



Memorandum from the Office of the Inspector General

June 24, 2025

Thomas W. Barnett

**REQUEST FOR FINAL ACTION – EVALUATION 2024-17507 – TVA DAM
MAINTENANCE AND INSPECTIONS**

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 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)

DDS:FAJ

Attachment

cc (Attachment):

TVA Board of Directors

Allen A. Clare

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OIG File No. 2024-17507



Office of the Inspector General

Evaluation Report

To the Vice
President, River
Operations

TVA DAM MAINTENANCE AND INSPECTIONS

Evaluation Team
Deana D. Scoggins
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Evaluation 2024-17507
June 24, 2025

ABBREVIATIONS

FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FY	Fiscal Year
O&M	Operations and Maintenance
OM&IM	Operations, Maintenance, and Inspection Manual
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority

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MEMORANDUM FROM TOM BARNETT TO DAVID P. WHEELER
DATED JUNE 13, 2025



Evaluation 2024-17507 – TVA Dam Maintenance and Inspections

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

The Tennessee Valley Authority (TVA) has developed a dam safety program to protect lives and property by ensuring that structures within the program are designed, constructed, and maintained as safely and reliably as practicable. This program applies to dams, dikes, impoundments, levees, water barrier components, pumping stations, and other appurtenant structures that are included in TVA's Dam Safety Program inventory.ⁱ As of September 9, 2024, this inventory included 106 structures.

TVA is a self-regulating entity in regard to dam safety; however, the program requirements are based, as appropriate, on the Federal Emergency Management Agency's *Federal Guidelines for Dam Safety*, and the Federal Energy Regulatory Commission's *Engineering Guidelines for the Evaluation of Hydropower Projects*. TVA has developed Standard Programs and Processes for both maintenance and inspection of dams. Due to the importance of maintenance and inspections to the reliable operation of assets, we performed an evaluation of TVA dams to determine if maintenance and inspections had been performed in accordance with established schedules.

What the OIG Found

TVA has generally performed maintenance but has not performed all inspections in accordance with established schedules for TVA dams. We identified 43 inspections that were between 1 and 99 months late and 33 that were not performed. We also determined that TVA had not taken actions to address 34 recommendations from inspections completed in fiscal years 2022 through 2024 or the most recent risk assessments. Additionally, we identified some areas where governance could be improved related to inaccuracies in inspection manuals and inspections.

What the OIG Recommends

We made seven recommendations to the Vice President, River Operations, related to (1) completing inspections in accordance with established schedules, (2) addressing recommendations from inspections or risk assessments, and (3) improving governance.

ⁱ TVA's Dam Safety Program inventory does not include coal combustion residual facilities.



Evaluation 2024-17507 – TVA Dam Maintenance and Inspections

EXECUTIVE SUMMARY

TVA Management's Comments

Prior to issuing a formal response, TVA management reviewed the draft report and provided informal comments that have been incorporated into the final report as appropriate. In TVA management's formal response to the draft report, they agreed with our recommendations and provided actions taken or planned to address the recommendations. See the Appendix for TVA management's complete response.

Auditor's Response

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

BACKGROUND

The Tennessee Valley Authority (TVA) has developed a dam safety program to protect lives and property by ensuring that structures within the program are designed, constructed, and maintained as safely and reliably as practicable. This program applies to dams, dikes, impoundments, levees, water barrier components, pumping stations and other appurtenant structures that are included in TVA's Dam Safety Program inventory.¹ As of September 9, 2024, this inventory included 106 structures. Dam Safety had an annual base operations and maintenance (O&M) budget of \$4.3 million, a strategic O&M budget of \$7.3 million, and a routine O&M budget of \$11.8 million for fiscal year (FY) 2024.²

TVA is a self-regulating entity in regard to dam safety; however, the program requirements are based, as appropriate, on the Federal Emergency Management Agency's (FEMA), *Federal Guidelines for Dam Safety*, and the Federal Energy Regulatory Commission's (FERC) *Engineering Guidelines for the Evaluation of Hydropower Projects*. FEMA defines three dam hazard potential classifications based on probable loss of human life and the impacts on economic, environmental, and lifeline interests:

- Low hazard potential are dams where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses.
- Significant hazard potential are dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.
- High hazard potential are dams where failure or misoperation will probably cause loss of human life. For each significant and high hazard dam, TVA requires a risk assessment every 10 years.

