



Memorandum from the Office of the Inspector General

May 7, 2025

John J. Bradley
Jeremy P. Fisher
Tracy D. McCrory

**REQUEST FOR FINAL ACTION – EVALUATION 2024-17486 – AURORA
TRANSMISSION PROJECT**

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

If you have any questions, please contact Noel K. Kawado, Senior Auditor, at (865) 633-7348 or Lisa H. Hammer, Director, Evaluations – Projects, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

David P. Wheeler
Assistant Inspector General
(Audits and Evaluations)

NKK:KDS

Attachment

cc (Attachment):

TVA Board of Directors
Christopher E. Columber
Jessica Dufner
James Patrick Hall
Gregory J. Henrich
Jill M. Matthews

Donald A. Moul
Ronald R. Sanders II
Rebecca C. Tolene
Ben R. Wagner
Kay W. Whittenburg
OIG File No. 2024-17486



Office of the Inspector General

Evaluation Report

To the Senior Vice President,
Economic Development, and to the
Senior Vice President,
Commercial, Communications, and
Customer Affairs, and to the Vice
President, Transmission Planning
and Projects

AURORA TRANSMISSION PROJECT

Auditor
Noel K. Kawado

Evaluation 2024-17486
May 7, 2025

ABBREVIATIONS

MW	Megawatt
PRB	Project Review Board
TPS	Transmission Project Services
TVA	Tennessee Valley Authority
TVA Board	TVA Board of Directors

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MEMORANDUM DATED MAY 2, 2025, FROM JOHN BRADLEY, JEREMY FISHER, AND TRACY D. MCCRORY TO DAVID P. WHEELER



Evaluation 2024-17486 – Aurora Transmission Project

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

In October 2021, the Tennessee Valley Authority (TVA) Board of Directors approved a capital project with a budget of \$142 million to make available up to 160 megawatts (MWs) for a manufacturing facility in west Tennessee. The project, internally known as Project Aurora, required TVA to make significant investments in its transmission system for economic development purposes. Transmission Project Services (TPS), a business unit within TVA's Transmission and Power Supplyⁱ organization, was responsible for managing the construction of the infrastructure needed to furnish power to the site. While the project was presented to the TVA Board of Directors as one singular project, Project Aurora was split into three separate projects (i.e., stages) for funding and implementation purposes: *TPS PWR Aurora Stage 1, Stage 2, and Stage 3*.

TVA's Standard Programs and Processes 34.000, *Project Management*, provides the minimum requirements and guidance to enhance the probability for project success, which is measured by safely completing projects on budget and on schedule. The procedure includes specific requirements related to defining and controlling project cost (cost management) and risk management.

- Cost management includes (1) developing a cost estimate for the planned work scope; (2) establishing project contingency; (3) monitoring and controlling costs; and (4) development of cost forecasts.
- Risk management includes specific methods and techniques to manage critical technical, performance, schedule, and cost risks, including (1) developing the risk register; (2) determining the project risk impact, which includes estimating cost contingency for projects equal to or greater than \$10 million through Monte Carlo analysis or project manager discretion; and (3) monitoring and controlling risk.

Due to the cost and complexity of Project Aurora, we performed this evaluation to evaluate the management of the project's costs and risks. The scope of our evaluation included stages 1 and 2.

ⁱ During the evaluation, TVA underwent an organizational realignment, where the Transmission and Power Supply organization was renamed Grid, effective January 27, 2025.



Evaluation 2024-17486 – Aurora Transmission Project

EXECUTIVE SUMMARY

What the OIG Found

We determined risks to TVA resulting from lower-than-expected demand by the manufacturer were not considered and actions to address cost overruns were not fully implemented. Specifically, the manufacturer's monthly demand has averaged approximately 10 MWsⁱⁱ of the planned 160 MWs, which could impact TVA's ability to recover the costs incurred to support the manufacturer. In addition, analyses conducted by TVA identified causes for cost overruns and action plans were developed to mitigate the risk of cost overruns on future transmission projects. However, we determined seven of eleven actions had not been implemented through process changes and actions.

What the OIG Recommends

We recommend TVA management address (1) risks from lower-than-expected demand by new industrial customers and (2) outstanding actions to address the risk of future cost overruns. Detailed recommendations are contained in the body of this report.

