI stated it requires members to provide funds prior to the initiation of work on a project and that it does not pay interest to any of its members on the funds. (b) (4) [redacted] EPRI agreed its project status reports were not always complete and stated it was working with TVA management to provide information that had been omitted. See Appendix A for EPRI's complete response.
- (b) (4) [redacted] Since EPRI does not pay interest to any of its members for advanced payments, TVA believes the current approach (b) (4) [redacted] is the most advantageous approach for TVA. Management also stated it (1) had requested a final status report for all projects worked under the contract and (2) was pursuing the option of directing EPRI to reimburse TVA for overfunded amounts in lieu of redirecting the funds (to other projects). See Appendix B for TVA management's complete response.

(b) (4) [redacted] Based on TVA's apparent decision to not require EPRI to pay interest on TVA's advanced payments, TVA should limit its interest losses (b) (4) [redacted]

With regards to TVA managements statements that it was pursuing the option of directing EPRI to reimburse TVA for overfunded amounts in lieu of redirecting the funds to other projects, our recommendation is for TVA to recover all unspent funds. Redirecting unspent funds to other projects adds to TVA's interest cost on its cash flow, especially considering EPRI's delinquency in accurately reporting the status of project costs to TVA.

# BACKGROUND

The Electric Power Research Institute (EPRI) is a nonprofit organization that conducts research and development (R&D) related to the production, transmission, distribution, and utilization of electric energy. EPRI's activities are carried out primarily under the sponsorship of the public, private, and cooperative sectors of the U.S. and international electric utility industries. The member organizations, including the Tennessee Valley Authority (TVA), provide funding for EPRI's R&D projects through the payment of annual dues.[1]

In addition to its membership agreement with EPRI, TVA also contracted with EPRI to provide supplemental R&D activities. Contract No. 99999868,[2] which was effective March 6, 2000, initially provided for two different types of funding mechanisms for the supplemental R&D activities.

- Tailored Collaboration (TC) – Under TC funding arrangements, TVA and EPRI share equally the cost of specific research projects of particular interest to TVA. (Note – A subsequent revision of the contract stated the matching funds provided by EPRI for TC projects are based on 25 percent of the annual membership dues paid by TVA).
- Cofunded (CF) – CF arrangements provided for TVA, EPRI, and other EPRI members to cofund research projects, although EPRI was not required to provide matching funds.

When Contract No. 99999868 was awarded in March 2000, it (1) did not include guidance on how cost estimates were to be determined, (2) allowed EPRI to receive payment for project costs prior to the costs being incurred without paying interest on the funds, (3) did not include compensation terms, and (4) did not require EPRI to provide an accounting for final project costs.

During 2002, the Office of the Inspector General performed an interim audit of $9 million that had been billed by EPRI under Contract No. 99999868 (Audit 2002-004C-01). Our audit report, dated July 24, 2002, recommended TVA amend the contract to (1) require EPRI to submit detailed cost estimates for planned projects, (2) discontinue the use of advanced payments unless EPRI is required to pay interest on the advanced payments, and (3) include specific compensation terms and require periodic accounting for all costs charged to projects.

(b) (4)

[redacted]

[1] TVA and EPRI have had various membership agreements since EPRI was established in 1973. Contract No. 99998150, which was effective January 1, 2003, provided the terms and conditions for TVA's annual membership with EPRI through December 2008.

[2] The contract number when awarded was 00PE1-261938 but was changed to Contract No. 99999868 when TVA implemented the PassPort system in July 2001.


In total, TVA paid EPRI $34 million under Contract No. 99999868 which expired on December 31, 2008.[4] We planned an audit of the contract payments TVA had made to EPRI since our previous audit as part of our annual audit plan.

## OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objective was to determine if the costs EPRI billed to TVA under Contract No. 99999868 were in compliance with the contract terms. Our scope included $25 million in payments TVA made to EPRI from January 1, 2002, through August 11, 2008, under the contract. To achieve our objective, we:

- Reviewed Contract No. 99999868 and contract-related documents to determine pricing terms.
- Obtained TVA's invoice payment history to determine amounts paid under the contract.
- Obtained and reviewed project reports submitted by EPRI to determine the project's progress (b) (4) for years 2007 and 2008.
- Reviewed TVA release data to (1) determine amounts authorized for work performed in research projects and (2) select a judgmental sample to obtain electronic project cost data for detailed testing purposes. We selected 18 releases totaling $3.7 million in TVA payments (b) (4) However, the majority of projects had multiple fund contributors, and EPRI provided matching funds for the TC projects. (b) (4) .

[3] (b) (4)

[4] TVA and EPRI entered into a new agreement in December 2008 (Contract No. 73824) that combined the membership and supplement funding agreements.

[5] (b) (4)

(b) (4)

(b) (4) We relied on inquires, analytical reviews, and substantive testing of documentation and therefore did not review EPRI's internal controls. Our scope did not include testing for compliance with laws and regulations. However, except for issues discussed in this report, nothing came to our attention that indicated noncompliance with laws and regulations. Our audit was conducted in accordance with generally accepted government auditing standards.

## FINDINGS AND RECOMMENDATIONS

As discussed in further detail below, our audit of Contract No. 99999868 found (1) TVA lost an estimated $1,125,000 in interest during the audit period because it made advanced payments for projects, (2) project status reports submitted by EPRI were incomplete and inaccurate, and (3) TVA was delinquent in recovering overfunded project amounts from EPRI.

### LOST INTEREST DUE TO ADVANCED PAYMENTS

When Contract No. 99999868 was awarded in March 2000, it allowed EPRI to receive payment for project costs prior to the costs being incurred without paying interest on the funds and did not require EPRI to provide an accounting for final project costs. (b) (4) , TVA did not require EPRI to provide interest credits for payments made prior to the incurrence of the cost.

To determine the financial impact on TVA of paying in advance for projects based on estimated expenditures, we compared the timing of TVA's payments for 16 projects (totaling $2.6 million) (b) (4) . We determined TVA's advanced payments for these projects resulted in a lost interest cost of at least $118,000. (The actual cost of interest to TVA would be higher than we calculated because we used a conservative method to calculate the outstanding balance of TVA's advanced payments.)

Based on our calculation of the lost interest for the 16 projects discussed above, we estimated in total TVA lost at least $1,125,000 in interest for the $25 million of advanced payments TVA made during our audit period.

**Recommendation**
We recommend TVA management discontinue the use of advanced payments unless EPRI is required to pay interest on the advanced payments.

**EPRI's Comments –** In its response to our draft report, EPRI stated it was a nonprofit corporation that conducts research and development work in energy and related fields for the benefit of the public. To ensure funding for its research projects, EPRI stated it requires members to provide funds prior to the initiation of work on a project and that it does not pay interest to any of its members on the funds. (b) (4) [redacted] See Appendix A for EPRI's complete response.

**TVA Managements Comments** – In their response to our draft audit report, TVA Management stated the contract had been revised in January 2004 (b) (4) [redacted] Since EPRI does not pay interest to any of its members for advanced payments, TVA believes the current approach (b) (4) [redacted] See Appendix B for TVA management's complete response.

**Auditors Response** – Although TVA management stated it began using (b) (4) [redacted] For example, the projects over $100,000 we reviewed, each had a substantial amount of the funding paid in advance with the remaining amounts being paid within a few months of the advance payment.

EPRI stated it is currently in discussions with TVA (b) (4) [redacted] Based on TVA's apparent decision to not require EPRI to pay interest on TVA's advanced payments, TVA should limit its interest losses (b) (4) [redacted]

## INCOMPLETE AND INACCURATE PROJECT STATUS REPORTS

Contract No. 99999868 required EPRI to provide TVA with monthly status reports for each project that (1) described the key technical accomplishments during the reporting period and (2) (b) (4) [redacted] Additionally, the status reports were to identify any known issues that may have a material impact on the cost or performance of the work under the projects. Although the contract required EPRI to submit monthly reports, we were informed by TVA management that TVA had informally changed the requirement for monthly reporting to quarterly reporting.

To determine the adequacy of the reports submitted by EPRI, we requested copies of each report that had been submitted during 2007 and 2008. As discussed further below, we found (1) EPRI's 2008 quarterly reports did not include the status of ongoing projects, and (2) EPRI did not accurately document projects that had been overfunded by TVA.

The reports EPRI submitted to TVA during 2007 included status updates on open and closed projects. However, during 2008, EPRI changed the format of the status reports it sent TVA to only include a summary of completed projects. By limiting the report to closed projects, TVA did not have adequate information for tracking the status of all projects. As a result, if EPRI failed to report on completed projects, TVA may not have been aware of the omissions. Additionally, we were informed that during 2008, TVA requested EPRI to only include the status of projects that were closed and had funds due back to TVA.

The sample of projects we reviewed included one project that had closed during December 2007 that was not included on any of EPRI's 2008 quarterly reports. Although the project (EPRI Project No. 66057 under TVA Release 320) had $10,009 of unspent funds, EPRI had not informed TVA of the overfunding that was due back to TVA. Additionally, we noted EPRI's (1) first quarter report for 2008 excluded information regarding at least two closed projects that were overfunded and (2) second quarter report for 2008 excluded information regarding at least six closed projects that were overfunded.

**Recommendation**
We recommend TVA management (1) take action to recover $10,009 of unspent funds under Release 320 (Project No. 66057), (2) require EPRI to provide a final status report for all projects worked under Contract No. 99999868 to facilitate TVA's efforts to determine if additional unreported overfunded amounts exist, and (3) require EPRI to include the status of all open and closed projects on its status reports.

**EPRI's Comments** – EPRI stated it agreed some projects had been overlooked in its reports and that it is working with TVA to provide information that had been omitted from its normal reporting process. EPRI also stated it was complying with instructions received from TVA to reallocate some of the unspent funds and

is awaiting final determination from TVA on the remainder. See Appendix A for EPRI's complete response.

**TVA Managements Comments** – TVA management agreed with the finding and stated it had (1) redirected the unspent funds identified by the audit to another project, (2) requested a final status report for all projects worked under Contract No. 99999868 and (3) directed EPRI to include the status of all open and closed projects on its status reports being provided the current active contract. See Appendix B for TVA management's complete response.

**Auditors Response** – Although TVA management stated it had redirected the unspent funds identified by the audit to another project, EPRI's response indicated it had not received directions from TVA for all of the unspent funds. TVA needs to ensure it has recovered all unspent funds rather than allowing EPRI to continue to benefit from TVA's overfunding of projects.

## DELINQUENCY IN RECOVERING OVERFUNDED AMOUNTS

Although EPRI's quarterly reports did not always show the status of overfunded projects, we found that TVA was often delinquent in recovering overfunded project amounts that were reported. For example, the 2008 fourth quarter report sent to TVA by EPRI included information regarding nine completed projects that were overfunded in total by $74,362. As shown in the following table, the projects had ending dates as far back as 2001.

**Summary of Overfunded Projects Reported to TVA by EPRI**

| Project End Date | TVA Release | Amount Overfunded |
|---|---|---|
| 12/31/01 | 00020 | $7,870 |
| 12/31/03 | 00093 | 13,656 |
| 12/15/04 | 00133 | 7,388 |
| 12/31/04 | 00182 | 3,368 |
| 12/31/04 | 00203 | 2.264 |
| 12/31/04 | 00105 | 29,024 |
| 12/31/05 | 00162 | 409 |
| 12/31/05 | 00160 | 1,052 |
| 04/30/07 | 00310 | 9,331 |
| | | $74,362 |

(b) (4) [redacted] Based on TVA's history of being delinquent on recovering unspent funds, the contract terms will result in not only lost interest, but potentially direct funding.

**Recommendation**
We recommend TVA management (1) take action to recover $74,362 of overfunded amounts and (2) institute procedures for ensuring the timely collections of all future overpayments.

**EPRI's Comments** – EPRI stated it has a goal of notifying members promptly of funds remaining in projects through continual internal monitoring and audits of cost reports. EPRI also stated it will continue to work with TVA to ensure the notifications reach the appropriate TVA staff in a timely manner. See Appendix A for EPRI's complete response.

**TVA Managements Comments** – TVA management stated it was working with EPRI to reallocate the overfunded amounts to other TVA projects and to institute procedures for ensuring the timely collection or redirection of any future overpayments. Management stated it is also pursuing the option of directing EPRI to reimburse TVA for overfunded amounts in lieu of redirecting the funds (to other projects). See Appendix B for TVA management's complete response.

**Auditors Response** – As stated previously, our recommendation is for TVA to recover all unspent funds. Redirecting unspent funds to other projects adds to TVA's interest cost on its cash flow, especially considering EPRI's delinquency in accurately reporting the status of project (b) (4) to TVA.

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

September 9, 2009

Mr. Robert E. Martin
Assistant Inspector General
Office of the Inspector General
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1401

Subject: Request for comments – Draft Audit 2008-11999 – Contract 99999868

Dear Mr. Martin:

Thank you for your letter and copy of the draft audit report. EPRI provides the following comments in regard to the findings presented in the report.

Concerns Regarding Lost Interest Due to Advanced Payments

As a nonprofit corporation recognized as a tax exempt organization under Section 501(c)(3) of the IRC, EPRI conducts research and development work in energy and related fields for the benefit of the public. In order to ensure sufficient funding to carry out the anticipated scope of research projects, it is EPRI's practice to require members to provide funds prior to the initiation of work for a new project. EPRI does not pay interest to any members on such funds, and, as the Audit draft notes, EPRI was not obligated under Contract #868 to pay TVA interest on payments provided for supplemental contracts. EPRI is engaged in discussions with TVA(b) (4)
(b) (4)

Concerns Regarding Incomplete and Inaccurate Project Status Reports

EPRI has provided over the course of Contract # 868 unique reports to TVA on the status of its projects, based upon EPRI's understanding of TVA's needs regarding the report's content and frequency. Other EPRI members do not receive similar reports. In addition, EPRI's staff makes regular, formal presentations to TVA managers at several levels, conducts program updates (with other funders if applicable), and leads or supports recurring informal communications with TVA. That said, EPRI agrees with the Auditor that some projects were overlooked in the reports. EPRI is currently working directly with TVA to provide information that has been omitted from the normal reporting process and will continue its efforts to improve the reporting accuracy



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3420 Hillview Avenue, Palo Alto, CA 94304-1338 USA • 650.855.2000 • Customer Service 800.313.3774 • www.epri.com

and completeness. EPRI is complying with instructions received from TVA to reallocate some unspent funds at issue and is awaiting final determination from TVA on the remainder.

Concerns Regarding Delinquency in Recovering Overfunded Amounts

EPRI continuously works to improve processes and communications to its members, including TVA, on the status of research funding and spending. The goal is to notify members promptly of funds remaining in projects through continual internal monitoring and audits of cost reports. We welcome our funder's response to notifications of overfunded projects. Redirection allows the funder and EPRI to put those funds to work on collaborative projects that solve critical problems in the safe, reliable and environmentally sound delivery of electricity. EPRI will continue to work with TVA to ensure the notifications reach the appropriate TVA staff in a timely manner.

Please let me know if you have any questions. EPRI appreciates the insights gained in the audit report from a valued member.

Sincerely,

Donn Baker

Donn Baker
Financial Manager

cc: Mr. Terrell M. Burkhart
Norma Formanek
Salvador A. Casente, Jr.
Steve Yamamoto

September 4, 2009

Robert E. Martin, ET 3C-K

DRAFT AUDIT RESPONSE - AUDIT 2008-11999 - ELECTRIC POWER RESEARCH INSTITUTE (EPRI) - CONTRACT NO. 99999868

We have reviewed the subject draft audit report and offer the comments shown below.

**LOST INTEREST DUE TO ADVANCED PAYMENTS**
The projects paid for under this contract with EPRI are research projects. EPRI is a non-profit organization performing research in the electricity sector for the benefit of the public, managing collaborative research and development programs for its members. As such, members commit in advance research dollars to specific projects each year. TVA agrees that the contract was revised in January 2004 (b) (4)

(b) (4)

EPRI has stated that the advance payment provisions of TVA's contract are the same requirements applicable to all other EPRI members, including major investor owned utilities such as Duke and Southern and publicly owned utilities such as Bonneville Power Administration. EPRI does not pay interest to any of its members for advanced payments and has stated that this is something they will not consider under any circumstances. (b) (4)

(b) (4)

**INCOMPLETE AND INACCURATE PROJECT STATUS REPORTS**
We concur with your findings and have (1) redirected the unspent fund identified in the amount of $10,009 to another project, (2) requested a final status report for all projects worked under Contract No. 99999868 and (3) directed EPRI include the status of all open and closed projects on its status reports being provided under the current active Contract No. 00073824. The current active contract requires EPRI to provide quarterly reports.

**DELINQUENCY IN RECOVERING OVERFUNDED AMOUNTS**
We concur with your findings and are working with the TVA Technical Contract Manager and EPRI to (1) reallocate the overfunded amount of $74,362 to other projects that TVA is funding and (2) institute procedures for ensuring the timely collection or redirection of any future overpayment. TVA is also pursuing the option of directing EPRI to reimburse TVA overfunded amounts in lieu of redirecting funds. As of September 3, 2009, approximately $52K has already been redirected and the remaining $22K should be directed by the end of the Fiscal Year.

Robert E. Martin
Page 2
September 4, 2009

Thank you for the efforts of Greg Strach and David Wheeler in the performance of this audit and for the suggestions to improve our contract management process. If you have further questions, you may contact Sandra Ingram at (865) 632-2161, or Jamie Keith at (865) 632-8658.

Terrell M. Burkhart
Vice President
Supply Chain
WT 3A-K

SGI:JEK:CFL
cc: Francine Brown, LP 4T-C
Brian Child, WT 8B-K
Peyton T. Hairston Jr., WT 7B-K
Sandra Goan Ingram, WT 3A-K
Jamie Elliott Keith, WT 3A-K
Carla Lewis, WT 3A-K
John. E. Long, Jr., WT 7B-K
Kenneth E. Tilley, WT 3A-K
EDMS, WT CA-K

Prepared by Sandra Goan Ingram; reviewed by Jamie Elliott Keith; and approved by Gene Tilley.

**Memorandum from the Office of the Inspector General**

September 15, 2010

Anda A. Ray, WT 11A-K

REQUEST FOR MANAGEMENT DECISION – AUDIT 2009-12728 – REVIEW OF RECREATIONAL LAND TRANSACTIONS

Attached is the subject final report for your review and management decision. You are responsible for determining the necessary actions to take in response to our findings. Please advise us of your management decision within 60 days from the date of this report.

Information contained in this report may be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

If you have any questions, please contact Kristi U. Reynolds, Senior Auditor, at (865) 633-7360 or Lisa H. Hammer, Director, Financial and Operational Audits, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

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

KUR:JP
Attachment
cc (Attachment):
James C. Adams, CTR 2C-M
Kimberly S. Greene, WT 7B-K
Peyton T. Hairston, Jr., WT 7B-K
Tom D. Kilgore, WT 7B-K
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Robert B. Wells, WT 9B-K
OIG File No. 2009-12728

Office of the Inspector General

*Audit Report*

To the Senior Vice President,
Environment and Technology

# REVIEW OF RECREATIONAL LAND TRANSACTIONS

Audit Team
Kristi U. Reynolds
Stephanie M. Broome
Milli K. Warren
Jamie M. Wykle

Audit 2009-12728
September 15, 2010

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## APPENDIX

# EXECUTIVE SUMMARY

Since 1933, Tennessee Valley Authority's (TVA) dam and reservoir construction program has acquired approximately 1.3 million acres of land for the creation of 34 reservoirs in five of the seven states in the Tennessee Valley region. Water flooded approximately 470,000 acres as part of the construction and operation of the reservoir system. Approximately 508,000 acres have been transferred or sold primarily to other federal and state agencies for public uses, leaving approximately 293,000 acres currently owned by TVA and managed to meet development needs and improve the quality of life in the Tennessee Valley. These reservoir properties, together with adjoining private lands, have been used for public parks, industrial development, commercial recreation, residential development, and a variety of other needs associated with local communities and government. Section 4(k)(a) of the TVA Act gives TVA the power "to convey by deed, lease, or otherwise, any real property in the possession of or under the control of the Corporation to any person or persons, for the purpose of recreation or use as a summer residence, or for the operation on such premises of pleasure resorts for boating, fishing, bathing, or any similar purpose."

According to TVA's Land Policy, as approved in November 2006, TVA may consider leasing or granting limited easements for commercial or public recreation purposes. Commercial recreation is defined as "recreation with facilities that are provided for a fee to the public intending to produce a profit for the owner/operator"; whereas public recreation is defined as "recreation on publicly owned land with facilities developed by a public agency (or their concessionaire) and provides amenities open to the general public." The Land Policy limits commercial recreation property usage to water-based recreation while retaining restrictions against residential use as well as prohibiting long-term accommodations or individually owned units. The Land Policy also contains restrictions against residential use, cabins, or other overnight accommodations (except for campgrounds), unless the property is part of a State park system that allows overnight accommodations.

TVA's Environment and Technology (E&T), Land and Shoreline Management (L&SM),[i] is responsible for management of reservoir lands. Within L&SM, seven Watershed Teams (WT) are located throughout the TVA region to perform stewardship functions and serve as the primary customer interface. WTs are responsible for providing the general public information and support in the areas

[i] Prior to April 2010, Land and Shoreline Management was known as Land and Water Stewardship.

of land use, water quality improvement, 26a permitting, recreation, and natural resource management and protection.[ii]

According to the Stewardship Guidelines, in order to obtain an agreement, all applicants must submit a Land Use application to the WT, which includes the applicant's information, location of the property, type of land use requested, a time schedule for the project, and a description of the project's purpose and intended use. For leases and easements that require approval by the Board or Chief Executive Officer, the applicant must also include information such as a cost estimate and funding source(s), environmental impacts and copies of reviews, assessments, or letters from federal or state agencies, and copies of all permits, approvals, or certifications as required. The applicant must pay TVA certain administrative fees to cover the costs of any administrative activities associated with the action.

Since 2008, two groups within L&SM have been responsible for monitoring recreational properties. L&SM's Stewardship Programs & Processes is responsible for developing, maintaining, and communicating stewardship strategies and implementing processes for the management of TVA land assets. The Stewardship Compliance group conducts inspections designed to determine contract, safety, and regulatory compliance for commercial and community campgrounds[iii] on TVA lands.

In April 2009, TVA hired Deloitte Financial Advisory Services LLP (Deloitte) to assist L&SM personnel in identifying industry practices related to the valuation and leasing of campgrounds and marinas. L&SM issued temporary licenses when a long-term agreement expired or when a business with a license changed ownership instead of entering into leases and easement agreements until the study was complete.

In February 2010, the Senior Vice President, E&T, approved the Commercial Recreation Management Guidelines, based on Deloitte's recommendations. These guidelines address agreement terms, rental fees, renewals, administrative costs, and documentation requirements by the commercial operator. The new guidelines also provided for the centralized administration and management of commercial recreation agreements into a single department to focus solely on public and commercial recreation agreements and permits.

[ii] During our review, E&T began making changes to their organizational structure. The seven WTs are now divided into two groups—Western and Central Regional Watersheds and Eastern Regional Watersheds—and are responsible primarily for implementing natural resource management. Two groups have been created to manage the 26 permitting and recreational properties. The Commercial and Dispersed Recreation group is currently responsible for "developing, maintaining, and communicating policies and implementing processes for the management of TVA recreation land assets from a valley-wide perspective," while the Reservoir Land Use and Permitting group is responsible for "working with TVA's external stakeholders in the 26a and land use application process."

[iii] Currently marinas are not included in the assessments conducted.

As part of our annual audit plan, we reviewed recreational land transactions. Our audit objectives were to assess the (1) process for entering into recreational land transactions and (2) monitoring and enforcement of those transactions as of August 26, 2009. In addition, our review included information related to the valuation of campgrounds and marinas. As a result of our review, we identified several areas for improvement. Specifically, we determined:

- Stewardship Guidelines do not include adequate criteria to provide for consistency in awarding recreational land agreements.
- Licenses have been used for long-term encumbrances of recreational lands.
- No formal process is in place to track changes in campground or marina ownership which could affect fees charged.
- Reevaluations of annual fees have not been consistently performed.
- Reviews of monthly invoicing for campground and marina operators may not be adequate.
- TVA does not have an accurate listing of recreational properties that hinders adequate monitoring.
- No process is in place for identifying data errors or noncompliance issues related to agreement terms, other than "visual" violations on the properties.
- TVA does not exercise its right of reentry for properties sold under Section 4(k)(a) when the properties are used in violation of the deed.
- Structures have been built on TVA properties without TVA approval.
- Sporadic usage of "approvable actions" (i.e., permits issued after construction or changes have been made to the property without TVA approval).
- TVA faces reputational risk due to external and internal cultural factors, primarily related to the monitoring and enforcement of violations and encroachments.

We recommend the Senior Vice President, E&T:

- Revise the Stewardship Guidelines to include criteria on when to use license, lease, or easement.
- Consider minimizing the use of licenses to prevent long-term encumbrances of land.
- Implement a process to track changes in campground or marina ownership and ensure reevaluations and other stipulations (i.e., pump reports).
- Implement a process for reevaluating annual fees as allowed by each recreation agreement.
- Ensure reviews of monthly invoices are adequately performed.

- Create and maintain an accurate listing of all campgrounds and marinas on TVA lands, including those that have been sold with a right of reentry, to ensure monitoring of those agreements can be accomplished.
- Consider implementing an inspection review of all campgrounds and marinas on a biennial basis.
- Consider stronger enforcement of violations and encroachments, including properties sold for commercial recreation use, up to and including repossession of those properties.
- Establish guidelines to deal with "approvable actions" including requiring WT manager approval before approving "after the fact" 26a permits.
- Communicate the importance of monitoring and enforcement of recreational agreements to responsible E&T personnel and develop performance standards for consistency in monitoring and enforcing these agreements.

We provided a draft of this report to TVA's Senior Vice President, E&T. TVA management agreed with our recommendations and provided other comments and clarifications which have been incorporated into the report as applicable (see Appendix).

# BACKGROUND

Since its creation in 1933, Tennessee Valley Authority's (TVA) dam and reservoir construction program has acquired approximately 1.3 million acres of land for the creation of 34 reservoirs in five of the seven states in the Tennessee Valley region. Approximately 470,000 acres were inundated with water as part of the construction and operation of the reservoir system. TVA has transferred or sold approximately 508,000 acres, primarily to other federal and state agencies for public uses. TVA currently owns approximately 293,000 acres, which are managed pursuant to the TVA Act and manages approximately 11,000 miles of shoreline surrounding TVA's reservoirs. Over the years, TVA has managed these reservoir lands to meet development needs and improve the quality of life in the Tennessee Valley. These reservoir properties, together with adjoining private lands, have been used for public parks, industrial development, commercial recreation, residential development, and a variety of other needs associated with local communities and government. Section 4(k)(a) of the TVA Act gives TVA the power "to convey by deed, lease, or otherwise, any real property in the possession of or under the control of the Corporation to any person or persons, for the purpose of recreation or use as a summer residence, or for the operation on such premises of pleasure resorts for boating, fishing, bathing, or any similar purpose."

On November 30, 2006, TVA's Board of Directors approved TVA's Land Policy, which governs the way TVA lands are managed. It is TVA's policy to manage its lands to "protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system, and to provide for continuing economic growth in the Valley." In addition, TVA intends to preserve reservoir lands under its control in public ownership except where the public would benefit from transferring the land to a private ownership or another public entity.

According to the Land Policy, TVA may consider leasing or granting limited easements for commercial or public recreation purposes. Commercial recreation is defined as "recreation with facilities that are provided for a fee to the public intending to produce a profit for the owner/operator"; whereas public recreation is defined as "recreation on publicly owned land with facilities developed by a public agency (or their concessionaire) and provides amenities open to the general public." The Land Policy limits commercial recreation property usage to water-based recreation while retaining restrictions against residential use as well as prohibiting long-term accommodations or individually owned units. The Land Policy also contains restrictions against residential use, cabins, or other overnight accommodations (except for campgrounds), unless the property is part of a State park system that allows overnight accommodations.

While much of TVA's lands were transferred to parties for conducting specific recreational activities, the Land Policy states that TVA will consider removal or modification of deeds in order to facilitate industrial development or public

recreational access. However, the Land Policy prohibits the removal or modification of deed restrictions for the purposes of residential development and will, to the extent permitted by the language of the deed, transfer, or other contractual instrument, administer its interest in former TVA land to achieve the goals of this policy.

TVA's Environment and Technology (E&T), Land and Shoreline Management (L&SM) is responsible for management of reservoir lands. Within L&SM, seven Watershed Teams (WT) are located throughout the TVA region to perform stewardship functions and serve as the primary customer interface. WTs are responsible for providing the general public information and support in the areas of land use, water quality improvement, 26a permitting, recreation, and natural resource management and protection.[1]

Based on a July 15, 2009, L&SM presentation, there are approximately[2] 260 campgrounds and 230 marinas located on TVA lands along the Tennessee River. There are approximately 150 agreements in place on TVA lands for marinas, and the remaining 80 operate on private property with a permit. Of the approximately 260 campgrounds, 118 are located on TVA public lands and operated under an agreement with TVA, 131 are located on privately owned lands, and 11 are owned and operated by TVA. There are three types of agreements: leases, easements, and licenses used to facilitate the operation of these campgrounds and marinas.

- A lease is an agreement used to transfer possession and authorize the occupancy and use of a defined area of TVA land for specific purposes that required TVA's advance written approval and a guaranteed long-term tenure or an interest in real property. Leases are typically for a period of up to 19 years and require Board or Chief Executive Officer (CEO)[3] approval.

[1] During our review, E&T began making changes to their organizational structure. The seven WTs are now divided into two groups—Western and Central Regional Watersheds and Eastern Regional Watersheds—and are responsible primarily for implementing natural resource management. Two groups have been created to manage the 26 permitting and recreational properties. The Commercial and Dispersed Recreation group is currently responsible for "developing, maintaining, and communicating policies and implementing processes for the management of TVA recreation land assets from a valley-wide perspective," while the Reservoir Land Use and Permitting group is responsible for "working with TVA's external stakeholders in the 26a and land use application process."

[2] As discussed later in this report, TVA does not have an accurate listing of campgrounds and marinas located on TVA lands.

[3] On May 18, 2006, the TVA Board delegated to the CEO the authority to handle specified land transactions including those consisting of less than 5 acres and the renewal of existing easements. Any new leases or easements involving more than 5 acres are required to be approved by the TVA Board.

