



Memorandum from the Office of the Inspector General

September 26, 2023

Aaron P. Melda

REQUEST FOR FINAL ACTION – AUDIT 2023-17405 – LOAD NOT SERVED WINNING PERFORMANCE MEASURE

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

If you have any questions or wish to discuss our findings, please contact Stephanie L. Simmons, Senior Auditor, at (423) 785-4820 or Rick C. Underwood, Director, Financial and Operational Audits, at (423) 785-4824. We appreciate the courtesy and cooperation received from your staff during the audit.

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

SLS:FAJ

Attachment

cc (Attachment):

TVA Board of Directors
Mary C. Corbitt
Samuel P. Delk
Buddy Eller
David B. Fountain
James Patrick Hall
Jeffrey J. Lyash
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Ronald R. Sanders II
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OIG File No. 2023-17405



Office of the Inspector General

Audit Report

To the Senior Vice President,
Transmission and Power
Supply

LOAD NOT SERVED WINNING PERFORMANCE MEASURE

Audit Team

Stephanie L. Simmons
Jennifer R. Bogus
Morgan A. Venturella

Audit 2023-17405
September 26, 2023

ABBREVIATIONS

FY	Fiscal Year
LNS	Load Not Served
NIST	National Institute of Standards and Technology
SIR	Service Interruption Report
TRANS-SPP	Transmission Standard Programs and Processes
TSC	Transmission Service Center
TVA	Tennessee Valley Authority
WP	Winning Performance

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 TO DAVID P. WHEELER



Audit 2023-17405 – Load Not Served Winning Performance Measure

EXECUTIVE SUMMARY

Why the OIG Did This Audit

For most Tennessee Valley Authority (TVA) employees, annual compensation consists of two components: base pay (salary) and pay at risk (Winning Performance [WP]). WP is a performance management program designed to promote teamwork, encourage high performance behaviors, and motivate and reward TVA employees for achieving goals aligned with TVA's mission and values.

We included an audit of TVA's Load Not Served (LNS) WP measure in our annual audit plan because LNS was the second highest weighted measure in the fiscal year (FY) 2022 WP scorecard. LNS, which is an estimate of the megawatt hours not delivered when an interruption to a customer connection point is greater than or equal to 1 minute, was weighted at 30 percent at the target level on the WP scorecard for FY 2022. TVA's total payout for WP for FY 2022 was \$147.8 million, based on a total payout percentage of 119 percent of target. The LNS goal was paid at the threshold level for FY 2022 (50 percent of target) and accounted for about \$18.6 million of the total \$147.8 million payout.

Our audit objective was to determine if adequate internal controls were in place to ensure accurate calculation and reporting of the LNS WP measure. Our audit scope included the LNS totals reported for WP in FY 2022 and the calculations' compliance with Transmission Standard Programs and Processes (TRANS-SPP) 10.001, Rev. 5, *Service Interruption Database Guidelines*. Our scope did not include an assessment of the reasonableness of any exclusions allowed by TRANS-SPP-10.001.

What the OIG Found

We determined the significant internal controls we identified for accurate LNS calculations were operating effectively. However, there were not adequate controls in place to ensure proper management approval of LNS exclusions. Additionally, we found some user access permissions were not appropriate.

What the OIG Recommends

We made two recommendations to TVA's Senior Vice President, Transmission and Power Supply, to (1) strengthen controls around LNS exclusions by requiring management approvals of all LNS exclusions and (2) implement a periodic review process of user access permissions.



Audit 2023-17405 – Load Not Served Winning Performance Measure

EXECUTIVE SUMMARY

TVA Management Comments

Prior to issuing a formal response, TVA personnel 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 provided actions they plan to take to address our recommendations. See Appendix B for TVA management's complete response.

Auditor's Response

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

BACKGROUND

For most Tennessee Valley Authority (TVA) employees, annual compensation consists of two components: base pay (salary) and pay at risk (Winning Performance [WP]). WP is a performance management program designed to promote teamwork, encourage high performance behaviors, and motivate and reward TVA employees for achieving goals aligned with TVA's mission and values. The WP Team Incentive Plan uses a scorecard to identify and communicate incentive program structure and status, connecting business unit and enterprise goals to all employees. Each scorecard measure is weighted differently and has annual "threshold," "target," and "stretch" goals. Load Not Served (LNS) has been one of TVA's incentive measures on the WP scorecard for multiple years and continues to be included for fiscal year (FY) 2023. LNS, which is an estimate of the megawatt hours not delivered when an interruption to a customer connection point is greater than or equal to 1 minute, was weighted at 30 percent at the target level on the WP scorecard for FY 2022. TVA's total payout for WP for FY 2022 was \$147.8 million, based on a total payout percentage of 119 percent of target. The LNS goal was paid at the threshold level for FY 2022 (50 percent of target) and accounted for about \$18.6 million of the total \$147.8 million payout. We included an audit of TVA's LNS WP measure in our annual audit plan because LNS was the second highest weighted measure in the FY 2022 WP scorecard.