TVA Management's Comments

TVA management agreed with our recommendations and provided actions taken and planned, including the creation of a plan to mitigate the risk of not fully recovering infrastructure costs for additional capacity and actions to better manage transmission project cost estimates. See the Appendix for TVA management's complete response.

Auditor Comments

We agreed with TVA management's actions taken and planned in response to our recommendations.

ⁱⁱ This represents the period from when TVA began providing power to the manufacturer in September 2023 through February 2025.

BACKGROUND

In October 2021, the Tennessee Valley Authority (TVA) Board of Directors (TVA Board) approved a capital project with a budget of \$142¹ million to make available up to 160 megawatts (MWs) for a manufacturing facility in west Tennessee. The project, internally known as Project Aurora, required TVA to make significant investments for economic development purposes. Specifically, the goals were to increase reliability and redundancy at the site and surrounding area, support the needs of the long-term asset strategy, add transmission capacity for additional economic development opportunities associated with the project and future growth, and create capacity for future solar interconnections. Transmission Project Services (TPS), a business unit within TVA's Transmission and Power Supply² organization, was responsible for managing the construction activities for Project Aurora. While the project was presented to the TVA Board as one singular project, Project Aurora was split into three separate projects (i.e., stages) for funding and implementation purposes: *TPS PWR Aurora Stage 1, Stage 2, and Stage 3*.

- Stage 1 – The primary purpose was to provide up to 66 MWs to support precommercial operations by July 2023. Stage 1 was initially approved by the Project Review Board (PRB) for \$29.8 million in April 2022, with an additional \$26.9 million approved by May 2023. Stage 1 went online on July 28, 2023. As of February 2, 2025, \$50.8 million had been spent on the project.
- Stage 2 – The purpose was to provide the infrastructure capacity for an ultimate load of 160 MWs by October 2024. This scope was later increased to 200 MWs. Stage 2 was initially approved by the PRB in October 2021³ for \$60 million. Additional project funding was approved in April 2022 (\$24.6 million) and May 2023 (\$27.6 million). Stage 2 went online September 20, 2024, and supports a total load of 200 MWs. As of February 2, 2025, \$99.6 million had been spent on the project.
- Stage 3 – The documented goal was to further invest in the transmission system to support economic development, provide for the increasing energy needs of the community, and contribute to the sustainable growth of the west Tennessee region.⁴

TVA's Standard Programs and Processes (SPP) 34.000, *Project Management*, provides the minimum requirements and guidance to enhance the probability for project success, which is measured by safely completing projects on budget and

¹ The TVA Board approved the project for \$142 million; however, approved funding has increased to \$168.9 million as May 2023. TVA Board Practices allows the Chief Executive Officer to increase any previously TVA Board-approved capital project, in an amount not to exceed \$200 million without additional TVA Board approval.

² During the evaluation, TVA underwent an organizational realignment, where the Transmission and Power Supply organization was renamed Grid, effective January 27, 2025.

³ The approval was obtained from the PRB for stage 2 prior to stage 1 in order to purchase transformers, which had a 2-year lead time.

⁴ *TPS PWR Aurora Stage 3* was cancelled based on TVA documentation dated March 4, 2025.

on schedule. TVA-SPP-34.000 includes specific requirements related to the management of projects having project costs greater than \$250,000,⁵ which both stage 1 and 2 met. The SPP requirements include defining and controlling project cost (cost management) and risk management.

- Cost management includes (1) developing a cost estimate for the planned work scope; (2) establishing project contingency; (3) monitoring and controlling costs; and (4) development of cost forecasts.
- Risk management includes specific methods and techniques to manage critical technical, performance, schedule, and cost risks. Identified risks should have sound mitigation strategies and actions developed and documented. Risk management requirements include (1) developing the risk register; (2) determining the project risk impact, which includes estimating cost contingency for projects equal to or greater than \$10 million through Monte Carlo analysis or project manager discretion; and (3) monitoring and controlling risk.

Due to the cost and complexity of Project Aurora, we performed this evaluation to evaluate the management of the project's risks and costs.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to evaluate the management of Project Aurora's risks and costs. The scope of our evaluation included stages 1 and 2.

To complete the evaluation, we:

- Conducted interviews with stage 1 and 2 project management to gain an understanding of the project, including project risks and costs.
- Reviewed project scope and project approval documentation to obtain an understanding of project risks and costs.
- Reviewed TVA-SPP-34.000, *Project Management*, to identify criteria related to risk and cost management.
- Reviewed risk reviews conducted by the Risk and Readiness team, which is comprised of project management and/or other qualified personnel from various TVA organizations.
- Conducted interviews with risk owners to obtain an understanding of how the risk registers were developed and monitored.
- Assessed stage 1 and 2 risk registers to determine consistency with the criteria identified in TVA-SPP-34.000.

