



Memorandum from the Office of the Inspector General

September 27, 2013

Bradley A. Adams, WT 9C-K

REQUEST FOR MANAGEMENT DECISION – EVALUATION 2012-14789 – REVIEW OF
TVA'S CAPITAL PROJECTS APPROVAL PROCESS

Attached is the subject final evaluation 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 Lindsay J. Denny, Auditor, at (865) 633-7349 or Gregory R. Stinson, Director, Evaluations, at (865) 633-7367. We appreciate the courtesy and cooperation received from your staff during this review.

Robert E. Martin

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

LJD:HAC
Attachment
cc (Attachment):

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OIG File No. 2012-14789



Memorandum from the Office of the Inspector General

September 27, 2013

David H. Schavey, LP 3R-C

FINAL REPORT – EVALUATION 2012-14789 – REVIEW OF TVA’S CAPITAL PROJECTS APPROVAL PROCESS

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

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 Lindsay J. Denny, Auditor, at (865) 633-7349 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

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Assistant Inspector General
(Audits and Evaluations)
ET 3C-K



Office of the Inspector General

Evaluation Report

To the Director, Capital
Productivity and Economic
Analysis and the Vice President,
Nuclear Business Operations

REVIEW OF TVA'S CAPITAL PROJECTS APPROVAL PROCESS

Audit Team
Lindsay J. Denny
E. David Willis

Evaluation 2012-14789
September 27, 2013

ABBREVIATIONS

CEO	Chief Executive Officer
CP&EA	Capital Productivity and Economic Analysis
NPG	Nuclear Power Group
OIG	Office of the Inspector General
PMBOK [®]	Project Management Body of Knowledge
PMI	Project Management Institute
PMO	Project Management Office
PRB	Project Review Board
PSO	Power System Operations
R3	Risk and Readiness Review
SBU	Strategic Business Unit
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority
VP	Vice President

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Evaluation 2012-14789 – Review of TVA’s Capital Projects Approval Process

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

This review was initiated as a follow up to a recent (OIG) Office of the Inspector General review of the project management software, PowerPlant.¹ During that review, we identified several areas for further analysis related to timely project approvals, delegated approvals, and project charges allocated incorrectly. The objective of our review was to determine if Tennessee Valley Authority’s (TVA) capital project approval process is (1) efficient and timely, (2) being performed in accordance with TVA policies, and (3) aligned with industry best practices.

What the OIG Found

We found the capital projects approval process is generally being performed in a timely manner as well as in accordance with TVA policies. We also found TVA has incorporated best practices in the approval process. However, we found areas for improvement related to the timeliness of Nuclear Power Group (NPG) project approvals and the forecasting of project schedules.

We found that although the overall TVA project approval process was completed in a reasonable time frame, the NPG approval process took 25 days longer than the TVA average. This indicates there are opportunities for improvement in the timeliness of NPG approvals.

We identified 31 percent of the projects reviewed came in more than 25 percent behind the forecasted schedule. While there were also projects that came in ahead of schedule, the degree to which the schedules are being missed indicates there is potential for more accurate planning related to forecasted schedules.

What the OIG Recommends

We recommend the Vice President (VP), Nuclear Business Operations, evaluate the approval process for Nuclear capital projects to identify opportunities to improve the timeliness of project approvals.

We recommend the Director, Capital Productivity and Economic Analysis (CP&EA), evaluate the planning and forecasting process to identify areas for improvement.

ⁱ Inspection 2012-14531 – Completion of Project/Portfolio Management Function issued on September 28, 2012.



Evaluation 2012-14789 – Review of TVA’s Capital Projects Approval Process

EXECUTIVE SUMMARY

TVA Management’s Comments

This report contained recommendations to two parties. The VP, Nuclear Business Operations, responded in writing and agreed with the findings and recommendations in this report (see the Appendix for his complete response). The Director, CP&EA, had no comments on the draft report.

Auditor’s Response

The OIG concurs with the comments and completed actions to address our recommendation received from the VP, Nuclear Business Operations. We will assess the response of the CP&EA organization as part of our normal recommendation follow-up process.

BACKGROUND

In fiscal years 2013 through 2015, the Tennessee Valley Authority (TVA) plans to spend about \$2 billion per year on capital projects. Capital projects are major investments with long-term value that require coordination of many different activities, people, and equipment. In response to recent capital project problems, TVA began a Capital Productivity Initiative in 2012. This initiative's goal is to help define and prioritize the tools, processes, training, and actions to make sure TVA is getting the most from its capital dollars.