Transmission Standard Programs and Processes (TRANS-SPP) 10.001, Rev. 5, *Service Interruption Database Guidelines*, provides the methods, processes, and controls for reporting and documenting interruptions to the TVA transmission system, including calculating and reporting LNS data. According to TRANS-SPP-10.001, an interruption event has a definite date and time of occurrence and a single cause. An interruption event may include one or more interruptions to pieces of equipment and/or customer connection points. LNS is calculated and reported only for automatic interruptions¹ to customer connection points that last greater than or equal to 1 minute and are caused by TVA, another customer of TVA, or an interconnected utility. In FY 2022, there were 347 individual interruptions to customer connection points during 172 interruption events. Of those 347 interruptions, 187 interruptions had LNS calculated for WP.

According to the TRANS-SPP-10.001, Rev. 5, Transmission Service Centers (TSC) are responsible for researching the cause of events in their respective geographical areas and calculating LNS. TRANS-SPP-10.001, Rev. 5, describes three methods for calculating LNS based on the duration of the interruption and load profile of the customer. TSCs are ultimately responsible for choosing the most appropriate method for calculating the LNS.

¹ An automatic interruption, or outage, is defined as an outage that results from the automatic operation of a switching device (e.g., a fault or imbalance occurring that causes a circuit breaker to operate resulting in an interruption).

Interruptions Excluded From Performance Indicators

TRANS-SPP-10.001, Rev. 5, listed the following types of interruptions as excluded from performance indicators:

- All prearranged customer or TVA interruptions.
- TVA or customer “emergency forced” outages, which are defined as the manual removal of equipment with a serious problem or manually isolating a portion of the transmission system for repair.
- TVA or customer “operational” outages, which are defined as manually initiated outages for the purpose of maintaining TVA’s or a customer’s system within operational limits that cannot be deferred.
- Events caused by tornado that have been verified by the National Weather Service or other source.
- Events with a cause or subcause of gunfire or vandalism, as verified by TVA Police.
- Specifically excluded locations.²

Effective October 1, 2022, TRANS-SPP-10.001 was revised (Rev. 6), and the following types of interruptions were added to the listing of interruptions excluded from performance indicators:

- Events caused by the formation of ice where the buildup is confirmed to be beyond design basis.
- Specifically excluded situations.³

A variance may be requested to exclude all, or portions of, events where peculiar or abnormal circumstances have occurred, that are not otherwise covered by TRANS-SPP-10.001, Rev. 5. Variances must be approved by the Vice President, Transmission Planning and Projects.⁴

Additionally, TVA created a category in TRANS-SPP-10.001, Rev. 5, entitled “Major Event” where LNS is calculated for analysis, benchmarking, and investigating, but is not included in WP. A Major Event is defined as a weather-related event (or series of events) such as tornadoes, severe storms, or blizzards that stress the transmission system beyond its design criteria or beyond normal event storm parameters. For a Major Event to be declared by TVA, it must meet one of the following criteria: (1) there is a combined LNS of 140 megawatt hours

² Specifically excluded locations include sites such as (1) the U.S. Army Corps of Engineers facilities, (2) Department of Energy plants, and (3) cogeneration turbine at Johnsonville Combustion Turbine Plant.

³ Specifically excluded situations include events (1) where another utility’s employees are performing switching for TVA (to return assets to service from automatic interruptions) and there are delays beyond their control and (2) caused by vehicular accidents that are a direct result of driving under the influence, hit and run, or suicide.

⁴ TVA management informed us that a variance was approved for outages caused by Winter Storm Elliott in December 2022; therefore, outages caused by the storm would not be included for WP purposes in FY 2023.

or greater during a single 24-hour period or (2) the total number of connection point interruptions during a 24-hour period exceeds the 10-year six-sigma threshold.⁵ All interruption events caused by or related to the weather occurrence are included in the Major Event. A Major Event must be approved by the Vice President, Transmission Planning and Projects.

Internal Control

During FY 2022, TSCs documented interruption events on TVA Form 6873, Service Interruption Report (SIR). Each interruption event required a separate SIR. The SIR included details such as date, times, description of event, causes, customer connection points/equipment interrupted, and LNS. SIRs were typically completed by a TSC system engineer and then submitted to TVA's Asset Performance group by e-mail. Asset Performance entered the interruption data into the Service Interruption Database as it appeared on the SIR.