Annual fees for leases are normally based on an appraisal[4] or comparative market analysis (CMA).[5]

- An easement is a recordable document that is used to convey an interest on, over, and across a defined area of TVA land and permit occupancy and use of the area for specific purposes that require TVA's advanced written approval and a guaranteed long-term tenure or an interest in real property. Easement rights may be conveyed permanently or for a set number of years—typically 30 years—and require Board or CEO approval. Annual fees for easements are normally based on an appraisal or CMA.

- A standard license agreement is used mainly to allow ongoing (but revocable) occupancy and the use of TVA land for commercial, private, and public projects that do not require long-term tenure or interest in real property. The term for license agreements runs indefinitely until such time that it is revoked by either party with a 30- or 60-day notice. Licenses are approved by WT management. The annual fees for licenses are based on a fee structure dependent upon acreage or length of shoreline, currently set at a minimum of $1,200. Prior to 1994, TVA did not charge an annual fee for licenses. According to L&SM personnel, campground and marina operations were grandfathered under this no-fee policy until ownership changed hands.

TVA's Realty Services maintains land records for all land currently or previously owned by TVA, including leases, easements, or other contractual arrangements for land. These contractual agreements may include transmission easements, campground leases, or transfer of TVA property to a local government for their use. TVA does not manage its land by disposition of the property but instead manages it by tract number. The Automated Land Information System (ALIS) stores land transactions occurring before October 1, 2005. Transactions after October 1, 2005, are stored in the Resource System Land Disposal (RSLD). Realty Services maintains official land records in the Land Acquisition and Disposal System (LADS).

Based on the information provided by L&SM, as of August 26, 2009, we identified 245 campgrounds and 191 marinas. Table 1 shows a breakdown by type of agreement, based on information provided the Office of the Inspector General (OIG) during this review.

[4] According to Realty Services' personnel, an appraisal to determine "fair market value" consists of a full-scale review of relevant market conditions using either the (1) cost approach, where the fair market value is equal to the land value plus the depreciated value of any improvements; (2) sales comparison approach, which focuses on the price of similar properties being sold in the marketplace; or (3) income approach, which derives a value indication for an income-producing property by converting its anticipated benefits (cash flows and reversion) into property value.

[5] According to Realty Services' personnel, a CMA is based upon sales listings and/or sales comparables and a cursory review of the property, without the details that would be required for a full-scale appraisal. CMAs are generally used for actions where TVA is not being reimbursed for fair market value or when the fee is low in order to save costs. In addition, CMAs are performed where a rough estimate of "fair market value" is initially needed, and a full-scale appraisal is subsequently performed if the applicant decides to go forward with the action and TVA requires a market value estimate.

| Agreement Type | Campgrounds | Marinas | Total |
|---|---|---|---|
| Lease | 21 | 7 | 28 |
| Easement | 44 | 7 | 51 |
| License | 63 | 57 | 120 |
| 26a Permits/ Concession Agreements[6] | 41 | 120 | 161 |
| Unknown due to insufficient information | 76 | 0 | 76 |
| **Total** | **245** | **191** | **436**[7] |

**Table 1**

**Land Use Application**

According to the Stewardship Guidelines, in order to obtain an agreement, all applicants must submit a Land Use application to the WT, which includes the applicant's information, location of the property, type of land use requested, a time schedule for the project, and a description of the project's purpose and intended use. For leases and easements that require approval by the Board or CEO, the applicant must also include information such as:

- Cost estimate and funding source(s); jobs created; negative socioeconomic impacts; public and investor benefits.
- Environmental impacts and copies of reviews, assessments, or letters from federal or state agencies.
- Copies of all permits, approvals, or certifications required by other federal, state, or local agencies for this project.

L&SM WT personnel are also responsible for ensuring (1) the requested intent of the land use aligns with the tract's deed and TVA's Land Policy, and (2) there are no outstanding land rights on the property. According to WT personnel, the WT is also responsible for requesting an appraisal.

As part of the application process, the applicant must pay TVA certain administrative costs, dependant on the type of transaction initiated. Costs may include compliance inspections; title and record searches; mapping and surveying; preparation of conveyance instruments, permits, or other authorization

[6] Section 26a of the TVA Act requires that TVA approval be obtained before any construction activities that can affect navigation, flood control, or public lands along the shoreline of the TVA reservoirs or in the Tennessee River, or its tributaries can be initiated. Permits must be issued for these construction activities, including commercial marinas.

[7] As demonstrated later in this report, we could not determine the accuracy of the listing.

or approval instruments; legal review; preparation of TVA Board packages; and any other administrative activities associated with a TVA land use/disposal action. In addition, the cost of an appraisal may be included in the required fees.

In 2007, TVA determined that as a general operating procedure, leases and easements for commercial recreation[8] purposes would be issued rather than licenses. The Stewardship Guidelines further provided that licenses would be transitioned to easements or leases as ownership changed, scope of operations changed, or when major capital investment took place. According to the guidelines, removing the option of a license would provide (1) TVA better protection with relation to liabilities and revenue and (2) commercial recreation providers a legal standing since licenses are revocable at will.

Since 2008, two groups within L&SM have been responsible for monitoring recreational properties. L&SM's Stewardship Programs & Processes (SP&P) is responsible for developing, maintaining, and communicating stewardship strategies and implementing processes for the management of TVA land assets. SP&P is responsible for conducting campground scorecard assessments that compare numeric scores over time to determine experience, facility safety, quality, and consistency. The Stewardship Compliance (SC) group conducts inspections designed to determine contract, safety, and regulatory compliance for commercial and community campgrounds on TVA lands. Currently marinas are not included in the assessments conducted.

On April 14, 2009, TVA hired Deloitte Financial Advisory Services LLP (Deloitte) to assist L&SM personnel in identifying industry practices related to the valuation and leasing of campgrounds and marinas. TVA halted entering into lease and easement agreements until the study was completed. In the interim, L&SM issued temporary licenses when a long-term agreement expired or when a business with a license changed ownership. The temporary license allowed the business to continue operation until a new agreement was issued.

**New Guidelines**

Based on Deloitte's recommendations, on February 25, 2010, the Senior Vice President, E&T, approved the Commercial Recreation Management (CRM) Guidelines.[9] These guidelines address agreement tenure, rent determination and escalation, agreement renewals, administrative costs, and the types of documentation required by the commercial operator. The new guidelines also provide for the centralized administration and management of commercial recreation agreements into a single department to focus solely on public and commercial recreation agreements and permits.

[8] Licenses are not included as a type of instrument used for commercial or public recreation in TVA's Land Policy.

[9] According to the Senior Vice President, E&T, as of August 31, 2010, additional changes and updates to the guidelines are in process.

According to the CRM Guidelines, the preferable recreation agreement is a 30-year easement without renewal options or extensions. However, "small campgrounds and marinas with less than approximately $250,000 in private fixed investments and no plans for additional infrastructure may continue to use revocable licenses at their option and risk."

Under these new guidelines, the applicant can choose a rental amount based on a fair market value (FMV) approach or a percentage of gross revenue approach. The calculations used in both of these methods consider total TVA land area involved in the commercial operation, as well as associated harbor limits. In addition, a minimum rental rate based on factors including the number of campsites or acreage is applicable for both methods. According to the new guidelines, the lowest minimum annual rent is $1,500.

Using the FMV approach, the applicant pays for an appraisal conducted by TVA or from a list of TVA-approved appraisers. The appraisal is based on the fair market value of the raw land and any TVA-provided improvements. Reappraisals are allowed after the fifth year of the easement. The first year's payment is based on a percentage of the appraised value, based on a rate of return as established by TVA's Financial Services (FS). Subsequent payments will be escalated each year based on an FS-established escalation rate.

The percent of gross revenue method is based on a percentage of all gross revenues from operations on TVA land and water-based facilities, except for individually metered electric sales, hunting and fishing license fees, and taxes collected as a part of the operation. Boat and motor sales on TVA land will be charged 1 percent of gross revenues, while restaurant facilities will be charged 4 percent of gross revenues for the first $200,000 plus 1 percent of gross revenues in excess of $200,000. The applicant will be required to pay the greater of the minimum rental rate (not less than $1,500) or the percent of gross calculation.

Existing recreation easements and leases will be converted to the new guideline standards upon expiration, whereas existing licenses will be evaluated for conversion to the new standards. Where large infrastructure improvements have occurred, TVA will work to convert the agreements to easements. However, some agreements will remain as licenses but will be converted to the new rental structure.

# OBJECTIVES, SCOPE, AND METHODOLOGY

As part of our annual audit plan, we reviewed recreational land transactions. Our audit objectives were to assess the (1) process for entering into recreational land transactions and (2) monitoring and enforcement of those transactions as of August 26, 2009. In addition, our review included information related to the valuation of campgrounds and marinas. We relied on the transactions as provided by L&SM personnel.

To achieve these objectives, we:

- Conducted interviews with L&SM personnel to gain an understanding of the recreational land transaction initiation process and the monitoring and enforcement of those transactions.
- Reviewed documentation and guidelines related to the process of entering into licenses, leases, and easements.
- Obtained a population of (1) agreements in place for campgrounds and marinas, including licenses, leases, and easements, and (2) transfers and sales of land for use in public recreation, where TVA had land rights or right of reentry.
- Selected a random and judgmental sample of agreements from the population and visited the seven WT offices for further review. Our random sample consisted of 10 percent of agreements at each WT, while our judgmental sample was based on (1) auditor knowledge of particular issues and (2) whether the agreement was listed as fee-waived or had no recreation identification number.
- Visited the (1) Kentucky, (2) Guntersville-Tims Ford, (3) Chickamauga-Hiwassee (CH), (4) Holston-Cherokee-Douglas (HCD), (5) Pickwick-Wheeler, (6) Little Tennessee (LT), and (7) Watts Bar-Clinch (WBC) WT offices to review sampled supplements, assignments, 26a documentation, and screen shots from the land records system.
- Interviewed WT personnel to gain an understanding of how each office initiates and monitors land transactions.
- Conducted site visits at selected campgrounds and marinas in our sample to determine noncompliance with criteria identified within the agreements, including, but not limited to, health and safety hazards, sewage management, residential use of property, and encroachments.
- Obtained and reviewed documentation from FS related to recreational agreements to determine if the appropriate billing information was being communicated.
- Interviewed L&SM personnel to determine how inspections of recreational properties are conducted. In addition, we examined documentation related to L&SM inspections performed for each sampled site within the year as well as any follow-up of site noncompliance.
- Observed an inspection as conducted by L&SM personnel.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that 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 objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Although we did not test

for compliance with laws and regulations, nothing came to our attention during the audit that indicated noncompliance with laws and regulations.

# FINDINGS

We assessed TVA's processes for (1) entering into recreational land transactions and (2) monitoring and enforcement of those transactions and identified several areas for improvement. Specifically, we determined:

- Stewardship Guidelines do not include adequate criteria to provide for consistency in awarding recreational land agreements.
- Licenses have been used for long-term encumbrances of recreational lands.
- No formal process is in place to track changes in campground or marina ownership that could affect fees charged.
- Reevaluations of annual fees have not been consistently performed.
- Reviews of monthly invoicing for campground and marina operators may not be adequate.
- TVA does not have an accurate listing of recreational properties that hinders adequate monitoring.
- No process is in place for identifying data errors or noncompliance issues related to agreement terms, other than "visual" violations on the properties.
- TVA does not exercise its right of reentry for properties sold under Section 4(k)(a) when the properties are used in violation of the deed.
- Structures have been built on TVA properties without TVA approval.
- Sporadic usage of "approvable actions" (i.e., permits issued after construction or changes have been made to the property without TVA approval).
- TVA faces reputational risk due to external and internal cultural factors, primarily related to the monitoring and enforcement of violations and encroachments.

## RECREATIONAL LAND TRANSACTION PROCESS

As part of our assessment of TVA's process for entering into recreational land transactions, we (1) reviewed the Stewardship Guidelines related to recreational land transactions and (2) interviewed the WT personnel responsible for entering into recreational land transactions. The WT is responsible for providing land use applicants with necessary information related to entering into the real estate transaction. This information includes the Land Use application and costs associated with that submittal, a time frame for decision-making, and information on the factors considered in processing a land use request. WT personnel are responsible for (1) coordinating any required environmental and programmatic reviews, (2) ensuring the land use aligns with the tract's deed and TVA's Land

Policy, (3) ensuring there are no outstanding land rights on the property, and (4) requesting the performance of an appraisal or CMA.

Based on our assessment, we determined (1) the Stewardship Guidelines do not include adequate criteria to provide for consistency in awarding recreational land agreements, (2) licenses have been used for long-term encumbrances of recreational lands, (3) no formal process is in place to track changes in campground or marina ownership that could affect fees charged, (4) reevaluations of fees have not been consistently performed, and (5) the review of monthly invoicing for campground and marina operators may not be adequate.

**Type of Agreement**

As previously stated, licenses are awarded by the WT and do not require Board or CEO approval. According to the WT personnel interviewed, the WT consults with the Office of the General Counsel (OGC) and other L&SM personnel as they deem necessary in making the determination as to the type of agreement awarded. Such factors as bank financing requirements, the amount of planned capital improvements, the type of entity (private or governmental), and/or the type of use requested may also be considered.

We noted the Stewardship Guidelines do not provide any criteria to determine whether a lease, easement, or license will be awarded. Without defined criteria providing the basis for determining the type of agreement awarded, inconsistencies between WTs may occur, and operators with adjoining properties may have different types of agreements, resulting in different fee structures. One example of this inconsistency, (b) (4) and (b) (4) is discussed in a subsequent section of this report.

In addition, the lack of defined criteria coupled with the WT's ability to enter into license agreements could result in land being encumbered for years without CEO or Board approval. Specifically, while license agreements are intended to allow use of TVA land that does not require long-term tenure, we noted that 39 of the 76 agreements in our sample were licenses. The following are examples of long-term licenses encumbering several acres. For example:

- (b) (4), encumbering approximately 22 acres, has operated in the Kentucky Watershed under a license since October 1998 when it was discovered that Bee Spring Lodge had been operating on TVA property without an agreement.
- (b) (4) has operated in the HCD Watershed under a license since October 1985. The acreage encumbered for this property could not be determined, based on information provided. This agreement is fee-waived.
- (b) (4) has operated in the Kentucky Watershed under a license since February 1985 and encumbers approximately 17.2 acres.

- (b) (4) has operated in the CH Watershed under a license since May 1993, encumbering approximately 0.9 acres.
- (b) (4) operating in the WBC Watershed has operated under a license since March 1985 and encumbers approximately 8 acres. This agreement is also fee-waived. However, on April 26, 2000, TVA awarded another license to the operator of Lone Mountain Dock for 540 linear feet of shoreline on the same tract of land for a $1,200 annual fee.
- (b) (4) has operated in the WBC Watershed under a license since January 1991 and encumbers 5.8 acres. The annual fee for this license agreement is $2,600.
- (b) (4) operating in the WBC Watershed has operated under a license agreement since March 1992 and encumbers approximately 6.5 acres. This license agreement is also fee-waived.

**Determination of Annual Fees**

According to the Stewardship Guideline 16.5.4.21 – Licenses, standard license agreements may be issued with or without compensation. The compensation may be based on a standard fee rate, an appraised value, or a percentage of gross, depending on the type of request. Stewardship Guideline 16.52.8.5 – Commercial Recreation Licenses, Leases, and Easements states the standard fee rate is based upon acreage or length of shoreline and is currently set at a minimum of $1,200. According to L&SM personnel, prior to 1994, TVA did not charge an annual fee for licenses. In addition, the campground and marina operations were grandfathered under this no-fee policy until ownership changed hands.

Stewardship Guideline 16.52.8.5 – Commercial Recreation Licenses, Leases, and Easements provides that licenses would be transitioned to easements or leases as ownership changed, scope of operations changed, or when major capital investment took place. However, discussions with L&SM personnel disclosed there is no formal process in place to track changes in the ownership of operators, which can result in subsequent owners operating under the original fee structure. For example, a corporation could be sold or transferred to a new owner and, if TVA is unaware of the ownership change, the original agreement with TVA could continue with no fee modifications. Similarly, a sole proprietor may sell his or her rights granted by TVA to another individual or entity without TVA's knowledge, and the new owner may continue to operate under the original agreement. In addition, WT personnel expressed concerns about small "mom and pop" businesses not being financially capable of bearing the cost of transitioning to a longer term agreement and that a mass transition would not be well received, particularly with older operators.

Temporary licenses have been issued for (1) leases and easements that were expiring or changed ownership and (2) any new applications for land use. According to WT personnel, these temporary licenses were to be used until the new fee structure, based on Deloitte's study, was established. The temporary

license allowed the business to continue operation until a new agreement was issued.

As of September 2009, TVA had six Land Use applications for campgrounds and/or marinas (two leases and four easements) that had not been finalized. L&SM personnel stated that execution of these agreements, when and if approved by the TVA Board, would not occur until a new fee structure was established. As shown in Table 2, as of April 2010, these six campgrounds and marinas were currently operating under a license with a stipulation that the applicant actively pursue a lease/easement agreement with TVA.

| | Name | License Date | Annual Fee Under Temporary License | Approximate Acreage |
|---|---|---|---|---|
| 1 | (b) (4) | 4/6/2006 | 5% of gross receipts | 57.28 |
| 2 | (b) (4) | 7/1/2007 – Supplement 6/30/2009 | $670.75 | 8.4 |
| 3 | (b) (4) | 4/25/2005 | 50% of the greater of the guaranteed minimum payment of $55,000 or 5% of gross revenues | 33 |
| 4 | (b) (4) | 9/17/2007 | $1,200 | 2 |
| 5 | (b) (4) | 7/14/2008 | $1,200 | 1.5 |
| 6 | (b) (4) | 7/27/2009 | $2,380 | 40 |

**Table 2**

According to TVA's Senior Vice President, E&T, (b) (4) was approved during the June 2010 Board meeting, while (b) (4) was approved at the August 2010 Board meeting. In addition, (b) (4), has two agreements—one of which was approved at the August 2010 Board meeting. The remaining agreement has not been presented for Board consideration.

**Reevaluation of Annual Fees**

After the annual fees are established, TVA executes the agreement that may include an option to reevaluate the annual fee. In general, this option would allow TVA to reevaluate the annual fee at a predetermined interval. Based on market conditions, the reevaluations could result in increased revenues for TVA.

For the 13 leases and easements in our sample, 3 contained a clause that allowed TVA to reevaluate the annual fee on a regular basis after the lease had been executed. Often times, TVA will only perform a reevaluation of the fee after the respective agreement is terminated and a new operator is interested in the premises. However, none of the documentation we reviewed contained evidence that the annual fee had been reevaluated since the respective agreement's execution. According to one WT manager, TVA has not utilized this clause to the extent they could have because of the expense of reappraisals. Consequently, because land market values can increase significantly over a relatively short

period of time, TVA may not be realizing the maximum revenues from its properties, especially in locations where market values consistently increase over time. A considerable increase in annual fees could result in resistance from new operators and further the delay of the execution of long-term agreements.

For example:

- The lease agreement for (b) (4) ., executed in July 1988, stated that TVA may initiate a reevaluation of the annual fee at each anniversary date after the first three years of the lease and that TVA's determination of the adjusted rental rate shall be binding on the lessee. Our review of the lease files provided by the WT disclosed no documentation that the lease's original annual fee of $670.75 had ever been reevaluated by TVA during the 19-year life of the lease. Near the end of the 19-year term, the lease agreement was assigned to a new operator, who continued to pay the original lease fee of $670.75. The new operator submitted a Land Use application for a 30-year easement to invest $3.5–$4 million and create a "showcase marina on Lake Guntersville." During negotiations with this new operator, TVA proposed an annual fee of $155,250, or 5 percent of gross revenues (whichever is greater). This new proposed fee, like the original lease fee, was based on fair market value of the leased premises. Based on the documentation we reviewed, the new operator expressed discontent with the new fee, believing that it was too high. As of the date of our site visit, a new long-term agreement had not been finalized, and the new operator continues to pay an annual fee of $670.75 under a license to expire on July 1, 2010. TVA's Realty Services stated one of the options offered to appease the new operator was to "give them a break in the first couple of years (not charging rent or maybe a minimal amount) since they are putting a substantial investment in the place."

- We reviewed the file for (b) (4) , which is adjacent to the (b) (4) ., property discussed above. We noted the original 19-year lease agreement for (b) (4) executed in 1987 stated the present fair rental value was $7,650. The original lease also stated that the "Lessor [TVA] may initiate a reevaluation of the lease fee at any time after the end of the first three (3) years of the lease term…Lessor's determination regarding adjustment of the rental rate shall be binding on the Lessee." Based on our review of the files, we did not find any evidence that a reevaluation of the annual fee had been performed since the lease's inception. The new lease was executed in 2009 with a minimum annual fee of $32,000 or 5 percent of gross revenues, whichever is greater. The minimum annual fee of $32,000 was within the new market value range in the updated appraisal.

- On February 6, 1985, TVA entered into a license agreement with the owners of (b) (4) . The agreement provided for (b) (4) to conduct a boat landing business, including a campground, for a semiannual fee of $860. According to the license, this rate could "be adjusted

from time to time for the next license period, upon written notice by TVA, to reflect any change in the value of the licensed premises." In July 1999, TVA informed the operator of (b) (4) that TVA had reviewed the standard rates charged for commercial recreation permits and determined the current semiannual fee should be increased from $860 to $2,580, an increase of 300 percent. Subsequently, based on information in the WT files, (b) (4) increased its rental rates by 330 percent, an increase that prompted at least one complaint to TVA. These significant increases could be avoided if reevaluations were conducted on a regular basis.

**Collection of Annual Fees**

FS is responsible for invoicing and collections of revenue from recreational operations on TVA property. FS sends the WT a monthly listing of charges to be billed for their review and approval. The WT is responsible for contacting the customer for payments over 60 days' past due. Once an invoice is over 90 days' past due, the WT can submit the invoice to OGC for collection or provide justification for not turning over to OGC and continue to collect internally. According to the Senior Vice President, E&T, TVA has been encouraging more internal organizational collections. L&SM has established overdue account recovery procedures which provide more detail and direction regarding the collections process.

We obtained a listing of recreational properties whose annual fees are paid on a percent of gross revenue or fixed price basis. We identified 33 sites that paid annual fees on a percent of gross revenue basis, totaling $322,946, and 98 sites that paid on a fixed price basis, totaling $290,596, for a total of $613,542. For 53 of the 76[10] agreements in our sample, we compared the annual fee in the sampled agreements to the revenue listings to verify the accuracy of revenue billing data. Based on this comparison, we identified a discrepancy between the amount billed and the annual fee noted in the respective agreement.

Specifically:

- The annual fee for (b) (4) was on the revenue listing at $1,560; however, the annual fee should have been the greater of 5 percent of gross revenues, or $4,000 as provided in the license agreement dated March 28, 2007. According to FS personnel, this issue was identified in September 2009, and the lists were updated. FS personnel also indicated that the $1,560 annual fee was the rate on the previous license agreement. The operators were notified of the issue regarding the annual fee in January 2010. As of February 24, 2010, the operator had paid the true-up balance of the base rate. As of March 3, 2010, TVA was still awaiting receipt of the gross revenue information for the years under the new contract to calculate the balance due, if necessary.

[10] The remaining 23 agreements in our sample were either fee-waived or lacked a recreational identification number.

According to WT personnel, the monthly invoice listings provided by FS are reviewed for accuracy. However, the above discrepancy in the annual fee for (b) (4) was not identified.

In addition, we noted one of our judgmentally selected agreements was not included on the revenue list provided by FS. TVA terminated its agreement with the operator of (b) (4) in November 2007 due to numerous public safety issues. On February 12, 2009, the TVA Board approved a lease agreement with a new operator, pending collection of administrative costs and the first year's rent, prorated based on the effective date. TVA granted approval on February 13, 2009, for the new operator to begin construction activities related to renovating the campground. During our review, we requested the executed agreement for (b) (4) from Realty Services and were informed they had not been notified of payment receipt by FS. We contacted FS to determine the status of the payments. According to FS personnel, (b) (4) had been invoiced for administrative costs but not the first year's rent because an effective date for the agreement had not been provided by Realty Services. Subsequent to our inquiries, the payment for the first year's rent was received on September 15, 2009, and the lease was executed December 11, 2009, with an effective date of April 3, 2009, which is the date the day-use area opened and operations started.

## MONITORING AND ENFORCEMENT OF RECREATIONAL LAND AGREEMENTS

Our review also consisted of assessing TVA's process for monitoring and enforcement of recreational land transactions. We conducted interviews with WT personnel, L&SM personnel, and OGC personnel to gain an understanding of this process. In addition, we performed site visits for selected sites within our sample. Historically, monitoring and enforcement of agreements and sites have been inconsistent. Since 2008, two groups have been responsible for conducting campground reviews—SP&P and SC.

Based on our assessment of the monitoring and enforcement of recreational land agreements, we determined (1) TVA does not have an accurate listing of recreational properties that hinders adequate monitoring, (2) no process is in place for identifying data errors or noncompliance issues related to agreement terms, other than "visual" violations on the properties, and (3) TVA does not exercise its right of reentry for properties sold under Section 4(k)(a) when the properties are used in violation of the deed. In addition, we noted (1) structures built on TVA properties without TVA approval and (2) sporadic usages of "approvable actions" (i.e., permits issued after construction or changes have been made to the property without TVA approval).

### Monitoring of Land Agreements

As previously stated, according to information provided by L&SM personnel as of August 26, 2009, there are currently 436 agreements for operation of

campgrounds and marinas on TVA land. Each of these agreements provides certain rights and requirements for operation of those recreational properties, including, but not limited to:

- The right to construct, maintain, develop, and operate recreational facilities, upon approval by TVA.
- Property usage for commercial recreation purposes only.
- Restrictions related to the type of business allowed, identification of sites for seasonal use, and length of stay associated with that use.
- Maintenance of the premises in good condition.
- TVA's right to inspect the premises.
- Contour elevation to be excluded from construction.

Failure to comply with the terms of the agreements can result in additional fees and termination of the agreement, including repossession of the land by TVA, if so stated in the sale and transfer deeds. According to OGC personnel, TVA has historically not pursued litigation against campground and marina operators who are in noncompliance with their agreements because, in most instances, the cost of pursuing litigation outweighs the benefit of this type of enforcement. For properties sold by TVA under Section 4(k)(a) with a right of reentry, according to OGC personnel, TVA has never utilized this right. In most instances, a deed modification would be executed to remove the recreation restriction.

According to L&SM personnel, monitoring of these agreements has historically been done as staffing resources were available. WT personnel further stated that when issues were discovered, follow-up on the remediation of violations has been inconsistent. In a December 2008, memorandum to the OIG, the Senior Vice President, E&T, confirmed that TVA had not put dedicated resources toward monitoring and enforcement efforts in over 20 years. In 2008, as a response to the lack of monitoring and enforcement efforts, E&T created two groups responsible for monitoring recreational properties. L&SM's SP&P conducts campground scorecard assessments to rate the experience, safety, and quality. The SC group investigates and confirms compliance with agreements and regulations. Currently, campgrounds are the primary focus of both groups.

TVA maintains a listing of violations and encroachments (V&E) for all compliance-related issues pertaining to land transactions. V&Es have typically been identified by WT shoreline inspections or customer complaints and generally relate to permitable items under Section 26a of the TVA Act (with some instances of campground and marina noncompliance issues). As of September 2008, the listing contained over 4,500 V&Es. Since that time, L&SM has worked to prioritize these V&Es and verify existing data in the V&E database. As of March 16, 2010, the "cleaned up" version of the V&E list totaled approximately 3,500 issues. While this listing provides WT with issues that can be seen (such as debris, property encroachments, etc.), it does not provide information on

issues that cannot be observed. L&SM currently has no process in place for identifying data errors or for determining noncompliance issues related to agreement terms.

**Data Inaccuracies in the Recreation Database**

As previously described, land records for all land currently or previously owned by TVA, including leases, easements, or other contractual arrangements for land, are maintained by Realty Services. Land records are maintained by tract number rather than by disposition of the property. Because of this, it is difficult to filter the tracts of TVA property by usage type. In addition, land transaction data is stored in three separate systems: ALIS for land transactions occurring before October 1, 2005, RSLD for transactions occurring after October 1, 2005, and LADS for acquisitions and disposals. L&SM uses the information from these three systems to maintain a listing of recreation facilities.

At the onset of our review, we requested L&SM personnel provide a listing of all TVA recreational lands to which TVA has some type of land right. This listing included campground and marina licenses, leases and easements, as well as transfers and sales where TVA has a right of reentry. L&SM personnel attempted several times to provide an accurate and complete listing of all recreation agreements. However, in the final listing provided, we noted several discrepancies, due to missing and inaccurate data in the files. We used the final listing as provided in selecting our sampled agreements but identified further discrepancies while reviewing the 76 agreements in our sample. Three of those discrepancies are described as follows:

- (b) (4) operates in the WBC Watershed. The lease was executed on August 1, 1989, for a term of 19 years, expiring on July 31, 2008. According to the documentation reviewed, the Land Use application for the new lease was received on April 29, 2009, nine months after the lease had expired. However, according to WT personnel, the WT did not discover that this agreement was expiring. The original lease did not show an expiration date in the ALIS system. An interim license was issued on July 27, 2009, while the applicant pursues a new 19-year lease.

- (b) (4) in the CH Watershed, was sold as a Section 31[11] sale in 1963. According to information provided by L&SM personnel, (b) (4) operated in the CH Watershed under a fee-waived license agreement for commercial recreation. The license further stipulated that the facilities and services would be available for use by all members of the general public. On February 6, 2008, representatives from the CH WT and SP&P visited (b) (4) and observed blocked access to the site. Because of the blocked access, the CH WT determined that, although their

[11] Section 31 of the TVA Act states ". . .That any land purchased by the Authority and not necessary to carry out plans and projects actually decided upon shall be sold by the Authority as agent of the United States, after due advertisement, at public auction to the highest bidder, or at private sale as provided in section 4(k) of this Act."

system showed a license agreement, (b) (4) must be a private facility.

OIG auditors visited (b) (4) on October 30, 2009, and also noted the site appeared to be closed to the general public. Upon further research by CH WT representatives, the license was determined to be null and void upon the original owner's death, which occurred around 2004. The agreement was subsequently terminated in the system.