In 2012, the Capital Productivity Initiative implemented Risk and Readiness Reviews (R3) of existing capital projects. These reviews are intended to quickly assess a project's health. The R3s became a formal process in August 2012 when TVA-SPP-34.020, Capital Project Risk and Readiness Review Process, went into effect. An R3 is required for capital projects greater than \$10 million. Additionally, TVA-SPP-19.3, Project Justification Process,¹ states Strategy and External Relations² will review the economic analysis provided by the Strategic Business Unit (SBU) for all new capital projects greater than \$8 million.

According to TVA-SPP-19.3, projects are approved in a three-phase authorization process: (1) Study and Preliminary Engineering, (2) Detailed Engineering, and (3) Implementation. The phased approach provides a review period at phase completion to refine remaining phase project cost and schedule estimates, verify project benefits can be obtained, and identify areas that need additional attention prior to committing to the complete project. Phase 1 includes evaluation and/or preliminary engineering work to establish the objective, scope, success criteria, and viability of the project. This phase is concluded when the design authorization is approved or when the proposed project is canceled. Phase 2 includes all engineering work necessary to specify the full actions required to implement the project. This phase is completed with the approval of the design deliverables and the authorization of the implementation phase. Phase 3 includes reviewing all documentation required to construct and test the recommended project solution, acceptance testing, and as-built preparation. Phase approval is not required for projects less than \$2 million, facility maintenance projects, or projects that implement an in-kind replacement.

In March 2011, TVA implemented PowerPlant, a fixed assets and project portfolio management system. The system changed the approval process from a manual approval process to an automated approval process. For fiscal year 2012, there were 166 capital projects totaling \$677.5 million that received initial approval.

¹ TVA-SPP-19.3, Revision 1 was effective during the audit scope. Revision 2 became effective May 1, 2013.

² The Capital Productivity and Economic Analysis (CP&EA) group now performs this review.

OBJECTIVE, SCOPE, AND METHODOLOGY

This review was initiated as a follow up to a recent Office of the Inspector General (OIG) review, Inspection 2012-14531 – Completion of PowerPlant’s Project/Portfolio Management Function, of the project management software, PowerPlant. During that review, we identified several areas for further analysis related to timely project approvals, delegated approvals, and project charges allocated incorrectly. The objective of our review was to determine if TVA’s capital project approval process is (1) efficient and timely, (2) being performed in accordance with TVA policies, and (3) aligned with industry best practices.

To achieve our objective, we:

- Interviewed TVA personnel and reviewed SPP (Standard Programs and Processes) to identify the process for approving capital projects within each SBU, at the Project Review Board (PRB), and board levels.
- Obtained PowerPlant reports and queries to determine if the approval process was being performed in a timely manner.
- Selected a judgmental sample of 50 projects from a total population of 1,114 projects that have been approved since the implementation of PowerPlant to test:
 - Compliance with approval authority, delegation authority, and TVA-SPP-19.3.
 - Time for project approval.
 - Actual cost and schedule to forecasted cost and schedule.
- Selected a sample of 33 projects at random to test for reclassified journal entries from one project to another.
- Obtained industry best practices for capital project approval and compared with TVA’s current practices.

The scope of our review included all capital projects approved in PowerPlant since implementation in March 2011 through February 22, 2013.

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 TVA's capital projects approval process is (1) generally timely, (2) performed in accordance with TVA policies, and (3) incorporating best practices. However, we found areas for improvement related to the timeliness of Nuclear Power Group (NPG) project approvals and the forecasting of project schedules.

The following provides a more detailed discussion of our findings.

CAPITAL PROJECTS APPROVAL PROCESS IS GENERALLY TIMELY AND EFFICIENT

The average number of days to approve a project for TVA is 18 days, which we consider to be a reasonable time frame. Additionally, the average number of days to approve at each approver level appears to be reasonable. While project approvals for TVA as a whole are being performed in a reasonable time frame, the NPG average is more than double the overall TVA average. NPG has routed 132 projects for approval since the implementation of PowerPlant, with an average of 43 days to approve. Due to the difference between the overall average for TVA and NPG, there appears to be opportunity for improvement in the timeliness of NPG project approvals.

To determine the average number of days it took each SBU to approve projects, we analyzed the population of all capital projects approved since the implementation of PowerPlant. The total population included 1,114 projects. The following table shows the number of days to approve by each SBU.

Table 1: Average Days to Approve by SBU

SBU	Average Days to Approve
Administration	21
Energy Delivery	13
Fossil Power Group	18
Financial Services	20
Generation Construction	23
Nuclear Construction	21
NPG	43
River Operations	14
All SBUs	18

We tested the same projects for number of days to approve at each approver level. The following table shows the average number of days at each approver level.