TVA has assigned a classification to each of its 106 structures that includes 81 high hazard, 7 significant hazard, and 18 low hazard.

TVA Standard Programs and Processes (SPP) 27.003, *Operation and Maintenance of Dams*, requires that maintenance and repair items for all significant and high hazard potential dams be assigned a priority level of 1 through 8 that determines the time frame for completion of work. See Table 1 on the following page.

¹ TVA's Dam Safety Program inventory does not include coal combustion residual facilities.

² Strategic O&M costs are tied to strategic capital projects that are authorized by the TVA Board of Directors, the Chief Executive Officer, or by a Chief Executive Officer direct report in concurrence with the Chief Financial Officer. Routine O&M includes costs associated with day-to-day ongoing operations or maintenance.

Dam Safety Priorities for Implementing Maintenance/Repair Activities	
Priority	Time Frame for Completion
1	Urgent - correct immediately
2	Complete within 1 week of inspection
3	Complete within 1 month (30 days) of inspection
4	Complete within 6 months of original entry date
5	Complete within 1 year of original entry date
6	Complete or re-evaluate within 3 years of original entry date
7	Complete or re-evaluate within 5 years of original entry date
8	Complete or re-evaluate during next scheduled outage

Table 1

TVA-SPP-27.004, *Inspection of Dams*, governs the inspection of all dams within the scope of the Dam Safety Program. The purpose of the inspection program is to verify the structural integrity and functionality of the dam and appurtenant structures. TVA-SPP-27.004 requires inspection plans that include informal, intermediate, and formal inspection requirements. Additionally, TVA requires special inspections be performed after unusually large floods, significant earthquakes, sabotage, or other unusual events. TVA has developed operation, maintenance, and inspection manuals (OM&IMs) that include required inspections. These manuals also address other items applicable to the structure, such as maintenance inspections and inspections for specific structures and components. See Table 2 on the following page for a description of inspection frequency and requirements.

Dam Inspection Frequency and Requirements		
Type	Frequency for High/Significant Hazard	Inspection Requirements
Civil Class A Inspection	5 Years	These thorough inspections are performed by a team of trained qualified engineers for Dam Safety assets where failure could result in loss of life, destruction of permanent structures, and/or severe environmental problems.
Civil Intermediate Inspection	15 Months	Intermediate inspections shall include a thorough field inspection of the dam and appurtenant structures and a review of the records of inspections following the last formal inspection. Intermediate inspections shall be conducted by technically qualified engineers, experienced in the operation and maintenance of dams, and trained to recognize abnormal conditions.
Class B and C Maintenance Inspections	2.5 - 5 Years	Maintenance inspections are conducted to ensure the continued reliability of the mechanical and electrical structures and equipment related to dam safety, that no unauthorized modifications have been made to the structure and equipment, and that the structures and equipment are being operated safely and in accordance with its design. Maintenance inspections are typically performed by an engineer.
Class A and B Informal Inspections	Weekly/Monthly	The purpose of informal inspections is to maintain surveillance, as far as practicable, of the dam. Personnel tasked with informal inspection duties are to make frequent observations of the dam and appurtenances and of operation and maintenance. Informal inspections may be performed by operation and maintenance personnel not formally educated in the field of engineering or geology.
Structure and Component Inspections	1 - 10 Years	Civil and mechanical/electrical inspections that are conducted to observe structures or equipment that may affect dam safety.