- (b) (4) operates in the Kentucky Watershed under a license agreement dated January 1, 1996, with an annual fee of $400. The license agreement was assigned to another operator on June 8, 2001. During our review of the (b) (4) file, we noted a letter to the former operator that stated a supplement to the agreement would be prepared to increase the fee from $400 per year to $1,200 per year, effective January 1, 2000, based on the increased land value. Another letter to the new operator in 2005 stated that the supplement had not been executed. A signed copy of this supplement could not be located during our review. According to Kentucky WT personnel, the new owner had been invoiced and had paid the amount recorded in the supplement but had never signed the supplement. The supplement was effective on January 1, 2000.

Without an accurate listing of active recreational agreements, monitoring of agreement terms is difficult. Had the operator of (b) (4) not submitted a new application, the WT may not have recognized the expired lease. Further, the (b) (4) property had been listed inaccurately for five years and, when the WT visited the property, the WT assumed that it was private property and did no further research to verify that assumption.

**Noncompliances With Recreational Land Agreements**

During our review of WT files for the recreational lands in our sample, we noted contract issues, including noncompliances, that had not been previously identified prior to our review. Specifically:

- (b) (4) operates in the WBC Watershed under a license agreement dated January 26, 2004. A special provision in the license requires the licensee to keep records related to the number of boat owners using the pumping services at the marina and submit a pumping report to the WT quarterly. We reviewed the WT file for (b) (4) and were unable to locate any documentation related to pumping services. According to the WT manager, pumping reports have never been requested from the marina.

- (b) (4) operated in the Guntersville-Tims Ford Watershed. TVA constructed the (b) (4) facility in the 1970s and operated the public recreation area through fiscal year 1995. Due to reductions in the fiscal year 1996 appropriations, (b) (4) was one of several recreation areas across the Valley selected to not be

operated and maintained by TVA. On January 31, 2000, TVA entered into a lease agreement with an external operator for approximately 28.12 acres of TVA land to "construct, maintain, develop, and operate the premises for public commercial recreation purposes." In addition, the lease agreement also includes several covenants in regard to the maintenance and condition of the leased premises. Specifically, Covenant B of the lease states that the "lessee shall invest a minimum of $50,000 not including the cost of the lease, for development of the premises within 2 years of the effective date of this lease. In the event that Lessee has not made said minimum investments within the allowed time, the Lessor, TVA, or their successors or assigns may reenter and take possession of the land as if this conveyance had never been made; provided, however, that if Lessee has made a good faith effort toward obtaining federal, state, or local permits, necessary for construction of improvements, and such time limitation expires through no fault of Lessee, then Lessor, TVA or their successors or assigns, at their sole discretion, may extend such time limitation."

TVA personnel completed a contract compliance inspection on September 15, 2006. No issues were noted during this review. In August 2008, the TVA OIG issued Inspection 2007-11428-08 on (b) (4) [redacted]. In that report, the OIG recommended TVA require (b) (4) [redacted] t to comply with documentation requirements of the lease agreement, including documentation of the investment provisions. On February 26, 2009, the WT drafted a compliance letter stating that the required investment had not been made, seven years after the date the documentation should have been provided.

TVA conducted a campground scorecard review of the (b) (4) [redacted] on June 4, 2009. During this scorecard review, several issues were identified, including evidence of long-term occupancy of campsites, current or imminent threats to public safety related to electrical hazards, and evidence of unapproved gasoline, petroleum, or other nonportable fuel storage tanks. After several attempts to work with the operator, TVA revoked this lease in November 2009 due to noncompliance with the lease agreement, including failures to provide (1) documentation of investment, (2) a performance bond, and (3) assurance that electrical services complied with standards.

Since 2008, L&SM has made strides in the monitoring and enforcement of agreements through the campground inspections conducted by SC. As part of these inspections, identified violations are communicated to the operator along with specific resolution requested and a time frame requirement for remediating the violations. Any regulatory and/or safety issues[12] that put TVA at risk are to be resolved within 30 days, while the operators/owners have 90 days to resolve any other types of issues. If the operator is unwilling or unable to remediate the

[12] There are special reporting requirements for suspected environmental violations, and SC follows these requirements using input from the environmental scientist and OGC.

violations, TVA can cancel the agreement depending on the agreement's language. (The (b) (4) discussed previously was cancelled due to noncompliance issues). For fiscal year 2010, SC hired contractors to complete 125 campground inspections.

**Observations Made During OIG Site Visits**

For the 76 agreements reviewed, we conducted site visits for 36 judgmentally selected sites (16 campgrounds and 20 marinas) to determine compliance with agreements as related to issues such as health and safety hazards, residential use of property, and encroachments. During those site visits, we identified issues such as long-term camping, unapproved structures, and/or unkempt conditions at 7 campgrounds and 12 marinas. We provided SC personnel with the results of our site visits.

Examples of these visits are as follows:

- (b) (4) is privately owned and operates in the HCD Watershed. A Land Use application was submitted on March 1, 2007, requesting use of the waterfront for water facilities to support the campground on back lying private property. The waterfront facilities requested by the applicant included a covered set of boat slips, wave break of 500 feet, earth fill for a parking lot, and a shoreline riprap walkway to access the boat slips.

  OIG auditors visited the site on October 22, 2009, and identified two boat docks, one of which is pictured at Picture 1.

**Picture 1**

According to the HCD WT manager, these boat docks require 26a approval; however, 26a permits had not been issued. As of March 31, 2010, no operating agreement or 26a permits had been issued.

- (b) (4) is a campground that operates in the LT Watershed under an easement agreement dated September 30, 2005. According to the easement provisions, seasonal rentals have an eight-month maximum duration. In addition, the provisions state "all camping units will remain truly mobile without any permanent connections, foundations, porches, or similar-type structures." An inspection was conducted by L&SM personnel in May 2009, which identified safety and storage issues. TVA informed the operator of the campground in October 2009 that issues related to boat dock safety and excessive private property stored at campsites had not been resolved.

  OIG auditors performed a site visit on November 4, 2009, and observed (1) a sinking dock (Picture 2) and (2) debris in the storage area (Picture 3).

**Picture 2**

**Picture 3**

We also observed several campers that had been in their location for quite some time, based on the presence of landscaping and personal belongings (Picture 4). In addition, we noted porches and decks were attached to some of the campers. According to LT WT personnel, no documented approvals for the porches and decks could be located. LT WT personnel stated that newer personnel at the WT office had assumed the porches were approved at some time in the past. A follow-up inspection was conducted in March 2010. According to SC personnel, during this inspection they noted the dilapidated dock had been removed and some of the issues had been cleared up, however, some of the V&Es remain open. TVA has two options in regard to the porches—either document what was approved, or treat them as V&Es that need to be removed. As of April 6, 2010, the OIG had not been notified of the WT manager decision.

**Picture 4**

- (b) (4) operates in the Kentucky Watershed under a license agreement dated March 22, 2006. The license was issued for a public commercial marina and campground business. Special provisions in the license state (1) campsite units rented between November 1 and May 31 shall be at a maximum of 14 consecutive days, (2) campers using the site must not leave the site unattended for more than 24 hours at a time, (3) all camping units will remain mobile-in-fact without any permanent connections, foundations, porches, or similar type structures attached or appended in any way to such units, and (4) no mobile homes will be allowed on the premises. On October 21, 2009, OIG auditors performed a site visit and noted potential violations of license provisions regarding length of stay and campers remaining mobile. Specifically, as shown in Picture 5, we identified campers with landscaping and attached structures.

**Picture 5**

According to documentation obtained from the (b) (4) file, the items noted during the OIG site visit were similar to issues identified during a 2006 Kentucky WT site visit performed by Kentucky WT personnel.

- (b) (4) operates in the LT Watershed under a license agreement dated April 20, 2000. During the OIG site visit on November 4, 2009, we observed restaurant decking at the edge of the shoreline posing a safety hazard or potential violation of the agreement (see Picture 6).

**Picture 6**

We discussed our observations with LT WT personnel regarding permits and approvals for the restaurant decking. According to LT WT personnel, the decking appears to be below the 100-year floodplain and possibly below the 813 contour line, which requires a 26a permit. As of April 14, 2010, no permit had been issued or requested.

- During our site visit to (b) (4), which operates on the Watauga Reservoir in the HCD Watershed, we identified two instances where a potential violation was not reported by the WT because it was considered an "approvable action," or an action that would have been permitted if requested. (b) (4) is privately owned; however, the pier extends past the privately owned land into the waters in front of TVA land. Because of this, an agreement between TVA and the marina owner is required for that portion of the marina pier. The marina has operated under a license agreement with TVA since December 12, 2005. In addition, there is a flowage easement for the land below the shoreline contour, requiring 26a approval for any construction activities below the shoreline contour. Based on documentation in the Watershed file, the existing facilities prior to the current agreement had not been approved.

  On October 20, 2009, the OIG performed a site visit of (b) (4) and observed (1) an expanded parking lot and (2) decks attached to camping units, without TVA authorization. According to HCD WT personnel, these

would be considered "approvable actions" or actions that would have been approved if requested by the operator. However, according to SC personnel, approvable actions such as those above should have been reported as violations and encroachments or permitted instead of remaining with no action taken. The existing parking lot and the camper decks were included in the 26a permit approved on April 8, 2010.

While the focus of L&SM's efforts has been on campground compliance, with a plan to include marina compliance in the future, sales and transfers of TVA properties sold under Section 4(k)(a) have not been monitored for compliance with the terms of the deed.

**Monitoring of Sales and Transfers**

As previously stated, Section 4(k)(a) of the TVA Act states that TVA has the power "to convey by deed, lease, or otherwise, any real property in the possession of or under the control of the Corporation to any person or persons, for the purpose of recreation or use as a summer residence, or for the operation on such premises of pleasure resorts for boating, fishing, bathing, or any similar purpose." While TVA's Land Policy provides for the removal or modification of deeds in limited circumstances, the Policy prohibits the removal or modification of deed restrictions for the purposes of residential development. The Land Policy further states that TVA will, to the extent permitted by the language of deed or other transfer or contractual instrument, administer its interest in former TVA land to achieve the goals of the policy.

Of the 76 agreements reviewed, we identified ten agreements that were a sale or transfer under Section 4(k)(a). All ten agreements required that the properties be used for recreational purposes only and contained a clause stating that TVA retained the right to reenter and repossess the land if those terms were not met. We conducted site visits for nine of the ten properties and determined that three of the nine properties were in noncompliance with the terms of their respective deeds, without TVA modifying the deed or exercising their right of reentry.

(b) (4) (b) (4) – CH Watershed (tract XCR-102), approximately 35.4 acres, was originally sold at public auction under Section 4(k)(a) of the TVA Act on September 28, 1949. The warranty deed required the property be used for commercial recreation only and provided the grantees rights to construct, maintain, operate, lease, and rent buildings as necessary for the operation of a commercial recreation site. The deed further stated, "Upon breach of this condition, either in whole or in part, the Grantor, and its successors, shall have the right to re-enter and take possession of said land, and to hold, own and possess the same in the same manner, and to the same extent as if the conveyance had never been made. Any failure on the part of the Grantor to re-enter and take possession of said land shall not be construed to be a waiver of this condition."

The property was subsequently sold in 1970. The new owners retained 22.9 acres as (b) (4) and sold 12.5 acres known as (b) (4) Currently, three separate tracts make up the original 35.4 acres—(b) (4), a small campground, and (b) (4) (previously (b) (4).

On October 5, 2009, the OIG performed a site visit of the area with a representative from CH WT. We observed houseboats and boat slips at (b) (4) signifying use as commercial recreation. During our visit, we requested the CH WT representative take us through the rest of the property that was included in the original deed. We observed several structures that appeared to be residential, along with a "private property" sign at the entrance of a newly paved street (Picture 7).


**Picture 7**

In addition, we observed manufactured homes on the property (Picture 8). CH WT personnel were unaware the remaining property was part of the original tract. According to CH WT, the property owners have been informed there can be three caretakers' residences on the property, but all other residential use is prohibited based on the original deed restrictions.

**Picture 8**

(b) (4) – Pickwick Watershed

This tract of land was sold as a Section 4 (k)(a) sale in August 1947. The original agreement required the land be used for construction and operation of cabins for public recreation and that water-use facilities be made available for public use at reasonable and customary charges. In addition, the agreement stated that if the commercial recreation conditions in the agreement were breached, "either in whole or in part, the grantor [TVA], and its successors, shall have the right to re-enter and take possession of said land, and to hold, own and possess the same in the same manner and to the same extent as if this conveyance had never been made. Any failure on the part of the grantor to re-enter and take possession of said land shall not be construed to be a waiver of this condition."

Most of this property was conveyed to (b) (4) in July 1997 by the previous owner. (b) (4) subsequently conveyed 11.9 acres to (b) (4) in April 2000. In February 2003, a deed modification was executed allowing all property except the 11.9 acres conveyed to (b) (4) to be subdivided and sold as individual lots. The deed modification further stated the property "shall be used for the purpose of recreation or use as a summer residence, or for the operation on such premises of pleasure resorts for boating, fishing, bathing, or any similar purpose; provided the use of said land for a

summer residence for private residential purposes at times other than, or in addition to the summer season shall not be deemed to be a breach of this covenant." This deed modification was executed in exchange for the fair market value of the property plus TVA's administrative costs.

In August 2004, the owner of the 11.9 acres requested a deed modification for 1.8 acres to be used in a manner similar to that detailed in the 2003 deed modification above. The usage request was to construct (b) (4) with approximately 50 permanent residences sold to individual owners. In October 2004, an appraisal conducted by TVA determined the fair market value of the deed modification to be $18,750. The appraisal concluded an Indian burial mound located within the 1.8 acres tract would reduce the buildable area by 0.30 acre. The owner subsequently conducted his own surveys of the property in 2005 and again in October 2006, but neither survey complied with TVA standards.

TVA completed an updated appraisal in March 2007. By that time, however, (b) (4) shown in Pictures 9 and 10, had been constructed without a deed modification allowing this construction. In addition, the condominiums were constructed within the 0.30 acre buffer that had previously been allocated for an Indian burial mound. As of May 4, 2010, a deed modification allowing these condominiums had not been executed.

**Picture 9**


**Picture 10**

(b) (4) – WBC Watershed

The property was transferred under Section 4(k)(a) to the Town of Spring City (Town) in February 1958. The transfer agreement stated:

> . . . all of the lands and rights transferred hereby be used only as a municipal park . . . and upon the breach of said condition as to any of said lands and rights, the Grantor, its successors, and assigns shall have the right to re-enter and take possession of all therefore and to hold, own and possess the same in the same manner and to the same extent as if this conveyance had never been made.

The deed further states:

> Nothing in this indenture shall constitute or evidence approval by TVA within the meaning of Section 26a of the Tennessee Valley Authority Act of 1933, as amended, of any structure or facilities constructed or to be constructed by the Grantee upon the fee parcels or upon the easement areas. The Grantee by its acceptance hereof covenants that it will not construct any structures or facilities for which approval is required under Section 26a until plans for such structure or facility have been submitted to the TVA's Committee for the Administration of Section 26a and approved by the TVA Board of Directors in accordance with established procedures.

According to the files maintained by the WBC WT, over the years the Town has provided commercial recreation operations and facilities such as cabins, campsites, marinas, and restaurants. In the early 1990s, TVA received a complaint that campsites were being used as residences. According to the complaint, campsites were being rented for up to a year at a time. Between 1993 and 1994, TVA staff met with Town officials and the lessee to remedy this situation. TVA determined the property was being used for temporary residential use and informed the Town that residential use was not compatible with the transfer agreement.

On April 20, 2006, the Town executed a 99-year lease with (b) (4) [redacted], co-owned by a former L&SM employee, to operate (b) (4) [redacted] This agreement states the property is to be used for the establishment of recreational facilities including hotel, motel, rental cabins, or camping. On November 9, 2006, TVA sent a letter to Spring City's Mayor requesting an immediate halt in all activities that were inconsistent with the terms and conditions of the deed. In addition, TVA requested the Town provide, within 30 days, a revised plan for future development of the property that was consistent with the use solely as a municipal park.

(b) (4) has added commercial recreation facilities, including expansions to the restaurant and campsites without Section 26a approval as required by the deed. These expansions have again created conflicts with adjoining property owners who argue TVA should not allow commercial recreation operations on municipal park land. The (b) (4) argues that TVA has allowed commercial recreation operations for many years without TVA interference. In order to resolve the existing problems, TVA offered three options:

1. Continue operations "as is," allowing no expansion or modifications and resolving the existing violations.
2. Clarify the deed to explain what type of facilities would be allowed in the future.
3. Modify the existing deed to allow for commercial facilities.

The Town has since declared the 99-year lease with (b) (4) null and void and is working with (b) (4) and its attorneys to enter into a 25-year lease, outlining the path forward and to resolve existing conflicts. However, according to documentation in the WT files, the operators of (b) (4) do not believe a deed modification is necessary due to TVA historically allowing noncompliances on the tract.

L&SM conducted a campground scorecard inspection of the property on May 20, 2009, and noted that extensive construction activity was occurring on the property (unauthorized structures and unauthorized fill below the 750-foot contour) without a 26a permit.

According to SC personnel, if TVA's efforts to resolve these issues with Spring City are not successful, TVA will review options to address the V&Es through other means. SC personnel further stated that if they choose not to resolve the issues, TVA's recourse would likely be reentering and taking possession of the property.

## CULTURAL FACTORS AFFECTING THE MANAGEMENT OF PUBLIC LANDS

Although revenue from campgrounds and marinas is immaterial to TVA financial statements, TVA faces a reputational risk by not adequately managing the use of these properties. In fact, "Stakeholder dissatisfaction due to the way TVA manages TVA Reservoir Lands" was identified as a "Medium" risk in Enterprise Risk Management's July 30, 2009, presentation to the Enterprise Risk Council. During our review, we observed a culture of marina and campground operators "asking forgiveness rather than permission," examples of which have been described in this report. This culture seems to have developed over the years, primarily due to TVA's inconsistency in monitoring and enforcement of V&Es. Based on interviews with WT personnel, much of this inconsistency stems from lack of management support, inadequate staffing, generic language in the agreements making enforcement difficult, inconsistent follow-up of identified issues, and an emphasis on 26a permit cycle time.

As previously stated, since 2008, TVA has increased its monitoring and enforcement of V&Es. While we applaud E&T's efforts to deal with V&Es, we believe further emphasis should be placed on changing the culture within the organization itself. Through management support and consistency in enforcement, we believe TVA can demonstrate leadership in managing these lands to improve the quality of life for the people within the Tennessee Valley.

# RECOMMENDATIONS

We recommend the Senior Vice President, E&T:

- Revise the Stewardship Guidelines to include criteria on when to use a license, lease, or an easement.
- Consider minimizing the use of licenses to prevent long-term encumbrances of land.
- Implement a process to track changes in campground or marina ownership and ensure reevaluations and other stipulations (i.e., pump reports).
- Implement a process for reevaluating annual fees as allowed by each recreation agreement.
- Ensure reviews of monthly invoices are adequately performed.

- Create and maintain an accurate listing of all campgrounds and marinas on TVA lands, including those that have been sold with a right of reentry, to ensure monitoring of those agreements can be accomplished.
- Consider implementing an inspection review of all campgrounds and marinas on a biennial basis.
- Consider stronger enforcement of violations and encroachments, including properties sold for commercial recreation use, up to and including repossession of those properties.
- Establish guidelines to deal with "approvable actions" including requiring WT manager approval before approving "after the fact" 26a permits.
- Communicate the importance of monitoring and enforcement of recreational agreements to responsible E&T personnel and develop performance standards for consistency in monitoring and enforcing these agreements.

## MANAGEMENT'S COMMENTS AND OUR EVALUATION

We provided a draft of this report to TVA's Senior Vice President, E&T, who agreed with our recommendations and provided other comments and clarifications, which have been incorporated into the report as applicable (see Appendix).

According to the Senior Vice President, E&T, organizational and procedural changes have been made that address many of the report's recommendations. These changes are related to a new guideline document and the new organization, "Commercial and Dispersed Recreation." In addition, E&T has developed a scorecard for evaluating campground operations, similar to "restaurant ratings," and uses the Clean Marina Program for marinas. E&T is revising the standard language for leases, easements, and licenses to better assist with management issues, including specific language related to termination of agreements for nonpayment, insurance requirements, surety requirements, and other such items.

August 31, 2010

Robert E. Martin, ET 3C-K

REQUEST FOR COMMENTS - DRAFT AUDIT 2009-12728 - REVIEW OF RECREATIONAL LAND TRANSACTIONS

Thank you for the opportunity to review and comment on the draft results of the subject audit. We agree with the ten recommendations. There is much work we need to do in these areas and I believe we have begun to make progress. The report is complete, well written, and will help guide our activities as we work to improve TVA's performance.

We offer the following comments and clarifications for your consideration.

1. Page 11 - The table references the status of (b) (4) as "Possible August Board Meeting." TVA has two agreements with (b) (4) – one on Guntersville and one on Chickamauga. The lease associated with the Chickamauga facility was approved by the Board on August 20, 2010. The Guntersville facility has not been presented for Board consideration. The status of the (b) (4) should be "approved – June 2010." (b) (4) should be "approved - August 20, 2010."

2. Page 13 - The report states that the Watershed Team (WT) can submit an invoice to OGC for collection, or provide justification for not turning over to OGC and continue to collect internally. We have been encouraging more internal organizational collections. To that end, Land and Shoreline Management (L&SM) has prepared overdue account recovery procedures which include more detail and direction regarding the collections process.

3. Page 29 - The underlined subheading should read, '(b) (4) – Watts Bar Clinch Watershed."

4. Page 31 - There is a recommendation that L&SM should "establish guidelines to deal with 'approvable actions' including requiring WT manager approval before approving 26a permits." It is unclear whether the OIG is suggesting that the WT manager approve all initial 26a permits, or rather just "after-the-fact" permitting of an "approvable action." We believe it is recommended that WT managers should approve the "after the fact" permit. Page iii of the report refers to "sporadic usage of 'approvable actions' (i.e., permits issued after construction or changes have been made to the property without TVA approval)." In the body of the report, there is no mention of the level of approval being an issue; but rather, the inconsistent follow-up in reviewing and issuing permits for after-the-fact permitting of approvable actions. We suggest the intent of this recommendation be clarified in the report.

5. Final recommendation - "Communicate the importance of monitoring and enforcement of recreational agreements to responsible E&T personnel and develop performance standards for doing so." As written, this recommendation is open to multiple interpretations. It could mean establishing performance standards for agreement language and the tracking and enforcement of those inspection items and standards. However, it could also include all Senior Management Performance Reviews associated with managing these agreements and making progress toward the successful goal and "changing the culture within the organization."

In addition to the specific items above, I offer the following comments for your consideration as you finalize the report.

- Page i - There is a summary of the organizational set-up of the WTs at the time the audit was conducted. I believe the recent reorganization should be acknowledged.

- Page 6 - There is a summary of the commercial recreation guideline. We have recently implemented additional changes to the guidelines and anticipate updating it within the next few weeks.

- We have implemented changes, both organizational and procedural, that I believe will address many, if not most, of the report's recommendations. Most of those are related to the new guideline document and the new organization, "Commercial and Dispersed Recreation," put in place to address these issues.

- We have developed a scorecard for evaluating campground operations and have used it during the past year. It is currently one of our operational indicators and is similar to a "restaurant rating" you see frequently posted at restaurants. Each campground will receive a score based upon a 100 point scale. We also have the Clean Marina Program for marinas.

- We are revising the standard language of our leases, easements, and licenses to better assist us with management issues. For example, we are specifically stating that TVA can terminate agreements for lack of payment. We are also adding language regarding insurance requirements, surety requirements, and other such items.

If you wish to discuss these comments, or need additional information, please give me a call, or you may contact James Adams at (256) 386-3655. Again, thank you for the review. We intend to make major improvements and to do so quickly.

Anda A. Ray

Anda A. Ray
Senior Vice President
Environment and Technology
WT 11A-K

**Memorandum from the Office of the Inspector General**

May 4, 2011

Robert J. Fisher, LP 3K-C

REQUEST FOR FINAL ACTION – AUDIT 2009-12763 – REVIEW OF FOSSIL FUEL INVENTORY

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 within one year from the date of this memorandum when final action is complete.

If you have any questions, please contact Kristi U. Reynolds, Senior Auditor, at (865) 633-7360 or Lisa H. Hammer, Director, Financial and Operational Audits, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

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

KUR:JP
Attachment
cc (Attachment):

Mark A. Creech, MR 2D-C
Elliott C. Flick III, LP 3K-C
Michael B. Fussell, WT 9B-K
Peyton T. Hairston, Jr., WT 7B-K
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OIG File No. 2009-12763

Office of the Inspector General

*Audit Report*

To the Senior Vice President,
Fossil Power Group

# REVIEW OF FOSSIL FUEL INVENTORY

Audit Team
Kristi U. Reynolds
Jamie M. Wykle

Audit 2009-12763
May 4, 2011

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ALF | Allen Fossil Plant |
| BC | Belt Conveyor |
| CGS | Coal and Gas Services |
| COF | Colbert Fossil Plant |
| CUF | Cumberland Fossil Plant |
| DCR | Daily Coal Report |
| eFMS | Enterprise Financial Management System |
| eSOMS | Electronic Shift Operations Management System |
| FPG | Fossil Power Group |
| FWX | Fuelworx |
| FY | Fiscal Year |
| GAF | Gallatin Fossil Plant |
| GPS | Global Positioning System |
| JSF | John Sevier Fossil Plant |
| KIF | Kingston Fossil Plant |
| NIST | National Institute of Standards and Technology |
| PAF | Paradise Fossil Plant |
| PERs | Problem Evaluation Reports |
| PSO | Power System Operations |
| SHF | Shawnee Fossil Plant |
| SPP | Standard Programs and Processes |
| TVA | Tennessee Valley Authority |
| WCF | Widows Creek Fossil Plant |

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## APPENDIX

# EXECUTIVE SUMMARY

Tennessee Valley Authority's (TVA) fossil fleet consists of 56 operating units at 11 fossil plants[i] in the Tennessee Valley. Over the past ten years, TVA's fossil plants, with 14,675 megawatts of capacity, have produced an average of 95.5 billion kilowatt-hours of electricity per year, accounting for more than 60 percent of TVA's power generation. TVA is the third largest purchaser of coal in the United States, with TVA's fossil plants burning coal from the four major U.S. coal basins. Through the third quarter of fiscal year (FY) 2010, TVA purchased 25.2 million tons of coal totaling $1.36 billion and burned 25.7 million tons totaling $1.50 billion. TVA's fuel inventory as of June 30, 2010, was $518,658,383.

Within the Fossil Power Group (FPG), Coal and Gas Services (CGS) is responsible for the procurement, transportation, storage, and delivery of coal. Coal Logistics, a group within CGS, coordinates and schedules coal deliveries via barge, rail, and truck between TVA and vendors responsible for providing coal, transportation, terminal services, and storage. Coal Logistics also establishes and manages inventory target levels, as well as develops terminal and fuel flexibility strategies that help minimize operating costs. Fuel Delivery and Support Systems is responsible for conducting annual material testing at each fossil plant and also for conducting semiannual physical inventories at each fossil plant.

The coal inventory on TVA's financial statements is impacted by the rate per ton in Fuelworx, vendor weights, TVA burn weights, and physical inventory adjustments. We assessed the operating effectiveness of the controls over the receipt and burning of coal at the fossil plants, including inventory adjustments. Specifically, we determined:

- The variance reports are generated using information in the Daily Coal Report (DCR). However, the vendor name listed in the DCR does not consistently represent the respective coal company, coal mine, or loading point, which could prevent the identification of significant issues.
- Variance investigations are not always coordinated between CGS and plant personnel, which could impact the efficiency of the investigations.
- Material tests, which ensure the accuracy of the TVA scales, are not being conducted on all receipt and burn scales on an annual basis at the 11 TVA fossil plants. According to TVA personnel, Problem Evaluation Reports (PERs) have been written at Allen and Gallatin fossil plants for infrastructure deficiencies preventing material testing.

[i] TVA's 11 fossil plants are Allen, Bull Run, Colbert, Cumberland, Gallatin, John Sevier, Johnsonville, Kingston, Paradise, Shawnee, and Widows Creek.

- Documentation is not consistently maintained for the daily belt scale checks, weekly belt scale calibrations, and material flow checks. Therefore, we were unable to determine whether these checks were consistently conducted.
- No formal process exists for conducting investigations on inventory adjustments that exceed the tolerable limit. According to TVA management, the FPG began utilizing Maximo to document and track PERs for inventory adjustment investigations in FY 2011.

We recommend to the Senior Vice President, FPG:

- Modify the macro that generates the DCR so that the coal company, coal mine, or loading points are consistently reflected resulting in more accurate data for the TVA versus vendor weight comparison.
- Improve TVA versus vendor variance investigations by extending the investigation beyond the plant level to include the support of CGS.
- Ensure material tests are being conducted on an annual basis at all 11 TVA fossil plants on the receipt and burn scales.
- Communicate the importance of consistency in conducting and documenting daily belt scale checks and weekly belt scale calibrations.
- Ensure material flow checks are being conducted and documented at all fossil plants, where practical without interrupting operations.
- Consider permanent implementation of the TVA pilot program on receipt scales to increase the level of accountability and automate the scale certification process at all 11 TVA fossil plants.
- Ensure a formal process is implemented for conducting investigations on inventory adjustments that exceed the tolerable limit in an effort to determine why adjustments fall outside tolerable range. The process should include a corrective action plan to minimize future inventory adjustments.

We provided a draft of this report to TVA's Senior Vice President, FPG. TVA management agreed with our recommendations and has taken or is taking actions to address these recommendations. See the Appendix for TVA's complete response.

# BACKGROUND

Tennessee Valley Authority's (TVA) fossil fleet consists of 56 operating units at 11 fossil plants[1] in the Tennessee Valley. Over the past ten years, TVA's fossil plants, with 14,675 megawatts of capacity, have produced an average of 95.5 billion kilowatt-hours of electricity per year, accounting for more than 60 percent of TVA's power generation. TVA is the third largest purchaser of coal in the United States, with TVA's fossil plants burning coal from the four major U.S. coal basins. Through the third quarter of fiscal year (FY) 2010, TVA purchased 25.2 million tons of coal totaling $1.36 billion and burned 25.7 million tons totaling $1.50 billion. TVA's fuel inventory as of June 30, 2010, was $518,658,383.

