



Memorandum from the Office of the Inspector General

June 5, 2024

Matthew M. Rasmussen

REQUEST FOR FINAL ACTION – EVALUATION 2023-17464 – TVA NUCLEAR
OBSOLETE EQUIPMENT

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 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 John Anthony H. Jacosalem, Auditor, Evaluations – Operations, at (423) 785-4821 or Lindsay J. Denny, Director, Evaluations – Operations, at (865) 633-7349. We appreciate the courtesy and cooperation received from your staff during the evaluation.

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

JAJ:FAJ

Attachment

cc (Attachment):

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OIG File No. 2023-17464



Office of the Inspector General

Evaluation Report

To the Senior Vice President,
Engineering and Operations
Support

TVA NUCLEAR OBSOLETE EQUIPMENT

Evaluation Team
John Anthony H. Jacosalem
Kenneth H. Sims (Trey)

Evaluation 2023-17464
June 5, 2024

ABBREVIATIONS

ATI	Action Tracking Items
CR	Condition Report
FY	Fiscal Year
NPG	Nuclear Power Group
OVR	Obsolescence Value Ranking
POMS	Proactive Obsolescence Management System
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority
WO	Work Order

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Evaluation 2023-17464 – TVA Nuclear Obsolete Equipment

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

According to a nuclear industry peer organization, ensuring the right spare and replacement items are available when they are needed to support critical plant equipment is essential to minimizing equipment unavailability and optimizing generation. Nuclear Power Group Standard Programs and Processes 09.18.8, *Equipment Obsolescence Program*, defines obsolete equipment as an item in plant service no longer manufactured or otherwise difficult to procure and qualify.ⁱ It establishes methods for (1) identification of obsolete items, (2) prioritization of obsolescence issues, and (3) resolution of obsolescence issues critical to plant reliability.

Based on a previous evaluationⁱⁱ that identified obsolescence issues negatively impacting equipment at the Tennessee Valley Authority's (TVA) nuclear sites, we performed an evaluation of TVA Nuclear obsolete equipment. The objective of this evaluation was to determine if TVA Nuclear was effectively managing obsolete equipment.

What the OIG Found

We determined TVA Nuclear's management of obsolete equipment could be improved. Specifically, we found (1) some obsolescence issues were not being proactively resolved, (2) proactive analytics and vulnerability reviews were not being performed, and (3) there was a lack of ownership and engagement in the obsolescence program. We also identified an opportunity for improvement related to prioritization of obsolescence issues.

What the OIG Recommends

We recommend the Senior Vice President, Engineering and Operations Support, (1) assess unresolved obsolescence issues and determine which items should be addressed, (2) reinforce the importance of performing proactive analytics and vulnerability reviews, (3) take steps to strengthen ownership and engagement of the Equipment Obsolescence Program, and (4) consider revising a prioritization method for ranking obsolescence issues.

ⁱ This refers to a class of plant equipment subject to auditable documentation of procurement, testing, installation, and maintenance to demonstrate that the equipment is capable of performing its safety function in order to avoid common cause failures.

ⁱⁱ Evaluation 2022-17384, *TVA Nuclear Preventive Maintenance*, September 28, 2023.



Evaluation 2023-17464 – TVA Nuclear Obsolete Equipment

EXECUTIVE SUMMARY

TVA Management's Comments

Prior to issuing a formal response, TVA management reviewed the draft report and provided informal comments incorporated into the final report as appropriate. In TVA management's formal response to the draft report, they agreed with three of our four recommendations and provided planned actions to address the recommendations. In addition, TVA indicated they would provide training and a procedure update to achieve alignment on the intended use of the current prioritization method. See the Appendix for TVA management's complete response.

Auditor's Response

We agree with TVA management's response and planned actions to address our recommendations.

BACKGROUND

According to an industry peer organization, ensuring the right spare and replacement items are available when they are needed to support critical plant equipment is essential to minimizing equipment unavailability and optimizing generation. Nuclear Power Group (NPG) Standard Programs and Processes (SPP) 09.18.8, *Equipment Obsolescence Program*, defines obsolete equipment as an item in plant service no longer manufactured or otherwise difficult to procure and qualify.¹ It establishes methods for identification, prioritization, and resolution of obsolescence issues critical to plant reliability.