⁵ TVA-SPP-34.000 was updated in May 2024 with requirements applying to projects with costs over \$400,000.

- Reviewed documentation related to stage 1 and 2 cost overruns, including a condition report and a white paper prepared by TVA to identify (1) the causes of the cost overruns and (2) actions to reduce the risk of future cost overruns on transmission projects.
- Conducted interviews with individuals from TPS to obtain an understanding of how costs were developed for stage 1 and 2.
- Reviewed contracts and agreements between TVA and the manufacturer to identify potential risks and mitigations.
- Obtained information from TVA's Power Customer Contracts, Transmission Customer Planning, Customer Relations, Economic Development, Enterprise Forecasting, and Financial Operations and Performance to gain an understanding of risks and mitigations related to the project.

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

FINDINGS

We determined risks to TVA resulting from lower-than-expected demand by the manufacturer were not considered and actions to address cost overruns were not fully implemented. The following provides a detailed discussion of each finding.

RISK OF REDUCED DEMAND WAS NOT CONSIDERED

Project Aurora was approved by the TVA Board for \$142 million. The approval was based on the assumption that the manufacturer's power requirements would be 160 MWs starting in October 2024. Additional information provided to the TVA Board stated that the project would (1) provide substantial benefits to the TVA service area and (2) have significant impacts on direct and indirect wages and jobs in the area. According to TVA's Economic Development, risks considered related to the project included (1) whether TVA could service the customer without disrupting operations, (2) the value of the project to TVA, and (3) the customer's ability to pay. However, financial risks to TVA resulting from lower-than-expected demand were not considered. Specifically, the agreements with the manufacturer do not provide for any compensation for lost revenue, outside of the minimum billing,⁶ to TVA in the event the manufacturer does not use the entire 160 MWs.

As of February 2, 2025, TVA has spent \$150.4 million on the project; however, the manufacturer's use of available MWs has been minimal. Specifically, the manufacturer's monthly demand has averaged approximately 10 MWs,⁷ which is

⁶ According to TVA's Power Customer Contracts, the minimum bill is a long-standing Board approved rate schedule charge intended to recover the transmission and other associated cost to provide service.

⁷ This represents the period from when TVA began providing power to the manufacturer in September 2023 through February 2025.

significantly less than the planned 160 MWs. TVA's Customer Relations anticipates the projected peak demand for the manufacturer will be 60 MWs by January 2026; but the manufacturer will not reach the 160 MWs available until, possibly, late 2027.

In March 2025, TVA's Power Customer Contracts,⁸ provided estimated revenue from the manufacturer under various scenarios, including (1) limited demand of 21 MWs and (2) full operations at 160 MWs (the demand contracted for in the original power contract). Under the limited demand scenario, TVA estimated revenue of \$8.4 million annually; whereas revenues under full operations approximated \$61.6 million annually. Since TVA first began billing the manufacturer for power provided in September 2023, total billings through February 2025 have been approximately \$9.3 million. Further, the manufacturer can terminate the contract in 2033, which would end future payments by the manufacturer. Based on the manufacturer's minimal demand to date, and TVA's project costs incurred, there is a risk TVA will be unable to recover its costs.

ACTIONS TO ADDRESS COST OVERRUNS WERE NOT FULLY IMPLEMENTED

TVA-SPP-34.000 contains cost management requirements, including those related to developing project cost estimates, establishing project contingency, and monitoring and controlling costs. Both stage 1 and 2 have experienced cost overruns on their estimates. Stage 1 was originally approved for \$29.8 million in April 2022 but had increased to \$56.7 million by May 2023, representing a 90 percent increase. Stage 2 was originally approved for \$60 million in October 2021; estimated costs had increased to \$112.2 million by May 2023, representing an 87 percent increase.

