



Memorandum from the Office of the Inspector General

August 7, 2024

Laura J. Campbell
Robert Bryan Williams

**REQUEST FOR MANAGEMENT DECISION – EVALUATION 2023-17462 – TVA'S
CUMBERLAND ENERGY SOLUTION PROJECT**

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. 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 evaluations that remain unresolved after 6 months from the date of report issuance.

If you have any questions or wish to discuss our findings, please contact Jessica L. Monroe, Senior Auditor, Evaluations – Projects, at (865) 633-7338 or Lisa H. Hammer, Director, Evaluations – Projects, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the evaluation.

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

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Attachment
cc (Attachment):

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OIG File No. 2023-17462



Office of the Inspector General

Evaluation Report

To the Senior Vice President,
Generation Projects and Fleet
Services, and to the Vice
President, Supply Chain

TVA'S CUMBERLAND ENERGY SOLUTION PROJECT

Evaluation Team
Jessica L. Monroe
Regina D. Headrick

Evaluation 2023-17462
August 7, 2024

ABBREVIATIONS

CES	Cumberland Energy Solution
EPC	Engineering, Procurement, and Construction
FERC	Federal Energy Regulatory Commission
FPDT	Foreign Procurement Decision Tool
OEM	Original Equipment Manufacturer
PMBOK®	Project Management Body of Knowledge
RFP	Request for Proposal
SPP	Standard Programs and Processes
T&I	Technology and Innovation
TVA	Tennessee Valley Authority

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ROGER WALDREP TO DAVID P. WHEELER



Evaluation 2023-17462 – TVA's Cumberland Energy Solution Project

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

In November 2021, the Tennessee Valley Authority's (TVA) Board of Directors authorized an evaluation of retirement and replacement generation options for the Cumberland Fossil Plant. TVA issued the record of decision, as required by the National Environmental Policy Act,ⁱ in January 2023 to retire and demolish Cumberland Fossil Plant and replace one of its unit's capacity with a natural gas plant. TVA initiated the Cumberland Energy Solution (CES) project to construct a 1,450-megawatt natural gas-fueled combined cycle plant on the Cumberland reservation. TVA awarded two firm fixed price contractsⁱⁱ for the CES project, one to an original equipment manufacturer (OEM) and one to an engineering, procurement, and construction contractor.

TVA's Standard Programs and Processes 34.000, *Project Management*, provides a standardized framework of project-related functional areas, including scope management and procurement management:

- Scope management is required for projects with a cost of greater than \$250,000. The scope management process begins with developing the project scope and includes (1) collecting requirements, (2) evaluating and selecting alternatives, and (3) defining project deliverables. Supplemental guidance, provided by TVA's Enterprise Project Management Office's *Scope Guide*, describes scope management activities, including the development and refinement of a risk register.ⁱⁱⁱ
- Procurement management is performed at the discretion of the business unit but is recommended for use on TVA projects. Procurement management includes (1) determination of the contracting strategy, (2) issuance of a request for proposal, and (3) evaluation of bids and award of contract. The bid process is managed by the Supply Chain business unit in conjunction with the project manager and joint project team.

Due to rising electricity demand and planned retirement of the coal fleet, TVA is planning to invest \$16.4 billion over the next four years to build additional generating capacity and upgrade the existing system to ensure

ⁱ The National Environmental Policy Act requires federal agencies to prepare detailed statements assessing the environmental impact of, and alternatives to, major federal actions significantly affecting the environment.

ⁱⁱ A firm fixed price contract is a lump sum contract where the supplier agrees to furnish goods or services at a fixed price.

ⁱⁱⁱ The risk register is the repository for identified project risks and includes assessment of the risks and determination of risk mitigation strategies.



Evaluation 2023-17462 – TVA's Cumberland Energy Solution Project

EXECUTIVE SUMMARY

TVA provides affordable, reliable, and resilient energy. One of the projects with potential major expenditures is TVA's CES project. Therefore, we initiated this evaluation to determine whether the CES project's (1) scope and (2) bid process were completed in accordance with TVA procedures.