NPG-SPP-09.18.8 states that although the most common method of identifying obsolete nuclear equipment occurs when procuring the part, this is the least desirable method. Proactive methods to identify obsolescence issues include: (1) notifications from vendors and third-party industry obsolescence databases such as the Proactive Obsolescence Management System (POMS);² (2) performing vulnerability reviews, which are targeted reviews of plant equipment to identify obsolescence issues in advance; and (3) performing Maximo³ analytics to identify pending obsolete⁴ items. System and component engineers also track obsolescence issues in health reports. During Evaluation 2022-17384, *TVA Nuclear Preventive Maintenance*, we found many health reports that identified obsolescence-related issues.

The Tennessee Valley Authority (TVA) prioritizes obsolescence issues in various ways, which include: (1) Obsolescence Value Ranking (OVR) score, (2) Estimated Impact Date, and (3) “Top 5 Obsolescence Issues list.” The OVR score is calculated in the POMS database based on several factors such as criticality, single-point vulnerability, functional classification, and stock level; while the Estimated Impact Date is the date when an obsolescence issue is expected to impact plant operations. NPG-SPP-09.18.8 also establishes an Obsolescence Peer Team, which is required to meet on a monthly basis, and is comprised of TVA Nuclear’s Obsolescence program manager and site obsolescence coordinators from each nuclear plant. The Obsolescence Peer Team is tasked with prioritizing obsolescence issues and discussing action plans. The Peer Team’s “Top 5 Obsolescence Issues list” reflects common fleet issues based on the top obsolescence issues from each nuclear site.

According to the industry peer organization, action plans should be developed for any system, component, or program for which aging or obsolescence concerns

¹ This refers to a class of plant equipment subject to auditable documentation of procurement, testing, installation, and maintenance to demonstrate that the equipment is capable of performing its safety function in order to avoid common cause failures.

² POMS is a suite of tools that have been designed to proactively resolve obsolescence issues for the nuclear industry.

³ Maximo is TVA’s Enterprise Asset Management system that stores and maintains data about assets, facilities, and inventory.

⁴ “Pending Obsolete” is a status which signifies the equipment is currently in stock, but has been identified as obsolete. Once there is zero stock in inventory, the equipment status is changed to “Obsolete.”

have been identified. TVA uses the following methods for resolution of obsolescence issues:

- Action Tracking Items (ATI) are initiated by Supply Chain and assigned to the Procurement Engineering Group when an obsolescence issue is identified in the process of procuring equipment. ATIs provide oversight of actions being taken to address obsolescence issues and track actions to completion.
- Work Order (WO) Restraints are initiated by site personnel and assigned to Engineering for resolution when obsolescence issues that may impact WO completion are identified. Restraints are any issue potentially impacting the successful outcome of a WO.
- Multiple site design solutions developed by the Fleet Central Design Organization, which includes resolution of the “Top 5 Obsolescence Issues list” mentioned above. These solutions are developed for identified obsolescence issues affecting multiple sites.

During a previous evaluation, we identified instances where obsolescence issues were negatively impacting equipment at TVA’s nuclear sites; therefore, we performed an evaluation of TVA Nuclear obsolete equipment.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to determine if TVA Nuclear was effectively managing obsolete equipment. The scope included obsolete equipment at TVA’s three nuclear plants. To achieve our objective, we selected criteria from NPG-SPP-09.18.8, and performed the following:

- Reviewed the Obsolescence Peer Team’s “Top 5 Obsolescence Issues list” to determine how these issues were being addressed.
- Assessed the resolution of obsolescence issues through the following:
 - ATIs Tracked by the Procurement Engineering Group. We judgmentally selected 12 of 63⁵ obsolescence-related ATIs for review. The 12 we selected were based on coverage of TVA’s three nuclear sites (i.e., Browns Ferry, Sequoyah, and Watts Bar), ATI status (e.g., “Open” or “Closed”), and key words “outage” or “forced outage.”
 - WO Restraints Assigned to Engineering. We judgmentally selected 15 of 110⁶ obsolescence-related restraints for review. The 15 we selected were based on coverage of TVA’s three nuclear sites, restraint status (e.g., “Open” or “Closed”), and priority level (e.g., “Urgent,” “Non-essential,” or “Outage”).