Table 2: Average Days to Approve by Approver Level

Approver Level	Average Days to Approve
Project Manager	1
Technical Reviewer	1
Planning Engineer – Power System Operations (PSO) ³	1
Product Line Manager – PSO	2
Manager of Project Manager	2
Project Sponsor	2
Portfolio Manager	5
SBU Officer	2
SBU Controller	1
SBU Executive	3
Financial Planning and Analysis	4
Chief Executive Officer (CEO) Direct Report	8
Chief Financial Officer	11
President	3
TVA Board	4

Area for Improvement Exists Related to Forecasted Schedules

Additionally, we tested the sample of 50 projects to determine the accuracy of the budget and schedule provided at the time of project approval. Of the 50 projects in our sample, 20 projects had been completed, so we tested the budget for only those projects. We identified one project that exceeded the approved budget by more than 25 percent.

Of the 50 projects in our sample, 35 projects had passed their in-service⁴ date, so we tested the schedule for only those projects. Our testing showed that 11 of 35 projects (31 percent) missed their approved in-service date by more than 25 percent. There were 8 projects that finished ahead of schedule by more than 25 percent. The degree to which the schedule is being missed indicates there is potential for more accurate planning related to forecasted schedules.

³ The PSO organization is now called Energy Delivery.

⁴ An asset is deemed to be in-service when it is performing its intended function and providing benefit to TVA.

Inefficiency Existed in the Approval Workflow for Phase 1 (Study and Preliminary Engineering)

According to TVA-SPP-19.3, Project Justification Process, Phase 1 can be approved at a lower level while an \$8 million project must be approved at the President/CEO level. However, this approval workflow did not previously exist in the PowerPlant system. Therefore, when an \$8 million project was routed for study phase approval of \$250,000, it had to be systematically approved by the same levels that would be required for the full project budget.

To alleviate this issue, TVA created a workaround process that required e-mails be sent to those approvers that were not necessary for the study phase approval. The e-mail notification alerted the approver to expect the approval request and approve the project, even though their approval was not required. This process was inefficient because it utilized a manual notification of users outside the normal automated process. However, during the course of the audit, TVA implemented the Phase 1 approval workflow for study phase approval in PowerPlant, which resolved this inefficiency.

CAPITAL PROJECT APPROVAL PROCESS IS BEING PERFORMED IN ACCORDANCE WITH TVA POLICIES

We tested the 50 judgmentally selected projects for compliance with TVA policy. We found all the projects were approved at the appropriate level in compliance with the chart on the following page from TVA-SPP-19.3, Project Justification Process. There were seven projects in our sample that were approved for more than \$8 million. Each of these projects had an economic analysis review performed to verify the economic benefits of the project are reasonable and appropriate and to determine if alternative options have been fully considered. Of the seven projects in our sample greater than \$10 million, none of them were initially approved after TVA-SPP-34.020, Capital Project Risk and Readiness Review Process, was placed in effect in August 2012. However, one project sought approval for Phase 3 in January 2013 and had an R3 performed at that time.

According to TVA-SPP-19.3, projects are authorized according to the following authorization matrix shown in Table 3.

Table 3: Authorization Authority

Total Capital Project Cost	SBU Officer (Vice President [VP])	SBU Executive (Senior VP or Executive VP)	CEO Direct Report	Chief Financial Officer and Group President	TVA Board
> \$50 Million	✓	✓	✓	✓	✓
> \$8 Million	✓	✓	✓	✓	
> \$2 Million	✓	✓			
≤ \$2 Million	✓				

In addition to the chart above, the study and preliminary engineering phase can be authorized at the following levels to complete project feasibility: SBU Officer, \$100,000; SBU Executive, \$250,000; and CEO Direct Report, \$1 million.

Project Charges Are Appropriately Classified

During the previous OIG review of PowerPlant, a concern was raised that when projects were not approved in a timely manner, charges for the project had to be assigned to an approved project until final approval was received. At that time, charges would be transferred to the new project. We randomly sampled 33 projects to test for project charges that had been reclassified from one project to another. We looked for any large charges that had been reclassified within the first two months after project approval. We identified one project that had a large reclassification from a holding account. This project, along with several others, was being approved during the transition to PowerPlant. A holding account was set up to accrue the charges while awaiting approval. We did not consider this an exception due to the software transition.

TVA HAS INCORPORATED BEST PRACTICES

We interviewed and obtained research related to best practices from the CP&EA group. The CP&EA group has performed research to obtain information related to utility peers and their project management practices. We also obtained best practices from the Project Management Institute (PMI)⁵ Project Management Body of Knowledge (PMBOK®),⁶ as well as PM Solutions⁷ PMO of the Year® award.⁸

We found industry leaders in project management include stage gate⁹ approvals or gate reviews for projects. In August 2012, TVA implemented the Capital Project Risk and R3 Process. The objective of the R3 is to provide comprehensive insight on project readiness to advance to the next phase as well as the overall risk of meeting project targets for use in “go or no go” decision making. The R3 process evaluates project management execution and compares projects against TVA project management SPP and industry best practices. This procedure is required for all Capital and Operations and Maintenance projects with total costs greater than \$10 million. An R3 is required at the stage gate before approval for Phase 2 and Phase 3. According to the Capital Productivity Group, the R3 process has identified about \$38 million in savings to projects since it began in 2012.