As of October 1, 2022, TSCs no longer submit SIRs to Asset Performance. Information, including LNS, previously recorded on the SIR, is now entered directly into the Service Interruption Database using a SIR tab in the software. Asset Performance obtains monthly reports from the Service Interruption Database, which are then provided to the Benchmarking and Enterprise Performance group. Benchmarking and Enterprise Performance uses LNS data from these monthly reports to calculate TVA's WP.

LNS data is entered into a digital submission portal for reporting to TVA's Business Planning and Analysis group by Asset Performance. The data is reviewed and approved monthly by the Asset Performance manager. Asset Performance selects a sample of interruptions with LNS and recalculates the LNS to verify its accuracy on a quarterly basis.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objective was to determine if adequate internal controls were in place to ensure accurate calculation and reporting of the LNS WP measure. Our audit scope included the LNS totals reported for WP in FY 2022 and the calculations' compliance with TRANS-SPP-10.001, Rev. 5. Our scope did not include an assessment of the reasonableness of any exclusions allowed by TRANS-SPP-10.001. A complete discussion of our audit objective, scope, and methodology is included in Appendix A.

⁵ The 10-year six-sigma threshold is recalculated each year based on the most recent 10 FYs of data. For FY 2022, the threshold for classifying an event as a Major Event was 33 connection point interruptions.

FINDINGS

We determined the significant internal controls we identified for accurate LNS calculations were operating effectively. However, there were not adequate controls in place to ensure proper management approval of LNS exclusions. Additionally, we found some user access permissions were not appropriate.

Prior to issuing a formal response, TVA personnel reviewed the draft report and provided informal comments that have been incorporated into the final report as appropriate.

IDENTIFIED SIGNIFICANT INTERNAL CONTROLS WERE OPERATING EFFECTIVELY

We determined TVA had three significant internal controls to ensure accurate calculation and reporting of the LNS WP measure:

1. TRANS-SPP-10.001, Rev. 5, defined three detailed methods for calculating LNS. LNS was calculated by the TSC using one of those approved methods for all required interruptions according to TRANS-SPP-10.001, Rev. 5.
2. Asset Performance performed quarterly audits of LNS data where they select a sample of interruptions with LNS and recalculated the LNS to verify its accuracy.
3. LNS data submitted by Asset Performance to Benchmarking and Enterprise Performance group for use in WP was reviewed and approved monthly to verify the accuracy of the data.

To assess these significant controls and the accuracy of LNS data, we obtained the FY 2022 LNS data used to calculate the WP measure from Asset Performance and reconciled it to the supporting SIRs without exception. Additionally, we reviewed documentation and determined Asset Performance (1) performed the quarterly audits of LNS data and (2) reviewed and approved monthly data submissions in FY 2022. We determined these controls were operating effectively.

To further assess the accuracy of LNS data, we selected a judgmental sample of 20 events with LNS and determined LNS was accurately calculated in accordance with the requirements of TRANS-SPP-10.001, Rev. 5, for all sampled events. We also reviewed documentation submitted for the two TVA declared Major Events in FY 2022 and determined the Major Events were appropriately approved by the Vice President, Transmission Planning and Projects. Additionally, we reviewed documentation for the one variance submitted in FY 2022 and determined the variance was appropriately approved by the Vice President, Transmission Planning and Projects.

CONTROLS WERE NOT ADEQUATE TO ENSURE PROPER MANAGEMENT APPROVAL OF LNS EXCLUSIONS

In FY 2022, the process for entering LNS data into the Service Interruption Database required a TSC system engineer to complete and submit a SIR form to Asset Performance via e-mail for each interruption. Asset Performance was responsible for entering LNS data into the Service Interruption Database. The SIR form included a line for TSC manager approval. Although TRANS-SPP-10.001, Rev. 5, stated TSC manager approval was optional, it also stated the TSC manager was responsible for SIR accuracy.

In FY 2023, TRANS-SPP-10.001 was updated (Rev. 6) and reassigned the responsibility for interruption data accuracy to the TSC as a whole, not the TSC manager. The TSC system engineer now enters the interruption data, including the initiating cause of the interruption and calculated LNS, directly into the Service Interruption Database using a SIR tab in the software. Asset Performance personnel can then access interruption data. However, there is still no requirement in the TRANS-SPP-10.001, Rev. 6, for TSC management to “approve” or “finalize” the interruption data entered into the SIR tab before it is made available to Asset Performance.