Within the Fossil Power Group (FPG), Coal and Gas Services (CGS) is responsible for the procurement, transportation, storage, and delivery of coal. Coal Logistics, a group within CGS, coordinates and schedules coal deliveries via barge, rail, and truck between TVA and vendors responsible for providing coal, transportation, terminal services, and storage. Coal Logistics also establishes and manages inventory target levels, as well as develops terminal and fuel flexibility strategies that help minimize operating costs.

Data from shipment documentation, such as the shipment identification number, date, and load weight (which reflects vendor weight), is entered into the Fuelworx[2] (FWX) system by FPG personnel. Upon receipt of coal, each fossil plant weighs the coal on the receipt scale to compare TVA's receipt weight to the vendor's delivery weight. The coal is then routed to either the powerhouse[3] for consumption or the stockpile for storage. Before the coal enters the powerhouse, it is weighed on a burn scale to determine the burn amount. The receipt scale and burn scale weights are entered into FWX by FPG personnel. TVA receipt scales are used to compare against the vendor weight while burn scales are used to determine the tonnage to deduct from inventory.[4]

Each plant maintains documentation of the comparison between TVA weights and vendor weights. The reporting tool used to determine the variances is called the Daily Coal Report (DCR). The DCR is downloaded from FWX and contains information related to daily inventory, weights, demurrage, consumption, and quality. Each line of the DCR represents a receipt, consumption, adjustment, or transfer. Monthly, a variance report is generated from the DCR that graphs the average percentage difference, by vendor, between the TVA weight and the vendor weight for each fossil plant. The comparison is performed to ensure the

[1] TVA's 11 fossil plants are Allen, Bull Run, Colbert, Cumberland, Gallatin, John Sevier, Johnsonville, Kingston, Paradise, Shawnee, and Widows Creek.

[2] FWX is a fuels management system that supports contract management, quality analysis, inventory management, accounting, and logistics.

[3] At 3 of the 11 plants, the coal may be first routed to a silo or a "live pile" for temporary storage until ready for consumption (Bull Run, Cumberland, and Paradise fossil plants).

[4] Some plants have multiple receipt scales and/or burn scales.

variances are within the tolerable limits[5] as established by CGS and no significant trends are identified. If the variance exceeds the tolerable limits, an investigation is conducted at the plant level to determine the cause for the variance.

TVA's scale accuracy is determined by an annual material test. The Fuel Delivery and Support Systems is responsible for conducting annual material testing on the belt scales at each fossil plant. A material test is conducted by either passing a previously weighed material over the belt conveyer scale or weighing all material that was passed over the belt conveyor scale. The goal of the material test is to ensure the accuracy of the scales by proving repeatability in testing. The material utilized in a material test must be weighed on a reference scale. The reference scale should be tested within 24 hours prior to the start of material testing. A minimum of three consecutive tests are run on each scale. The results of these tests must be within a predetermined acceptable tolerance limit.

In between the annual material test, each plant is responsible for ensuring the scales maintain accurate repeatability. This is accomplished by (1) daily belt scale checks, (2) weekly belt scale calibrations, and (3) weekly belt scale material flow checks. FPG Standard Programs and Processes (SPP) 08.008 states that the entire belt line be inspected for excessive coal buildup, coal spills, weigh bridge clear and free of binding, idlers (rollers) turning freely and also ensuring the scale integrator reads zero when the belt is running empty. The daily belt scale check is a visual inspection of the scales to ensure the scales are clean and clear of debris. The weekly belt scale calibrations confirm the calibration hasn't changed since the last material test. The weekly belt scale material flow check compares weights between two scales on the same conveyor line en route to the powerhouse.

TVA's Yard Operations procedure, YOP SPP.08.002, states that, to ensure accurate inventory accounting, TVA will test all receipt and consumption scales at least annually in a manner consistent with the National Institute of Standards and Technology (NIST) Weights and Measures Handbook 44. Handbook 44 lists specifications, tolerances, and other technical requirements for weighing and measuring devices. Handbook 44 scale certification is defined as the ability to bill, invoice, or purchase from the scale readings. Material testing does not certify a scale per Handbook 44, and scales do not have to be certified to be accurate. The purpose of material testing TVA scales is for accuracy or calibration versus certification. According to TVA personnel, no TVA belt scales are currently certified per Handbook 44. In an effort to certify TVA scales, TVA recently initiated a pilot program at four fossil plants that focuses on receipt scale enhancements including the addition of printers to increase the level of accountability and automate the scale certification process. As of January 5,

[5] The tolerable limits are determined by calculating the mean and standard deviation of the monthly average variances for the previous two years for each fossil plant, then adding or subtracting two standard deviations from the mean resulting in the upper and lower tolerable limits.

2011, both Cumberland and Widows Creek fossil plants have implemented these enhancements. However, according to Fuel Delivery and Support Systems personnel, these scales are eligible for certification but have not been certified. Although there are currently no certified TVA scales, some vendors are paid based on TVA weight.

The Fuel Delivery and Support Systems conducts a semiannual physical inventory to determine the number of tons in each plant's coal pile. The volume of the coal pile, density of the pile, and subsidence[6] are all used to determine the number of tons in the coal pile. The semiannual physical inventory survey is conducted using a Global Positioning System (GPS). The density number and the subsidence number are sent to Survey and Project Services (Power System Operations (PSO)) to be used in the calculation of tonnage from the survey. If the density is within the tolerable range limits, the final inventory results are sent to Portfolio Management. If the density range exceeds tolerable limits, an investigation is initiated by Fuel Delivery and Support Systems.

# OBJECTIVE, SCOPE, AND METHODOLOGY

Due to recurring issues identified during Sarbanes-Oxley testing, we conducted a review of Fossil Fuel Inventory. Our objective was to assess the operating effectiveness of the controls over the receipt and burning of coal at the fossil plants, including inventory adjustments. For the purposes of this review, we concentrated on the controls impacting TVA's financial statements; specifically, the rate per ton in FWX, vendor weights, TVA burn weights, and physical inventory adjustments. The scope of the review included FYs 2009 and 2010.

To achieve our objective we:

- Interviewed Chief Operating Officer personnel to gain an understanding of the (1) coal inventory process, (2) daily belt scale check process, (3) weekly belt scale calibration checks, (4) TVA versus vendor weight comparison, (5) material test process, (6) physical inventory process, and (7) inventory adjustments, including how adjustments are determined.
- Interviewed FPG site personnel to determine the coal inventory process including (1) unloading equipment utilized, (2) type of coal utilized, and (3) belt scales utilized for receipt and burn weights.
- Interviewed Kaskaskia Valley Scale Company[7] personnel to gain an understanding of the scale systems and maintenance requirements.
- Reviewed TVA's SPP related to coal receipt, coal weight, and coal inventory to gain an understanding of TVA's policies.

[6] Subsidence is the amount and weight of the coal that has caused the ground under the pile to form a bowl depression.

[7] Kaskaskia Valley Scale Company is an independent contractor hired by TVA to assist with material testing and make adjustments to the scales.

- Reviewed (1) Fuel Statistics reports to get a historical view of inventory adjustments, (2) TVA versus vendor weight variance reports to determine whether investigations were conducted for any variance outside the tolerable limits, and (3) coal contracts to compare price per ton to the price per ton as loaded into FWX.
- Judgmentally selected Colbert (COF), Cumberland (CUF), Paradise (PAF), Shawnee (SHF), and Widows Creek (WCF) fossil plants for conducting our site visits and associated testing. During our testing, we replaced WCF with John Sevier (JSF) for our site visit because their annual material test occurred during our fieldwork. Our judgmental sample was based on (1) auditor knowledge of particular issues and (2) method of coal receipt.
- Obtained the DCR for COF, CUF, PAF, SHF, and WCF as of June 1, 2010. We compared the information on the DCR to FWX[8] for selected fields downloaded to the DCR and obtained explanations for any discrepancies.
- Selected a 10 percent random sample of 164 business days between October 1, 2009, and May 31, 2010, resulting in a sample size of 16, for obtaining shipment information from the DCR.
- Compared coal shipment information on the selected DCRs to the supporting documentation for the randomly selected days.
- Compared the contract rate per ton to the FWX rate per ton for the contracts with shipments received on the randomly selected days for COF, CUF, PAF, SHF, and WCF.
- Interviewed Business Services' Chief Operating Officer personnel to determine how inventory adjustments are entered into FWX.
- Obtained and compared the physical inventory results for FY 2010 for all fossil plants to the inventory adjustments in FWX to determine whether inventory adjustments were accurately recorded in FWX.
- Visited Gallatin Fossil Plant (GAF), COF, CUF, PAF, SHF, and JSF to observe (1) the coal flow process and (2) receipt and burn entries in FWX.
- Observed a physical inventory being conducted at CUF.
- Observed a material test being conducted at KIF (Kingston Fossil Plant) and JSF.
- Obtained and reviewed the most recent receipt scale and burn scale material test results for all 11 fossil plants to ensure material tests were being conducted on an annual basis. We did not test for compliance with the NIST Weights and Measures Handbook 44.[9]

[8] FWX is a fuels management system that supports contract management, quality analysis, inventory management, accounting, and logistics.

[9] Handbook 44 lists specifications, tolerances, and other technical requirements for weighing and measuring devices.

- Obtained and reviewed documentation related to the calibration, consistency, and daily maintenance of the receipt and burn belt scales for CUF, COF, JSF, PAF, and SHF.
- Obtained TVA weight and the vendor weight variance reports for the period October 2009 through April 2010 for CUF, COF, PAF, SHF, and JSF.

We conducted this performance audit in accordance with generally accepted government audit standards. Those standards require that 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 objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Although we did not test for compliance with laws and regulations, nothing came to our attention during the audit that indicated noncompliance with laws and regulations.

# FINDINGS

We assessed the operating effectiveness of the controls over the receipt and burning of coal at the fossil plants, including inventory adjustments. Specifically, we determined:

- The variance reports are generated using information in the DCR. However, the vendor name listed in the DCR does not consistently represent the respective coal company, coal mine, or loading point, which could prevent the identification of significant issues.
- Variance investigations are not always coordinated between CGS and plant personnel, which could impact the efficiency of the investigations.
- Material tests, which ensure the accuracy of the TVA scales, are not being conducted on all receipt and burn scales on an annual basis at the 11 TVA fossil plants.
- Documentation is not consistently maintained for the daily belt scale checks, weekly belt scale calibrations, and material flow checks. Therefore, we were unable to determine whether these checks were consistently conducted.
- No formal process exists for conducting investigations on inventory adjustments that exceed the tolerable limit.

# DAILY COAL REPORT, VARIANCE REPORTS, INVESTIGATIONS

FWX is a fuels management system that supports contract management, quality analysis, inventory management, accounting, and logistics. FPG personnel enter data into FWX related to coal shipments including, but not limited to, contract number, vendor name, contract rate, shipment identification number, ship date, burn weight, load weight, and unload weight. The DCR is generated by FPG personnel using a macro that extracts information related to daily inventory, weights, demurrage, consumption, and quality from FWX. Each line of the DCR represents a receipt, consumption, adjustment, or transfer. The DCR is used, among other things, to determine whether or not the TVA weight and vendor weights are within tolerable limits. For those shipments that are not within tolerable limits, an investigation of the variance is conducted.

## Accuracy of the Daily Coal Reports

We confirmed the DCR was downloaded correctly from FWX by comparing the receipts for selected fields on the DCR to the respective FWX fields for the first sampled day for each judgmentally selected plant. To confirm shipment information (i.e., vendor, contract, load weight, etc.) had been entered into FWX accurately, we selected a sample of shipments for further review. We obtained the DCR as of June 1, 2010, for the judgmentally selected plants. Based on our random sample of 16 days between October 1, 2009, and May 31, 2010, we selected all shipments for COF, CUF, PAF, SHF, and WCF. We determined there were 396 shipments received at those plants for the 16 sampled days and obtained supporting documentation for those shipments. We compared the coal shipping and receiving information on the DCR to supporting documentation such as bill of ladings, shipping notices, etc., to verify the accuracy of the DCR.[10] For the 396 shipments, we identified the following:

- The vendor name on the DCR did not agree with the vendor name on the supporting documentation for eight shipments. The vendor listed on the bill of lading had not been entered into FWX; therefore, another vendor under the same contract and the same price per ton was used on the DCR.
- The conveyance identification on the DCR did not agree with the conveyance identification on the supporting documentation for one shipment. This was attributed to a keying error. This discrepancy has been corrected.
- One shipment's contract number on the DCR did not agree with the contract number on supporting documentation because the vendor had changed names, and a new contract had been established. This discrepancy has been corrected.

[10] We did not compare fields related to demurrage, sampling, blank fields, or fields that were hidden from view on the DCR.

We also obtained the 45 contracts associated with the 396 shipments received for the selected plants on the sampled days. We compared the contract rates to the FWX[11] rates for the selected sites without exception.

**Variance Reports and Investigations**

On a monthly basis, FPG personnel generate the TVA versus vendor weight variance reports for their respective plant using the DCR. The variance report graphs the average percentage difference, by vendor, between the TVA weight and the vendor weight. We obtained the TVA versus vendor weight variance reports for COF, CUF, JSF,[12] PAF, and SHF for FY 2010 through April. We determined the vendor on the DCR, which is the basis for the grouping of the variance report, is downloaded from the Origination Point field in FWX. According to CGS personnel, there is no required field in FWX that displays the loading point. However, using the Origination Point to identify the vendor may not provide complete information for the variances because more than one coal producer could utilize the same loading point.

Based on the results of the variance report, plant-level investigations for the reasons for the variances are conducted. These investigations are initiated for variances that occur outside a plant's tolerable limits.[13] We compared the average percentage variance for each vendor to the tolerance limits to identify variances that required investigation. We identified a total of 57 investigations that were required for COF, CUF, JSF, PAF, and SHF for FY 2010 through April and requested documentation related to each investigation to assess the investigation's effectiveness. Of the 57 variance investigations required, 56 were investigated. Of those 56, 28 resulted from scales needing calibration, 1 resulted from an incorrect variance limit, 1 resulted from a train derailment en route to the plant, and 26 resulted from rain/moisture.

CUF accounted for 25 of the 26 variances related to moisture. According to CUF personnel, the combination of the unloader type used at CUF and the water in the barge results in approximately 50-70 tons of coal, per barge, that cannot be unloaded. The type of unloader used at CUF is called a continuous bucket elevator. According to CUF personnel, PAF also uses a continuous bucket elevator. However, PAF leaves approximately 7-10 tons of coal per barge (estimate based upon auditor observation in comparison to 50-70 tons observed at CUF).

While these investigations are conducted by plant personnel, no coordination exists with CGS personnel. For example, during our review we were informed

[11] TVA utilizes a weighted average unit cost for recording fuel inventory. Each receipt in FWX is linked to a contract.

[12] During our testing, we replaced WCF with JSF for our site visit and associated testing because their annual material test occurred during our fieldwork.

[13] As previously described, the tolerable limits are determined by calculating the mean and standard deviation of the monthly average variances for the previous two years for each fossil plant, then adding or subtracting two standard deviations from the mean resulting in the upper and lower tolerable limits.

that a bad load cell[14] on a scale at Arclar Mine had been identified during an annual material test and was replaced. Based on the information we received, there was not a good way to determine when the load cell went out of adjustment. The variance reports for this particular mine have consistently been outside the tolerable range. The variance investigations attributed the errors to moisture and TVA scale calibrations. Coordination with CGS personnel could have resulted in the identification of the bad load cell.

## TESTING AND MAINTENANCE OF THE SCALES

TVA's YOP SPP.08.002 policy states that to ensure accurate inventory accounting, TVA will test all receipt and consumption scales at least annually in a manner consistent with NIST Handbook 44.[15] TVA receipt scale weights are compared against the vendor weight to ensure TVA is receiving the amount of coal purchased, while burn scales are used to determine the tonnage to deduct from inventory. Between annual material tests, daily belt checks, weekly belt scale calibrations, and weekly material, flow checks are to be conducted to ensure continue optimal performance of the scales.

### Annual Material Testing

We obtained the most recent results of the last material test performed at each of the 11 fossil plants. Our audit revealed that only 3 of the 11 plants successfully completed the annual material test on the burn scales in FY 2010, and 5 of the 11 plants successfully completed a material test on the receipt scales in FY 2010. The primary reason provided for not completing material tests is equipment in need of repair. For example, CUF has not had a material test since 2006 due to broken equipment. Budget constraints have prevented CUF plant personnel from repairing or replacing the equipment. Additionally, weekly belt scale material flow checks are not practical to conduct at CUF without interrupting the operational process; therefore, neither the material test nor the flow checks have been performed at CUF to test scale accuracy. COF yard personnel stated that a materials test had not been conducted in two years due to scheduling issues. At Allen Fossil Plant (ALF), a material check was performed on the receipt scales instead of the more accurate material test. According to TVA personnel, Problem Evaluation Reports (PERs) have been written at ALF and GAF for infrastructure deficiencies preventing material testing.

According to TVA personnel, no TVA belt scales are currently certified per Handbook 44. In an effort to certify TVA scales, TVA recently initiated a pilot program at four fossil plants which focuses on receipt scale enhancements including the addition of printers to increase the level of accountability and automate the scale certification process. As of January 5, 2011, both CUF and WCF have implemented these enhancements. However, according to Fuel

[14] A load cell is a device, whether electric, hydraulic, or pneumatic, that produces a signal (change in output) proportional to the load applied.

[15] NIST Weights and Measures division publishes Handbook 44 annually. Handbook 44 lists the specifications, tolerances, and other technical requirements for weighing and measuring devices.

Delivery and Support Systems personnel, these scales are eligible for certification but have not been certified.

**Daily Belt Scale Checks**

FPG SPP 08.008 provides the technical instruction for conducting daily belt scale checks. Daily belt scale checks help ensure the belt scales are operating within acceptable limits. The policy states that the entire belt line should be inspected for excessive coal buildup, cleaned of coal spills, the weigh bridge must be clear and free of binding, idlers (rollers) must be able to turn freely, and the scale integrator should read zero when the belt is running empty. The policy further provides for evidence of the daily belt scale check to be documented on the scale inspection form. We requested the daily belt scale check documentation for May and June 2010, totaling 61 days, for COF, CUF, JSF, PAF, and SHF to determine if daily belt scale checks were being conducted on receipt and burn scales. Documentation was provided evidencing the daily belt scale checks on the receipt and burn scales for JSF and SHF for all 61 days. However:

- PAF could not provide documentation of the daily checks for 16 of the 61 days for the receipt scales and 3 of the 61 days for the burn scales.
- CUF does not maintain documentation of these daily checks. According to CUF plant personnel, the belt scales are checked daily for cleanliness and operation.
- COF maintains all information electronically through the Electronic Shift Operations Management System (eSOMS).[16] The eSOMS includes a hand held device that stores information that is uploaded daily to a computer. However, due to a failure of the eSOMS device, COF did not have electronic documentation to support the daily checks for May and June 2010. We subsequently requested and reviewed the electronic documentation for January to March 2010 without exception. According to COF plant personnel, the eSOMS failure has been resolved.

**Weekly Belt Scale Calibrations**

According to FPG.TI.08.009, Weekly Belt Scale Span Calibration Check, belt scale calibrations are to be conducted and documented on a weekly basis. The results are to be entered on a control chart[17] and evaluated to determine if maintenance or material testing is needed.

To determine if weekly belt scale calibrations were being conducted as required, we requested documentation supporting the weekly calibrations for COF, CUF, JSF, PAF, and SHF for the 36 weeks between October 5, 2009, and June 11, 2010. We were provided documentation supporting the weekly calibrations for:

[16] eSOMS stores six basic types of data including narrative logs, operator rounds, clearance executing tag out/lockout procedure, track temporary alteration permits, track fire incident reports, and track impairments of fire detection and suppression equipment.

[17] According to the procedure, "control charts are used to monitor scale performance. Charting the span checks and the flow checks allows the user to visually see when the scale has changed and might need maintenance or material testing."

- Four weeks for COF's belt conveyor (BC)1 receipt scale and BC13 burn scale, two weeks for their BC2 receipt scale, and one week for COF's BC12 burn scale.
- Eighteen weeks for CUF's BC2 receipt scale and BC15 burn scale, and 15 weeks for CUF's BC14 burn scale.
- Twenty-eight weeks for JSF's BC1 receipt scale, 31 weeks for their BC2 burn scale, and 31 weeks for their BC3 burn scale.
- Twenty-two weeks for PAF's BC4 receipt scale, 17 weeks for their BC8 receipt scale and BC13 burn scale, 16 weeks for PAF's BC14 burn scale, and 21 weeks for PAF's BC7, BC 50, and BC51 receipt scales.
- Twelve weeks for SHF's BC1 receipt scale and BC3 burn scale, and 12 weeks for their BC4 burn scale.

Reasons provided by CUF plant personnel for not conducting a weekly calibration included (1) units off-line due to forced and scheduled outages, (2) weather conditions, (3) short work crews, (4) the yard cannot accommodate the calibration, and (5) cancellation due to belt problems and continuous running of coal to avoid demurrage costs. The remaining plants could not provide reasons for not conducting a weekly calibration.

**Weekly Material Flow Checks**

According to FPG.TI.08.010-TI, belt scale material flow checks are to be conducted and documented on a weekly basis. The policy states that the weekly belt scale material flow check is not intended to replace the material test, but rather serve as an indicator of performance between material tests. The difference between the annual material test and the material flow check is that the annual material test is a measure of scale accuracy, and the weekly belt scale material flow check is a measure of scale consistency to ensure the precision of the scales following the material test.

To perform a material flow check, coal must cross two scales en route to the powerhouse. Additionally, both scales must be on the same conveyer line. The two scales are compared for variances. If a variance exists, a problem could be occurring with the scales such as a dirty scale, coal lodged in the scale weigh deck, or is in need of maintenance or repair.

To determine if weekly belt scale material flow checks are being conducted as required, we requested supporting documentation for COF, CUF, JSF, PAF, and SHF for the 36 weeks between October 5, 2009, and June 11, 2010. We determined that weekly belt scale material flow checks are not practical to conduct at CUF without interrupting the operational process; therefore, these flow checks are not conducted. We were provided documentation supporting the weekly material flow checks for:

- Three weeks for COF's BC1 and BC2 receipt scales and BC12 and BC13 burn scales.

- Thirty-six weeks for JSF's BC1 receipt scale and BC2 and BC3 burn scales.
- Five weeks for PAF's BC4, four weeks for BC50 receipt scales, two weeks for their BC7 scales, three weeks for BC51 receipt scales, one week for BC8 receipt scale, and no documentation for their BC13 and BC14 burn scales.
- Four weeks for SHF's BC1 receipt scale to BC3 burn scale comparison and three weeks for the BC1 receipt scale to BC4 burn scale comparison.

As discussed above, the issues demonstrate that evidence of daily belt scale checks, weekly belt calibrations, and material flow checks is not consistently documented. However, without a material test for each scale, conducting these more frequent inspections is ineffective in ensuring that the scales are precise and consistent. In addition, without verification that the scales are accurate, the variance reports as described in the previous section may not accurately reflect any problems with the amount of coal received.

## PHYSICAL INVENTORY ADJUSTMENTS

YOP SPP.08.0.26 outlines the requirements for the physical inventory survey process. The process is designed to ensure that all useable coal is accounted for and the accounting of each stockpile is reconciled correctly. The physical inventory surveys are conducted semiannually at each plant. The results of the survey are used to determine the appropriate inventory adjustment amount. As previously discussed, the volume of the coal pile, density of the pile, and subsidence[18] are all used to determine the number of tons in the coal pile. The volume is determined by Survey and Project Services within PSO using a GPS, and the density and subsidence are determined by drilling. The density and subsidence numbers are sent to Survey and Project Services to be used in conjunction with the volume in the calculation of tonnage from the survey. The tonnage information is provided to Portfolio Management, and the balance sheet tonnage is adjusted to agree with the survey results. If the adjustment exceeds the acceptable tolerance limits,[19] an investigation is initiated and conducted by Fuel System Engineers in the Fuel Delivery and Support Systems.

We obtained and reviewed FWX reports, screenshots from eFMS (Enterprise Financial Management System), and other documentation related to the physical inventory adjustments for FY 2010 through August 12, 2010. We did not obtain and review the documentation related to the second physical inventory for PAF, JOF, COF, GAF, BRF, and ALF because those surveys had not been completed as of August 12, 2010. To ensure the adjustments were recorded accurately, we

[18] Subsidence is the amount and weight of the coal that has caused the ground under the pile to form a bowl depression.

[19] The tolerance is calculated by summing (payment scale accuracy X receipt tons) + (bunker feed scale accuracy X bunker feed tons) + ((physical survey accuracy + density survey accuracy) X tons in stockpile). This gives a number that is +/- limits of the acceptable tolerance. As long as the physical inventory adjustment is within the limits, the adjustment is within the accuracy of the measurement equipment.

compared the inventory adjustments in FWX, which feeds the general ledger, to the supporting documentation for the physical inventory adjustments without exception.

In addition, we compared the inventory results for FY 2010 through August 12, 2010, to the tolerable limit ranges for each fossil plant. We identified six variances that exceeded the tolerable range, requiring an investigation. Two of the six variances—one at SHF and one at BRF—were not investigated by Fuel Delivery and Support Systems. According to Fuel Delivery and Support Systems personnel, an investigation was not initiated for the two variances because (1) SHF had not successfully completed a materials test and (2) BRF's variance was approximately 1 percent outside the tolerable range; therefore, Fuels took a "cautiously acceptable" stance on this particular inventory adjustment. An investigation at SHF was subsequently completed on September 28, 2010.

We requested documentation related to the four investigations. According to Fuel Delivery and Support Systems personnel, no formal process exists for conducting investigations on inventory adjustments that are outside the tolerable range; however, they follow a "thought process" in determining where the error may exist. This "thought process" includes, but is not limited to, (1) gathering information related to completion of daily and weekly checks for the receipt and burn scales, (2) whether or not the TVA weights compare to the vendor's weights, and (3) rechecking the survey and drilling results for errors. According to TVA management, FPG began utilizing Maximo to document and track PERs for inventory adjustment investigations in FY 2011.

# RECOMMENDATIONS

We recommend to the Senior Vice President, FPG:

- Modify the macro which generates the DCR so that the coal company, coal mine, or loading points are consistently reflected resulting in more accurate data for the TVA versus vendor weight comparison.
- Improve TVA versus vendor variance investigations by extending the investigation beyond the plant level to include the support of CGS.
- Ensure material tests are being conducted on an annual basis at all 11 TVA fossil plants on the receipt and burn scales.
- Communicate the importance of consistency in conducting and documenting daily belt scale checks and weekly belt scale calibrations.
- Ensure material flow checks are being conducted and documented at all fossil plants, where practical without interrupting operations.
- Consider permanent implementation of TVA pilot program on receipt scales to increase the level of accountability and automate the scale certification process. Consider implementing at all 11 TVA fossil plants.

- Ensure a formal process is implemented for conducting investigations on inventory adjustments that exceed the tolerable limit in an effort to determine why adjustments fall outside tolerable range. The process should include a corrective action plan to minimize future inventory adjustments.

We provided a draft of this report to TVA's Senior Vice President, FPG. TVA management agreed with our recommendations and has taken or is taking actions to address these recommendations. See the Appendix for TVA's complete response.

April 29, 2011

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

AUDIT 2009-12763 -REVIEW OF FOSSIL FUEL INVENTORY

We appreciate the opportunity to provide comments on the draft report of Audit 2009-12763-Review of Fossil Fuel Inventory on March 30, 2011.

Fossil Power Group (FPG) agrees to take the following actions to address the provided recommendations.

**Recommendations:**

**1. OIG recommendation 1 stated:**
**"Modify the macro that generates the DCR so that the coal company, coal mine, or loading points are consistently reflected resulting in more accurate data for the TVA versus vendor weight comparison."**

Action:
Modifications to the Daily Coal Report (DCR) macro will be made to incorporate the mine name and loading point name into the displayed vendor name for all new and existing entries in all DCR files.
**Completed** Owner: Mark Creech

**2. OIG recommendation 2 stated:**
**"Improve TVA versus vendor variance investigations by extending the investigation beyond the plant level to include the support of CGS."**

Action:
Revise CGS-SPP-08.014 "TVA vs. Vendor Weights" process to include support of CGS when extending the investigation beyond the plant level.
Due Date: 6/30/2011 Owner: Greg Nunley

**3. OIG recommendation 3 stated:**
**"Ensure material tests are being conducted on an annual basis at all 11 TVA fossil plants on the receipt and burn scales."**

Actions:

- FPG currently schedules Material Tests for all sites prior to start of fiscal year. Service Requests (SR) and Problem Evaluation Reports (PERs) are generated for any known issue preventing the proper execution of the material tests. Currently, PER's have been written to address deficiencies for Allen, Cumberland, and Gallatin.
**Completed** Owner: Michael Davis

- FPG Communiqué to be issued laying out expectations for plant operations and maintenance to comply with required scale processes.
  Due Date: 6/30/2011 Owner: Annette Moore

**4. OIG recommendation 4 stated:**
**"Communicate the importance of consistency in conducting and documenting daily belt scale checks and weekly belt scale calibrations."**

Actions:
- FPG Communiqué to be issued laying out expectations for plant operations and maintenance to comply with required scale processes.
  Due Date: 6/30/2011 Owner: Annette Moore

**5. OIG recommendation 5 stated:**
**"Ensure material flow checks are being conducted and documented at all fossil plants, where practical without interrupting operations."**

Actions:
FPG Communiqué to be issued laying out expectations for plant operations and maintenance to comply with required scale processes.
Due Date: 6/30/2011 Owner: Annette Moore

**6. OIG recommendation 6 stated:**
**"Consider permanent implementation of the TVA pilot program on receipt scales to increase the level of accountability and automate the scale certification process at all 11 TVA fossil plants."**

Actions:
Consideration and recommendation for implementing the TVA pilot program on receipt scales to increase the level of accountability and automate the scale certification process all 11 sites will be made upon completion of pilot program. A business case will be developed to provide support for the recommendation made.
Due Date: 8/30/2012 Owner: Michael Davis

**7. OIG recommendation 7 stated:**
**"Ensure a formal process is implemented for conducting investigations on inventory adjustments that exceed the tolerable limit in an effort to determine why adjustments fall outside tolerable range. The process should include a corrective action plan to minimize future inventory adjustments."**

Actions:
FPG currently uses the MAXIMO PER and Corrective Action Program (FPG-SPP-03.001) to document and report any issue, problem and/or adverse condition for evaluation and corrective action. This includes investigations required when inventory adjustments fall outside tolerable limits. Procedure FPG-SPP-08.067 "Physical Inventory Survey at TVA Fossil Plants" will be revised to include language requiring PERs to be initiated for the purpose of conducting investigations on inventory adjustments that fall outside tolerable limits.
Due Date: 8/12/2011 Owner: Michael Davis

Please let me know if you have any other questions or need additional information.