What the OIG Found

We determined the CES project complied with most elements of scope management and the bid process. However, we identified certain areas under each process that need improvement to help mitigate potential TVA risk. In summary:

- TVA's Cybersecurity, a business unit under TVA's Technology and Innovation business unit, was not included as a stakeholder throughout the project.
- TVA did not adequately mitigate risks related to the use of equipment from nondesignated countries.^{iv} Specifically,
 - Cybersecurity concerns related to the use of equipment from a nondesignated country had not been evaluated.
 - Some procurements were not evaluated for compliance with the Trade Agreements Act.
- The CES project risk register could be improved related to (1) project staffing and (2) gas pipeline construction.
- TVA's contract pricing strategies may cause TVA to pay inflated costs.

What the OIG Recommends

We made recommendations to address risks associated with the inclusion of appropriate stakeholders, use of equipment from nondesignated countries, the CES risk register, and contract pricing strategies. Detailed recommendations are contained in the body of the report.

TVA Management's Comments

TVA management partially agreed with our findings and indicated they would take action on those items that the teams are in agreement with to

^{iv} The Trade Agreements Act specifications in TVA contracts requires only United States-made or designated country end products or services, unless such end products or services (1) are not available from United States or designated country sources, (2) are insufficient to fulfill TVA's requirements, or (3) costs are unfair, unreasonable, or both.



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achieve the recommendations. See the Appendix for TVA management's complete response.

Auditor's Response

We reviewed management's comments and actions planned and taken for addressing our findings and associated recommendations and have provided detailed responses to each within this report.

BACKGROUND

In November 2021, the Tennessee Valley Authority's (TVA) Board of Directors authorized an evaluation of retirement and replacement generation options for the Cumberland Fossil Plant. The National Environmental Policy Act requires federal agencies to prepare detailed statements assessing the environmental impact of, and alternatives to, major federal actions significantly affecting the environment. TVA's National Environmental Policy Act process considered four alternatives for the Cumberland Fossil Plant: (1) continued operation of the fossil plant with additional investments for reliability and environmental regulatory requirements, (2) a combined cycle gas plant on the Cumberland reservation, (3) combustion turbines at two other TVA locations, or (4) construction and operation of solar generation and energy storage facilities at numerous locations in the Tennessee Valley. In January 2023, TVA issued its record of decision to retire and demolish the fossil plant and replace one of its unit's capacity with a natural gas plant.

TVA initiated the Cumberland Energy Solution (CES) project to construct a 1,450-megawatt natural gas-fueled combined cycle plant on the Cumberland reservation. In December 2022, TVA awarded a firm fixed price contract¹ to an original equipment manufacturer (OEM) for the manufacture and delivery of power island equipment trains, which include gas turbine generators, heat recovery steam generators, and steam turbine generators. In October 2023, TVA entered into an engineering, procurement, and construction (EPC) firm fixed price contract for the CES project. In addition to engineering, procurement, and construction, the EPC contractor is responsible for coordinating and monitoring the OEM's progress and delivery of major equipment. Both contracts include compliance with the Trade Agreements Act and specify the requirement for the delivery or performance of only United States-made or designated country end products or services, unless such end products or services (1) are not available from United States or designated country sources, (2) are insufficient to fulfill TVA's requirements, or (3) costs are unfair, unreasonable, or both.

TVA's Standard Programs and Processes (SPP) 34.000, *Project Management*, provides a standardized framework of project-related functional areas that are either required or recommended to effectively manage TVA projects. Two of the functional areas included in TVA-SPP-34.000 are scope management, required for projects with a cost of greater than \$250,000; and procurement management that, while performed at the discretion of the business unit, is recommended for use on TVA projects. TVA's Major Projects, a business unit under the Chief Operating Office's Generation Projects and Fleet Services organization, is responsible for project management for new generation facilities.

TVA-SPP-34.000 defines project scope as "the specific project deliverables and tasks the project intends to execute to meet the stated project objectives and acceptance criteria." Specifically, the scope management process begins with

¹ A firm fixed price contract is a lump sum contract where the supplier agrees to furnish goods or services at a fixed price.

developing the project scope and includes (1) collecting requirements, (2) evaluating and selecting alternatives, and (3) defining project deliverables. TVA's Enterprise Project Management Office's *Scope Guide* describes scope management activities, including the development and refinement of a risk register.² Project managers are responsible for development and tracking of the project scope with support from stakeholders, including a joint project team made up of members from TVA specialties such as engineering, environmental, and construction.