The determination to exclude an interruption from LNS is based on what the TSC system engineer enters into the system as the initiating cause of the interruption. If the initiating cause is listed in TRANS-SPP-10.001, Rev. 5, as excludable from performance indicators, LNS does not have to be calculated. According to Asset Performance personnel, they perform a monthly independent check to ensure the TSC has applied the appropriate cause as it aligns with TRANS-SPP-10.001, Rev. 5, and the event description provided. We sampled 20 events with all, or a portion of, the event excluded from LNS and determined all 20 events were appropriately excluded in accordance with the requirements of TRANS-SPP-10.001, Rev. 5. Although we did not identify any inappropriate exclusions based on the guidance in TRANS-SPP-10.001, controls around the decision to exclude an event from LNS are crucial to the accuracy of the LNS WP measure. During our audit period, manager approval was optional, and only 13 of 20 SIRs tested for excluded events showed some evidence of manager approval. Management review and approval of LNS data entered into the SIR tab could increase accuracy of the LNS WP measure.

SOME USER ACCESS PERMISSIONS WERE NOT APPROPRIATE

As previously described, LNS data is now entered directly into the Service Interruption Database using the SIR tab in the software. According to the National Institute of Standards and Technology (NIST),⁶ system access control should be based on least privilege, which refers to granting users only those accesses required to perform their duties. During our review of user access

⁶ NIST Special Publication 800-12, Revision 1, *An Introduction to Information Security*.
(<http://doi.org/10.6028/NIST.SP.800-12r1>)

permissions to the system tabs that involve entering and editing LNS data, we identified 9 of 42 users with access who did not need access to the SIR tab.

The process for entering LNS data using the SIR tab in the software was implemented in FY 2023, but a periodic review process for user access permissions had not yet been established as of April 7, 2023. Periodically reviewing user access permissions to ensure users are up to date and limited to least privilege could help prevent unauthorized changes to LNS data. Asset Performance took steps to remove access for the 9 users identified and stated they plan to begin quarterly reviews of access permissions.

RECOMMENDATIONS

We recommend the Senior Vice President, Transmission and Power Supply:

1. Require TSC management approval of all LNS data entered into the Service Interruption Database, including all exclusions.

TVA Management's Comments – In response to our draft report, TVA management provided an alternative course of action to having TSC management approval of all LNS data entered into the Service Interruption Database. TVA management suggested after the review currently performed by Asset Performance, a letter will be signed by the Vice President, Transmission Planning and Projects, each month. The letter would state that LNS data entered into the Service Interruption Database, including exclusions, has been reviewed and found to be accurate to be used as evidence of management approval. See Appendix B for TVA management's complete response.

Auditor's Response – We agree with TVA management's planned course of action to provide evidence of review and approval of LNS data entered into the Service Interruption Database, including all exclusions, by the Vice President, Transmission Planning and Projects.

2. Implement and formalize a periodic review process of user access permissions to the system tabs that involve entry and editing of LNS data.

TVA Management's Comments – In response to our draft report, TVA management stated a quarterly review will be performed to determine those individuals who no longer need access. If no longer required, they will be notified and their access will be removed. An initial review was performed and access was removed for those who do not serve in the TSC System Engineer Role. See Appendix B for TVA management's complete response.

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

OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objective was to determine if adequate internal controls were in place to ensure accurate calculation and reporting of the Load Not Served (LNS) Winning Performance (WP) measure. Our audit scope included the LNS totals reported for WP in fiscal year (FY) 2022 and the calculations' compliance with Transmission Standard Programs and Processes (TRANS-SPP) 10.001, Rev. 5. Our scope did not include an assessment of the reasonableness of any exclusions allowed by TRANS-SPP-10.001. To achieve our objective, we:

- Obtained an understanding of internal controls, including information system controls, associated with the calculation and reporting of the LNS WP measure.
- Reviewed TRANS-SPP-10.001, Rev. 5 and 6, *Service Interruption Database Guidelines*, to identify key requirements applicable to estimating/calculating and reporting LNS.
- Reviewed Tennessee Valley Authority (TVA) Standard Programs and Processes 13.020, *TVA Incentive Metric Planning and Performance*, to identify WP measures.
- Interviewed TVA Asset Performance, Benchmarking and Enterprise Performance, and Transmission Service Center personnel to determine the primary controls for calculating and reporting LNS.
- Obtained the FY 2022 LNS WP metric calculation spreadsheet.
- Obtained a listing of 347 individual interruptions to customer connection points that occurred over a total of 172 events in FY 2022. Table 1 below provides a summary of the events and associated interruptions that TVA included or excluded from its WP calculations.