Robert J. Fisher
SVP, Fossil Power Group
LP 3K-C

RJF:MDD:ALM

**Memorandum from the Office of the Inspector General**

November 14, 2013

James R. Dalrymple, LP 3K-C

REQUEST FOR FINAL ACTION – AUDIT 2012-14631 – REVIEW OF TVA'S MANAGEMENT OF COMBUSTIBLE COAL DUST

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 within one year from the date of this memorandum when final action is complete.

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 Jamie M. Wykle, Auditor, at (865) 633-7382 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
Assistant Inspector General
(Audits and Evaluations)
ET 3C-K

JMW:HAC
Attachment
cc (Attachment):
William D. Johnson, WT 7B-K
Dwain K. Lanier, MR 3K-C
Justin C. Maierhofer, WT 7B-K
Richard W. Moore, ET 4C-K
Charles G. Pardee, WT 7B-K
John M. Thomas III, MR 6D-C
Andrea L. Williams, WT 9B-K
OIG File No. 2012-14631

Office of the Inspector General

*Audit Report*

To the Senior Vice President,
Power Operations

# REVIEW OF TVA'S MANAGEMENT OF COMBUSTIBLE COAL DUST

Auditor
Jamie M. Wykle

Audit 2012-14631
November 14, 2013

# ABBREVIATIONS

| | |
|---|---|
| ALF | Allen Fossil Plant |
| BRF | Bull Run Fossil Plant |
| CUF | Cumberland Fossil Plant |
| ERM | Enterprise Risk Management |
| FY | Fiscal Year |
| KIF | Kingston Fossil Plant |
| LOI | Loss-on-Ignition |
| NEP | National Emphasis Program |
| NFPA | National Fire Protection Association |
| O&M | Operations and Maintenance |
| OIG | Office of the Inspector General |
| OSHA | Occupational Safety and Health Administration |
| PAF | Paradise Fossil Plant |
| SPP | Standard Process and Procedure |
| TSP | TVA Safety Procedure |
| TVA | Tennessee Valley Authority |

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## APPENDIX

# Audit 2012-14631 – Review of TVA's Management of Combustible Coal Dust

## EXECUTIVE SUMMARY

### Background

Combustible dusts are fine particles that present an explosion hazard when suspended in air under certain conditions. Combustible coal dust presents a real and serious loss exposure to utility generating facilities and personnel safety. Coal handling and fueling operations are inherently dusty, requiring the highest standard of housekeeping, equipment tightness, and electrical integrity. Failure to establish and maintain such standards sets the stage for a potential catastrophic loss event that could jeopardize property, business operations, and life safety.

The Occupational Safety and Health Administration issues procedures in the National Emphasis Program for reducing combustible dust hazards. The Tennessee Valley Authority (TVA) issued TVA Safety Procedure (TSP) 816 Combustible Dust to provide direction in complying with the Occupational Safety and Health Administration's National Emphasis Program and describe the requirements for TVA's Combustible Dust Inspecting and Reporting Program. According to TSP 816, if the coal dust exceeds 1/32inch thickness accumulation over a surface area of at least 5 percent of the floor area of the facility or any given room, then cleaning of that area is required.

TVA's Coal and Gas Operations organization, within the Generation organization, is responsible for managing combustible coal dust. Mechanical Programs and Components, within Generation's Systems Engineering department, manages TVA's Combustible Dust Inspecting and Reporting Program.

### What the OIG Found

We evaluated the adequacy of actions taken to mitigate combustible coal dust risk. To do so, we reviewed policies, procedures, and regulations related to combustible coal dust, performed walkdowns at three of TVA's coal plants to observe coal dust conditions, reviewed various documents and internal assessments, and interviewed TVA personnel. In summary, we found that despite some improvements in combustible dust management, actions to date have been inadequate to improve deteriorating equipment conditions, address housekeeping challenges, and provide appropriate monitoring of combustible dust conditions at TVA's coal plants.

We observed coal dust accumulations to be above the allowable 1/32 inch standard in many of the coal handling areas during our walkdowns at

three coal generation plants. TVA self-identified coal dust accumulations above the allowable standard in many of the coal handling areas throughout the coal fleet. Coal handling equipment has deteriorated faster than funding was available for repairs or replacement. For example, as described in more detail later, a September 2011 report by our office identified coal dust issues which TVA began to address through a variety of activities, the funding for which was later eliminated. Due to the deteriorated equipment, housekeeping activities have not kept pace with dust cleaning requirements. Tools for monitoring dust conditions, including site dust management plans, quarterly site assessments, Monthly Housekeeping reports, and sampling ash for combustibility, are not consistently used. TVA's aging equipment, housekeeping conditions, and inadequate monitoring present great challenges toward achieving compliance with combustible coal dust requirements.

## What the OIG Recommends

We recommend the Senior Vice President, Power Operations:

1. Request corporate and plant staff to work together on a plan for correcting equipment deficiencies and work toward completion of the plan to improve coal dust containment. The plan should:
   a. Include estimates for resource requirements, such as funding, staff, and equipment needs.
   b. Include monitoring progress of equipment remediation quarterly using the same tracking method (similar to Work-Off Curves).
   c. Consider conducting plant walkdowns with peers from other plants and exchange ideas to improve coal dust management.

2. Work with coal plants to minimize dust accumulations and address housekeeping challenges. Include actions, such as keeping all chute doors closed while coal is being transported and ensuring there are properly operating sump pumps and drains for removing washdown water and coal slurry.

3. Dedicate more attention to address housekeeping challenges, particularly cleaning high overhead, hard-to-reach areas and other priority areas.

4. Develop site-specific dust management programs as required by TSP 816 to define expectations, establish standards, and monitor and document results. Develop site combustible dust teams and allocate adequate resources to meet the site-specific housekeeping goals.

5. Perform monthly and quarterly assessments for housekeeping compliance to the combustible dust standards, as required by TSP 816, and correct deficiencies in a timely manner to address housekeeping challenges.

6. Test fly ash dust quarterly to determine loss-on-ignition levels for combustibility.

## TVA Management's Comments

TVA management agreed with our recommendations and has taken or is taking actions to address all recommendations. See the Appendix for TVA's complete response.

## Auditor's Response

The OIG (Office of the Inspector General) agrees with the actions planned and taken by TVA management in regards to all recommendations.

# BACKGROUND

Combustible dusts are fine particles that present an explosion hazard when suspended in air under certain conditions. The National Fire Protection Association (NFPA) defines combustible dust as ". . . a finely divided combustible particulate solid[1] that presents a flash fire or explosion hazard when suspended in air." Combustible coal dust presents a real and serious loss exposure to utility generating facilities and personnel safety. Although coal can be handled safely and can be an efficient fuel, there are explosion hazards that are heightened as the particle size is reduced. Coal handling and fueling operations are inherently dusty, requiring the highest standard of housekeeping,[2] equipment tightness, and electrical integrity. Failure to establish and maintain such standards sets the stage for a potential catastrophic loss event that could jeopardize property, business operations, and life safety.

If coal dust is suspended in air in the right concentration, under certain conditions, it can become explosive. Coal dust explosions are classified as being primary or secondary explosions. When combustible coal dust particles become suspended in air and find an ignition source, a rapidly expanding ball of fire and pulse of pressure results, which is referred to as a primary explosion. This event, in the confines of a building, starts a repeating cycle of dust suspension, ignition, and explosion called the secondary explosions. Secondary dust explosions are the result of dust accumulation inside the plant being disturbed and ignited by the primary explosion, resulting in a much more dangerous uncontrolled explosion. Coal dust that is carried into high areas of the plant, such as overhead beams, creates prime areas where secondary explosions can occur. These high areas are hard to reach and not easily seen due to the dark nature of the plants, making inspection and cleaning efforts more difficult. The coal dust that has settled on high surfaces, if disturbed, can become suspended in air, setting the stage for an explosion if exposed to an ignition source.

The Tennessee Valley Authority (TVA) has experienced fire events involving combustible coal dust. Between 2008 and 2012, TVA tracked 60 fires involving coal dust at eight coal plants. Many of the fires involved coal build-ups, mechanical failures, or spontaneous combustion. More of these fires have occurred at Allen Fossil Plant (ALF) and Shawnee Fossil Plant, which burn a significant percentage of Powder River Basin coal. It is especially critical to properly manage combustible dust when Powder River Basin coal is the fuel because it is more volatile and more subject to spontaneous combustion than other fossil fuels. Two of the biggest fires at TVA occurred about 20 years ago at Colbert Fossil Plant in 1993 and ALF in 1996 (see Figure 1 on the following page).

[1] NFPA defines combustible particulate solid as ". . . any solid material composed of distinct particles or pieces, regardless of size, shape, or chemical composition that presents a fire hazard."

[2] In the power industry, housekeeping means controlling dust and preventing spills.

**Colbert Fossil Plant Fire, 1993** **ALF Fire, 1996**


**Figure 1: Identified in a 2012 Yard Users' Group Meeting presentation.**

Due to the number of industry-wide explosions related to combustible coal and the resulting deaths and damages,[3] the U.S. Chemical Safety and Hazard Investigation Board and Congress made recommendations to the Occupational Safety and Health Administration (OSHA) in 2006 for prevention of hazards that lead to worksite combustible dust explosions. In response to those recommendations, OSHA released new policies and procedures for the reduction or elimination of combustible dust hazards in the Combustible Dust National Emphasis Program (NEP).[4] This program affects more than 60 industries but emphasizes 16 industries where the combustible dust hazard is greatest. Coal fired power generation is number two on the list of the industries emphasized.

In response to the OSHA NEP, TVA issued TVA Safety Procedure (TSP) 816 Combustible Dust to provide direction in complying with the OSHA NEP and describe the requirements for TVA's Combustible Dust Inspecting and Reporting Program.[5] TVA's current Program began in 2010 as an effort to further define the standards in TSP 816 and each plant's level of compliance with these standards. As part of the Program, combustible coal dust site assessments were performed by Yard Systems Engineers, approximately every 6 months, at all TVA's coal plants. These assessments identified deficiencies and recommendations to reduce dust, address spillage issues, and enhance the efficiencies of cleaning.

As part of the Program, each plant is to conduct monthly combustible dust assessment reports, called Monthly Housekeeping reports, for coal yards and powerhouses. According to TSP 816, if the coal dust exceeds 1/32 inch thickness accumulation over a surface area of at least 5 percent of the floor area of the facility or any given room, then cleaning of that area is required.

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[3] The U.S. Chemical Safety and Hazard Investigation Board identified 23 combustible dust incidents related to the coal industry between 1984 and 2005 that killed 16 workers, injured 94 workers, and damaged electric service and other facilities.

[4] The OSHA NEP is based upon NFPA 654 "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids" issued in 2006.

[5] Unless otherwise noted, the term "Program" refers to TVA's Combustible Dust Inspecting and Reporting Program.

TVA's Coal and Gas Operations organization, within the Generation organization, is responsible for managing combustible coal dust. Mechanical Programs and Components, within Generation's Systems Engineering department, manages TVA's Combustible Dust Inspecting and Reporting Program.

**Belt Conveyor System**

Coal is carried from an unloading point or reclaim storage area to the powerhouse by a belt conveyor system, which is composed of six major elements: the belt, pulleys, drive, structure, belt support systems, and transfer points. The continuous rubber belt is stretched between terminal pulleys, with one end called the tail, where coal loading occurs and the other end called the head, where coal is delivered. The belt is supported along the top and bottom with rollers called idlers. Conveyors are driven by motors attached to a drive pulley. In addition, conveyors consist of secondary equipment to improve the systems operation. This includes components, such as take-up pulleys, belt cleaners, tramp-iron detectors, skirtboards and seals, safety switches, and dust suppression/collection systems, as shown in Figure 2 below.

High-capacity conveying systems handle hundreds of tons of coal per hour. When even a small fraction of this tonnage is released, coal particles become airborne creating suspended combustible coal. As mentioned previously, the suspended coal dust eventually settles on a variety of surfaces, and over time, the thickest layers accumulate in less-visible or hard-to-reach areas if housekeeping activities are not routinely performed. One of the most common areas of dust occurrence is at conveyor transfer points where loading, unloading, crushing, or movement of the coal creates air currents that allow the coal particles to become airborne, creating suspended coal dust that is carried away from the conveyor system.

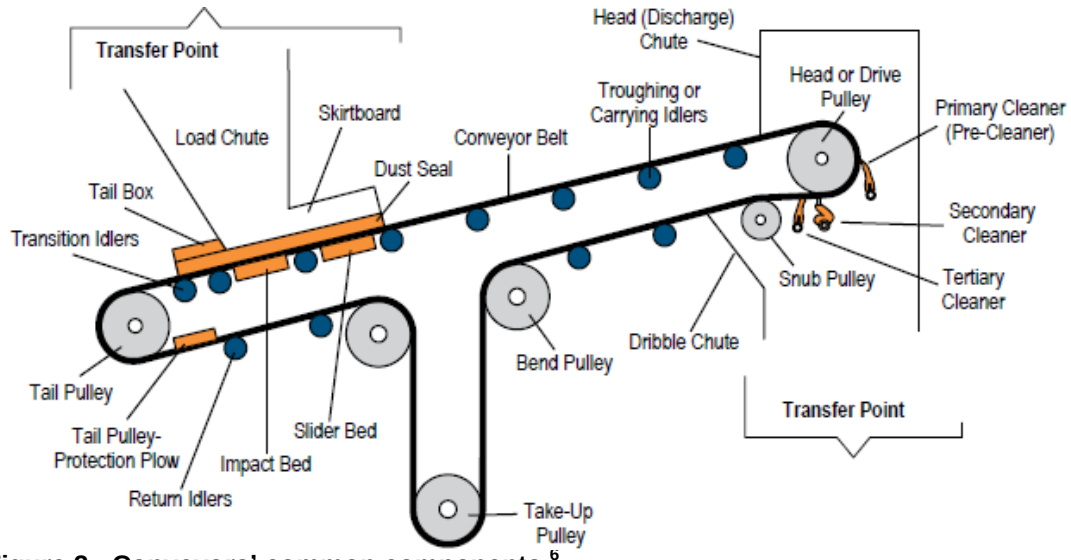


**Figure 2: Conveyors' common components.**[6]

[6] Illustration from "FOUNDATIONS™ The Practical Resource for Cleaner, Safer, More Productive Dust & Material Control, Fourth Edition" published in 2009 by Martin Engineering Company.

Coal Operations has identified coal dust explosions under the risk category of Catastrophic Plant Accident in its Enterprise Risk Management (ERM) risk map. The probability of occurrence is rated unlikely, and consequences are rated as severe. Specifically, the ERM indicates recent events, both within this industry and in other industries, handling combustible dust require more stringent standards and dust accumulation must be lowered. The mitigation plan is to reduce the risk of coal dust explosions by providing (1) combustible dust training for all Coal Operations employees, (2) several separate coal dust audits conducted by Generation Engineering and plant personnel and tracked for improvement, (3) increased housekeeping personnel, and (4) projects planned and in progress to minimize coal dust accumulations.

Specific activities included in the mitigation plan are: (1) coal dust explosion online awareness training; (2) coal yard condition assessments; (3) coal dust accumulation self-assessments; (4) capital projects, such as repairing dust collectors and coal chutes, to reduce dust accumulation or improve cleaning capability; (5) Operations and Maintenance (O&M)/staff augmentation programs to clean coal dust; (6) annual coal dust audit with Work-Off Curve developed; and (7) implement Class II, Division 2[7] electrical equipment studies and resultant projects.

Airborne dust is created whenever coal is moved, manipulated, and subjected to air currents strong enough to raise or redirect the small particles within the coal. Containment is the preferred method of controlling coal dust, which is more economical in the long run than continual cleanup. However; if dust is not initially contained, water is the most effective and preferred means of cleaning in a coal dust environment. Additional housekeeping methods include using explosion proof vacuums, sweeping, mopping, and foam cleaning.

## OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objective was to evaluate the adequacy of actions taken to mitigate combustible coal dust risk. The scope of the audit was fiscal years (FY) 2010 to present. To achieve the audit objective, we:

- Identified and reviewed policies, procedures, and regulations related to combustible coal dust to identify requirements and maximum-allowed standard accumulations levels. We relied on TSP 816 for audit criteria because it established Program requirements based on industry standards. For the purposes of this report, we focused on the 1/32 inch dust accumulation standard, dust combustibility, written dust programs, equipment, operating conditions, and dust suppression identified in that procedure.

[7] Class II, Division 2 is the NFPA location classification where combustible dust accumulations could interfere with electrical safety, including coal handling areas, and sets the minimum safety standards for any electrical equipment in those areas.

- Interviewed personnel in TVA's Coal Operations organization, within the Generation organization, and coal plant sites selected in our sample (as described below) to gain an understanding of TVA's risks associated with combustible coal dust, identify financial resources allocated for combustible coal dust management, and determine the consequences of uncontrolled coal dust accumulations.
- Relied on the expertise of TVA's Fossil Fire Protection Manager and one of TVA's Yard Systems Engineers, both of whom were assigned to combustible dust management, to assist in identifying (1) areas of concern at plants visited and (2) combustible coal dust management best practices.
- Obtained and reviewed coal dust plant assessment Monthly Housekeeping reports to determine which plants had low, moderate, or high amounts of coal dust. Based on these reports, we judgmentally selected three of TVA's coal plants for review: Bull Run Fossil Plant (BRF), Cumberland Fossil Plant (CUF), and Paradise Fossil Plant (PAF). These three coal plants accounted for 42 percent of TVA's net generating capacity from coal. We performed site walkdowns at these plants, which were ranked with low, moderate, and high amounts of coal dust, in order to identify conditions associated with varying risk levels. Because we used a nonstatistical method for selecting our sample, there is no basis for projecting the results to the entire population.
- Reviewed site assessment reports prepared by TVA's Yard Systems Engineers for all TVA coal plants to determine what sources of combustible coal dust and associated challenges had been self-identified.
- Obtained and reviewed Compliance Reports related to coal dust housekeeping issues. Only one Compliance Report pertained specifically to housekeeping issues, ALF. As a result of TVA's Compliance Report from ALF, we did not perform a site walkdown.

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

We evaluated the adequacy of actions taken to mitigate combustible coal dust. Despite some improvements in combustible dust management, actions to date have been inadequate to improve deteriorating equipment conditions, address housekeeping challenges, and provide appropriate monitoring of combustible dust conditions at TVA's coal plants.

Although the probability of occurrence for coal dust explosions was rated in the ERM risk map as unlikely by TVA, the potential consequences of an explosion are severe and could result in disruption of generating capacity, costly clean up and repairs, and even loss of life. TVA's aging equipment presents a great challenge toward achieving compliance with Program requirements. Coal plant and coal handling conditions currently exceed acceptable dust level limits specified in TSP 816. We observed coal dust accumulations exceeding 1/32 inch in many of the coal handling areas during our walkdowns at BRF, CUF, and PAF. TVA self-identified coal dust accumulations above the allowable standard in many areas throughout the coal fleet. In addition, monitoring tools required by the Program are not being used consistently to improve plant conditions.

Site assessment reports performed by Yard Systems Engineers indicated some conditions improved between 2010 and 2012. Some equipment deficiencies are being addressed, and there are several programmatic practices in progress that will improve conditions over time.[8] However, equipment has deteriorated faster than funding has been available for repairs or replacements. Deficiencies resulting from inadequate equipment maintenance contribute to the increased presence of combustible coal dust and coal accumulations within the coal handling system. With deteriorating equipment and recent staff reductions for housekeeping, TVA faces significant challenges for keeping coal dust accumulations within limits provided by TSP 816. More focus is needed on the Program in order to better contain coal dust and reduce the necessity for extensive and repeated housekeeping activities to achieve dust accumulations below the 1/32 inch standard.

[8] For example, ALF and KIF (Kingston Fossil Plant) incorporated state of the art technology to reduce dusting and spilling of coal being transferred to conveyors; PAF added a water-fogging dust suppression system on multiple conveyors; ALF added a dust collector system and belt cleaners/scrapers; and ALF and CUF added spill pans to various areas of the belt line.


**Picture 1: Dust accumulations greater than 1/32 inch, as observed during our walkdown at CUF on August 14, 2012. This is a beam on top of the Surge Hopper building.**

## Equipment Conditions Are Deteriorating

The primary method for preventing a coal dust explosion is to contain the coal dust in order to reduce or eliminate the amount of dust dispersed. The obvious place for a coal dust explosion to begin is where coal dust has accumulated. Inspection and maintenance of coal handling equipment is important because it identifies problems before they become a disaster, reduces the potential for ignition sources, and reduces the amount of combustible coal dust in coal handling areas.

As mentioned previously, TVA's Yard Systems Engineers have performed combustible coal dust site assessments at all TVA coal plants. We reviewed the most recent Yard Systems Engineers' site assessments as of September 2012 and TVA's 2012 Compliance Reports for ALF. Based on our review, we determined TVA self-identified excess coal dust accumulations at all coal plants.

By performing walkdowns of all coal handling areas at each coal plant, Yard Systems Engineers identified coal handling equipment deficiencies that contributed to coal dust accumulation. These assessments include recommendations to reduce dust, address spillage issues, and enhance the efficiencies of cleaning. Equipment deficiencies identified during the assessment are itemized by plant. All deficiencies are compiled into one spreadsheet which is used to create a graph called the Work-Off Curve, and provides the basis for prioritizing equipment deficiencies. The prioritization helps determine capital improvements and O&M budgets for items with associated estimated costs. Each plant has two Work-Off Curves: one for the coal yards and one for the powerhouse.

Together, the Yard Systems Engineers, Plant Systems Engineers, and other site personnel review the deficiencies identified and determine the funding available to remedy each deficiency as well as a target completion date. The goal of the Work-Off Curve is to add equipment deficiencies as they are discovered and add completion dates once deficiencies have been updated. The Master Work-Off Curve is maintained by the Yard Systems Engineers. The Work-Off Curve was designed to be updated quarterly by plant personnel and is only as accurate as the information entered by plant personnel. According to the Yard Systems Engineer, not all plants use the Work-Off Curve for its intended purpose, but rather some plants use the Work-Off Curve to maintain documents at the plant level describing equipment deficiencies. Where alternative tracking methods are being used to manage deficiencies related to combustible dust and monitor progress at the plant level, the Yard Systems Engineer stated the Work-Off Curves have become a redundant activity. In our opinion, regularly updated Work-Off Curves or similar tracking methods are needed at all plants to maintain consistency and manage funding that may become available at the corporate level.

We noted some plants have taken positive steps to improve containment and help reduce combustible coal dust in spite of equipment deficiencies. Specifically:

- ALF and KIF have incorporated state of the art technology in load zones to reduce dusting and spilling of coal being transferred to conveyors.
- PAF added a water-fogging dust suppression system on multiple conveyors and added fixed washdown systems on two conveyors.
- ALF added a dust collector system and belt cleaners/scrapers.
- ALF and CUF added spill pans to various areas of the belt line, as shown in Picture 2 on the following page.


**Picture 2: A spill pan as observed at CUF on August 14, 2012, in the Rotary Breaker building. Spill pans help eliminate accumulation of coal dust.**

Despite these and other efforts to address coal dust issues, we observed deteriorating equipment conditions during our site walkdowns at BRF, CUF, and PAF and discussed our observations with each plant manager. The following eight photos provide examples of some of the conditions we observed.


**Picture 3: A deteriorated seal around the chute door as observed at PAF on August 28, 2012, located at the Alpha Station Breaker. Deterioration in the chute allows coal dust to escape.**


**Picture 4: A deteriorated chute allowing coal dust to escape as observed at CUF on August 13, 2012, located at Transfer Station B.**


**Picture 5: Deterioration around the skirt box opening allowing coal dust to escape as observed at PAF on August 27, 2012, in the West Bunker room.**


**Picture 6: A skirting system in need of adjustment or replacement as observed at PAF on August 27, 2012, in the West Bunker room (BC-22). Misaligned skirts cause coal dust leaks. This picture illustrates coal leaking onto a white notebook held by the Auditor.**


**Picture 7: A skirt seal in need of alignment as observed at CUF on August 14, 2012, in Silo 1 (BC-9).**


**Picture 8: A worn belt due to misalignment causing coal dust leaks as observed at BRF on September 25, 2012, along Belt Feeder 2.**


**Picture 9: A skirt box too wide as observed at BRF on September 25, 2012, along BC-7. Skirt boxes that are too wide cause coal leaks.**


**Picture 10: A gouge in a belt cleaner causing coal dust leaks as observed at CUF on August 13, 2012, along BC-16.**

## Funding Has Not Kept Pace With Equipment Deterioration

Each coal plant operates with limited funding for correcting equipment deficiencies. According to TVA personnel, for the past several years funding for equipment deficiencies that contribute to dust accumulation was included in each plant's O&M budget with no additional funding dedicated to fixing equipment deficiencies identified on the Work-Off Curves. Over time, equipment has deteriorated faster than funding was available to repair or replace the equipment. These equipment inadequacies and deficiencies contribute to increased presence of combustible coal dust and coal accumulations within the coal handling system. In our opinion, TVA's aging equipment presents a great challenge toward achieving compliance.

We observed numerous conditions contributing to excess coal dust accumulations and increasing the need for additional equipment and housekeeping efforts:

- As part of the plants' washdown[9] process, whether it is by hosing or using fixed systems, accumulations of water and coal slurry[10] can build up and clog drains. TVA coal plants have sump pumps which are used to remove excess coal slurry and unwanted accumulations of water from washdown. During our walkdown at BRF, we observed the existing sump pumps under the Silo, Beaker building bottom floor, and the basement of Transfer A were inadequate or deficient which caused unwanted accumulations of water and coal slurry during washdown. Specifically, water and slurry were standing in

[9] If dust is not initially contained and is allowed to accumulate, water is the most effective means of cleaning in a coal dust environment, which is referred to as washdown

[10] Coal slurry is a waste fluid produced by washing coal with water.

the areas shown below in Pictures 11 and 12. This problem causes additional housekeeping challenges and limits the use of washdowns by clogging drains.


**Picture 11: Slurry several inches deep covering the Auditor's boot as observed at BRF on September 25, 2012, in the Breaker building.**


**Picture 12: Footprints the Auditor made in slurry as observed at BRF on September 25, 2012, in the Breaker building.**

- A dust collector system is used in coal handling areas to enhance the quality of air released by collecting dust and other impurities from the air. Designed to handle high volume dust loads, a dust collector system consists of a blower, dust filter, filter-cleaning system, and dust receptacle or dust removal system. During our site walkdowns at BRF, CUF, and PAF, we observed abandoned dust collector systems and associated duct work. These abandoned systems increase the need for housekeeping efforts because coal dust accumulates on the abandoned equipment and has to be cleaned. According to the TVA Yard Systems Engineer, these systems have not been in service for years due to the lack of funding to repair or replace nonworking equipment.


**Picture 13: Duct work from an abandoned dust collector system as observed at CUF on August 13, 2012, in the Unit 1 South Bunker room (BC-25).**


**Picture 14: An abandoned dust collector system as observed at CUF on August 13, 2012, in the Unit 1 North Bunker room (BC-23).**


**Picture 15: Open coal chute doors above the feeder platform as observed at PAF on August 28, 2012. We also observed open and deteriorating chute doors at head pulleys, tail pulleys, transfer points, and feeders at BRF and CUF. Open chute doors allow dust to be expelled into the surrounding area, adding to housekeeping efforts and increasing the hazard of coal dust explosions.**

TVA designated an additional $17.4 million from capital reserves to supplement the plants' combined O&M budgets of $4.9 million for combustible coal dust improvements in FY2013. This additional funding will be used for repairs to belts, breakers, barge unloader buckets, chutes, skirts, and seals, all of which impact combustible coal dust.

**Housekeeping Challenges Are Not Being Met**

In the power industry, housekeeping means controlling dust and preventing spills. Particular attention must be paid to cleaning because the buildup of dust on the walls of bunkers, silos, along conveyors, and transfer points poses safety problems if the coal dust is left unattended. These cleaning efforts could include washing, vacuuming, sweeping and mopping (adequate only for floors), and foaming. Housekeeping must be a priority within the plant's culture and be continually supported by management in order to keep combustible coal dust levels below the 1/32 inch OSHA NEP standard. According to TSP 816, all surfaces should be cleaned, including beams, walls, equipment, ducts, and floors, among other surfaces.

As previously stated, if dust is not initially contained and is allowed to accumulate, water is the most effective means of cleaning in a coal dust environment, which is referred to as washdown. To operate effectively, washdowns require proper equipment seals and adequate drainage. Methods of washdown include simply a laborer pointing a hose to the area, installing fixed washdown systems consisting of a series of engineered spray nozzles throughout conveyer areas, or utilizing fixed fire suppression water spray systems to clean coal dust from conveyor belts. Fixed washdown systems are the most efficient and effective ways to get water to the correct places for cleaning combustible dust. Fixed systems reduce labor cost, require less water, and result in cleaner areas. Generally speaking, a fixed washdown system cleans the target area in one quarter of the time needed for manual washdowns and typically requires only one person to operate. We observed a fixed washdown system in use during our site walkdown at PAF. Due to the cost of these systems and the cost to retrofit plants for the systems, PAF is the only TVA plant that has these systems. Additionally, all TVA coal plants have fixed fire suppression water spray systems along the belt conveyors that may provide viable washdown methods, if adequate drainage is provided.

The Office of the Inspector General conducted an Inspection of TVA's Fossil Fire Protection Systems in 2011[11] which identified areas of significant coal dust accumulations at several sites and recommended regular coal washdowns to minimize coal dust accumulations. TVA management agreed with our recommendation and committed to regular coal washdowns in FY2012 and beyond.

According to TVA personnel, staff augmented labor was used for cleaning combustible dust but was cut in 2012 under TVA's Diet and Exercise program. There is not enough annual plant staff to keep up with the housekeeping related to combustible coal dust. TVA personnel stated that without enough labor to clean everything, plants need to prioritize areas to be cleaned and set a high priority for cleaning areas next to the boilers to minimize exposure to sparks and hot cinders.