TVA-SPP-34.000 also provides that procurement management is to include (1) determination of the contracting strategy, (2) issuance of a request for proposal (RFP), and (3) evaluation of bids and award of contract. The bid process is managed by the Supply Chain business unit in conjunction with the project manager and joint project team. Supply Chain develops sourcing strategies, procures products and services at the lowest cost of ownership, and manages all commercial aspects of contracts. TVA-SPP-04.000, *Management of the TVA Supply Chain Process*, describes Supply Chain management's role in lowering total costs to TVA and outlines the guiding principles and fundamental values impacting how the organization executes the bid process.

The Project Management Institute is a global, non-profit, project management membership organization that creates industry standards for project management, including the Project Management Body of Knowledge (PMBOK®) guide. The PMBOK® identifies project management principles that guide the behaviors and actions of those working on projects and project performance domains that form an integrated system to enable successful project delivery. Included within those domains are project scope and procurement. Project scope management includes defining, developing, monitoring, controlling, and validating scope. The project scope drives the procurement process, which includes defining a procurement strategy and the bid process. TVA considers the Project Management Institute as best practice in project management. TVA uses PMBOK® as a key reference for TVA-SPP-34.000 series and process guides.

Due to rising electricity demand and planned retirement of the coal fleet, TVA is planning to invest \$16.4 billion over the next four years to build additional generating capacity and upgrade the existing system to ensure TVA provides affordable, reliable, and resilient energy. One of the projects with potential major expenditures is TVA's CES project. Therefore, we initiated this evaluation to assess the scope management and bid process for the CES project.

² The risk register is the information repository for each identified project risk and includes assessment of the project risks and determination of strategies to address identified risks.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to determine whether the CES project's (1) scope³ and (2) bid process⁴ were completed in accordance with TVA procedures. To complete the evaluation, we:

- Reviewed TVA project management SPPs to gain an understanding of scope and procurement management requirements and guidance, including (1) TVA-SPP-34.000, *Project Management*, and (2) TVA-SPP-34.001, *Project Management Governance, Oversight, Execution, and Support*.
- Reviewed Enterprise Project Management Office documentation, including the *Scope Guide* to understand activities associated with scope management.
- Reviewed TVA Supply Chain SPPs, including (1) TVA-SPP-4.000, *Management of the TVA Supply Chain Process*, and (2) TVA-SPP-04.002, *Procurement of Products and Services*, to gain an understanding of the supply chain management process and requirements of the bid process.
- Reviewed TVA's *Supply Chain Buyer Guide*⁵ to understand the roles and responsibilities of Supply Chain and risks associated with contracting strategies.
- Reviewed the PMBOK® for industry guidance on scope and procurement management.
- Reviewed CES project documentation related to scope requirements, alternatives, and development of the project risks, including the:
 - Contractor study outlining various plant configuration options;
 - Project charter, project management plan, including the original risk register and updates as of January 2024, and select project meeting notes;
 - Spreadsheets showing scope refinement discussions and decisions with contractors; and
 - External project consultant risk and readiness review presentation.
- Reviewed the CES project stakeholder engagement plan to determine how stakeholder feedback was gathered.
- Evaluated CES project bid process documentation to determine if procedures were followed and to analyze procurement risks. Documentation reviewed included the OEM and EPC contract (1) RFPs, (2) bid evaluation criteria, and (3) draft and final contracts.

³ For scope management, we did not evaluate the development and documentation of acceptance criteria and work breakdown structure.

⁴ For the bid process, we did not evaluate vendor oversight.

⁵ The *Supply Chain Buyer Guide* is a reference document "designed to support informed decision making throughout the contracting process and to help TVA achieve its goal of lowering total cost of ownership."

- Reviewed CES project change requests and purchase orders, as of February 2024, issued as a result of scope changes to determine pricing methodology.
- Toured the CES project site and conducted interviews with the project manager, project controls specialist, and principal contracts manager to understand how the CES project scope and procurement were managed.
- Conducted interviews with affected stakeholders from various TVA strategic business units, including the Chief Operating Office, Financial Services, and the Office of the General Counsel.