Summary of FY 2022 Events and Associated Interruptions				
Type of Event	Number of Events	Interruptions		Total Interruptions
		Interruptions Included In LNS WP	Interruptions Excluded From LNS WP	
Included in reporting	85	164		164
Partially included in reporting	18	23	24	47
Excluded from reporting	41		56	56
Excluded from reporting – associated with 2 “Major Events”	28		80	80
Total	172	187	160	347

Table 1

We verified the total LNS in each interruption agreed with the total used in the LNS WP metric calculation spreadsheet for the 187 interruptions with LNS. Additionally, for the 172 events, we reviewed TVA’s supporting

documentation for samples of events, and associated interruptions, as follows:

- We judgmentally selected a sample of 20 of 103 events (85 + 18) with all, or a portion of, the event included for WP to verify the accuracy of the LNS calculations. The 20 sampled events included 48 of 187 interruptions included in LNS WP. Our selection was based on both the highest total LNS and the length of the outage. Since this was a judgmental sample, the results of the sample cannot be projected to the population.
- We judgmentally selected a sample of 20 of 59 events (18 + 41) with all, or a portion of, the event excluded from WP to review the exclusion for appropriateness. The 20 sampled events included 39 of 160 interruptions that were not included in LNS WP. Our selection was based on both the highest duration outages and consideration of the events' initiating cause descriptions. Since this was a judgmental sample, the results of the sample cannot be projected to the population.
- We reviewed a variance TVA approved for 1 event, which affected 1 of 187 interruptions that were included in LNS WP, to determine if documentation was appropriately submitted and approved.
- Compared the LNS to the supporting service interruption reports for all interruptions with LNS to test the accuracy of the LNS data recorded in systems.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

September 22, 2023

David P. Wheeler, WT 2C-K

RESPONSE: DRAFT EVALUATION 2023-17405 - Load Not Served Winning Performance Measure

Reference: OIG Memorandum dated July 28, 2023

Thank you for the opportunity to address the Draft Report for Evaluation 2023-17405 - Load Not Served Winning Performance Measure. We would like to thank Stephanie Simmons and her team for their professionalism and cooperation during this audit and their willingness to meet with our team to discuss preliminary comments.

General Comment:

Considering the extensive nature of this audit, the overall report reinforces the importance of the Load Not Served metric and maintaining data integrity.

Recommendation 1:

Require TSC management approval of all LNS data entered into the Service Interruption Database, including all exclusions.

Management Response:

Based on a review of existing processes within TRANS-SPP-10.001, we have determined that the existing guidance requires thorough review of causes, including those eligible for exclusion, as described further below.

The roles and responsibilities of the Transmission Service Center (TSC) as defined in the SID Guidelines, TRANS-SPP-10.001, are as follows:

- Submits required SID data in the iTOA SIR tab for their assigned assets, providing a detailed event description including results of event investigations and impacted assets.
- Responsible for accuracy of the iTOA SIR tab data points as identified in this SPP. TSC management approval/accuracy is an inherent part of their role.

Per the SPP, the Asset Performance roles and responsibilities include the following:

- Performs reviews and provides guidance to the Transmission Service Center (TSCs) for their completion of the SID events data through the iTOA SIR tab.
- Maintains quality checks on the SID data and document corrections to ensure accuracy.
- Generates periodic reports using the SID interruption data.

Asset Performance serves as the independent reviewer of the TSC System Engineer entered cause and makes the determination on how events are classified and whether each connection point meets the criteria to be excluded from performance indicators as outlined in the SPP. If discrepancies are identified through monthly quality control checks or otherwise, they are communicated to the TSC System Engineer and resolved. If a resolution can not be reached, it is elevated to upper management for review.

David P. Wheeler
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Rather than TSC management approval of all LNS data entered into the Service Interruption Database, including exclusions, we suggest the following. After the review discussed above, a letter signed by the Vice President of Transmission Planning and Projects (TPP) each month stating that LNS data entered into the Service Interruption Database, including exclusions, has been reviewed and found to be accurate will be used for management approval.

Recommendation 2:

Implement and formalize a periodic review process of user access permissions to the system tabs that involve entry and editing of LNS data.

Management Response:

We agree with this recommendation. A quarterly review will be performed to determine those individuals that no longer need ITOA Interruption Module access. If no longer required, they will be notified and their access will be removed. An initial review was performed and access was removed for those that do not serve in the TSC System Engineer Role.

Date Completed: August 23, 2023

If you have further questions, please let me know.



Aaron Melda
Senior Vice President
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MR 3H-C

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