[11] Inspection 2010-13530 – Review of TVA's Fossil Fire Protection Systems, issued on September 30, 2011.

Although housekeeping efforts are active throughout the coal fleet, several factors contribute greatly to TVA's inability to keep pace with housekeeping requirements and leave TVA facing significant challenges to meet TVA's requirements for compliance with OSHA NEP standards. Among the most notable factors are recent reductions of staff dedicated for housekeeping and reductions in the funding for equipment improvements and upgrades.

**High Priority Areas of Coal Dust Accumulation Need Attention**

Coal dust that is carried into high areas of the plant, such as overhead beams, creates prime areas where secondary explosions can occur because these areas may not be inspected or cleaned as frequently as they should be due to unreachability or poor visibility. We observed dust accumulations on overhead beams, joists, tops of equipment, cable trays, piping, conduits, and duct work that exceeded 1/32 inch. We also observed ½ to 1 inch of coal on floors under boiler archways. These are somewhat enclosed areas located dangerously near boilers and should be considered high priority for cleaning to remove the dust accumulations. More attention is needed for cleaning high overhead and hard-to-reach areas and susceptible areas near boilers.

We observed coal and dust accumulations on idlers during our walkdowns at BRF, CUF, and PAF. Cleaning of idlers should be high priority as idlers embedded in coal can seize or generate heat and may eventually ignite the surrounding combustible material.


**Picture 16: Coal and dust accumulations on idlers at a tail pulley as observed at CUF on August 13, 2012. We observed similar conditions at BRF and PAF.**

**Tools for Monitoring Combustible Dust Conditions Are Not Consistently Used**

The Program involves several tools for managing combustible dust risks, monitoring plant conditions, and setting priorities for remediation. These tools include site-specific dust management plans, quarterly site assessments, Monthly Housekeeping reports, and sampling for combustibility.

TSP 816 states that a written dust management plan should be developed by all coal plants for hazardous dust inspection, combustibility testing, housekeeping, and controls. Specifically, a dust management plan should:

- Define responsibilities for Program controls at each plant.
- Require documentation of daily, weekly, monthly, and quarterly inspections for housekeeping compliance to the combustible dust standards.
- Define requirements for placing warning signs for combustible coal dust.
- Detail cleaning frequencies needed to achieve compliance.

According to TVA personnel, some plants do not have a site-specific dust management plan. BRF, KIF, and Shawnee Fossil Plant are the only plants that had site-specific dust management plans available in TVA's Procedure Center. Dust management plans were not available for the other seven operating coal plants. Until recently, TVA has not enforced the necessity to develop site-specific plans. Although several of the coal plants that do not have dust management plans will most likely be idled or closed in the next few years, dust management plans are needed for the coal plants that will remain in service in order to properly mitigate combustible dust accumulations and prevent damage from dust hazards.

Quarterly combustible coal dust site assessments identify combustible coal dust hazards and help personnel understand the gaps that exist between safe practices and compliance and actual conditions. According to the Yard Systems Engineer, staff reductions and budget crunches have impacted the ability to perform quarterly site assessments. As a result, only one site assessment has been conducted since September 2012.

Although the plant housekeeping reports are completed monthly, these reports are not an accurate tool for evaluating dust conditions because the reports occur at a particular point in time and may not accurately reflect overall plant conditions that can change quickly. This reporting could be conducted at the dirtiest time or the cleanest time for plant conditions. If an assessment is conducted while the plant is not running, conditions could reflect positively in the housekeeping report. Within hours, the plant could start running and conditions would change drastically and reflect poorly in the housekeeping report. Additionally, reported plant conditions are subject to personal interpretation which varies from plant to plant, further contributing to the questionable accuracy of these monthly reports.

According to TVA personnel, to evaluate the combustibility of any dust, including fly ash, the dust should be sampled and analyzed to determine the loss-on-ignition (LOI). Based upon Factory Mutual Testing that was performed for the American Electric Power Company, TVA requires that any dust testing with 15 percent or greater combustible product should be treated as a combustible dust, and the 1/32 inch maximum accumulation standard applies. We observed areas where fly ash dust[12] accumulations were being cleaned at BRF before areas of combustible coal dust. However, LOI sampling to date has only been performed upon request from TVA's Fire Protection staff when it is probable there is a combustible dust problem, particularly after a fire has occurred in the upper elevations of a powerhouse around the boiler. A draft revision to TSP 816, which is under review, requires a minimum of quarterly LOI testing of fly ash dust. Regular sampling and analysis is necessary to determine the dust combustibility and establish housekeeping priorities.

Without site-specific dust management plans, quarterly site assessments, accurate monthly reports, or routine LOI sampling, plants cannot effectively monitor conditions or set appropriate remediation priorities.

## RECOMMENDATIONS

We recommend the Senior Vice President, Power Operations:

1. Request corporate and plant staff to work together on a plan for correcting equipment deficiencies and work toward completion of the plan to improve coal dust containment. The plan should:
   a. Include estimates for resource requirements, such as funding, staff, and equipment needs.
   b. Include monitoring progress of equipment remediation quarterly using the same tracking method (similar to Work-Off Curves).
   c. Consider conducting plant walkdowns with peers from other plants and exchange ideas to improve coal dust management.

2. Work with coal plants to minimize dust accumulations and address housekeeping challenges. Include actions, such as keeping all chute doors closed while coal is being transported and ensuring there are properly operating sump pumps and drains for removing washdown water and coal slurry.

3. Dedicate more attention to address housekeeping challenges, particularly cleaning high overhead, hard-to-reach areas and other priority areas.

4. Develop site-specific dust management programs as required by TSP 816 to define expectations, establish standards, and monitor and document results.

[12] Fly ash dust is very fine, powdery material resulting from the combustion of coal. Fly ash alone is not considered combustible.

Develop site combustible dust teams and allocate adequate resources to meet the site-specific housekeeping goals.

5. Perform monthly and quarterly assessments for housekeeping compliance to the combustible dust standards, as required by TSP 816, and correct deficiencies in a timely manner to address housekeeping challenges.

6. Test fly ash dust quarterly to determine LOI levels for combustibility.

## MANAGEMENT'S RESPONSE AND OUR EVALUATION

TVA management responded to a draft of this report and agreed with our recommendations. Management has taken or is taking the following actions:

- Committed to using a previously created short- and long-term combustible dust projects spreadsheet that includes fleet wide prioritization and funding requirements and is updated quarterly. Power Operations Performance & Oversight will coordinate with Corporate Engineering personnel to work with TVA plant employees to update this spreadsheet by December 31, 2013. Subsequent updates will be performed quarterly.
- Developed a Combustible Dust Program document with collaboration between Power Operations personnel, Corporate Engineering, and Corporate Safety. This document contains 16 Combustible Dust Program milestones that define standards and set expectations including minimizing coal dust accumulations, preventing housekeeping challenges, developing site-specific dust management programs, performing combustible dust assessments, and testing LOI levels for combustibility. An SPP will be developed and approved during FY2014 to replace the program document.
- In addition to the inspection and housekeeping details provided in the program document, Power Operations will continue to evaluate projects, such as installing shed plates to prevent reaccumulation of dust in hard-to-reach areas.
- Develop a site-specific combustible dust procedure template that will be provided to all coal sites. This template will be completed by December 31, 2013. Each site will use the template to develop site-specific combustible dust procedures by May 30, 2014.

With regard to our recommendation to perform monthly and quarterly assessments for housekeeping compliance as required by TSP 816, TVA management responded that TSP 816 is being phased out and replaced with TSP 1205 which no longer requires quarterly assessments. However, TSP 1205 does require daily, monthly, and annual assessments which will be part of Power Operations Combustible Dust Program.

The Office of the Inspector General agrees with the actions planned and taken by TVA management in regards to all recommendations.

November 5, 2013

Robert E. Martin, ET 3C-K

REQUEST FOR COMMENTS – DRAFT AUDIT 2012-14631 – REVIEW OF TVA'S MANAGEMENT OF COMBUSTIBLE COAL DUST

We appreciate the opportunity to provide further comments on the draft report of TVA's management of combustible coal dust dated October 8, 2013.

Responses for recommendations are summarized below.

Recommendations

1. Request corporate and plant staff to work together on a plan for correcting equipment deficiencies and work toward completion of the plan to improve coal dust containment. The plan should:
    a. Include estimates for resource requirements, such as funding, staff, and equipment needs.
    b. Include monitoring progress of equipment remediation quarterly using the same tracking method (similar to Work-Off Curves).
    c. Consider conducting plant walkdowns with peers from other plants and exchange ideas to improve coal dust management.

Response

A short- and long-term combustible dust projects spreadsheet, which includes fleet-wide prioritization and funding requirements, was developed several years ago by Fossil Engineering. This tool will be used to address recommendations 1(a) and 1(b). This living document will reside on the Power Operations Performance & Oversight "Plant Compliance" SharePoint site (http://gen.tva.gov/coalOps/os/PC/Pages/default.aspx). Over the past year, Coal Operations invested $17.4M on combustible dust and coal yard improvements. Many of the items funded were on this spreadsheet and will now be able to be removed.

Power Operations Performance & Oversight will coordinate with Corporate Engineering personnel to work with plant employees to update this spreadsheet. The target date for update completion is December 31, 2013.

Subsequent updates will be performed quarterly as recommended.

2. Work with coal plants to minimize dust accumulations and address housekeeping challenges. Include actions, such as keeping all chute doors closed while coal is being transported and ensure there are properly operating sump pumps and drains for removing washdown water and coal slurry.

Response

A Combustible Dust Program Document has been developed by Power Operations personnel with collaboration and input from Corporate Engineering and Safety to define standards and set expectations. This program will address all of recommendations 1(c) - 6. A draft copy of the

program document is attached to this transmittal. An SPP will be developed and approved during Fiscal Year 2014 to replace the program document.

As shown in the program document, 16 milestones have been defined to get this program up and running. All milestones are expected to be complete by September 30, 2014. Until complete, the ongoing status of these milestones will be reported to Power Operations senior management along with other compliance milestones in the Monthly Asset Performance Report.

3. Dedicate more attention to address housekeeping challenges, particularly cleaning high overhead, hard-to-reach areas and other priority areas.

Response

See response for recommendation 2. In addition to the inspection and housekeeping details provided in the program document, Power Operations will continue to evaluate projects such as installing shed plates to prevent re-accumulation of dust in hard-to-reach areas.

4. Develop site-specific dust management programs as required by TSP 816 to define expectations, establish standards, and monitor and document results. Develop site combustible dust teams and allocate adequate resources to meet the site-specific housekeeping goals.

Response

With support from Corporate Engineering, Power Operations will develop a site-specific combustible dust procedure template that will be provided to all coal sites. This template will be completed by December 31, 2013. Each site will use that template to develop site-specific combustible dust procedures that include all site-specific procedure requirements by May 30, 2014. Both of these activities are included in the program milestones that are provided in the Combustible Dust Program Document.

5. Perform monthly and quarterly assessments for housekeeping compliance to the combustible dust standards, as required by TSP 816, and correct deficiencies in a timely manner to address housekeeping challenges.

Response

TSP 816 is being phased out and replaced with TSP 1205 which no longer requires quarterly assessments. It does require daily, monthly, and annual assessments which will be part of the Power Operations Combustible Dust Program.

6. Test fly ash dust quarterly to determine LOI levels for combustibility.

Response

See response for recommendation 2.

Please let us know if you have any other questions or need additional information.

James R. Dalrymple
Senior Vice President
Power Operations
LP 3K-C

JLR:AEP
Attachment
cc (Attachment):
Suzanne H. Biddle, LP 2R-C
Dwain K. Lanier, MR 3K-C
Daniel C. McIntire, LP 3K-C
William W. Morrison, LP 3K-C
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OIG File No. 2012-14631

# Power Operations - Coal

*Combustible Dust Program Document*

TVA Operations

**Program Mission**

Define standards and set expectations and to provide practical guidance and description of how Power Operations will address findings and recommendations outlined in OIG audit 2012-14631 as well as manage risks and close gaps in compliance with combustible dust regulations described in TSP1205.

This program document is to be used in conjunction with TSP1205. If conflicting information is discovered, the content of TSP1205 supersedes the content in this document.

This program document will later be replaced by an SPP.

**Combustible Dust Program Philosophy**

- Assign accountability and keep accurate records
- Validity and repeatability of coal dust inspections must be improved across the fleet. This will be necessary to ensure compliance gaps and risks for the fleet are accurately understood, prioritized, communicated, and managed.
- Continually improve and revise housekeeping practices, inspections, etc and make good decisions related to prioritizing efforts to make the most out of available resources to minimize risks associated with combustible dust.
- Corporate personnel to provide support toward the development of program requirements (site-specific procedure development, etc) through the creation of templates and sharing of best practices.
- Containment is the best method of complying with combustible dust regulations. For areas & equipment where containment is compromised, water washing is the most effective method to remove dust. All plants should work to improve ability to wash trouble areas by sealing rooms and equipment, adding drains, etc.
- Lighting improvements and painting combustible dust areas white will improve the quality of inspections and truly identifying breaches in containment.
- It is the responsibility of each employee to maintain good housekeeping in his/her assigned area. It is each employee's responsibility to identify and correct, if possible, any housekeeping issues during daily operations. If the issue is small and can be handled safely by one person, the employee is expected to do so.
- Any coal pipe leak found will be addressed immediately. If the leak cannot be stopped within a reasonable amount of time, the equipment will be removed from service until repairs can be made.

**Core Program Elements**

- Combustible Dust Program Coordinator + two SME's at each plant
  - One SME for the plant and one for the yard. These SME's will perform monthly Combustible Dust inspections at their site.
  - Prepare budget requests for corporate funding.
  - Provide data to update the Combustible Dust score card.
  - Ensure daily, monthly and annual inspections are completed and documented as required.

        - Write WO's using "combustible dust" coding in Maximo (to be developed - see Milestone #3) and ensure conditions are addressed in a timely manner
    - Review & evaluate the effectiveness of inspections, audits and assessments.
    - Advise the MOIC of the effectiveness of the facility Combustible Dust program and areas needing improvement.
- Site-specific written combustible dust procedure
    - Power Operations Performance & Oversight to provide a template, Program Coordinator at each site to develop
    - Inspection plans (daily, monthly, annual)
        - During all inspections, ensure all chute doors are closed while coal is being transported and ensure there are properly operating sump pumps and drains for removing washdown water and coal slurry where applicable
        - Each plant inspector to carry with them glass jars with known LOI content (example 10%, 20%, 30%) during monthly inspections. The samples will be used to quickly and effectively approximate carbon content / combustibility of accumulations of dust identified.
    - Combustibility testing
        - Each plant develop the ability to perform LOI testing onsite to reduce costs and decrease wait time for results
        - This is to encourage more sampling, providing a better understanding and documentation of locations in the powerhouse where ash contains enough carbon to be combustible
        - Flyash dust shall be collected from various locations in the powerhouse and tested quarterly
    - Housekeeping methods and frequencies (living document)
        - These plans will reside on the Power Operations Performance & Oversight "Plant Compliance" sharepoint site. This will allow each plant to review other plants' plans which may be beneficial from a "sharing best practices" standpoint.
        - Housekeeping plans will include plans to address housekeeping challenges such as high overhead, hard-to-reach areas
            - Evaluate projects such as installing shed plates to prevent re-accumulation of dust in hard-to-reach areas
        - Results of monthly inspections are to be used to continually refine the housekeeping plan.
        - Housekeeping methods and frequencies will be updated over time as conditions change.
    - Plan view drawings showing areas of plant with hazardous electrical classifications
        - These drawings have already been created for each site (see 25W100 series drawings)
    - Hazard assessments
        - All plants required to have PHA (Process Hazard Assessment) for coal handling

## Power Operations - Coal
*Combustible Dust Program Document*

TVA Operations

        - TVA Safety will lead these assessments at each site, expect 3-5 days onsite, will require competent plant employee participation from Ops, Maint, and Engineering during hazard assessments
        - Power Operations Performance & Oversight will schedule Process Hazard Analysis for all sites
- Prioritization guidelines will be developed and used to help each plant provide sound judgment in prioritizing areas of excessive accumulation of combustible dust
    - The explosion pentagon
        - Potential ignition source (heat)
        - Fuel (combustible dust)
        - Air
        - Dispersion, or could become suspended (any elevated dust should be considered capable of being thrown into suspension)
        - Confinement of the dust cloud
- Training
    - Per TSP1205, all TVA employees, contractors, and unescorted visitors shall complete ATIS 75616 training within 30-days of hire or transfer to a facility with combustible dust, then annually thereafter
    - The combustible dust program coordinator and SME's will attend training specific to this Combustible Dust Program coordinated by Power Operations Performance & Oversight and Corporate Engineering.
- Vendor contracts
    - Each plant to set up monthly vendor contract / service agreement (Benetech or similar) to inspect, adjust, replace belt cleaners, skirts, etc
        - Expected budget $20k/month for coal fleet
- Develop Maximo coding to designate combustible dust WO's for streamlined tracking, trending
    - Ensure all deficiencies identified during regularly scheduled Combustible Dust inspections are captured in Maximo and tracked until completion
    - COGNOS reports can then be built to pull WO information
- Update and manage the short and long term combustible dust projects spreadsheet
    - This spreadsheet will be used as a tool to prioritize and communicate equipment deficiencies that lead to ongoing gaps in compliance and/or ongoing difficulty maintaining compliance with combustible dust regulations
    - Each plant to update this spreadsheet no less than quarterly

# Power Operations - Coal

*Combustible Dust Program Document*

TVA Operations

## Combustible Dust Program Milestones & Due Dates

| # | Milestone |
|---|---|
| 1 | Each site to ensure required signs posted to warn of combustible dust areas. Due date 12/1/2013 (in line with HazCom due date which has been communicated to Yard Ops Supervisors). |
| 2 | Power Operations Performance & Oversight to work with Corporate Engineering and personnel from each plant to update the Long and Short Term Combustible Dust Projects spreadsheet by 12/31/2013. |
| 3 | Power Operations Performance & Oversight to develop Maximo coding that will be used to designate combustible dust work orders. Due date 12/31/2013. |
| 4 | Power Operations Performance & Oversight to develop quarterly scorecard. Due date 12/31/2013. |
| 5 | Engineering and Power Operations Performance & Oversight to develop site-specific combustible dust procedure template. REFERENCE ITEM 12. Due date 12/31/2013. |
| 6 | Plant managers will designate a combustible dust program coordinator that will be responsible for managing the program at their site. Due date 1/31/2014. |
| 7 | The combustible dust program coordinator will assign two SME's (one plant, one yard) who will be responsible for all combustible dust inspections. Due date 1/31/2014. |
| 8 | Engineering and Power Operations Performance & Oversight to develop combustible dust program training module (REFERENCE ITEM 11) for program coordinators and SME's. Due date 1/31/2014. |
| 9 | Power Operations Performance & Oversight to develop priority guidelines based on Explosion Pentagon to help plants make good decisions on prioritizing risks associated with combustible dust accumulations. Due date 1/31/2014. |
| 10 | Power Operations Performance & Oversight to schedule Process Hazard Assessments with TVA Safety for all sites. Due date for schedule 2/28/2014. |
| 11 | The combustible dust program coordinator and SME's will attend combustible dust program training (REFERENCE ITEM 8) coordinated by Power Operations Performance & Oversight. Due date 3/28/2014. |
| 12 | Combustible dust program coordinator / SME's will develop a site level Combustible Dust procedure using template provided by Engineering / Power Operations Performance & Oversight. This procedure will include inspection plans (daily, monthly, annual), combustibility testing, Hazard Assessments, and plan view drawings showing areas of plant with electrical requirements. REFERENCE ITEM 5. Due date 5/30/2014. |
| 13 | Combustible dust program coordinator / SME's will develop housekeeping plan which specifies cleaning frequencies and methods (some plants already have this complete). This will be a living document that will be stored on the Power Operations Performance & Oversight compliance sharepoint site. Due date 5/30/2014. |
| 14 | Verify facility has LOI measurement capability. Perform and document sampling of flyash at multiple locations throughout powerhouse to document expected boundaries of "combustible" dust. Follow up measurements will be performed quarterly.<br><br>Create glass jars with known LOI content (10%, 20%, 30%) to be used to approximate combustibility of ash accumulations during monthly inspections. Due date 6/26/2014. |
| 15 | Each site to set up vendor (Benetech or similar) monthly service agreement to inspect, adjust, replace belt cleaners, skirts, etc. Due date 6/26/2014. |
| 16 | Power Operations Performance & Oversight to create Combustible Dust SPP to replace Program Document. Due date 9/30/2014. |

**Memorandum from the Office of the Inspector General**

November 4, 2014

Charles G. Pardee, WT 7B-K

REQUEST FOR MANAGEMENT DECISION – AUDIT 2012-14811 – TVA PRODUCTIVITY IMPROVEMENT INITIATIVES

Attached is the subject final report for your review and management decision. You are responsible for determining the necessary actions to take in response to our findings. Please advise us of your management decision within 60 days from the date of this report.

Information contained in this report may be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

If you have any questions or wish to discuss our findings, please contact me 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
Assistant Inspector General
(Audits and Evaluations)
ET 3C-K

MVE:BSC
Attachment
cc (Attachment):
James R. Dalrymple, LP 3K-C
Robert M. Deacy, Sr., LP 5D-C
Joe P. Grimes, LP 3R-C
William D. Johnson, WT 7B-K
Dwain K. Lanier, MR 3K-C
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John M. Thomas III, MR 6D-C
TVA Board of Directors
OIG File No. 2012-14811

Office of the Inspector General

*Audit Report*

To the Executive Vice President and the Chief Operating Officer, Operations

# TVA PRODUCTIVITY IMPROVEMENT INITIATIVES

Auditor
Maria V. Edwards

Audit 2012-14811
November 4, 2014

# ABBREVIATIONS

| | |
|---|---|
| APQC | American Productivity and Quality Center |
| CAGR | Compound Annual Growth Rate |
| CEO | Chief Executive Officer |
| COO | Chief Operating Officer |
| CUF | Cumberland Fossil Plant |
| DBA | DeWolff, Boberg & Associates, Inc. |
| D&E | Diet and Exercise |
| EFOR | Equivalent Forced Outage Rate |
| FPG | Fossil Power Group |
| FY | Fiscal Year |
| MOS | Management Operating System |
| NFOM | Non-Fuel Operations and Maintenance |
| NPG | Nuclear Power Group |
| OEI | Organizational Effectiveness Initiative |
| OIG | Office of the Inspector General |
| O&M | Operations and Maintenance |
| PAF | Paradise Fossil Plant |
| PTO | Performance Transition Office |
| SQN | Sequoyah Nuclear Plant |
| TVA | Tennessee Valley Authority |
| WBN | Watts Bar Nuclear Plant |
| WBN U2 | Watts Bar Nuclear Plant Unit 2 |
| WCF | Widows Creek Fossil Plant |

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## APPENDIX

# AUDIT 2012-14811 – TVA PRODUCTIVITY IMPROVEMENT INITIATIVES

## EXECUTIVE SUMMARY

### Why the OIG Did This Audit

The Tennessee Valley Authority (TVA) engaged in three major initiatives during fiscal year (FY) 2009 through FY2013 related to workforce productivity and operational performance: DeWolff, Boberg & Associates, Inc.'s (DBA) workforce performance, McKinsey and Company's Pilot[i] and Performance Boost,[ii] and TVA's Diet and Exercise (D&E). Our audit objective was to assess the effectiveness of TVA's management of those productivity and operational performance improvement initiatives.

Under the direction of the former TVA Chief Operating Officer, TVA contracted with DBA, effective August 1, 2009, for the purpose of assessing and analyzing fossil and nuclear plant process operations for improvement opportunities. During the initiative, DBA was to provide tools including a unique system and training methods designed to reduce costs, improve processes, and increase management and employee effectiveness. Specific benefits to be achieved included "improved leadership and oversight behaviors from first line supervisors, increased labor productivity, reduced maintenance costs and backlogs, reduced employee overtime, and optimization of contractor expenditures." DBA claimed savings of $82.6 million as a result of the DBA contract, which ended December 31, 2012.

Concurrently, in August 2009, TVA contracted with McKinsey for an Organizational Effectiveness Initiative focused on improving effectiveness and creating a culture of ownership and accountability at TVA. To simultaneously improve both organizational health and performance, McKinsey launched the Pilot, its first efficiency effort, in a program at Paradise Fossil Plant in December 2009 with the purpose of providing employees an opportunity to suggest and discuss improvement ideas in four major areas: operations, outages, maintenance, and fuels. These efficiency efforts continued starting in May 2011 for fossil and nuclear plants through McKinsey-led "Performance Boosts." McKinsey claimed savings of $11.1 million and $330 million as a result of the Pilot and Boost, respectively. McKinsey initiatives ended in December 2012.

TVA's D&E initiative began in February 2012 in response to decreased revenues as a result of unusually mild winter weather, slow economic growth, and consumer behavior changes. D&E was a business strategy designed to keep rates competitive by lowering spending, resulting in immediate savings or cost reductions. In February 2013, D&E ended

[i] McKinsey's first efficiency effort will be referred to as the Pilot throughout this report.

[ii] McKinsey's second improvement effort will be referred to as Boost throughout this report.

when TVA's current CEO advised that TVA's focus would be on financial excellence, in order to be "as efficient, as productive, as effective as we can." Savings claimed as a result of D&E were $1.2 billion, with the portion of those savings attributed to productivity ranging from $122.7 to $343 million.

## What the OIG Found

We assessed the effectiveness of TVA's management of the DBA, McKinsey Pilot and Boost, and D&E initiatives and determined TVA management did not effectively monitor achievement of each performance initiative. Specifically, we identified a deficiency in the control design related to tracking and monitoring claimed savings attributed to DBA and McKinsey initiatives. In addition, the sustainability of each performance improvement initiative was hindered by the lack of employee engagement and resource constraints that made operational efficiency improvements unachievable or unrealistic. Further, employee morale suffered from employee perceptions of disrespectful behavior towards them by DBA personnel and perceived lack of follow-through by TVA management to provide funding necessary to implement improvements identified during the McKinsey efforts. Table 1 on the following page summarizes the findings associated with each initiative.

## EXECUTIVE SUMMARY

| Initiative and Savings Claimed | Observed Savings or Productivity Enhancement | Findings |
|---|---|---|
| **DBA**<br>$82.6 million (all savings were attributed to efficiency and productivity enhancements). | Some improvement in key metrics (i.e., Equivalent Forced Outage Rate [EFOR], non-fuel operations and maintenance [NFOM]). | • Results not adequately tracked or validated by TVA.<br>• Controls were not in place to ensure consistency for measuring productivity improvements.<br>• Unsupported assumptions used to calculate savings from the average number of maintenance work orders closed during the baseline period.<br>• Tools developed are no longer utilized. |
| **McKinsey**<br>$341 million (all savings were attributed to operational efficiency improvements). | Some improvement in key metrics (i.e., EFOR, NFOM). | • Results not adequately tracked or validated by TVA.<br>• Potential duplication of EFOR efforts already identified by TVA personnel and included in TVA funding strategies being implemented before Boost.<br>• Unsupported assumptions and TVA employee approximations of potential savings were used to calculate savings.<br>• Improvements in NFOM during and after Boost efforts were not significant.<br>• Boost efforts and funding stopped after the initiative ended. |
| **D&E**<br>$1.2 billion (savings attributed to productivity ranged from $122.7-$343 million). | FY2012 budgetary savings. | • Inconsistencies in reported savings associated with productivity improvements.<br>• Claimed savings were already attributed to DBA and Boost efforts.<br>• TVA noted majority of savings claimed were due to capital and operations and maintenance project timing, deferrals, delays, and interest favorability due to lower project spend. |

**Table 1**

### What the OIG Recommends

While the findings were based on past initiatives, we believe the resulting recommendations should be adopted going forward. We recommend the Executive Vice President and Chief Operating Officer, Operations:

1. Assess the cultural climate through meaningful dialogue with employees about the impacts of the initiatives to determine the long-term effects on employee engagement and morale. This may be

accomplished by conducting employee forums in a safe environment for employees to voice their reactions regarding the initiatives discussed in this report. The forums may also allow employees to raise issues in other areas where these employees have concerns or fear of retaliation.

2. Establish a standard process and procedure that includes the following for future improvement programs:[iii]

   a. An implementation plan clearly describing availability of resources, a methodology with an established baseline, and well-defined and measurable deliverables.

   b. A communication plan documenting the purpose, specific objectives and goals, and funding limitations.

   c. Controls and appropriate metrics for ongoing tracking, monitoring, and reporting of progress.

   d. Methodology to (1) allow employees to voice concerns and suggestions and (2) provide transparent and timely feedback to address employee concerns and suggestions.

   e. A sustainability plan outlining actions for employee engagement, and transference of consultant roles to TVA personnel if an outside party is used, to ensure the results continue.

## TVA Management's Comments

TVA management reviewed a draft of this report and agreed the contents are factually correct. TVA management is currently working on a plan to address our recommendations. See the Appendix for TVA management's complete response.

[iii] The terminology in this report refers to productivity and operational performance improvement efforts as initiatives, but these recommendations would also apply to future efforts referred to as programs.

# BACKGROUND

Productivity is defined by the United States Bureau of Labor Statistics as "a measure of economic efficiency which shows how effectively economic inputs are converted into output."[1] Various methods can be used to measure productivity, with the most common method described by the Bureau as measuring "Output per hour of all persons." The American Productivity and Quality Center (APQC)[2] notes performance indicators are used to identify areas for potential improvement, gauge operational performance, allocate resources, and measure progress toward achieving business goals.

The Tennessee Valley Authority (TVA) uses performance indicators to measure improvement in certain areas through benchmarking against internal goals, as well as other utilities. Many of the performance indicators TVA uses to benchmark against internal goals are incentivized. From fiscal year (FY) 2004 until FY2008, one of the incentivized performance indicators was "Productivity," which factored labor cost compared to delivered generation or sales. Equivalent Forced Outage Rate (EFOR) was an additional performance indicator used by TVA's coal and nuclear generation plants for FY2004 through FY2013. EFOR focused on achieving reliable operation and measured the generation lost due to forced outages and derating as a percentage of time the unit would have been scheduled to run.