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 AND RECOMMENDATIONS

We determined the CES project complied with most elements of scope management and the bid process. However, we identified certain areas under each process that need improvement to help mitigate potential TVA risk. In summary:

- TVA's Cybersecurity, a business unit under TVA's Technology and Innovation (T&I) business unit, was not included as a stakeholder throughout the project.
- TVA did not adequately mitigate risks related to the use of equipment from nondesignated countries. Specifically,
 - Cybersecurity concerns related to the use of equipment from a nondesignated country had not been evaluated.
 - Some procurements were not evaluated for compliance with the Trade Agreements Act.
- The CES project risk register could be improved related to (1) project staffing and (2) gas pipeline construction.
- TVA's contract pricing strategies may cause TVA to pay inflated costs.

TECHNOLOGY AND INNOVATION'S CYBERSECURITY WAS NOT INCLUDED AS A STAKEHOLDER THROUGHOUT THE PROJECT

We found that most project stakeholders we interviewed from Power Operations, Environment and Sustainability, Fuels, Supply Chain, and Transmission Planning and Projects were involved in evaluation of project alternatives and collection and refinement of requirements. In addition, external stakeholders were kept informed as the project deliverables were defined. While most stakeholders we interviewed were involved in development of the project requirements, a review of the project charter and project management plan indicated no representatives from T&I's

Cybersecurity were included. TVA-SPP-34.000 indicates that collection of scope requirements should include TVA's Cybersecurity for additions, removals, or changes to equipment that impact cybersecurity, which the CES project does. T&I's Cybersecurity personnel should have been engaged early in the process to ensure any applicable cybersecurity regulations were adhered to throughout the project lifecycle and to identify any cybersecurity risks. Excluding T&I's Cybersecurity organization as a stakeholder throughout the CES project creates the risk that cyber vulnerabilities are not identified and assessed.

Recommendation

We recommend the Senior Vice President, Generation Projects and Fleet Services, take action to ensure project managers include all required parties on current and future major projects.

TVA Management's Comments – TVA management disagreed with the finding that Cybersecurity was not included as a stakeholder on the project. TVA management stated that cybersecurity requirements were included in the contract and all technical specifications. Further, questions, exceptions or clarifications and contract markups related to cybersecurity were reviewed and resolved with the Cybersecurity team during the RFP and best and final offer process. In addition, Cybersecurity is actively involved in design reviews for engineering documents and drawings and multiple meetings occur weekly to ensure compliance with specifications, including scope additions by Cybersecurity for changing requirements. TVA management noted that, while TVA's T&I Cybersecurity members were engaged in various aspects of the project, there is an opportunity to improve how and when to engage T&I Cybersecurity on future projects. See the Appendix for TVA management's complete response.

Auditor's Response – We agree that T&I's Cybersecurity was involved in the RFP process and reviewing contracts, and that Power Operations Engineering and Technical Programs personnel with cybersecurity responsibilities review engineering documents and drawings. However, as stated below, the procurement of transformers from a nondesignated country took place without knowledge of T&I's Cybersecurity. Involvement from T&I's Cybersecurity throughout the CES project could mitigate risks to TVA.

INADEQUATE RISK MITIGATION RELATED TO THE USE OF EQUIPMENT FROM NONDESIGNATED COUNTRIES

TVA's contract with the OEM included various specifications for parts and materials including, in some cases, specific manufacturers that were to be used. However, during our review, we determined TVA had not adequately mitigated the risk related to the use of equipment from nondesignated countries. Specifically, (1) cybersecurity concerns related to the use of equipment from a Chinese company had not been evaluated, and (2) some procurements were not evaluated for compliance with the Trade Agreements Act.

Cybersecurity Concerns Related to the Use of Equipment from China

During our review, Generation Projects and Fleet Services employees expressed concerns to us with the OEM using a Chinese company to supply transformers. Upon further review, we determined that TVA's December 2022 fixed price contract with the OEM included specifications for transformers that were to be manufactured by a certain manufacturer at their United States facility. The contract required prior written approval of TVA's contracting officer and contract technical steward for any changes to specifications and that the OEM was to notify the TVA contracting officer, in writing, prior to provision of foreign items, components, or materials. Additionally, the OEM contract for the CES project required compliance with the Trade Agreements Act.