⁵ We obtained a list of 63 ATIs from Maximo using parameters provided by TVA Nuclear personnel and initiated between July 1, 2022, through June 30, 2023.

⁶ We obtained a list of 110 Restraints from Maximo using parameters provided by TVA Nuclear personnel and reported between July 1, 2022, through June 30, 2023.

- Design Solutions for Multiple Site Issues Developed by the Fleet Central Design Organization. We reviewed the “Top 5 Obsolescence Issues list.”
- Requested documentation of Maximo analytics and vulnerability reviews to determine if obsolescence issues were being proactively identified.
- Reviewed Obsolescence Peer Team meeting minutes for calendar years 2020 through 2023 to determine if obsolescence issues were being prioritized and action plans were being developed.
- Reviewed the (1) OVR score and (2) Estimated Impact date prioritization methods to assess the ranking of obsolescence issues.

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 TVA Nuclear’s management of obsolete equipment could be improved. Specifically, we found (1) some obsolescence issues were not being proactively resolved, (2) proactive analytics and vulnerability reviews were not being performed, and (3) there was a lack of ownership and engagement in the obsolescence program. We also identified an opportunity for improvement related to the prioritization of obsolescence issues.

SOME OBSOLESCENCE ISSUES WERE NOT BEING RESOLVED

NPG-SPP-09.18.8 states a “Top 5 Obsolescence Issues list” will be maintained for the fleet. This list reflects common fleet issues based on the top obsolescence issues from each nuclear site. The program states that “the fleet list will be approved through meetings with site and corporate stakeholders in order to maximize engineering resources to provide long term solutions.” We reviewed the “Top 5 Obsolescence Issues list” to determine how these items were being addressed and found they were not being proactively addressed. Specifically, an Obsolescence Peer Team member indicated the list has remained unchanged and unaddressed for at least 2 years due to a hold on capital funding that supported efforts to resolve obsolescence issues. However, TVA Nuclear management indicated they expect to obtain funding to begin addressing the “Top 5 Obsolescence Issues list” beginning in fiscal year (FY) 2025.

ATIs and WO Restraints are two additional methods included in NPG-SPP-09.18.8 for tracking resolution of obsolescence issues. Our review of a sample of 12 ATIs and 15 WO Restraints found that 3 of each had not been resolved.

- Three of the twelve ATIs we reviewed had not been resolved. The 3 unresolved ATIs were related to restocking inventory of obsolete parts currently not needed for upcoming scheduled work. Personnel involved with

all 3 ATIs indicated the obsolescence issue would likely not be resolved until the parts were needed.

- Three of the fifteen WO Restraints we reviewed had not been resolved. Personnel involved with these restraints indicated:
 - Two are currently being addressed; however, the projected resolution date is unknown.
 - One is not currently being addressed due to the obsolete part not being needed for upcoming scheduled work.

Personnel involved with the resolution process indicated reasons for not actively addressing obsolescence issues include: (1) limited funding or resources, (2) resolution of the obsolescence issue being a lower priority compared to other work, and/or (3) the obsolete equipment not currently being needed to complete work in the near future. During our evaluation, personnel also indicated some obsolescence issues remain unaddressed for such an extended length of time that the potential resolution developed becomes obsolete before it has been implemented.

PROACTIVE ANALYTICS AND VULNERABILITY REVIEWS WERE NOT BEING PERFORMED

NPG-SPP-09.18.8 includes multiple proactive methods for identifying obsolescence issues at TVA Nuclear sites. One method is to perform proactive analytics to identify pending obsolete items in Maximo that do not already have a solution identified. Another method is vulnerability reviews, which consists of targeted reviews of plant equipment to identify obsolescence issues in advance of discovery through equipment failure or through the Supply Chain process. The program states advantages of a proactive approach to identification of obsolescence issues include comprehensive scoping, avoidance of redundant or short-term solutions, and accuracy in replacement cost estimates. According to the Obsolescence Program manager, these proactive analytics and vulnerability reviews were intended to be performed by each site and provided to the Obsolescence Peer Team. However, our discussion with the Obsolescence Peer Team members indicated these were not being performed or provided to the Peer Team.