Starting in FY2008, TVA included a productivity component of labor and benefits in non-fuel operations and maintenance (NFOM)[3] costs per megawatt hour of sales, another incentivized performance indicator, and productivity was no longer measured separately. TVA described NFOM as the most significant controllable component of TVA's total costs. In FY2009 through FY2012, a broader performance measure, "Net Cash Flow from Operations less Investing," replaced NFOM. This measure focused on total cash spend and included controllable components of TVA's total costs, such as capital projects, working capital, and the NFOM productivity component of labor and benefits.

During FY2009 through FY2012, TVA implemented several initiatives for the principal purpose of increasing productivity and operational performance and reducing costs. Two of these initiatives were led by outside consultants, DeWolff, Boberg & Associates, Inc. (DBA) and McKinsey and Company, and focused primarily on utilizing cost-cutting strategies, tools for working smarter, and employee engagement. A third initiative, Diet and Exercise (D&E), was a TVA-led cost reduction program that also included elements from both DBA and McKinsey. These three initiatives are described in more detail on the following pages.

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1 "Labor Productivity and Costs – Frequently Asked Questions (FAQs)," U.S. Bureau of Labor Statistics, http://www.bls.gov/lpc/faqs.htm, accessed on July 22, 2014.

2 APQC is an industry leader in business benchmarking, best practices, and knowledge management research aimed at helping organizations improve productivity and quality.

3 Total TVA NFOM includes expenses for power production, transmission, administrative and general, customer service and information, and sales.

## DEWOLFF, BOBERG & ASSOCIATES, INC.

Under the direction of the former TVA Chief Operating Officer (COO), TVA entered into Contract No. 2216 with DBA, effective August 1, 2009. The scope of the contract included work management improvement services "to assess and analyze current plant process operations and offer improvement ideas to achieve maximum operation capacity to benefit the long-term and ongoing performance at multiple TVA Nuclear Power Group (NPG) and Fossil Power Group (FPG) generation sites." DBA was to "provide unique system and training tools designed to reduce costs, improve processes and management and employee effectiveness." Specific benefits to be achieved included, but were not limited to, "improved leadership and oversight behaviors from first line supervisors, increasing labor productivity, reduced maintenance costs and backlogs, reduced employee overtime and optimization of contractor expenditures."

TVA's contract with DBA defined a base productivity rate, which was calculated as base-earned hours per task divided by hours worked and would be used to calculate estimated savings achieved during the initiative. DBA was to guarantee cost savings of nearly $18 million from efficiency and productivity gains under a total contract amount of $8.2 million. To provide a platform for sustaining efficiency gains, DBA was also to create and implement a set of tools in a Management Operating System (MOS) to reinforce concepts and principles learned throughout the project. The MOS included guidelines for planning estimates, scheduling and planning tools, development of daily and weekly plans, detailed task studies, and ideal roles and responsibilities.

The DBA contract had seven supplements that extended the contract term to December 31, 2012, increased the guaranteed cost savings to $25.1 million, and increased the contract ceiling for unspecified additional services to $19.8 million. DBA performed work across the TVA nuclear and fossil fleet and reported its work had resulted in total savings to TVA of $82.6 million by the end of April 2012. As reported in our previous audit of TVA's contract with DBA,[4] TVA paid DBA a total of $16.17 million under the contract. However, "We could not determine if DBA achieved the guaranteed cost savings" or determine the value TVA received from work performed by DBA.

## MCKINSEY AND COMPANY

At its July 2009 meeting, the TVA Board of Directors authorized the use of an outside management consulting firm to assist with rectifying the organizational issues identified in connection with the Kingston ash spill. In August 2009, TVA contracted with McKinsey for an Organizational Effectiveness Initiative (OEI) focused on implementing needed changes to improve the effectiveness of the organization and to create a culture of ownership and accountability at TVA. To improve both organizational health and performance simultaneously,

[4] Audit 2012-14775, DeWolff, Boberg & Associates, Inc. - Contract No. 2216, issued May 22, 2013.

McKinsey launched its first efficiency effort, the Pilot,[5] at Paradise Fossil Plant (PAF) in December 2009. The 12-week Pilot included employee workshops facilitated by plant managers and supervisors that gave employees an opportunity to provide and discuss improvement ideas with the focus on four major areas: operations, outages, maintenance, and fuels. By its completion in March 2010, almost 400 PAF employees had contributed more than 1,300 ideas that forecasted savings of $50 to $60 million annually. Funding to institute the majority of these changes was not initially available; however, according to TVA, $400,000 was invested after the Pilot to capture $11.1 million of value through "quick wins." An additional $12.7 million one-time cost would be required to obtain the full savings potential.

As OEI efforts continued, TVA entered into a new 2-year contract with McKinsey in May 2011 for a second improvement effort to conduct a "Performance Boost"[6] with TVA's fossil and nuclear plants. Boost[7] was a continuation of the Pilot process through which plant employees were tasked with specific problem solving, taking ownership, and working together toward common goals to improve efficiency and lower costs. Initial fleet savings under Boost were estimated at $340 to $570 million annually, which did not include cost to achieve. These savings opportunities included EFOR reduction, capacity improvement, NFOM reduction for the generation fleet, benefits of cost-effective investments to improve material condition of the fleet, and heat rate improvements[8] at power plants. McKinsey later increased the projected fleet savings opportunities to a range of $490 to $900 million annually in their progress report.

According to an August 2011 TVA Oversight Council presentation, Boost weaves organizational health objectives, such as improving skills for leadership, communication, coaching, feedback, and problem-solving facilitation, with plant performance objectives of building on existing initiatives, highlighting new opportunities, strengthening core principles in specific areas, and ensuring sustainable performance. Specifically, Boost was designed to:

- Build the foundation of a TVA owned and executed program that can be replicated and sustained to improve frontline health and performance.
- Fundamentally change the skills/capabilities and performance of frontline leaders.
- Equip employees to tackle significant performance issues.
- Highlight visible continuous improvement activities.

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5 McKinsey's first efficiency effort will be referred to as the Pilot throughout this report.

6 McKinsey's second improvement effort will be referred to as Boost throughout this report.

7 For purposes of this report, the Pilot and Boost are considered the same initiative.

8 Heat rate is the amount of energy used by an electrical generator or power plant to generate one kilowatt hour of electricity. We were unable to obtain useful information for the heat rate metric because the measure was not provided for individual plants. According to TVA personnel, heat rate was not a valid improvement metric for the plant level.

- Reinforce initiatives already clearly articulated (e.g., Human Performance rules and tools, the Behavior Centered Safety Process, and Corrective Action Programs) while capturing ideas from the workforce on focused improvement areas.

TVA ended Boost efforts as part of D&E cost-cutting efforts and made the last payment to McKinsey on the Boost contract in December 2012. According to McKinsey, the total savings value generated at the conclusion of Boost efforts was $330 million annually which would require a one-time investment of $28 million. The total amount paid to McKinsey was $1.3 million for the Pilot[9] and an additional $13.6 million for Boost work at Cumberland Fossil Plant (CUF), PAF, and Widows Creek Fossil Plant (WCF), as well as Sequoyah Nuclear Plant (SQN) and Watts Bar Nuclear Plant (WBN).

## DIET AND EXERCISE

In February 2012, the former TVA President and Chief Executive Officer (CEO) introduced D&E[10] to the TVA Leadership Council and employees in response to decreased revenues due to an unusually mild winter weather, slow economic growth, and consumer behavior changes. According to the former CEO, D&E was a business strategy driven by keeping rates competitive and included making changes within capital and operations and maintenance (O&M) spending that would give TVA immediate savings or cost reductions.

The April 2012 Board Overview of Diet and Exercise listed the following key takeaways from D&E:

- Continue investments in key assets and critical operating activities.
- Increase productivity across TVA workforce.
- Reduce reliance on contractors and consultants.
- Reduce inefficiencies across TVA.

The D&E strategy considered major cost areas and identified the highest priority cost categories as non-fuel inventory, overtime, vacancies, management consultants, managed task contractors, and staff augmentation. Although D&E was a primarily a cost-cutting strategy rather than a productivity initiative, portions of the strategy claimed savings as productivity initiatives. The Board Overview projected approximately $1.2 billion in D&E savings opportunities, which included the following as productivity initiatives totaling $379 million:

- Labor-related savings of $46 million from reorganization and reduction in overtime.

[9] The Pilot was included as part of the original OEI contract which totaled $21.3 million. McKinsey showed the cost of the Pilot at $1.3 million in the final report it provided to the Office of the Inspector General (OIG).

[10] Diet referred to immediate cost reductions and exercise to sustainable cost-reduction programs to maintain TVA's health.

- External/auxiliary labor savings of $20 million from reductions in staff augmentation and consultants.
- Efficiency/productivity savings of $200 million from reprioritizing projects, category management, reducing travel, and reducing information technology devices.
- Favorable interest rates/alternative financing of $113 million.

In February 2013, D&E ended when TVA's current CEO advised that TVA should be practicing cost management and cost control "all the time." Going forward, TVA would focus on financial excellence, in order to be "as efficient, as productive, as effective as we can."

A summarization of the TVA strategies for increasing productivity and operational performance is included in the table below.

| Initiative | Start Date | End Date | Savings Claimed | Contract Cost |
|---|---|---|---|---|
| **DBA** | August 1, 2009 | December 31, 2012 | $82.6M | $16.2M |
| **McKinsey (*Pilot*)** | December 2, 2009 | February 24, 2010[11] | 11.1M | 1.3M |
| **McKinsey (*Boost*)** | May 2, 2011 | December 17, 2012 | 330.0M | 13.6M |
| **D&E** | February 9, 2012 | February 5, 2013 | 122.7-343.0M[12] | N/A |

**Table 1**

# OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of our audit was to assess the effectiveness of TVA's management of productivity and operational performance improvement initiatives. Our review was limited to three major initiatives TVA engaged in during FY2009 through FY2013 related to productivity and operational performance: DBA's workforce performance, McKinsey's Pilot and Boost, and TVA's D&E. We limited tests of internal controls to those related to management oversight of these improvement initiatives.

To achieve our objective, we:

- Interviewed a nonstatistical sample of individuals, not projected to the population, at TVA Corporate and fossil and nuclear plants based on responsibility or referral, including, but not limited to, Financial Services, NPG,

[11] Approximate end date based on the 12-week pilot duration.
[12] The entire D&E initiative claimed savings of $1.2 billion.

and Generation[13] in order to obtain information about DBA, McKinsey, and D&E initiatives.

- Interviewed DBA and McKinsey consultants and obtained information relevant to this audit.
- Compared descriptions of DBA, Boost, and D&E improvement initiatives for applicable business units over the 4 years of FY2009 through FY2013 to determine if any overlapping goals and/or savings criteria existed.
- Obtained and reviewed available TVA savings and efficiency documentation for validation, reasonableness, and/or achievability in order to assess the effectiveness of all three initiatives in achieving claimed productivity savings.
- Reviewed applicable information obtained during Audit 2012-14775 related to the guaranteed minimum productivity savings of $17,971,760 under DBA Contract No. 2216.
- Obtained and reviewed future plans for ongoing productivity and operational performance initiatives and planned tracking methods.
- Compared performance measures used to track EFOR, NFOM, and labor and benefits for time periods before, during, and after the initiatives to determine whether efficiencies were gained.

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

We assessed the effectiveness of TVA's management of the DBA, McKinsey Pilot and Boost, and D&E initiatives and determined TVA management did not effectively monitor achievement of all performance improvements. Specifically, we identified a deficiency in the control design related to monitoring and tracking for verification of savings claimed from DBA and McKinsey initiatives. In addition, the sustainability of the performance improvement initiatives was hindered by the lack of employee engagement and resource constraints that made operational efficiency improvements unachievable or unrealistic. Further, employee morale suffered during the DBA initiative due to employee perceptions of disrespectful behavior towards them by DBA. Morale also suffered during the McKinsey initiative from a perceived lack of follow-through by TVA management to provide funding to implement improvements.

[13] NPG and Generation transitioned to Operations in FY2014, after we completed work for our audit.

## INSUFFICIENT MONITORING OF PERFORMANCE IMPROVEMENTS

Prior to beginning a performance improvement initiative, it is important to determine where the organization is currently and where it would like to be in the future. This can be done by establishing a baseline or starting point and setting realistic and measurable goals. To determine whether goals and/or savings have been achieved, progress should be measured throughout the initiative, allowing enough time to elapse for the benefits of the initiative to be realized. In instances when a third party is compensated for assisting an organization in these performance improvement efforts, tracking progress against established, well-defined goals is critical in determining whether benefits were realized. Although there were improvements in two key productivity indicators, EFOR and NFOM, over the timeframe of the DBA and McKinsey work, TVA did not tie these improvements back to either initiative. However, due to a deficiency in the control design supporting the tracking and verification of the initiatives' progress, including improvements in EFOR and NFOM, we were unable to confirm whether any observed efficiency improvements or productivity savings were directly attributable to DBA or McKinsey. While TVA tracked dollar savings in D&E, the amounts attributed to productivity savings ranged from $122.7 to $343 million; therefore, we were unable to verify the savings from productivity improvements.

### Observed Improvement in Productivity Performance Indicators Cannot Be Directly Linked to the Initiatives

TVA uses performance indicators to help the organization understand how well it is actually performing as well as how close it is to achieving goals. Neither the DBA nor McKinsey initiatives used consistent or well-defined performance indicators, and both made unsupported assumptions to calculate savings. As previously stated in our prior audit, "We could not determine if DBA achieved the guaranteed cost savings." Specifically, we determined controls were not in place to ensure consistency for measuring productivity improvements attributed to DBA. In addition, performance improvements could not be specifically attributed to McKinsey because of potential duplication of efforts already identified by TVA personnel.

DBA defined the baseline productivity rate as base-earned hours per task divided by hours worked. However, the calculation utilized by DBA was actual maintenance hours worked divided by the average number of maintenance work orders closed during the baseline period. According to multiple FPG employees, DBA focused on improving productivity by splitting larger work orders, including work orders with multiple tasks for similar work, into multiple smaller work orders and purging the backlog of work orders, sometimes without completing the work or creating new work orders for work not completed. While DBA focused on increasing work orders, it was unclear if any of this work was tied to EFOR drivers including boilers, turbine, generators, transformers, and clean air, which was a focus of McKinsey initiatives.

McKinsey targeted operational efficiencies such as reducing EFOR and NFOM and improving heat rate. TVA tracked both EFOR and NFOM at the fleet level separately from these initiatives. As stated in the Background section, EFOR was an additional performance indicator used by TVA's generation units for FY2004 through FY2013. In addition, as part of the annual planning process during FY2009 and FY2010, FPG implemented a component funding strategy to address material condition of EFOR drivers. Boost focused on EFOR improvements at CUF, PAF, WCF, SQN, and WBN beginning in May 2011. After the TVA funding strategy, EFOR started improving in FY2011, making it difficult to attribute EFOR improvements specifically to either TVA efforts already being implemented or Boost initiatives. As shown in Figure 1, developed by the OIG, EFOR improved for all fossil plants during FY2011 and FY2012 and for all nuclear plants during FY2011 through FY2013.

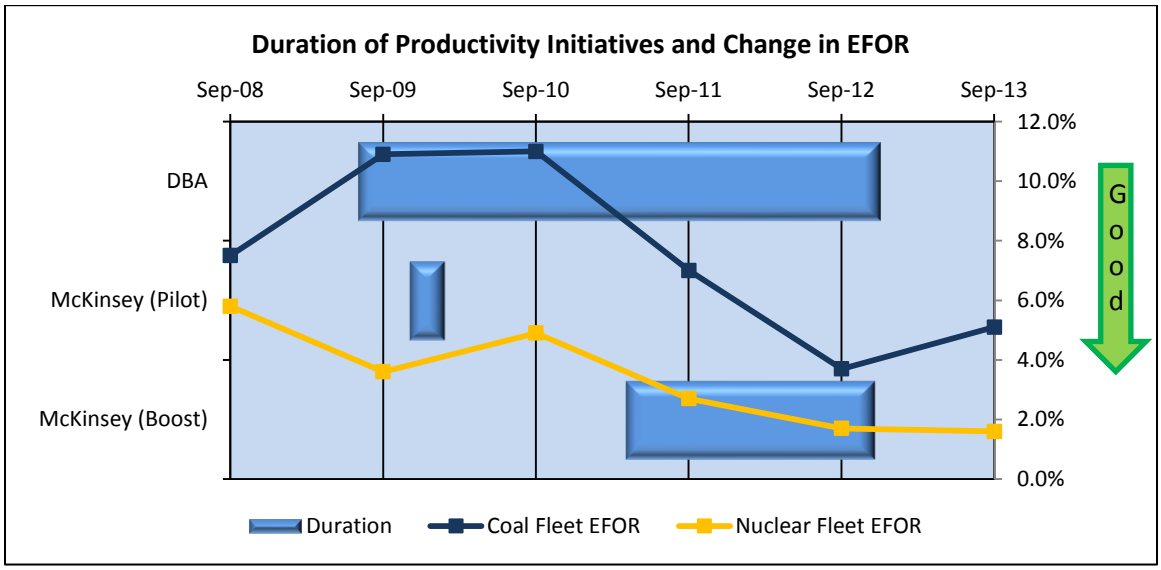


**Figure 1**

As stated previously, NFOM was an incentivized metric only in FY2008 and focused on the most significant controllable component of TVA's total costs, which included the productivity component of labor and benefits. NFOM was still included as part of TVA's benchmarking through FY2013. According to the October 2012 TVA Benchmarking Notebook, total NFOM expenses increased 61 percent from 2007 to 2011 and TVA ranked 19th out of 19 peers for the 3-year average for 2009 through 2011. Although reducing NFOM was a McKinsey focus, we did not note any significant improvements during or after Boost efforts. Figure 2[14] on the following page, provided by TVA Benchmarking, illustrates the steady increases in NFOM between FY2008 and FY2011 and slight decreases for FY2012 and FY2013 as compared to FY2011.

[14] TVA FY2013 benchmarking analysis was completed in October 2014 after we completed our audit. Amounts in Figure 2 were confirmed by the final analysis.

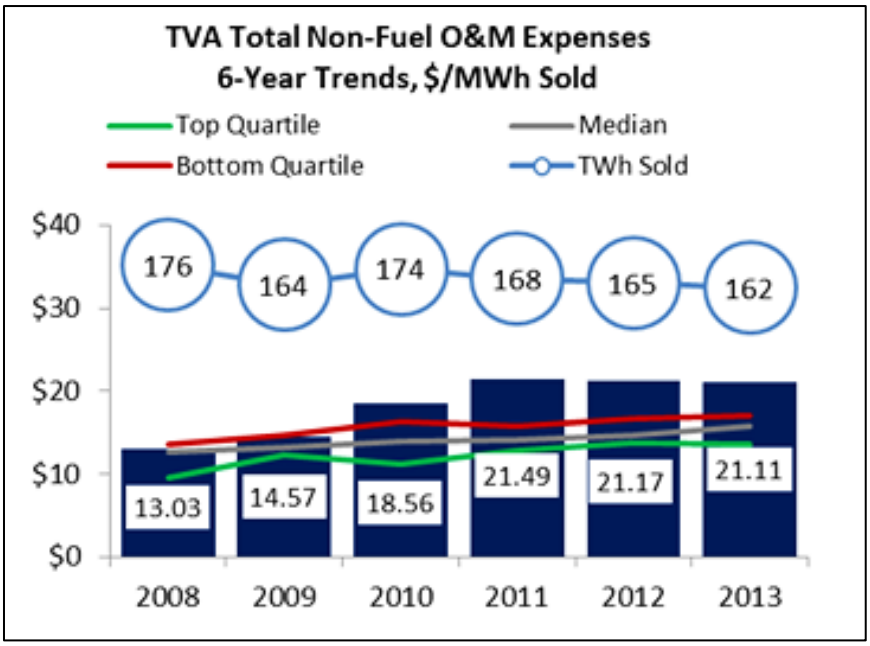


**Figure 2**

We were unable to determine whether improvements were made as a result of the DBA and McKinsey initiatives due to three primary factors. First, TVA did not provide any documentation attributing these improvements to either initiative. Secondly, TVA identified EFOR as an improvement opportunity in the annual planning process, recognized factors contributing to the high EFOR, and was addressing some of those factors prior to the McKinsey initiative. Lastly, inclusion of productivity as a component of the NFOM metric made it difficult to distinguish whether improvements were attributed to productivity or other controllable costs.

**Claimed Savings Were Not Tracked and Could Not Be Verified**

As stated previously, savings claimed from DBA and McKinsey initiatives totaled $423.7 million between FY2009 and FY2012 without factoring in implementation costs. TVA's D&E initiative claimed $1.2 billion in savings for FY2012, including $122.7 to $343 million attributed to productivity savings. We could not verify savings actually occurred as a result of the DBA and McKinsey initiatives because there was no evidence that TVA tracked or validated dollar savings. Furthermore, as shown in Figure 2, the initiatives overlapped, making it more difficult to determine whether promised savings were realized as a result of each initiative.

While DBA reported its efforts had resulted in $82.6 million in savings, the TVA employees assigned to track the initiative stated DBA's savings calculations could not be validated because DBA did not provide support for the numbers used in their calculations. Additionally, as stated in our prior audit, we could not determine the value TVA received from the services provided under the DBA contract.

McKinsey claimed savings totaling $341.1 million for the Pilot and Boost initiatives which required a $28.4 million investment. Generation employees advised they provided McKinsey approximations of how much they thought their ideas would save which, according to those employees, McKinsey used to build reports and show potential savings. Through our interviews with TVA personnel, we obtained copies of McKinsey's presentations reflecting savings opportunities for the fossil and nuclear sites included in the McKinsey initiatives. However, we were unable to obtain support for the savings actually achieved because TVA did not track[15] or validate the dollar savings resulting from the McKinsey initiatives.

To determine whether the $1.2 billion in the FY2012 budgetary[16] savings claimed by the D&E initiative included sustainable productivity improvements, we interviewed TVA corporate and BU personnel who stated the D&E initiative assumed savings were attributed to productivity. We also reviewed TVA performance and budget reports that stated the majority of the $1.2 billion in savings was due to capital and O&M project timing, deferrals, and delays as well as interest favorability due to lower project spend. We could not verify the savings associated with productivity improvements due to inconsistencies in amounts reported. For example:

- TVA's September 2012 Monthly Performance Report Rates package associated $122.7 million with productivity savings. Specifically, these savings were attributed to a "decrease in spending/productivity due to funds transferred to WBN U2 [Watts Bar Nuclear Plant Unit 2]."[17]
- TVA's November 2012 presentation "FY12 Financial Performance & FY13 Look Ahead" stated productivity savings of $343 million resulted from D&E. This presentation attributed productivity savings to "outages, projects, maintenance, supply chain contract pricing, utilizing current inventories, less travel, [and] projects."

In addition, our review of other TVA documentation identified D&E savings that were previously claimed or identified by the other two initiatives. For example:

- In a March 2012 TVA Today update on the D&E concept, one of the Boost initiatives at SQN, "Outage Innovations," was cited as an example of a D&E initiative that would reduce costs around future outages.
- An August 2012 TVA OpenLine response described maintenance efficiency through the NPG MOS, which was a product of the DBA initiative, as an example of a D&E improvement.

[15] TVA created the Performance Transition Office (PTO) to track and monitor initiatives that depended on FPG and NPG input, but the PTO was disbanded in 2012 during Boost.

[16] This amount was primarily from FY2012 budgetary savings versus long-term savings for TVA.

[17] Funds were transferred from the planned construction of Bellefonte Nuclear Plant to the ongoing construction of WBN U2.

As stated previously, progress should be measured throughout an initiative to determine whether goals and/or savings have been achieved. Measurement of this progress may aid in the understanding of behaviors or activities that work toward achieving goals as well as those that may be detrimental to an initiative's success. If progress is not tracked for initiatives, especially those where a third party is compensated for leading the effort, an organization may unnecessarily spend money without knowing whether those efforts were effective.

## INTENDED INITIATIVE IMPROVEMENTS WERE NOT SUSTAINABLE

According to McKinsey:

> Sustainability has long been on the agenda at many companies, but for decades their environmental, social, and governance activities have been disconnected from core strategy. Most still take a fragmented, reactive approach--launching ad hoc initiatives . . . rather than treating sustainability as an issue with a direct impact on business results.

Implementing sustainable efficiency gains requires employees who are engaged and may often require resources such as funding or tools. However, we determined the intended initiative improvements were not sustainable because of low employee engagement, and operational efficiency improvements were not achievable or realistic due to resource constraints.

### Sustainability Was Compromised by Low Employee Engagement and Morale

In order to sustain improvements made with an initiative, it is vital to engage employees and communicate expectations and intentions. Employee engagement is generally defined as the commitment an employee makes not just to the job but to the organization overall and is a significant driver of productivity. According to a 2013 Gallup employee engagement survey,[18] lost productivity of actively disengaged employees costs the United States economy $450 to $550 billion annually. Without employee engagement, low employee motivation and morale can result in unsustainable improvements and can adversely impact the success of future endeavors.

During the DBA initiative, employee buy-in was low and morale suffered primarily due to employee perceptions of disrespectful behavior toward them by DBA personnel. During the McKinsey initiative, employees were encouraged to provide operational improvement ideas. Several employees stated processes to get employee feedback improved by encouraging upward communication and open dialogue. However, a perceived lack of follow-through by TVA senior

[18] "State of the American Workplace," Gallup, 2013, http://www.gallup.com/strategicconsulting/163007/state-american-workplace.aspx.

management and lack of funding to implement improvements negatively affected the level of engagement and adversely impacted employee morale. Furthermore, both initiatives resulted in instances of counter productivity that also adversely affected employee engagement levels and morale. We interviewed 28 FPG employees and all specifically stated morale was negatively impacted either by the DBA initiative, the McKinsey initiative, or both. By not obtaining employee buy-in and adequately addressing employee concerns and perceptions, the sustainability of the initiatives was greatly diminished.

Based on comments received during our interviews, the DBA initiative lacked employee engagement and resulted in instances of counter productivity. As stated previously, specific benefits to be achieved by the DBA initiative included increased labor productivity, reduced maintenance costs and backlogs, and improved leadership and oversight behaviors from front-line supervisors. The initial focus of the initiative was to provide front-line supervisors with the tools and training necessary to remain competitive and successful while maintaining safety and quality priorities. As part of this focus, DBA observed supervisors and scored their perceived performance in several areas on forms known as "fever charts."

According to DBA documentation, the main barriers to productivity were daily lost time issues and safety concerns. DBA focused on improving productivity by increasing the number of work orders completed. As previously described, multiple personnel at different TVA fossil plants stated DBA increased work orders by dividing single work orders into multiple task work orders giving the appearance of more work being completed. This resulted in excess paperwork, an increasing rather than decreasing backlog of work orders, and loss of productivity. In addition, while one of the benefits of the initiative was improved leadership and oversight behaviors, personnel at the participating fossil sites candidly provided OIG audit staff multiple examples of their perceptions of disrespectful behavior toward them by DBA personnel. For example:

- Personnel at multiple sites stated that "lost time" was tracked to the minute. They had to tell DBA personnel when they were going to the bathroom and felt they had no privacy.
- According to a Coal Operations Manager, DBA was always timing the employees and if schedules were not met, lunch breaks would have to be taken at the end of the day.
- One individual stated when timing work and tracking "lost time," DBA did not consider certain factors such as the impact and health-related time restrictions for working in extreme heat. This example of not considering health restrictions contradicted the DBA contract requirement to "promote health and safety in the work environment."
- While one expected benefit of the DBA initiative was reduced employee overtime, many Generation employees described the excessive hours

supervisors needed to manually enter the data required for the DBA initiative. Supervisors were also expected to work after shifts and on weekends to complete these tasks. Several supervisors stated it was the worst work experience they had at TVA.

- According to FPG employees, DBA ranked the cooperation of individual TVA supervisors and managers by scoring them on fever charts with the total score being marked green (90 percent or better), yellow (75 to 89 percent), or red (below 75 percent). For example, the MOS Utilization Assessment included items such as the supervisor "Utilizes overage in headcount to complete capital/outage work dedicated to Contractors" for backlog control and supervisor has "100% attendance (No Stragglers)" at a shift huddle meeting. If only part of the work was completed the supervisor's score for that item was zero points and was marked red. Some FPG employees we interviewed stated DBA gave employees no reasons for the scores and used the fever charts to threaten or intimidate employees who questioned any parts of the initiative, such as prioritization of work.
- Several employees stated they feared losing their jobs as a result of low fever chart ratings. Some managers also stated fever charts were not shared with employees and instead were sent directly to the COO rather than the plant manager.
- A maintenance manager at one site informed us, upon learning of our audit, that he met with responsible TVA personnel from other sites and encouraged them to talk to OIG audit staff, even though no one wanted to talk about DBA. Another individual stated, in hindsight, he wished he had contacted the OIG but was afraid he would lose his job.

Not only did plant personnel state DBA treated employees badly, the former Coal Fleet Operations Vice President also confirmed "The methodology DBA used made the working conditions inhumane for the supervisors in the field." Employee attitudes also worsened with the belief that there was no avenue for expressing concerns or asking questions without job-threatening consequences for noncompliance, especially because the initiative was COO driven. Several employees stated some people were fired, others were threatened to be fired or moved to another site, and some had negative performance reviews, all for their perceived lack of cooperation with DBA.

We interviewed DBA management about employee perceptions related to lost time and the use of fever charts. We also provided DBA management with examples of "observation sheets" which showed personal time was tracked. According to DBA management, the sole purpose of the observation sheet was to develop work to time relationships and/or identify best practices used by crews for doing the repetitive work. DBA trained the supervisors and managers to "observe" the actual work process, not the people. All activities in a work order were to be identified as work time or lost time. Another tool on the operator logs was used to report lost time and contained no categories for reporting breaks,

lunches, or personal time. The observation tools were never used to figure out breaks and lunches. With regard to the fever charts, DBA management informed us the purpose of the fever charts was to be used as a "progressing tool" to identify behavior gaps rather than a human resource tool. DBA management further stated these fever charts were shared weekly during the initiative with TVA upper management.