Table 2

Due to the importance of maintenance and inspections to the reliable operation of assets, we performed an evaluation of TVA dams' maintenance and inspections.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of our evaluation was to determine if maintenance and inspections have been performed in accordance with established schedules for TVA dams. The scope of our evaluation included maintenance and inspections for FYs 2022 through 2024. To achieve our objective, we:

- Compared TVA SPPs to FEMA's *Federal Guidelines for Dam Safety*³ to determine if there is alignment related to inspections and maintenance, including:
 - TVA-SPP-27.003, *Operation and Maintenance of Dams*
 - TVA-SPP-27.004, *Inspection of Dams*
- Selected a sample of 10 of TVA's 88 significant and high hazard dams⁴ to:
 - Determine if inspections were completed as required.
 - Determine if issues identified during inspections were addressed.
 - Determine if issues identified in the most recent risk assessments related to inspections or maintenance were addressed.⁵
 - Conduct interviews with site employees to identify concerns with the inspection process or maintenance.
- Reviewed feedback from the Independent Review Board⁶ to determine if their guidance and recommendations were addressed.
- Identified priority 1 through 5 work orders to determine if they were completed timely and, if not, why actions were late.

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

TVA has generally performed maintenance but has not performed all inspections in accordance with established schedules for TVA dams. We also determined that TVA had not always taken actions to address recommendations from

³ We did not review alignment with FERC guidelines because they focus on how inspections are conducted.

⁴ We judgmentally selected Blue Ridge, Chatuge, Cherokee, John Sevier, and Nolichucky based on their level of risk in TVA's enterprise risk portfolio and/or flooding in 2024. The remaining five dams were selected using a random number generator. Those dams are Clear Creek, Douglas, Nickajack, Tims Ford, and Watts Bar.

⁵ We reviewed risk assessments for nine of the ten sampled dams because one dam is scheduled for a risk assessment in 2025.

⁶ The Independent Review Board is made up of contractors with expertise in subject matters, including, but not limited to, engineering geology, geotechnical engineering, hydrotechnical engineering, structural engineering, and construction engineering. The board provides independent advisory services and was established to help identify risks, evaluate major projects, initiative, activities, and provide guidance and recommendations with respect to dam safety.

inspections or risk assessments. Additionally, we identified some areas where governance could be improved.

TVA PERFORMED MAINTENANCE AS REQUIRED

TVA has generally performed maintenance according to established schedules. We reviewed 415 corrective maintenance work orders coded as dam safety and identified two that were late based on dam safety priority codes. For one, the work was closed late but completed in the required time frame. The other required completion within 1 year but was closed 56 days past the due date.

TVA DID NOT PERFORM ALL INSPECTIONS AS REQUIRED

TVA-SPP-27.004, *Inspection of Dams*, governs the inspection of all dams within the scope of the Dam Safety Program. These inspections are performed to verify the structural integrity and functionality of the dams. The OM&IM for each dam documents the required inspections and frequency that are to be performed. We reviewed the required inspections for the ten dams included in our sample and found TVA did not perform all inspections in accordance with established schedules. Table 3 below lists the inspections that were late or not performed.

Type	Number Required	Late	Not Performed
Class A Civil	6	1	0
Class A Intermediate	26	1	0
Class B and C Maintenance	25	14	8
Specific Structures or Components	83	27	25
Total	140	43	33

Table 3

As shown in Table 4, late inspections ranged from 1 to 99 months past due.

Months Late	Number of Inspections
1 - 6	9
7 - 12	8
13 - 24	19
25 - 99	7

Table 4

For inspections not performed, six were due between FYs 2009 and 2019, and 25 were due between FYs 2020 and 2024, and we were unable to locate any inspection reports for two.⁷ In addition, we were unable to determine if informal inspections were completed as required because of inconsistencies in the completion date between documentation.

⁷ We included inspections that were originally due prior to our scope because we considered required inspections that were not performed to be due each year until performed.

Recommendations – We recommend the Vice President, River Operations:

- Develop a plan to prioritize and complete overdue inspections.
- Emphasize the importance of recording the correct completion date for informal inspections.

TVA Management's Comments – TVA management agreed with the recommendations and provided planned actions to (1) develop a technical instruction that will address overdue inspections and (2) provide training and detailed instructions to ensure that actual inspection dates are recorded. See the Appendix for TVA management's complete response.