Despite these requirements, in August 2023, the OEM informed TVA that they had placed a purchase order for the transformers with a Chinese manufacturer to meet schedule requirements because the manufacturer specified in the contract was nonresponsive. According to TVA personnel, the OEM did not notify TVA prior to placing the purchase order with the Chinese manufacturer. However, TVA personnel stated they verbally conceded to use of the Chinese manufacturer in December 2023 to meet schedule constraints. Further, the OEM asserted that the country of origin for the transformers was Mexico, although in other communications with TVA, the OEM stated the key components come from a factory in China.

Due to concerns with potential risks resulting from the unauthorized change to a Chinese manufacturer, we met with officials in TVA's Office of the General Counsel and Cybersecurity. Neither organization was aware of the purchase of transformers from the Chinese company. TVA's Cybersecurity expressed concern they had not been asked to look at anything for the CES project since the contracting phase of the project and had not been provided a list of suppliers. TVA's Cybersecurity subsequently initiated a cybersecurity supplier assessment of the Chinese manufacturer.

Some Procurements Were Not Evaluated for Compliance with the Trade Agreements Act

As part of the bid process, the commercial evaluation of vendors includes an assessment of compliance with the Trade Agreements Act. The Foreign Procurement Decision Tool (FPDT) was developed by Supply Chain and the Office of the General Counsel for use in documenting exceptions, and approval is required by the appropriate Supply Chain director. TVA requires documentation in the FPDT for all foreign materials and service offers, regardless of dollar value. Supply Chain is responsible for identifying potential foreign procurements and the Office of the General Counsel provides guidance on the determination of whether a potential foreign material or service meets the requirements for a Trade Agreements Act compliance exception. As noted in the background section of this report, Trade Agreements Act compliance exceptions outlined in TVA contracts are allowable if (a) no domestic or designated country offers were received, (b) domestic and/or designated offers are insufficient to fulfill TVA's needs, and (c) the domestic or designated country offers have an unreasonable or unfair cost.

We found Supply Chain did not evaluate the change in transformer manufacturer (discussed in the previous finding) for Trade Agreements Act compliance on the CES project. We also reviewed documentation for a project change request related to steel from Vietnam and found that, while the vendor did notify TVA of the foreign procurement, the request was not processed through the FPDT. The OEM asserted their inability to obtain the product from a designated country. The Office of the General Counsel advised more information was needed to confirm the OEM's assertion; however, Supply Chain did not obtain additional documentation.

As TVA enters a new era of construction, the consistent application of tools such as the FPDT is important to ensure compliance with Trade Agreements Act and adequate consideration of risk to TVA of any exceptions granted. According to a Supply Chain director, formal training on the FPDT was last provided in 2023 and is planned for August 2024.

Recommendations

We recommend the Senior Vice President, Generation Projects and Fleet Services, work with TVA's Cybersecurity organization to assess the CES project for other potential cybersecurity risks.

We recommend the Vice President, Supply Chain, evaluate its Trade Agreements Act compliance process and make changes as needed to improve compliance.

TVA Management's Comments – TVA management partially agreed with the finding, stating that Supply Chain included the necessary contract language to comply with the Trade Agreements Act. TVA management also stated that the OEM confirmed in writing that the transformer was Trade Agreements Act compliant with the country of origin being Mexico. TVA management stated that a review of TVA's foreign procurement process was conducted in 2023 and resulted in improvements to the tool and updated training provided to Supply Chain contracting officers. Major Projects, Supply Chain, and Cybersecurity have initiated routine meetings around the potential risk on projects, and are preparing a joint mitigation plan for this project and future projects. See the Appendix for TVA management's complete response.

Auditor's Response – As noted in our report, we recognize that contract language related to compliance with the Trade Agreements Act was included in the contract with the OEM and that the OEM asserted the country of origin was Mexico. However, further documentation from the OEM describes the key components as manufactured in China. In addition, in January 2024, the EPC proposed providing transformers from the same supplier and their request was denied by TVA. Because of the inclusion of parts manufactured in a nondesignated country, T&I Cybersecurity should have been consulted to assess the risk to TVA of using this product. We agree with the planned action of initiating routine meetings around the potential risk of projects and preparing a joint mitigation plan for the project and future projects.