LACK OF OWNERSHIP AND ENGAGEMENT OF THE OBSOLESCENCE PROGRAM

In 2019, an internal benchmarking study was performed with the purpose of identifying best practices in obsolescence programs to close gaps within TVA. The study stated that ownership was not well defined and concluded there were gaps preventing a common fleet approach to resolving known obsolescence issues. A condition report (CR)⁷ initiated to address these gaps indicated (1) additional resources were needed to address obsolescence issues, and (2) roles involved in addressing obsolescence issues were not well defined. In 2023, a time study within TVA Nuclear was performed with the purpose of making behavioral, process, and organizational structure adjustments for site and fleet engineering to achieve sustained excellence. As part of the study, a Lean Six Sigma analysis of the obsolescence process was performed. The study stated that “the process roles and responsibilities regarding the Obsolescence Program are not agreed upon by all parties and analysis is needed to determine the best owner for each portion of the process.” Throughout our evaluation, several TVA Nuclear personnel indicated there was still a lack of ownership over the obsolescence program.

We also reviewed several CRs initiated due to a lack of site engagement. The Procurement Engineering Group was assigned to develop actions to highlight the importance of active participation in the Peer Team. However, TVA Nuclear management acknowledged that they still needed to take steps to strengthen ownership and engagement of the obsolescence program.

OPPORTUNITY FOR IMPROVEMENT IN THE PRIORITIZATION OF OBSOLESCENCE ISSUES

NPG-SPP-09.18.8 states the POMS database uses the OVR score to identify obsolete equipment that will have the most impact on the plant based on equipment classification data, previous and future demand, and current stocking levels. This score is used to determine an automated priority ranking of obsolescence issues in POMS, and displays these items by numeric rank. The OVR score is also used to compile the “Top 5 Obsolescence Issues list.” However, Obsolescence Peer Team members indicated the OVR score is not meeting its intended purpose. One member indicated he does not utilize the OVR score, while two other members indicated that the OVR score is irrelevant if the obsolete equipment is not currently needed. Additionally, all three members indicated the OVR score (1) is more focused on individual components, as opposed to whole systems and (2) is not meeting its intended purpose of proactively ranking obsolescence issues that need to be resolved. All three members indicated they view the Estimated Impact Date as currently dictating prioritization of addressing obsolescence issues.

⁷ CRs are used at TVA’s nuclear plants to document the condition, evaluation, and resolution of identified issues.

As referenced above, NPG-SPP-09.18.8 states proactive methods of identification of obsolete equipment is the most desirable because response occurs before the part is needed. Additionally, an industry peer organization states that (1) trending should be performed on a periodic basis to allow proactive identification of new or potential trends, and (2) prioritization should include consideration of obsolescence issues that have not been addressed. However, as described throughout our report, some proactive elements of TVA's current management of obsolete nuclear equipment could be improved. Increased proactive resolution of obsolescence issues can reduce the risk of obsolete equipment not being available when needed, which could negatively impact TVA Nuclear's plant production and cost.

RECOMMENDATIONS

We recommend the Senior Vice President, Engineering and Operations Support:

- Assess unresolved obsolescence issues and determine which items should be addressed.

TVA Management's Comments – TVA management agreed with the recommendation and plans to (1) finalize funding for FY 2025 to address top obsolescence items and are in the process of securing funding for FY 2026 and FY 2027 and (2) update NPG-SPP-09.18.8, *Equipment Obsolescence Program*. See the Appendix for TVA management's complete response.

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

- Reinforce the importance of performing proactive Maximo analytics and vulnerability reviews.

TVA Management's Comments – TVA management agreed with the recommendation and plans to conduct training with the Obsolescence Peer Team, key stakeholders, and others as required. See the Appendix for TVA management's complete response.

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

- Take steps to strengthen ownership and engagement of the Equipment Obsolescence Program.

TVA Management's Comments – TVA management agreed with the recommendation and stated the following actions will be taken: (1) revision of the Obsolescence Peer Team meeting agenda to include regular discussion of roles and responsibilities and use of prioritization tools to drive engagement; (2) increasing ownership through the Peer Team collectively developing actions, assigning owners, and documenting impacts to the fleet; and (3) providing project updates in Peer Team meetings to share progress on proactive obsolescence activities/actions. See the Appendix for TVA management's complete response.