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

TVA HAD NOT ALWAYS ADDRESSED RECOMMENDATIONS

TVA had not always addressed recommendations from risk assessments or inspections. For the 10 dams selected in our sample, there were 205 recommendations made (40 from risk assessments and 165 from inspections). Of the 40 recommendations made in risk assessments, TVA had not taken actions to address 16 recommendations. We also found TVA had not taken actions for 18 of 165 recommendations made in inspection reports. Of the 34 recommendations with no actions taken, 11 were administrative in nature, 9 related to inspections, and 14 required a repair or additional evaluation. Two of the thirty-four recommendations were listed as safety concerns. One is listed as a public safety concern because of potential risk to boaters and fishermen and has been open since October 2022. The other is listed as a safety concern because of possible falling objects and has been open since September 2024.

According to TVA personnel, they have added or plan to add 22 of the 34 recommendations to an engineering task list to be addressed. However, this does not ensure the recommendations will be addressed timely. Dam Safety has described the engineering task list as low priority and noted that items on the list can be open for many years. The engineering task list we were provided in December 2024 contained over 800 open items with the oldest dated 2004.

In addition, we identified actions to address two recommendations made at the wrong dam. An inspection report for the Chatuge Dam identified that a spillway car needed an oil change and deteriorated grating on the spillway operating deck. However, we found the work to address the issues was inadvertently performed at the Nottely Dam. The estimated cost to complete the work was \$13,000. TVA has created a work order to address the oil change and will include the grating on the next inspection report to be issued in May 2025.

Recommendations – We recommend the Vice President, River Operations:

- Evaluate the open recommendations and determine a priority and schedule for completion.

- Evaluate the engineering task list and determine if open items should be closed, addressed, or left on the list.

TVA Management's Comments – TVA management agreed with the recommendations and provided planned actions to (1) use updated existing processes to evaluate open recommendations, and (2) improve the prioritization system for the engineering task list to aid in determining if open items should be closed, addressed, or left on the list. See the Appendix for TVA management's complete response.

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

INSPECTION GOVERNANCE COULD BE IMPROVED

We identified some areas where governance of inspections could be improved, including inaccuracies in OM&IMs and insufficient review of inspection reports.

Inaccuracies in OM&IMs

We identified some inaccuracies in OM&IMs, as follows:

- Twelve required inspections were not included.
- Twelve inspections were included but should not have been.
- Thirty-nine inspections were misclassified as the wrong type, which could lead to insufficient inspections or inspections not being performed.

In addition, three types of inspections included in some OM&IMs did not have a defined frequency to be performed.

Insufficient Review of Inspection Reports

TVA is conducting supplemental inspections as part of interim risk reduction measures at some dams. These include weekly inspections conducted by site personnel that are reviewed by Dam Safety personnel. However, documentation indicated Dam Safety personnel had not reviewed 42 of 157 weekly inspections for one dam. In addition, some required items were not inspected during supplemental monthly engineering inspections. If inspections are incomplete and not reviewed by proper personnel, the interim risk reduction measure could be ineffective.

Recommendations – We recommend the Vice President, River Operations:

- Revise OM&IMs to include an accurate listing of required inspections for all dams.
- Add required frequency for all inspections.
- Emphasize the importance of reviewing required weekly inspections and inspecting all monthly checklist items for supplemental inspections.

TVA Management's Comments – TVA management agreed with the recommendations and provided planned actions to develop a master inspection list that includes frequency and classification. Additionally, TVA provided training and instruction to personnel on accessing inspection reports and proper observation and documentation of all monthly checklist items. See the Appendix for TVA management's complete response.

Auditor's Response – We concur with TVA management's taken and planned actions and will verify completion prior to closing the recommendations.

June 13, 2025

David P. Wheeler

**RIVER OPERATIONS' RESPONSE TO 30-DAY REQUEST FOR COMMENTS – DRAFT
EVALUATION 2024-17507 – TVA DAM MAINTENANCE AND INSPECTIONS**

Tennessee Valley Authority (TVA) River Operations would like to thank Deana Scoggins, Senior Auditor, for evaluating maintenance and inspections at TVA river system dams. Maintaining and inspecting dams and their appurtenant structures are fundamental components of the River Operations dam safety program, and these activities are essential for ensuring safe and reliable operation of assets within the program. We appreciate the TVA Office of the Inspector General (OIG) team's insights in their report as it provides us with an opportunity to further strengthen our dam safety processes and procedures.