We also found industry leaders in project management have project oversight committees that include subject matter experts from various disciplines throughout the company. TVA began the PRB to provide oversight for TVA projects and serve as a control for project approvals. The PRB does not approve projects but reviews project requests and recommends projects for approval by the CEO and CEO direct reports. The PRB includes one representative from each SBU.

Industry leaders in project management also have Enterprise Project Governance structures. Along with the PRB and the R3 process, TVA has issued an SPP series on Project Management. The TVA-SPP-34 series includes 11 procedures that define TVA’s expectations for managing projects. TVA also

⁵ PMI is one of the world’s largest not-for-profit membership associations for the project management profession.

⁶ PMBOK® is a collection of processes and knowledge areas generally accepted as best practices within the project management discipline. PMBOK® is used by the MI to provide a consistent structure for the certification of Project Management Professionals and accreditation of degree-granting, educational programs in project management.

⁷ PM Solutions is a project management solution and consulting firm that helps PMO (Project Management Office), project, and business leaders apply project and portfolio management process practices that drive performance and operational efficiency.

⁸ The PMO of the Year® award salutes a PMO that has demonstrated excellence and innovation in developing and maturing an organizational structure to support the effective management of projects. It is a showcase for PMOs that have demonstrated vision and business acumen in implementing new ideas, methods, or processes that led to measurable improvements in project management realizing business benefits for their organizations.

⁹ A stage gate is defined as a point in a project or plan at which development can be examined and any important changes or decisions related to costs, resources, profits, etc., can be made.

has a Project Management Peer Team whose mission is to incorporate industry best practices into internal processes to improve and standardize project management processes for Capital and Operations and Maintenance projects across TVA. The Peer Team is directed by the PRB to review and discuss issues and options to arrive at the best solutions for the agency.

According to the former Director, CP&EA, the goal of the Capital Productivity Initiative was to do projects right and to do the right projects. Additionally, the PRB, R3, and new governance structure have been set up to ensure projects are done right and overall, the new processes have greatly increased the transparency and accountability for capital projects throughout the company.

RECOMMENDATIONS

The OIG recommends the VP, Nuclear Business Operations, evaluate the approval process for Nuclear capital projects to identify opportunities to improve the timeliness of project approvals.

The OIG recommends the Director, CP&EA, evaluate the planning and forecasting process to identify areas for improvement.

TVA Management's Comments – The VP, Nuclear Business Operations, provided a written response to a draft of this report. He agreed with the findings and recommendations in this report (see the Appendix for his complete response).

In response to the recommendation, Nuclear Business Operations management has reviewed and implemented measures which will serve to remediate the identified opportunity for improvement. The changes were implemented as part of NPG-SPP-19.6 Rev 0 – NPG Project Management Process on July 31, 2013.

The Director, CP&EA, had no comments on the draft report.

Auditor's Response – The OIG concurs with the comments and completed actions to address our recommendation received from the VP, Nuclear Business Operations. We will assess the response of the CP&EA organization as part of our normal recommendation follow-up process.

Robert Martin,

RE: REQUEST FOR COMMENTS - DRAFT EVALUATION 2012-14789-REVIEW OF TVA'S
CAPITAL PROJECTS APPROVAL PROCESS

Thank you for the opportunity to comment on the subject draft evaluation. Your team provided a thorough review and some valuable insights regarding the NPG's use of the projects approval process. As recommended, we have reviewed and implemented some measures which will serve to remediate the identified opportunity for improvement

We acknowledge that during the timeframe evaluated, some packages took up to 43 days to progress through the project approval process. In fact, based on scheduling of the reviews, a package could take up to 60 days to matriculate from project initiation through PAB approval. In recognition of this potential concern, we have implemented an Emergent PAB approval mechanism, which provides for an emergent project approval meeting on a 24/7 basis. This change was recently implemented as part of NPG-SPP 19.6 Rev 0 - *NPG Project Management Process*, dated July 31, 2013.

Based on implementing this change, we are confident that review and approval of projects within NPG can be accomplished in a manner which supports our business processes and supports emergent/expedited needs as well.

If you have any questions or would like any further information, please let me know.

Regards,

David Schavey
Vice President, Nuclear Business Operations