CES PROJECTS RISK REGISTER COULD BE IMPROVED

According to the PMBOK®, identification of overall project risks is part of defining the scope of a project. In addition, the *Scope Guide* includes project risk and mitigations as scope management activities. Potential risk items that may affect project performance, cost or schedule are documented in a project risk register. The CES project risk register describes the risk management activities, including (1) identification of events that could prevent the project from progressing as planned to successful completion, (2) assessment of the likelihood of occurrence and impact of occurrence for each risk, and (3) development of a strategy(ies) to respond to each risk. We reviewed 87 CES project risks and conducted interviews to identify any gaps or areas for improvement related to CES project risks. We found the risk register for the CES project could be improved related to (1) project staffing and (2) the gas pipeline construction. Improvement of these risk areas in the CES project risk register could help manage impacts to project cost and schedule.

- **Project Staffing** – According to a project consultant hired by TVA, CES project staffing, which includes project management and oversight personnel such as individuals conducting technical reviews, is lean compared to their industry experience on a project of this size and complexity. In response, the CES project team chose to accept the risk, countering that past projects have been successfully executed with this lean staffing concept and heavy reliance is placed on the EPC for project execution. No additional actions were taken by the project team.

During our review, concerns were expressed to us about the availability of TVA personnel to perform technical reviews, such as engineering design reviews and inspections, on the CES project. For example, some of these individuals indicated, those conducting technical reviews for the CES project are also tied to other ongoing and planned construction work. The CES project risk register does not include a risk that addresses technical staff availability for TVA personnel. Adding this information to the CES project risk register could proactively help TVA develop mitigations to reduce the impacts of this risk.

- **Gas Pipeline Construction** – Completion of the CES project is dependent on construction of a gas pipeline. Gas will need to be available to the site by January 2026 to meet scheduled targets associated with start-up activities. Federal Energy Regulatory Commission (FERC) approval is required for all pipeline construction. In January 2024, FERC gave approval for the pipeline. Construction is planned to begin in November 2024. A schedule provided by TVA from the pipeline construction contractor included a 10-month construction period, which would meet the January 2026 target date. However, in a June 2023 FERC filing, the contractor had indicated construction would take 15 to 16 months, which would cause a delay in site start-up activities. Further, appeals of FERC's approval of the pipeline by an environmental group and a landowner have already been filed and TVA

anticipates the appeals will be heard in mid-2024. According to TVA personnel, the appeals process is lengthy and could negatively impact the pipeline project timeline and costs if site start-up activities are delayed.

While the CES project risk register includes gas pipeline delay as a risk, the risk register does not sufficiently address the risk to schedule and cost impacts. For example, the expected schedule impact for a delay in pipeline construction is listed as less than one day; however, the pipeline construction project is already anticipated to miss target milestones by approximately three months. Cost impacts due to a delay are shown to be less than \$10,000. However, potential costs related to (1) continued operation of Cumberland Fossil Plant, and (2) extension of the EPC contractor's time on-site are not included in the risk register. Adding realistic impacts and mitigations, particularly in light of the current known delays, could better prepare TVA for any schedule and cost impacts.

Recommendation

We recommend the Senior Vice President, Generation Projects and Fleet Services, evaluate the project staffing risks and gas pipeline construction impacts and mitigation strategies, and make changes to the risk register as needed.

TVA Management's Comments – TVA management partially agrees with the finding and concurs that the risk register can be improved, but disagreed that the stated risks were omitted in error or inappropriately weighted. TVA management stated a third-party review had been conducted and additional project staffing had been added, as needed, with 12 additional staff members. Further, TVA management disagreed with statements regarding the pipeline risk and stated the project has adequate float in the schedule to mitigate any risks in this area. See the appendix for TVA management's complete response.

Auditor's Response: – We agree with actions taken to address staffing risks and reviewed documentation provided by TVA management related to the addition of TVA and contract personnel on the project. Regarding the gas pipeline risk, we recognize that the risk register is a living document which can result in additional risks or elimination of risks. Including all relevant risks in the risk register may help plan for risk mitigations if they materialize.