In response to these increases, the PRB, at its May 2023 meeting, requested the preparation of a white paper to identify lessons learned on schedule delays and cost increases for stage 1 and 2. The white paper, prepared by TVA's Enterprise Project Management Office, Transmission Project Management, and Transmission Project Development, described the causes of the cost increases and identified actions to mitigate the cost overruns on future transmission projects. According to the white paper, causes for the cost increases included rushed estimate development and inadequate time for review of the estimate, exclusion of new pricing for materials, incorrect assumptions related to right-of-way work and in-house labor, and infrequent monitoring of actual burn rates.⁹

The white paper described eleven actions that were to be taken to address the causes and mitigate these issues on future transmission projects through process changes and actions. As of November 2024, we noted that seven of the eleven actions related to the estimating process, estimate reviews, as-designed

⁸ TVA's Power Customer Contracts is responsible for developing and administering all contracts related to the sale of power.

⁹ This refers to how quickly project funding is being spent.

estimates, benchmarking, and estimate assumptions had not been fully implemented. For example, one action called for the creation of a team to further examine the project cost overages and determine solutions to prevent reoccurrence. According to project management, a Voluntary Operational Learning Team was created, but no actions were taken. Fully implementing all actions on the white paper through process changes could help mitigate the risk of cost overruns on future transmission projects.

RECOMMENDATIONS

We recommend the:

- Senior Vice President, Commercial, Communications, and Customer Affairs,¹⁰ in conjunction with the Senior Vice President, Economic Development, develop a plan for future business arrangements with industrial customers to mitigate the risk of TVA not fully recovering infrastructure costs for the additional capacity.

TVA Management Comments – TVA management agreed with the recommendation and will evaluate items to create a plan to mitigate the risk of not fully recovering infrastructure costs for additional capacity. These items include: (a) modifications to TVA Transmission Project reimbursement payment process, (b) concurrence by the Economic Development Board of any variations from standard terms and deviations from policies regarding recovery of infrastructure cost, and (c) implementation of a demand ramp up schedule in power contracts when companies do not plan to take their ultimate contract demand immediately upon start-up. See the Appendix for management's complete response.

Auditor's Response – We agree with TVA management's planned actions.

- Vice President, Transmission Planning and Projects, ensure outstanding actions to mitigate the risk of future transmission cost overruns are completed and process changes documented.

TVA Management Comments – TVA management agreed with the recommendation and indicated they had fully implemented ten actions and partially implemented one action item to support their commitment to better managing cost estimates. See the Appendix for management's complete response.

Auditor's Response – We agree with TVA management's completed and planned actions.

¹⁰ Effective April 22, 2025, the title of the Senior Vice President, Strategy and Commercial Officer, changed to the Senior Vice President, Commercial, Communications, and Customer Affairs.



1101 Market Street, Chattanooga, Tennessee 37402

David P. Wheeler
Assistant Inspector General – Audits & Evaluations
Office of the Inspector General

May 2, 2025

RE: REQUEST FOR COMMENTS – EVALUATION 2024-17486 – AURORA TRANSMISSION PROJECT

Dear Mr. Wheeler,

We would like to thank the Office of the Inspector General (OIG) for their diligence and support in assessing the Aurora Transmission Project.

We have reviewed your draft memorandum dated April 3, 2025, and would like to provide the following responses and follow-up actions.

Recommendations

1. **Risk** – *We recommend the Senior Vice President, Strategy & Commercial Officer in conjunction with the Senior Vice President, Economic Development, develop a plan for future business arrangements with industrial customers to mitigate the risk of TVA not fully recovering infrastructure costs for the additional capacity.*

RESPONSE

We agree with this recommendation.

The Senior Vice President, Strategy and Commercial Officer and the Senior Vice President, Economic Development propose evaluating the following items to create a plan to mitigate the risk of not fully recovering infrastructure costs for additional capacity.

1. Consider modifications to TVA Transmission Project reimbursement payment process. The reimbursement would be dependent upon the fulfillment of the obligations of the company and the percentage achieved of their contract demand.
 2. The Economic Development Board would concur with any variations from the standard terms or deviations from the policies set forth regarding recovery of infrastructure cost.
 3. All companies not planning on taking their ultimate contract demand immediately upon start up would be required to provide an ultimate/staggered contract demand ramp up schedule, included in their power contract. Reimbursements would be aligned to the schedule set forth and any variance from the schedule would be preapproved by TVA and would impact the timing of repayment to ensure cost recovery.
2. **Cost Overruns/Estimating** – *We recommend the Vice President, Transmission Planning & Projects, ensure outstanding actions to mitigate the risk of future transmission cost overruns are completed and the process changes documented.*

RESPONSE

We agree with this recommendation.

