



Memorandum from the Office of the Inspector General

August 22, 2007

Masoud Bajestani, EQB 1B-WBN

**FINAL REPORT – INSPECTION 2007-11059 – CONSTRUCTION/MODIFICATIONS
LESSONS LEARNED/BEST PRACTICES**

Attached is the subject final report for your review. As discussed with you on August 3, 2007, the subject report is being issued in presentation format. Your informal comments to the draft report have been incorporated in the final report. We will periodically review your progress in implementing the suggested improvements.

If you have any questions, please contact Gregory C. Jaynes, Deputy Assistant Inspector General (Inspections), at (423) 751-7821 or me at (865) 632-6309. We appreciate the courtesy and cooperation received from your staff during the inspection.

Ben R. Wagner
Deputy Inspector General
ET 3C-K

GCJ:SDB

cc: William R. Campbell, LP 3R-C
Tom D. Kilgore, WT 7B-K
William R. McCollum, Jr., LP 6A-C
Richard W. Moore, ET 4C-K
Emily J. Reynolds, OCP 1L-NST
OIG File No. 2007-11059



Construction/Modifications Lessons Learned/Best Practices

2007-11059

August 22, 2007



Summary

- ◆ The Tennessee Valley Authority's (TVA) successful effort to restart Unit 1 at Browns Ferry Nuclear Plant (BFN) provides an opportunity to transfer knowledge to future generation projects to (1) improve project oversight, (2) improve project efficiency and effectiveness, (3) generate cost savings opportunities, and/or (4) reduce TVA's risk of fraud, waste, and abuse.
- ◆ OIG reviews of the BFN Unit 1 Restart project and TVA management's evaluations of the restart activities have identified opportunities for improvement in future generation projects. Specifically:
 - The OIG conducted reviews throughout the course of the project focusing on (1) payment of overheads and direct expenses, (2) craft time labor reporting, (3) equipment and tools controls, (4) inventory management and accounting, (5) the restart incentive program, and (6) contract compliance.
 - TVA management identified areas they felt were "hard spots" during the project and developed key project control activities to avoid the issues in the future. Some "hard spots" identified related to (1) staffing and training, (2) self assessments, (3) development of a comprehensive plan, (4) turnover, and (5) material and equipment availability.



Background

- ◆ In May 2002, the TVA Board of Directors approved a plan to return Browns Ferry Nuclear (BFN) Unit 1 to service.
 - BFN Unit 1, which began commercial operation in 1974, had not operated since 1985.
 - The objective of the project was to recover the unit in a manner that meets TVA, industry, and Nuclear Regulatory Commission standards for safe operation.
- ◆ TVA estimated the restart project would cost approximately \$1.8 billion over a 5-year period.
- ◆ TVA contracted with Bechtel Power Corporation for engineering design services and Stone and Webster Construction, Inc., for construction modifications.
 - TVA estimated 4.5 million work hours for the design services and 12 million work hours for the modifications.
 - General Electric provided the equipment and services needed for the modifications.
- ◆ TVA restarted BFN Unit 1 on May 22, 2007, within the projected cost and time frame.
- ◆ Due to the significance of the BFN Unit 1 project, the OIG increased its oversight effort. Audit, Inspections, and Investigations conducted reviews throughout the project to promote cost control and identify, on a proactive basis, any fraud, waste, or abuse.



Browns Ferry Nuclear Plant



Background (continued)

- ◆ TVA expects to need additional base-load power early in the next decade.
- ◆ Currently, TVA is planning to meet the need for additional base-load capacity on the TVA system and maximize the use of existing assets by completing and operating Watts Bar Nuclear Plant (WBN) Unit 2.
 - WBN Unit 2 could provide more than 1,150 megawatts to meet a projected increase in demand by 2012.
 - The unit would be completed as originally designed, alongside its sister unit, WBN Unit 1, which has been operating since 1996.
 - Only minimal new construction is proposed, and no expansion of the existing site footprint would be required.



Watts Bar Nuclear Plant



Objective and Scope

Objective:

Identify improvement opportunities through previously reported audits, inspections, investigations, and management's comments.

Scope:

All OIG review activities since project inception and certain management reports and follow-up interviews.



Methodology

Methodology:

- Review relevant OIG audits, inspections, and investigations.
- Review monthly BFN Unit 1 Restart Executive Reports to identify issues not addressed in OIG reviews.
- Review TVAN information on restart lessons learned and remedial actions.
- Interview some key TVAN personnel to identify (1) potential lessons learned not already identified and (2) potential remedial actions.



OIG Involvement in BFN Unit 1 Restart

- ◆ The OIG has completed:
 - Twenty-seven audits/inspections related to the BFN Unit 1 Restart Project.
 - ◆ Of the potential \$41.5 million contract and preaward savings identified by Audits/Inspections, approximately \$18.5 million has been recovered/avoided by TVA and about \$8.5 million is pending management decision. Specifically:
 - About \$7.3 million has been avoided based on contract preaward audits.
 - About 11.2 million has been recovered based on contract compliance audits.
 - About \$8.5 million is pending management decision and relates to our review of Stone & Webster Construction, Inc. (SWCI) indirect rates.
 - ◆ Fifteen of the reviews conducted were requested by TVA management.
 - Multiple investigations related to the BFN Unit 1 Restart Project.
- ◆ Members of the OIG attended the monthly BFN Unit 1 Restart meetings.
- ◆ There are still investigations and audits related to the BFN Unit 1 Restart underway.
 - Ongoing contract audits include reviews of (1) SWCI, (2) Bechtel Power Corporation, and (3) Analytic Stress/Shaw Field Services (SWCI subcontractor).
 - Ongoing Investigations relate to the reporting of injuries and other contractor issues, including time reporting.