CONTRACTS PRICING STRATEGY AND PROJECT CHANGE REQUEST RISKS

TVA complied with TVA-SPP-34.000 and the *Supply Chain Buyer Guide* by (1) developing RFPs to include the solicitation letter, scope of work, draft contract, and evaluation factors; (2) conducting commercial and technical evaluations using subject matter experts; and (3) negotiating the final contracts. TVA-SPP-34.000 also recommends consideration of different forms of pricing terms (such as fixed price, cost-reimbursable, and time and materials pricing structures), which is the responsibility of the contracting officer. However, based on evidence provided, we were unable to determine whether TVA gave adequate consideration of the

alternative pricing strategies before soliciting fixed price bids from potential OEM and EPC contractors. (During our review, concerns were expressed that the limited headcount in Supply Chain may have impacted the contracting strategy.)

According to the Federal Acquisition Regulation, part 16, a firm fixed price contract is suitable when the risk involved is minimal or can be predicted with an acceptable degree of certainty. In addition, the FAR states firm fixed prices are suitable when the contracting officer can establish fair and reasonable prices such as when there is adequate price competition or when there are reasonable price comparisons with prior purchases of the same or similar supplies or services made on a competitive basis. The CES project is the first-time TVA has used air-cooled condenser technology, purchased all components of the power island equipment through a single OEM contractor, and purchased a heat recovery steam generator from this OEM. As a result, Supply Chain was unable to perform reasonable price comparisons with prior purchases. Also, although TVA received two bids for the planned EPC contracts and three bids for the power island equipment, multiple TVA “firsts” increase the risk of inflated price estimates. According to TVA and based on documentation provided, Supply Chain did not perform detailed testing on any specific cost categories to determine if these were realistic estimates of the probable costs of performance.

An additional risk with fixed pricing could materialize when project change requests are issued. Both the OEM and EPC are required to submit change orders to TVA using a project change request that includes, among other things, the reason for change, cost impact, and impact to major milestones. The cost impact resulting from a change order can be submitted by the contractor based on their actual and allowable costs or as firm fixed price. We reviewed the project change requests issued under both contracts and found that as of February 2024 TVA had already incurred over \$5 million in fixed-price project change requests for the OEM. The project change requests did not include a detailed price breakout; therefore, TVA could not analyze them for reasonableness.

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According to TVA’s *Supply Chain Buyer Guide*, firm fixed price results in the least financial risk of overruns to TVA; however, it also provides an avenue for bidders to inflate costs to cover unforeseen overruns and contingencies.

TVA-SPP-04.000 states that the purpose of supply chain management is to reduce TVA’s cost of supplying power by lowering total costs to TVA. If different forms of pricing strategies are not adequately evaluated for major projects TVA may choose a contract type that leaves TVA vulnerable to incurring inflated costs. As a result, Supply Chain may not be putting TVA in the best position to achieve lowest-cost contracting.

Recommendations

We recommend the Senior Vice President, Generation Projects and Fleet Services, in conjunction with the Vice President, Supply Chain:

- Evaluate alternative contracting strategies for major projects.
- Take steps to determine the reasonableness of fixed prices and project change requests.

TVA Management's Comments – TVA management did not agree with the finding related to contract pricing strategy and project change requests. TVA management stated members of the joint project team held multiple meetings to discuss pricing strategy, and the RFP included a mixed pricing strategy, which incorporated fixed and cost reimbursable components. TVA management stated that a fixed price strategy was decided during the best and final offer phase because the EPC contractor was able to fix their price, likely saving TVA money in the volatile market and allowing the project team to determine that the fixed price provided during the best and final offer was fair. Further, project change requests, when received, are reviewed by the Project Manager and Contracts Manager and include supporting documentation and details such as subcontractor quotes, pricing breakdown of work hours, and material quantities. The team will continue to evaluate contracting strategies on an individual project basis for complexity, risk, and market. See the Appendix for TVA management's complete response.

Auditor's Response – TVA indicated during our evaluation that they did not perform any detailed testing of any specific cost categories or validate any cost savings for the pricing strategy. Project change requests provided did not include details such as subcontractor quotes, pricing breakdown of work hours, or material quantities, leaving TVA unable to evaluate the reasonableness of the project change requests. We agree with TVA's plan to continue to evaluate contracting strategies on an individual project basis for complexity, risk, and market.