McKinsey, on the other hand, encouraged employee participation to identify ideas to improve their plants. The Pilot was initiated to help employees and management identify ways to improve the most significant gaps in the plant's operational and organizational performance with "Paradise to serve as the 'beacon' for improvements at fossil plants." According to TVA, employees at PAF contributed more than 1,300 ideas by March 2010 with savings forecasted from $50 to $60 million annually. However, as previously stated, funds were not initially available to implement the improvements which discouraged employees involved in the initiative. As one source stated, it was frustrating to know TVA was paying consultants millions of dollars but a plant could not get $30,000 to fix a pump. The resulting negative impact to employee morale was detrimental to achieving both organizational health and performance improvements.

Under Boost, TVA sent McKinsey to PAF a second time at an ultimate cost of $1.8 million. However, this time, McKinsey had very little employee buy-in because, according to plant personnel, the PAF employees felt McKinsey was the "flavor of the day" after the majority of the Pilot improvements were not implemented. According to a TVA source who helped oversee the efforts for the Pilot, McKinsey's process was not integrated into TVA's processes. As a result, when the consultants left the site, work on Boost stopped. In addition, employees stated McKinsey claimed improvements that had been previously identified by FPG and other Generation personnel and were included in business plans. For example, PAF personnel pointed out the initial Pilot assessments claimed items that were already included in the budget or planned for later completion. Some of these items, such as decreasing EFOR, were in the process of being implemented when they were included as part of Boost opportunities. Furthermore, personnel at WCF reported that McKinsey listed more than 500 ideas as a result of Boost efforts, but most of those ideas had already been identified by site personnel and were being considered in planning. According to a senior-level Generation employee, these efforts could have been accomplished by simply using TVA personnel already on staff.

Additional frustration and instances of counter productivity occurred because the timeframe of the DBA and McKinsey initiatives overlapped. Both McKinsey and DBA consultants were working on-site at PAF, CUF, and SQN at the same time and some instructions to plant personnel conflicted with each other. Their efforts targeted some of the same employees who were splitting their time between normal work assignments and participation in McKinsey's and DBA's operational efficiency improvement efforts. Plant personnel stated the initiatives consumed so much time, regular duties were being neglected.

**Sustained Operational Efficiency Gains Were Not Achievable or Realistic**
Both DBA and McKinsey promised sustainable operational efficiency improvements. However, these efforts were not achieved due to a lack of integration into TVA processes and a lack of resources furthered by TVA's D&E cost-cutting initiative.

Specifically, operational efficiency tools provided by DBA are no longer utilized by employees due to inefficiencies inherent to the tools. As stated in the Background section, DBA was to create and implement a set of tools in a MOS to reinforce concepts and principles learned throughout the project so efficiency gains could continue. However, according to FPG employees, the MOS tool was labor intensive and was discontinued at the conclusion of the DBA initiative. NPG did not use the MOS tool until after the majority of the data entry was automated and redeployed for NPG starting in FY2011. According to NPG personnel, the redeployed MOS stopped working after 1 year and the application had to be rewritten. After rewriting, the tool became more burdensome to use, and NPG eliminated MOS procedures after upgrading to Primavera Version 6, with costs of $1.6 million covering implementation from FY2012 through December 2013. This upgraded work management scheduling tool included productivity capabilities and aligned with industry metrics, which significantly enhanced sustainability.

McKinsey's initiative was designed to build the foundation of a TVA owned and executed program that could be replicated and sustained to improve health and performance. However, McKinsey's process was not replicated across the fleet and funding for the initiative and recommended improvements stopped during D&E.

McKinsey's analysis of TVA's performance suggested improvement potential ranging from $490 to $900 million annually for a "range of improvement opportunity for fossil, nuclear, hydro and gas fleets."[19] However, these savings from efficiency gains did not include costs to implement actions or reflect budgetary constraints and may not have been achievable. As previously stated, Generation employees provided McKinsey estimations of how much they thought their ideas would save which, according to those employees, McKinsey used to show potential savings. In addition, Generation personnel stated McKinsey assumed coal units were available more often when calculating savings but did not consider units were actually being run at a lower capacity due to reduced demand. McKinsey made other assumptions when calculating savings related to reductions in the length and variability of outage time and unit startup times at PAF, including the number of forced and planned outages per year, average unit startup time, and cost margin per outage hour. According to the former Fossil Operations Senior Vice President, the methodology for reducing unit startup time was tried by McKinsey one time at one unit at PAF, but McKinsey did not apply the methodology to the other two units at PAF or roll it out to the other fossil

[19] We were unable to obtain any evidence that Boosts were conducted for hydro or gas fleets.

plants. However, McKinsey included net savings of $1.2 million related to the reduced startup time as a "quick-win" for PAF.

Furthermore, as stated previously, funding for the McKinsey initiative and improvements identified at the plants ended under D&E, which was introduced in February 2012. FPG personnel stated there were no opportunities to implement Boost improvements in conjunction with other efforts, because D&E delayed planned outages and preventive maintenance. In addition, NPG personnel stated there were no additional monies outside of the budgeted O&M as a result of D&E.

According to the FY2014 Long Range Planning Assumptions dated November 29, 2012, continuing the D&E "cost-conscious and disciplined culture" was needed to sustain D&E productivity improvements. The D&E strategy was to increase productivity across the TVA workforce by considering the high-priority cost categories identified on page 4 of this report. However, D&E was not a productivity strategy, but rather an immediate need to cut costs to address unplanned decreased revenues. Focusing on short-term, cost-cutting initiatives, such as project deferrals and delays, could have long-term detrimental effects on an organization. According to KPMG:[20]

> Most cost reduction programs are relatively ineffective over the medium- to long-term because they do not reduce the amount of work required per unit of output, so costs tend to grow back over time. Indeed, some short-term cost-out initiatives, such as project deferrals, actually detract from the medium-term performance of the business.

In addition, APQC notes that a cost-cutting approach rarely offers more than short-term benefits and organizations must search for methods to increase productivity, such as process reengineering or identification of outdated overhead expenses.

While third parties can be consulted for advice and suggestions for improving productivity, it is imperative that management retain control over the implementation to mitigate the risk that efficiencies are not achievable or sustainable. Moreover, stopping the initiatives without transferring the consultant role to TVA personnel combined with cutting or delaying project funding for improvements impeded implementation and sustainability of efficiency gains. As stated previously, cost cutting rarely offers more than short-term benefits and focusing on short-term, cost-cutting initiatives such as project deferrals and delays could have detrimental effects on an organization's operational efficiency in the long-term.

[20] "Embedding Productivity Disciplines: Why financial services firms need a lifestyle change that lasts," KPMG International, September 2012, http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/embedding-productivity-disciplines/Documents/embedding-productivity.pdf

# CONCLUSION

While hiring consultants to independently review processes, provide advice, or suggest problem solutions may benefit the organization, management is ultimately responsible for the organization and its health and must maintain control of the consulting projects. TVA brought in DBA and McKinsey to focus on sustainable productivity and performance improvements. However, because the time period of these initiatives overlapped and performance improvements or dollar savings generated during these initiatives were not tracked, TVA does not know what benefits these initiatives actually provided. Further, Figure 3,[21] provided by TVA Benchmarking, illustrates increasing labor and benefit costs while sales decreased during and after the time period of the initiatives.

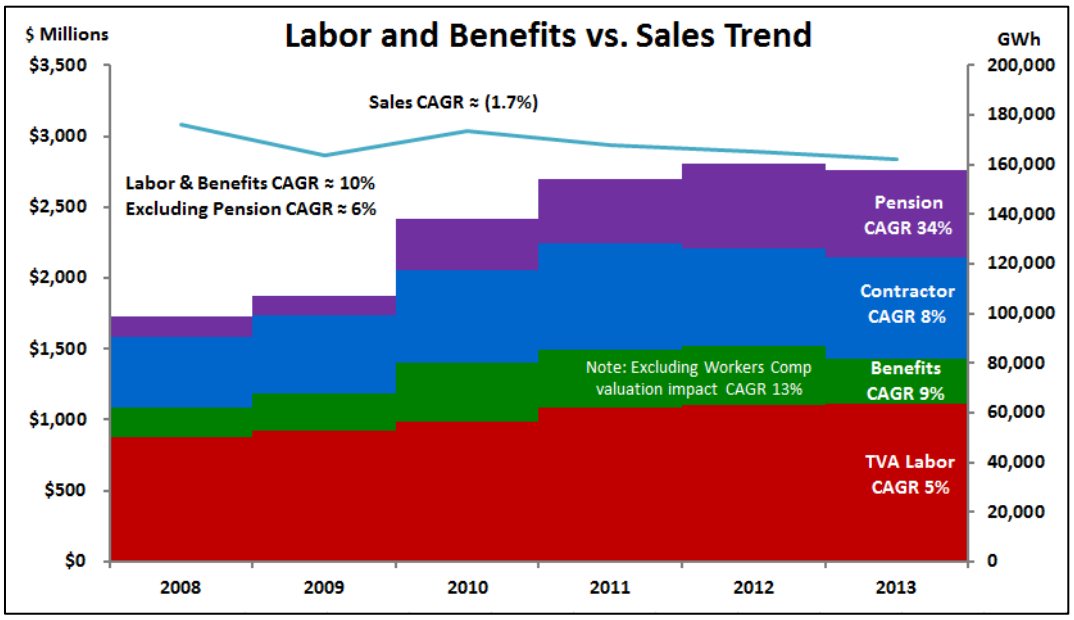


**Figure 3**

Although the focus of the DBA and McKinsey initiatives was productivity and performance improvement, improvements in those areas were quantified in terms of dollars saved. However, TVA did not adequately consider the amount of funding and other resources required to sustain these improvements. Because TVA's focus was on cost savings, TVA undertook cost-cutting efforts that included deferring potential projects and improvement opportunities identified during the initiatives. As a result, employees received mixed messages regarding implementation of potential improvements and what it takes to ensure TVA is moving forward.

While improving performance is an important initiative, it is also important to recognize the TVA employee is the primary driver impacting that improvement.

[21] Provided by TVA Financial Services. The compound annual growth rate (CAGR) as depicted in the graph is the rate at which something grows (e.g., sales or costs) over a period of years, taking into account the effect of annual compounding.

Employee engagement and empowerment are beneficial to continuous organizational improvement and may aid in achieving top performance as well as generating future dollar savings. Under DBA, employees were subjected to a stressful environment and intimidating actions, to the point where people feared for their jobs. Under McKinsey, employees were encouraged to identify improvements; however, employees were not given the resources necessary to implement those improvements. These conditions can create a distrust of management and a perception that management disrespects its employees by not valuing their input.

Although all three of these initiatives have now ended, we believe it is important that lessons learned are incorporated into future initiatives. We identified one employee-driven initiative that seems to have already incorporated lessons learned. "Mission Engagement" was a Spring 2013 TVA-led initiative at Allen Fossil Plant to engage employees to find solutions to plant issues in order to improve plant economics. Because this was viewed by TVA as a successful effort, a "Continuous Improvement Program"[22] was implemented across the coal and gas fleet, with site coordinators assigned, to identify and eliminate waste or nonvalue-add activities to reduce costs and improve the viability of the fleet. Results from individual plant efforts are quantified, tracked, and replicated at other sites as applicable, as well as posted on a SharePoint site for future use. This type of initiative seems to have more employee engagement as well as a measurement of performance and the sharing of information across the Coal and Gas Fleet, a combination of factors that should help continue and sustain improvement at multiple plants.

## RECOMMENDATIONS

While the findings were based on past initiatives, we believe the resulting recommendations should be adopted going forward. We recommend the Executive Vice President and COO, Operations:

1. Assess the cultural climate through meaningful dialogue with employees about the impacts of the initiatives to determine the long-term effects on employee engagement and morale. This may be accomplished by conducting employee forums in a safe environment for employees to voice their reactions regarding the initiatives discussed in this report. The forums may also allow employees to raise issues in other areas where these employees have concerns or fear of retaliation.

[22] The OIG did not evaluate specific program results for the "Mission Engagement" or the "Continuous Improvement Program."

2. Establish a standard process and procedure that includes the following for future improvement programs:[23]

   a. An implementation plan clearly describing availability of resources, a methodology with an established baseline, and well-defined and measurable deliverables.

   b. A communication plan documenting the purpose, specific objectives and goals, and funding limitations.

   c. Controls and appropriate metrics for ongoing tracking, monitoring, and reporting of progress.

   d. Methodology to (1) allow employees to voice concerns and suggestions and (2) provide transparent and timely feedback to address employee concerns and suggestions.

   e. A sustainability plan outlining actions for employee engagement, and transference of consultant roles to TVA personnel if an outside party is used, to ensure the results continue.

**TVA Management's Comments** – TVA management reviewed a draft of this report and agreed the contents are factually correct. TVA management is currently working on a plan to address our recommendations. See the Appendix for TVA management's complete response.

[23] The terminology in this report refers to productivity and operational performance improvement efforts as initiatives, but these recommendations would also apply to future efforts referred to as programs.

October 24, 2014

Robert E. Martin, ET 3C-K

REQUEST FOR COMMENTS – DRAFT AUDIT REPORT 2012-14811 – TVA PRODUCTIVITY IMPROVEMENT INITIATIVES

This is in response to your memo dated September 24, 2014.

I have reviewed the draft report and consider it to be factually correct. We have begun consideration of how to respond to the recommendations and have no other comments at this time. A response to the recommendations will be provided, in a timely manner, once the final report is issued.

If you have any questions, please contact me directly.

Charles G. Pardee
Executive Vice President and
Chief Operating Officer
WT 7B-K

cc: Katherine J. Black, LP 6A-C
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**Memorandum from the Office of the Inspector General**

February 6, 2014

Amy M. Edge, WT 8B-K

REQUEST FOR FINAL ACTION – EVALUATION 2013-14984 – REVIEW OF TVA'S NON-NUCLEAR CONCERNS RESOLUTION

Attached is the subject final report for your review and action. Your written comments, which addressed your management decision and actions planned, have been included in the report. Please notify us when final action is complete.

Information contained in this report may be subject to public disclosure. Please advise use of any sensitive information in this report that you recommend be withheld.

If you have any questions, please contact E. David Willis, Auditor at (865) 633-7376 or Gregory R. Stinson, Director, Evaluations, at (865) 633-7367. We appreciate the courtesy and cooperation received from your staff during the evaluation.

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

EDW:FAJ
Attachment
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OIG File No. 2013-14984

Office of the Inspector General

*Evaluation Report*

To the Director,
Organizational Effectiveness

# REVIEW OF TVA'S NON-NUCLEAR CONCERNS RESOLUTION

Audit Team
E. David Willis
Lindsay J. Denny

Evaluation 2013-14984
February 6, 2014

# ABBREVIATIONS

| | |
|---|---|
| ECP | Employee Concerns Program |
| FY | Fiscal Year |
| NC | Nuclear Construction |
| OIG | Office of the Inspector General |
| TVA | Tennessee Valley Authority |

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## APPENDIX

# Evaluation 2013-14984 – Non-Nuclear Concerns Resolution

## EXECUTIVE SUMMARY

### Why the OIG Did This Evaluation

Due to the importance of the Non-Nuclear Employee Concerns Program (ECP) to the Tennessee Valley Authority's current culture and environment, this review was initiated to determine whether the program is addressing employee concerns in a timely and effective manner.

### What the OIG Found

We found that while the Non-Nuclear ECP has improved in addressing concerns in a timely manner, the effectiveness of the program could be improved. Although Non-Nuclear ECP did not achieve its fiscal year (FY) 2012 goal of 90 percent of concerns addressed in less than 30 days, it is currently achieving its FY2013 goal for timeliness. The program's FY2013 goal for timeliness was to resolve 75 percent of all concerns within 45 days. Of the 73 concerns submitted and resolved during our scope, 62 (85 percent) were resolved within 45 days.

However, program effectiveness could be improved. For example, our review of files disclosed certain instances where program personnel did not adequately address concerns. Of the 50 concerns we sampled and tested, 3 concerns were not, in our opinion, adequately addressed, and two case files did not contain enough information to draw a conclusion regarding the adequacy of the resolution. These concerns were in the Nuclear Construction organization, at one coal plant, and in Financial Services. In addition, a survey conducted by the OIG (Office of the Inspector General) disclosed 32 percent of respondents felt their concerns were not adequately addressed, and 34 percent of respondents also reported feeling pressure or repercussions from management or team members as a result of raising concerns through the program.

### What the OIG Recommends

The OIG recommends the Senior Vice President, Diversity and Labor Relations, and Chief Ethics Officer, (1) identify an individual to perform audits and assessments of closed concerns, (2) coach individuals addressing concerns on what constitutes a sufficient investigation, and (3) develop an instrument to send to complainants to indicate instances of retaliation and investigate as necessary.

## TVA Management's Comments

TVA management agreed with the findings and recommendations in this report. See the Appendix for TVA's complete response.

## Auditor's Response

The OIG concurs with TVA management's comments.

# BACKGROUND

According to the Tennessee Valley Authority (TVA) Employee Concern's Web site, "TVA strongly encourages an atmosphere where employees can freely express their views, concerns and suggestions without fear of retaliation. Being able to have open discussions about workplace issues will help managers and supervisors obtain valuable information, especially about the safe and efficient operation of our business."

The Non-Nuclear Employee Concerns Program (ECP) was implemented in July 2010 for employees and contractors who support non-nuclear operations in order to provide an alternative avenue for resolving issues and concerns when doing so through the chain of command is not appropriate, or when doing so has been unsuccessful. Non-Nuclear ECP provides the option for employees to contact them by phone or e-mail and offers confidentiality or anonymity when requested. The Non-Nuclear ECP listens to the concern, investigates the issue, and follows up with the resolution. The Non-Nuclear ECP focuses on two major goals: (1) supporting and enhancing the reporting and resolution of employee issues directly between the employee and their immediate supervisor and (2) providing an alternate avenue for the expression and resolution of employee concerns for those cases where line management is not effective or cannot help in the resolution of concerns.

The mission of TVA's Non-Nuclear ECP is to promote an environment free of harassment, intimidation, retaliation, and discrimination where employees can raise concerns and have those concerns addressed in an effective, timely, and confidential manner. The Non-Nuclear ECP issued a strategy in January 2013 with objectives and key initiatives for the year. The key initiatives for 2013 included:

- Implementing a new case management system, I-Sight.
- Developing desk level procedures for the Non-Nuclear ECP.
- Developing a communication strategy to increase awareness of the Non-Nuclear ECP.
- Implementing an exit interview process for employees who transfer or leave the company.
- Developing an audit program for self-assessment of the Non-Nuclear ECP.

In October 2013, the Non-Nuclear ECP is planning to reduce the number of employee concerns representatives from seven to one for non-nuclear concerns. While three Nuclear Construction (NC) representatives have been part of the Non-Nuclear ECP, reporting to the Senior Vice President, Diversity and Labor Relations, and Chief Ethics Officer, they will be moving organizations to become a part of the NC organization.

# OBJECTIVE, SCOPE, AND METHODOLOGY

Due to the importance of the Non-Nuclear ECP to TVA's current culture and environment, this review was initiated to determine whether the program is adequately addressing employee concerns in a timely and effective manner.

To achieve our objective, we:

- Reviewed a judgmental sample of submitted employee concerns to evaluate whether they were adequately addressed. In order to do this, we determined if the:
  - Case file contained documentation sufficient to show the resolution of a concern.
  - Investigation processes or end results were reasonable.
- Surveyed the employees who have utilized the Non-Nuclear ECP to obtain employee's opinions concerning the effectiveness of the program.
- Evaluated timeliness and adequacy of reporting.
- Evaluated the percentage of concerns that are considered to be addressed timely.
- Analyzed employee concerns data to identify any trends in location or number of concerns.

The scope of our review included the program's functions during fiscal year (FY) 2012 through January 2013.[1]

This review was performed in accordance with the Council of the Inspectors General for Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*.

# FINDINGS AND RECOMMENDATIONS

We found while the Non-Nuclear ECP has improved in addressing concerns in a timely manner, the effectiveness of the program could be improved. We found (1) there are instances where the Non-Nuclear ECP is not adequately addressing concerns, and (2) some employees feel that concerns are not being adequately addressed and reported experiencing pressure and repercussions from management and team members.

## TIMELINESS OF ADDRESSING CONCERNS HAS IMPROVED

We found Non-Nuclear ECP did not meet its timeliness goal for FY2012. However, it has improved and is currently achieving its timeliness goal for

[1] Concerns from Day & Zimmerman NPS employees were excluded from the scope.

FY2013. Of the 492 concerns submitted during the scope, 464 had been closed or resolved.

Non-Nuclear ECP's FY2012 goal was to have 90 percent of concerns closed in less than 30 days. We determined that it did not meet its timeliness goal.[2] As shown in Figure 1 below, during FY2012, only 74 percent[3] of concerns were closed in less than 30 days.

**Figure 1: Number of Days to Close Employee Concerns in FY2012**

| Closed Within: | Number of Concerns | Percentage of Total Closed |
|---|---|---|
| Same Day | 81 | 20.72% |
| 2-9 Days | 114 | 29.16% |
| 10-29 Days | 96 | 24.55% |
| 30-44 Days | 33 | 8.44% |
| 45-99 Days | 44 | 11.25% |
| 100-199 Days | 17 | 4.35% |
| 200-270 Days | 6 | 1.53% |
| **Total** | **391** | **100.00%** |
| | | |
| < 30 Days | 291 | 74.42% |

Non-Nuclear ECP's FY2013 goal was to have 75 percent of cases closed within 45 days. As shown in Figure 2 below, during the scope of the review tested for FY2013, approximately 85 percent of the closed concerns were addressed in less than 45 days.

**Figure 2: Number of Days to Close Employee Concerns in FY2013**

| Closed Within: | Number of Concerns | Percentage of Total Closed |
|---|---|---|
| Same Day | 20 | 27.40% |
| 2-9 Days | 12 | 16.44% |
| 10-29 Days | 21 | 28.77% |
| 30-44 Days | 9 | 12.33% |
| 45-99 Days | 11 | 15.07% |
| **Total** | **73** | **100.00%** |
| | | |
| < 45 Days | 62 | 84.94% |

[2] Four of the 50 concerns sampled contained dates that were significantly different in the case documentation and the data provided. These four dates were incorrect to the detriment of Non-Nuclear ECP. We changed these four dates to match the case documentation provided for the timeliness calculation performed. Otherwise, we relied on the data provided by Non-Nuclear ECP.

[3] The ECP department reorganized during FY2012. NC ECP and Non-Nuclear Chief Operating Officer ECP combined with Corporate ECP. Our calculation included all cases closed during FY2012 by Non-Nuclear ECP personnel. However, according to ECP personnel, ECP's calculation included NC ECP and Non-Nuclear Chief Operating Officer ECP only after they combined with Corporate ECP.

## PROGRAM EFFECTIVENESS COULD BE IMPROVED

Of the 492 concerns submitted to the Non-Nuclear ECP during the scope, we selected a judgmental sample of 50 concerns to test. Our review of files disclosed certain instances where program personnel did not adequately address concerns. Of the 50 concerns we sampled and tested, 3 concerns were not, in our opinion, adequately addressed, and two case files did not contain enough information to draw a conclusion regarding the adequacy of the resolution. Three of the concerns were in the NC organization, 1 concern was at a coal plant, and 1 was in Financial Services.

The 3 concerns not adequately addressed involved a management/personnel issue and 2 hostile and intimidating environment concerns:

- The management/personnel issue involved a contract employee who felt her work load had increased due to the misbehavior of other team members and was concerned her performance would suffer. The Non-Nuclear ECP contacted the manager who felt things were evenly distributed. However, the concerned individual was still troubled by the workload at the closure of the concern. The investigation was insufficiently conducted to adequately address the concern.
- The first hostile and intimidating environment concern involved an employee who reported his manager was verbally abusive and had threatened his person and employment, which created a hostile work environment. Non-Nuclear ECP concluded that the concern was not substantiated after interviews with all current security personnel. However, in the interviews, 5 of the 12 employees stated that they had witnessed the manager being verbally abusive. According to Non-Nuclear ECP personnel, the concern was resolved using “an unorthodox method of resolution,” which included a meeting involving all parties. The documentation provided by Non-Nuclear ECP does not support the conclusion that the concern was unsubstantiated.
- The second hostile and intimidating environment concern involved an employee who was concerned his supervisor was trying to fire him for false reasons. The employee did not want his identity revealed, so Non-Nuclear ECP offered to perform a pulsing of the organization. However, no pulsing was performed. Non-Nuclear ECP stated they performed training in this organization, but there was no documentation of the training or training dates that could be provided.

The 2 concerns without adequate documentation involved concerns related to safety and unfair treatment from management. The safety concern was turned over to the manager of the safety program. However, during the course of the resolution of the concern, the employee was removed from his position. There is no additional information provided to indicate there was any follow-up done related to the employee’s change in position. The concern related to unfair treatment from management was obtained during an exit interview, but no

additional information could be provided to document that any work was done to investigate the employee's concern.

One of the 2013 Key Initiatives for ECP was to develop a program assessment and audit function. An assessment was completed for the Bechtel Power Corporation ECP program at Watts Bar Nuclear Plant Unit 2 in March 2013, and one is currently in process for TVA's Non-Nuclear ECP at Watts Bar Unit 2. Additionally, Case File Quality Reviews were completed for a sample of closed concerns in March 2013 and May 2013. With the reorganization taking place in October 2013, there is concern for how the audit program will continue with only one employee concerns representative remaining.

In addition, some employees feel concerns are not adequately addressed and feel retaliation from management and team members. About 32 percent of the employees surveyed feel their concerns are not adequately addressed. Additionally, 34 percent of respondents answered that they felt pressure or repercussions from management or team members after submitting their concern. This indicates an environment that does not support the desired atmosphere where employees feel comfortable expressing their views, concerns, and suggestions without fear of retaliation.

We surveyed 85 employees that submitted concerns during the scope. We surveyed those employees whose concerns were not submitted anonymously and who are still employed with TVA. Of the surveys sent, we received 41 responses. Survey respondents were asked questions related to their experience with the Non-Nuclear ECP. Employees indicated that they learned about the Non-Nuclear ECP most from either a supervisor/coworker or through new-hire training. Also, the majority of respondents submitted their concern face-to-face with a Non-Nuclear ECP representative. Below is a summary of the responses:

- Thirty-one respondents felt their concern was addressed in a timely manner, while 9 respondents did not.
- Twenty-six respondents felt their concern was adequately addressed, while 13 respondents did not.
- Twenty-seven respondents answered "yes," they felt their concern was handled confidentially and/or anonymously, while 4 respondents answered "no," and 10 answered "don't know."
- Twenty-eight respondents answered "yes," they would bring another concern to the Non-Nuclear ECP in the future, while 8 respondents answered "no," and 5 respondents answered "maybe."
- When asked if they felt pressure or repercussions from their manager or team members after submitting their concern, 14 answered "yes," and 26 answered "no."

We also asked what the Non-Nuclear ECP did well. Below are a few of the comments provided:

- "My employee concerns rep was the greatest and I truly feel that my rep saved my career. The rep answered all of my questions and gave me a thorough briefing on all company policies. The rep explained the reasons for the delays and made very serious efforts to expedite the process. The rep maintained accessibility whenever my schedule was busy even if it were after hours. I feel like my rep gave 110% to resolve my concern."
- "They listened to my concern, took notes and used 3 way communication to ensure they had the correct understanding of the issue."
- "My issue was handled with the utmost concern for privacy and accuracy. The representative was very professional yet empathetic."

We asked how the Non-Nuclear ECP could improve. Below are a few of the comments provided:

- "A little more follow up on what happened with one's concern."
- "I believe that EC did as much as they could. Their job is to gather concerns and follow up on corrective actions. It is up to management to take action on the concern."
- "Have more leverage on how the concerns are answered or dealt with."

# RECOMMENDATIONS

We recommend the Senior Vice President, Diversity and Labor Relations, and Chief Ethics Officer, (1) identify an individual to perform audits and assessments of closed concerns, (2) coach individuals addressing concerns on what constitutes a sufficient investigation, and (3) develop an instrument to send to complainants to indicate instances of retaliation and investigate as necessary.

**TVA Management's Comments** – The Director, Organizational Effectiveness provided a written response to a draft of this report. TVA management agreed with the findings and recommendations in this report. Specifically, management stated Ethics and Employee Concerns will:

- Assign personnel based on knowledge of overall concerns process, familiarity with TVA policies and procedures, ability to provide coaching and feedback, and demonstrated professionalism.
- Work together on the development of the investigative plan before launching an investigation.
- Design an electronic survey form to distribute to concerned individuals after the investigative report has been issued to management.

See the Appendix for TVA's complete response.

**Auditor's Response** – The Office of the Inspector General concurs with TVA management's comments

January 30, 2014

Robert E. Martin, ET 3C-K

REQUEST FOR COMMENTS - DRAFT EVALUATION 2013-14984 - REVIEW OF TVA'S NON-NUCLEAR CONCERNS RESOLUTION

TVA management has reviewed the report of the OIG's evaluation regarding TVA's Non-Nuclear Concerns Resolution and agreed with the findings. The plan for addressing the deficiencies is summarized in the table below.

| **TVA Management's Response to Recommendations** | | |
|---|---|---|
| **OIG Recommendation** | **TVA Management's Planned Action** | **Estimated Implementation Date** |
| 1. Identify an individual to perform audits and assessments of closed concerns after the reorganization occurs | Ethics & Employee Concerns will review the existing Case File Quarterly Review process and revise as necessary to reflect the new organization structure and priorities.<br><br>As part of the revised case file review process, Ethics and Employee Concerns will follow-up with TVA management to ensure concerns resolution recommendations were implemented in a timely manner.<br><br>The responsibility for the case file reviews will be assigned to personnel based on knowledge of overall concerns process, familiarity with TVA policies and procedures, ability to provide coaching and feedback, and demonstrated professionalism. | July 2014 |
| 2. Coach individuals addressing concerns on what constitutes a sufficient investigation | Before launching an investigation, Ethics and Employee Concerns personnel will work together on the development of the investigative plan.<br><br>Prior to drafting investigative reports, personnel will collaboratively identify the most appropriate and effective ways to resolve substantiated concerns. | July 2014 |

**TVA RESTRICTED INFORMATION**

| | | |
|---|---|---|
| 3. Develop an instrument to send to complainants to indicate instances of retaliation and investigate as necessary | Ethics & Employee Concerns will design an electronic survey form to distribute to concerned individuals after the investigative report has been issued to management. | July 2014 |

Please let me know if you have any questions.

Amy M. Edge,
Director, Organizational Effectiveness
WT 8-K

AME:JPB
cc: Janda E. Brown, WT 7C-K
OIG File No. 2013-14984