As stated in the project whitepaper presented to the May 2023 PRB and referenced in this draft evaluation, TPP is committed to better managing cost estimates.

Please see the updates below to the 11 actions described in the whitepaper:

Processes

1. The estimating process will be followed, with adequate time provided to the JPT to complete a detailed and fully vetted estimate, regardless of whether the project is managed through the fast-track process.
Status: Implemented. See "Detailed Estimate Process" attached. All estimates are being reviewed with JPT.
2. As-designed estimates are performed for PRB projects prior to coming for full Phase 3 approval.
Status: Implemented. See "As-Design Estimate Checklist" attached. PRB projects coming for Phase 3 approval as-design estimates are being performed at Project Management direction.
3. Challenge meetings for fast-track projects will occur prior to PAB to include all primary stakeholders and support groups.
Status: Implemented. Project Managers are scheduling scrub workshops for PRB and/or Key Projects. These meetings include subject matter experts, the project team and stakeholders across the organization and provide an opportunity to discuss and challenge the details of the project. The estimating team has also implemented Estimating Peer Reviews for estimates seeking concept approval in a process that allows for independent review across peers to ensure accuracy. In addition, Monthly Key Project Meetings also provide project challenge opportunities for key stakeholders and support groups. See invites from recent meetings that provide challenge opportunities in "Meetings Where Projects Can Be Challenged" attachment.
4. A minimum of 3 similar projects will be identified for benchmarking purposes to add confidence to estimates and schedules for fast-track projects.
Status: Partial Implementation. Project Managers are reviewing similar types of projects to add confidence to current benchmarks. A written standard is under investigation. See attached "Variance Analysis" for a sample recently submitted.
5. In the absence of adequate internal benchmarks, external benchmarks will be obtained.
Status: Implemented. The estimating team refers to the MISO transmission estimating guides and have used portions of it to develop the TVA Transmission Estimating calculators. See "MISO Transmission Cost Estimation Guide" and "iTwo Calculator" attached.
6. Current material prices will be verified prior to finalizing estimates.
Status: Implemented. Current material prices are being used and updated in iTwo with supply chain coordination on a regular basis throughout the year. See attached "Coordination with Supply Chain - Updating of Material Prices."
7. Estimating assumptions will be challenged prior to finalizing estimates, in particular for right-of-way scope of work.
Status: Implemented. Action is part of the standard estimating process. Estimating Peer reviews have also been established and conducted for PRB and/or identified key projects. See invites from recent meetings that provide challenge opportunities in "Meetings Where Projects Can Be Challenged" attachment.
8. Project burn rate will be monitored more closely and more frequently to identify estimating inaccuracies sooner in the project lifecycle.
Status: Implemented. See "Forecasting Overview and Demo Sessions" attached. These overviews

and training sessions have provided additional guidance on monthly forecasting and provided opportunities for both Project Managers and Project Control Specialists (PCSs) to identify inaccuracies sooner in the project lifecycle.

9. Creation of a VOLT team to further examine the overages and what can be done in the future to prevent re-occurrence.
Status: Implemented. VOLT team was conducted in 09/2023 and it was determined that no further actions were required apart from outstanding PRB actions.

Tools

10. iTWO has been adopted as Transmission's estimating system which includes updated material pricing and labor rates.
Status: Implemented. Information is reviewed yearly at minimum. See "iTWO SharePoint Page" attached that shows all the resources available to Transmission estimators and stakeholders.
11. Transmission and PMPT are pursuing a flag to designate fast-track and emergency projects in C55 for easier identification and tighter oversight of fast-track projects.
Status: Implemented. Checkboxes for both Fast Track and Emergency projects have been added to PAB and PRB Project Approval Request forms. Flags noting "Emergent or Emergency" and "Planned or Unplanned" have been implemented in C55 and a Fast Track Checklist has been created and added as a resource for stakeholders to use as a guide. Verbiage has also been added to TVA-SPP-34.000 – Project Management v.10 to expound on Fast Track and Emergency project procedures. See "Fast Track and Emergency Projects" attached.

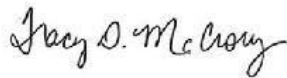
On behalf of TVA, we thank you for allowing us to review your findings and provide feedback on the evaluation.



Jeremy Fisher
Senior Vice President
Commercial, Communication
and Customer Affairs



John Bradley
Senior Vice President
Economic Development



Tracy McCrory
Vice President
Transmission Planning and Projects