July 31, 2024

David P. Wheeler, WT 2C-K

RESPONSE TO REQUEST FOR COMMENTS – DRAFT EVALUATION 2023-17462-TVA'S
CUMBERLAND ENERGY SOLUTION PROJECT

Reference: Request for Comments – Draft Evaluation 2023-17462-TVA's Cumberland Energy
Solution Project Memorandum dated May 23, 2024

Supply Chain and GP&FS (Major Projects) have reviewed the report and provide the following
comments and management decision:

CYBERSECURITY WAS NOT INCLUDED AS A STAKEHOLDER ON THE PROJECT

Supply Chain and Major Projects do not agree with the finding that Cybersecurity was not
included as a stakeholder on the project. Cybersecurity requirements were included in the
contract and all technical specifications. Additionally, during the RFP process, including during
Best and Final Offer phase (BAFO), any questions, exceptions or clarifications, and contract
mark-ups related to cybersecurity were reviewed and resolved through the Cybersecurity team.
Cybersecurity is actively involved in design reviews for engineering documents and drawings and
multiple meetings occur weekly to ensure compliance with specifications and include scope
additions by Cybersecurity for changing requirements. While T&I Cybersecurity members were
engaged in various aspects of the Project, GP&FS, T&I and Supply Chain agree there is an
opportunity to improve how and when to engage T&I Cybersecurity of future projects.

**INADEQUATE RISK MITIGATION RELATED TO THE USE OF EQUIPMENT FROM
NONDESIGNATED COUNTRIES**

Supply Chain and Major Projects partially agree with this finding. Per the OIG report, Supply
Chain did include necessary Contract language to ensure compliance with the Trade Agreement
Act (TAA). As provided to the OIG during the audit, the OEM confirmed, in writing, that the
transformer was TAA compliant with the country of origin being Mexico. Supply Chain requests
that the report be revised to correct this. A review of TVA's foreign procurement process was
conducted in 2023 and resulted in improvements to the tool, and updated training provided to
Supply Chain Contracting Officers. Major Projects, Supply Chain, and Cybersecurity have
initiated routine meetings around the potential risk on projects, and are preparing a joint
mitigation plan for this project and future projects.

CES PROJECTS RISK REGISTER COULD BE IMPROVED

Major Projects partially agrees with this finding. Per PMBOK, the risk register is a living
document and can evolve with project maturity and identification, elimination of risks, leading
indicators, and lessons learned. Major Projects concurs that the risk register can be improved,
however disagrees that the stated risks were omitted in error or inappropriately weighted. In the
course of this project, Major Projects had a 3rd party review of project staffing completed and has
been adding project staffing as needed. To date, 12 staff members have been added.
Additionally, Major Projects disagrees with the statements regarding the gas pipeline risks. The
project has adequate float in schedule to mitigate any risks in this area.

CONTRACTS PRICING STRATEGY AND PROJECT CHANGE REQUEST RISKS

Supply Chain and Major Projects do not agree with this finding. Members of the joint project team

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held multiple meetings to discuss pricing strategy, and as a result of those meetings, the RFP included a mixed pricing strategy that incorporated fixed price and cost reimbursable components. It was not until the BAFO phase that the pricing strategy changed to fixed price as the EPC contractor for this project was able to fix their price without increasing the cost reimbursable components, which has likely saved TVA money in a continued volatile market. This allowed the evaluation team to ensure that the fixed price provided during BAFO was fair. Project change requests, when received, are evaluated by the Project Manager and Contracts Manager. Change requests include supporting documentation and details such as subcontractor quotes, pricing breakdown of work hours, material quantities, etc. The teams will continue to evaluate contracting strategies on an individual project basis for complexity, risk, and market.

CONCLUSION

TVA partially concurs with the OIG's findings and will take action on those the teams are in agreement with to achieve the OIG's recommendations.

We would like to thank Jessica L. Monroe, Lisa H. Hammer and the OIG staff for their professionalism in conducting this audit. If you have further questions please contact Isaac Cudzilo, Principal Contracts Manager.



Laura J. Campbell
Vice President
Supply Chain



Roger Waldrep
Vice President
Major Projects

IJC:MDW
Attachments
cc: See page 3

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cc (Attachment):

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