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

- Consider revising the OVR score to meet its intended purpose of proactively ranking obsolescence issues.

TVA Management's Comments – TVA management indicated they would provide training and a procedure update to achieve alignment on the intended use of the OVR score instead of revising the scoring. See the Appendix for TVA management's complete response.

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



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

May 29, 2024

David P. Wheeler

RESPONSE TO REQUEST FOR COMMENTS – DRAFT EVALUATION 2023-17464 – TVA
NUCLEAR OBSOLETE EQUIPMENT – DATED APRIL 29, 2024

Tennessee Valley Authority (TVA) Nuclear Power appreciates the TVA Office of Inspector General's (OIG) review of the Nuclear Obsolete Equipment (Obsolescence Program). We value the OIG team's insights as it provides us with an opportunity to further strengthen and improve our program to address obsolescence issues across the fleet which further increases plant reliability.

TVA management has reviewed the OIG Evaluation Report Dated April 29, 2024. The response to your recommendations is as follows:

Recommendation 1: Assess unresolved obsolescence issues and determine which items should be addressed.

Response: TVA Nuclear agrees with this recommendation and has taken action through the creation of a gap statement as documented in Condition Report (CR) 1930953. The gap documents findings from this OIG report as drivers and lays out actions that will be tracked with the CR. Actions that address additional OIG recommendations are discussed further in this response.

Fleet Design Engineering and Projects are finalizing funding for FY25 to address top obsolescence items and are in the process of securing funding for FY26 and FY27 to address new priorities as determined by the Obsolescence Peer Team. Peer Team members will update Site Top 10 lists and participate in updating the Fleet Top 5 list to drive priorities to optimize use of this funding.

The governing procedure (NPG-SPP-09.18.8, Equipment Obsolescence Program) will be updated to outline use of latest analytic tools, recommended use of Obsolescence Value Ranking (OVR) scores, SharePoint locations, and requirements for documentation of meeting minutes.

Recommendation 2: Reinforce the importance of performing proactive Maximo analytics and vulnerability reviews.

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Response: TVA Nuclear agrees with this recommendation and will be taking the following training actions as driven by the established gap statement. Training will be conducted with the Peer Team, key stakeholders and others as required or as noted below.

- Conduct Proactive Obsolescence Management System (POMS) Training session(s) to ensure understanding of key capabilities and reporting features in identifying and prioritizing Obsolescence issues.
- Train Peer Team and affected engineers to effectively use PowerBI Analytics for obsolescence reporting.
- Conduct In-person training sessions with engineers at each site to demonstrate how to use PowerBI reporting to identify obsolescence concerns and how to document/communicate with the Peer Team.
- Demonstrate effective use of Nuclear Utility Obsolescence Group (NUOG) Project Center to share obsolescence challenges with nuclear utilities and key suppliers.

Recommendation 3: Take steps to strengthen ownership and engagement of the Equipment Obsolescence Program.

Response: TVA Nuclear agrees with this recommendation and will be taking the following actions:

- Peer Team meeting agenda will be revised to include regular discussion of Roles and Responsibilities and use of prioritization tools to drive engagement.
- To increase ownership, the Peer Team will collectively develop actions, assign owners and document impact(s) to the fleet.
- Project Updates will be provided in Peer Team meetings to share progress on Proactive Obsolescence activities/actions.

Recommendation 4: Consider revising the OVR score to meet its intended purpose of proactively ranking obsolescence issues.

Response: TVA Nuclear recognizes interviewed employees' understanding of the OVR score and its use was not consistent. With training and procedure update as documented above, use of OVR will be aligned. Peer Team members will regularly discuss effective use of OVR scores as one of the available tools in ranking items and establishing priorities as the scores are intended to drive discussions among peer team members based on objective criteria related to risk and impact to the plant.

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If you have any questions or need additional information, please contact Matt Kirschenheiter at (423) 751-3284 or by email mjkirschenheiter@tva.gov.

Sincerely,



Matthew M. Rasmussen
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