OIG Audit Findings

- ◆ Contract Payment Provisions (i.e., overhead rates and direct billed expenses).
 - TVA paid overhead rates that included costs that were also directly billed and paid by TVA.
 - Contract payment provisions should be fully understood by both parties (e.g., listings and verification of contractor personnel costs and other cost allocations applicable to the contractor overhead pools).
- ◆ Contractor Time Reporting
 - Contractors were billing for time on site when no record existed of their presence.
 - Project oversight and controls should ensure that contractor time reports accurately reflect hours worked, e.g., designated contractor access gates, perimeter monitoring and surveillance system, and contract management oversight and random face checks.



OIG Audit Findings (continued)

- ◆ Equipment and Tool Accountability and Controls
 - High rate of tool loss was identified.
 - Weaknesses were identified related to inventory tracking and TVA/contractor accountability.
 - Controls should ensure that TVA employees and contractors are held accountable for tool loss/theft and/or the burden to supply tools and the associated risk be transferred to the contractor.
 - ◆ Future actions could include:
 - Installing cameras in the tool rooms for coverage when tool rooms are not staffed.
 - Employing tool room attendants around the clock during peak work periods.
 - Painting tools a unique color.
 - Putting unique identification numbers on larger tools such as welders and power tools.
 - Installing security tags on tools where possible.
 - Using vending machines which utilize badge bar codes for issuance of gloves, safety glasses, and ear plugs.



OIG Audit Findings (continued)

- ◆ Inventory Management, Warehousing, and Accounting
 - Problems were identified related to storage due to early buying.
 - Accounting questions were raised due to timing issues and inventory adjustments.
 - Procurement should ensure the location of materials is accurately reported in TVA's inventory system and personnel are provided adequate training regarding TVA's warehousing policies and procedures.
 - Controls should ensure compliance with accounting practices and TVA policies and procedures, including ongoing monitoring by the Chief Financial Officer Organization.
- ◆ Project Incentive Programs
 - We reviewed concerns raised regarding the validity of milestone achievements and corresponding incentive awards, e.g., milestone achievement was not based on final completion and rework was done after incentives were paid.
 - Project incentive goals should be clarified or revised to reduce subjectivity.



OIG Audit Findings (continued)

- ◆ Contract Compliance
 - Contract compliance reviews identified TVA overpayments pertaining to the billing of:
 - ◆ A craft labor classification that was not supported by the contract.
 - ◆ Incentive fees to cover bonuses to nonmanual personnel which the contract did not provide for.
 - ◆ Wrong indirect cost markup rates.
 - ◆ Safety awards (e.g., a gift certificate for a boat, wide-screen televisions, Wal-Mart gift cards, etc.) that the contract did not provide for.
 - ◆ Temporary living certifications.
 - ◆ Unapproved/ineligible relocation costs.
 - ◆ Incorrect labor hours and/or pay rates.
 - Contract oversight should be increased, including validation of reported expenditures to ensure TVA does not make overpayments.
 - TVA management has stated that increased oversight and control would occur if an OIG auditor was dedicated to the WBN Unit 2 project activities on a full-time basis. OIG management plans to provide an increased audit presence.



OIG Investigative Findings

- ◆ Investigations were conducted related to alleged:
 - Violation of ethics rules
 - Falsification of records
 - Intimidation and harassment
 - Fraud
- ◆ Several investigations are still ongoing related to contract fraud.
- ◆ Budget and schedule pressures contributed to or were cited as the cause for many of the questioned actions.
 - Management cited examples, which occurred in the latter stages of the restart project, where quality and safety were reinforced with employees/contractors, which helped address concerns about budget and schedule pressures.
- ◆ Management should continuously reinforce proper tone at the top regarding integrity throughout the project.



TVA Management Identified “hard spots”

- ◆ Staffing and Training
 - Adequate time was not given (1) for the qualification of new hires, (2) to achieve desired staffing plans, or (3) to qualify licensed operators.
 - The time needed to support the overall hiring process had a significant impact on the management staff.
 - The high turnover of managers during the recovery had some impact on the overall effort.
 - The project should target to have a fully qualified operations staff approximately two years before anticipated start up.
- ◆ Self Assessments
 - At the start of the project, not all departments fully embraced the completion of quality self assessment reports and consequently rework resulted due to shortcomings in:
 - ◆ The thoroughness of the self assessment review performed;
 - ◆ Report quality; and
 - ◆ The proper use of the corrective action program once issues were identified.
 - Requirements should be formally defined for scope, detail, report quality, and corrective actions to ensure all meet management expectations.



TVA Management Identified “hard spots” (continued)

- ◆ Development of a Comprehensive Plan
 - Plans were not communicated and developed until late in the program which impacted employee understanding of expectations.
 - A comprehensive plan is necessary early in the process to delineate the requirements, expectations, and schedule for the overall operational readiness program and the transition to operational ownership.
- ◆ Turnover
 - Initially site organizations had little or no involvement in and took no ownership for either the operational readiness or system turnover processes.
 - Site ownership expectations need to be established and communicated. These expectations should be reinforced to ensure site participation in testing, walkdowns, and turnover meetings.
- ◆ Material and Equipment Availability
 - Foreign components caused difficulties with communications and translation, time zone differences, engineering support, and long lead times.
 - Schedule changes did not always allow sufficient time for material procurement processing.
 - Material procurement should be included as part of the scope of vendor work versus TVA scope to align ownership and accountability.