As there were no findings from the maintenance assessment, the follow up responses below are in response to the findings from the inspection program assessment.

As requested in the OIG memorandum dated May 14, 2025, River Operations has reviewed your draft evaluation and provides the following response:

Recommendations

You recommended the Vice President, River Operations (RO), take steps to:

- **Develop a plan to prioritize and complete overdue inspections.**

Response

River Operations agrees with this recommendation. River Operations has a robust inspection program with 658 engineering inspections having been completed in FY22 through FY24. As can be seen in the Table 3 of the OIG's draft report, TVA prioritizes Class A Civil Formal and Intermediate inspections to be scheduled and completed on-time. Historically, Class B, Class C, and Specific Structures or Component Inspections have been difficult to schedule as most of these inspections require hydro generation unit outages and/or funding for external services to complete the work. Dam Safety has enacted a new work management process in FY25 that links inspection work orders to existing outage work orders. The new process creates scheduling efficiency, and it allows outage managers to include the inspection scopes in the outage plans.

To address this recommendation, a technical instruction is being developed that details the planning and prioritization of dam safety inspections, including an appropriate focus on addressing overdue inspections. As the technical instruction is applied to the current overdue inspection list, elements such as improved coordination of scheduled outages will allow Dam Safety to complete inspections that were missed in previous workflows.

Additionally, completing overdue inspections will require greater funding, and Dam Safety has allocated more of its base project O&M funding to inspections beginning in FY26.

- **Emphasize the importance of recording the correct completion date for informal inspections.**

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Response

River Operations agrees with this recommendation. River Operations has tracked completion of informal inspections as a monthly metric since FY18 and the completion rate to date is 98.4%. Metric evaluation has been a manual process with work order closure reviewed for each dam manually by Dam Safety staff, but an automated metric calculation is currently being developed. Inspectors and coordinators will be provided with training and detailed instructions to ensure that actual inspection completion dates are recorded.

- Evaluate the open recommendations and determine a priority and schedule for completion.

Response

River Operations agrees with this recommendation. River Operations has updated its processes to require that every inspection or risk assessment recommendation is either added to the engineering task list (ETL), entered as work order, or entered as a project, and projects and work orders are prioritized as part of these processes. Consistent use of existing procedures and processes will be emphasized as open recommendations are evaluated.

- Evaluate the engineering task list and determine if open items should be closed, addressed, or left on the list.

Response

River Operations agrees with this recommendation. River Operations uses risk-informed decision making in the dam safety program to ensure that recommended actions having the potential to significantly reduce risk of dam failure are prioritized, funded and tracked to completion through TVA's projects process. Recommended actions with lower priority assignments are entered into the ETL where they can be reviewed and reconsidered for inclusion in future projects or work orders. An improved categorization/prioritization system in the ETL is being developed to aid in determining if open items should be closed, addressed, or left on the list.

- Revise OM&IMs to include an accurate listing of required inspections for all dams.

Response

River Operations agrees with this recommendation. To address this recommendation, a master inspection list will be developed that includes each inspection and its associated inspection frequency and classification. An inspection summary sheet will be developed for every facility.

- Add required frequency for all inspections.

Response

River Operations agrees with this recommendation. To address this recommendation, the frequency for each inspection will be included in the inspection summaries described in the previous response.

- Emphasize the importance of reviewing the required weekly inspections and inspecting all monthly checklist items for supplemental inspections.

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Response

River Operations agrees with this recommendation. Dam Safety personnel conduct monthly inspections as part of interim risk reduction measures, but they were initially unable to access and review some written reports from the weekly inspections conducted by site personnel. Two items were initially missing from or mislabeled on the supplemental inspection checklists, and the OIG evaluation report identified these items as having not been inspected. The uncertainty in the inspection checklist related to these two items has been resolved, and all checklist items are now included in the inspections. To address the OIG recommendation, River Operations has provided training and instruction to Dam Safety personnel on accessing inspection reports and on proper observation and documentation of all monthly inspection checklist items.

Thank you for allowing me the opportunity to provide this response. Please contact me with any questions.



Tom Barnett
Vice President
Generation, River Operations

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