

December 29, 2022

VIA ELECTRONIC FILING

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: **NERC Full Notice of Penalty regarding Tennessee Valley Authority
FERC Docket No. NP23_-000**

Dear Ms. Bose:

The North American Electric Reliability Corporation (NERC) hereby provides this Notice of Penalty¹ regarding Tennessee Valley Authority (TVA), and referred to herein as the Entity, NERC Registry ID# NCR01151,² in accordance with the Federal Energy Regulatory Commission's (Commission or FERC) rules, regulations, and orders, as well as NERC's Rules of Procedure including Appendix 4C (NERC Compliance Monitoring and Enforcement Program (CMEP)).³

NERC is filing this Notice of Penalty, with information and details regarding the nature and resolution of the violations,⁴ with the Commission because SERC Reliability Corporation (SERC) and the Entity have entered into a Settlement Agreement to resolve all outstanding issues arising from SERC's determination and findings of the violations of the Voltage and Reactive (VAR) and Protection and Control (PRC) Reliability Standards listed below.

¹ *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, order on reh'g, Order No. 672-A, 114 FERC ¶ 61,328 (2006); *Notice of New Docket Prefix "NP" for Notices of Penalty Filed by the N. Am. Elec. Reliability Corp.*, Docket No. RM05-30-000 (February 7, 2008); *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, 118 FERC ¶ 61,218, order on reh'g, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

² The Entity was included on the NERC Compliance Registry as a Balancing Authority (BA), Distribution Provider (DP), Generator Owner (GO), Generator Operator (GOP), Planning Authority (PA)/Planning Coordinator (PC), Reliability Coordinator (RC), Resource Planner (RP), Transmission Owner (TO), Transmission Operator (TOP), Transmission Planner (TP), and Transmission Service Provider (TSP) on May 31, 2007.

³ See 18 C.F.R § 39.7(c)(2) and 18 C.F.R § 39.7(d).

⁴ For purposes of this document, each violation at issue is described as a "violation," regardless of its procedural posture and whether it was a possible, alleged, or confirmed violation.

**1401 H Street NW Suite 410
Washington, DC 20005
202-400-3000 | www.nerc.com**

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According to the Settlement Agreement, the Entity neither admits nor denies the violations, but has agreed to other remedies and actions to mitigate the instant violations and facilitate future compliance under the terms and conditions of the Settlement Agreement.

Statement of Findings Underlying the Violations

This Notice of Penalty incorporates the findings and justifications set forth in the Settlement Agreement, by and between SERC and the Entity. The details of the findings and basis for the penalty are set forth in the Settlement Agreement and herein.

In accordance with Section 39.7 of the Commission's regulations, 18 C.F.R. § 39.7 (2022), NERC provides the following summary table identifying each violation of a Reliability Standard resolved by the Settlement Agreement. Further information on the subject violations is set forth in the Settlement Agreement and herein.

Violation(s) Determined and Discovery Method								
*SR = Self-Report / SC = Self-Certification / CA = Compliance Audit / SPC = Spot Check / CI = Compliance Investigation								
NERC Violation ID	Standard	Req.	VRF/VSL	Applicable Function(s)	Discovery Method* & Date	Violation Start-End Date	Risk	Penalty Amount
SERC2019021779	VAR-002-4.1	R2	Medium/Severe	GOP	SR 7/2/19	1/12/18 – 7/8/21	Moderate	No penalty
SERC2021025211	PRC-005-2	R3	High/Lower	GO, TO	SR 5/20/21	4/14/15 – 12/21/21	Moderate	

Information About the Entity

TVA is a corporate agency and instrumentality of the United States created by the TVA Act of 1933 with a total generation capacity of 33,526 MW with an additional 3,988 MW of contract generation capacity from Power Purchasing Agreements (PPAs). TVA operates its power system facilities in a vertically integrated manner, providing electric power to 154 Local Power Companies (LPCs) and certain end-use customers, primarily large commercial and industrial loads and federal agencies. TVA has approximately 16,000 miles of transmission line and 69 interconnections with neighboring Balancing Authorities (BAs).

Executive Summary

Both violations are composed of multiple instances of smaller risk issues which, when aggravated, increase the overall risk of both to moderate. For the VAR-002-4.1 R2 violation, TVA had a total of 287 excursions across both Nuclear and Power Operations (e.g. non-nuclear) plants. For the PRC-005-2 R3 violation, TVA had instances of missed maintenance within its Transmission, Nuclear, and Power

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Operations groups. Both violations were caused by ineffective or missing internal controls, a deficient change management program, and insufficient training. To mitigate these violations, TVA has modified existing procedures, added additional internal controls, clarified existing maintenance forms, and provided training on the overall maintenance program and updated internal controls.

VAR-002-4.1 R2 (SERC2019021779)

SERC determined that the Entity failed to maintain the generator voltage schedule provided by the Transmission Operator (TOP), or otherwise meet the conditions of notification for deviation from the voltage schedule provided by the TOP. The Entity had a total of 287 excursions across both Nuclear and Power Operations (e.g. non-nuclear) plants during the violation.⁵ Attachment 1 includes additional facts regarding the violation.

The causes of this violation included: (1) a deficient procedure lacking sufficient detail and guidance on reporting requirements and warnings regarding the impact of failures to properly report alarms; (2) deficient internal controls in which voltage schedule alarms were not configured properly and did not notify operators of excursions requiring action; (3) human performance failures in which operators did not follow training and implemented internal controls.

SERC determined that this violation posed a moderate risk to the reliability of the BPS. Attachment 1 includes the facts regarding the violation that SERC considered in its risk assessment.

The Entity submitted its mitigating activities to address the referenced violation, with an expected completion date of July 15, 2022. Attachment 1 includes a description of the mitigation activities the Entity took to address this violation.⁶ The Entity certified it had completed all mitigation activities. SERC will verify that the Entity has completed all mitigation activities and promptly report its successful completion to NERC.

PRC-005-2 R3 (SERC2021025211)

SERC determined that the Entity failed to maintain its Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components that are included within the time-based maintenance program in accordance with the minimum maintenance activities and maximum maintenance intervals prescribed

⁵ Paragraph 47 of the Settlement Agreement in the section discussing the VAR-002 violation references 294 instances of excursions. This is a typographic error and the correct number for that paragraph is 249.

⁶ Paragraph 50 of the Settlement Agreement in the section discussing the VAR-002 violation references a Mitigation Plan for a previously filed TVA violation that is unrelated to the instant violation. The mitigating activities discussed in Paragraph 51 of the Settlement Agreement address the VAR-002 violation at issue in this Notice of Penalty.

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within Tables 1-4, 1-5, and Table 3. The Entity had instances of missed maintenance within its Transmission, Nuclear, and Power Operations groups. Attachment 1 includes additional facts regarding the violation.

The causes of this violation included: (1) ineffective internal controls allowing (a) the use of an unverified one-line diagram rather than verifying it through hands-on relay testing, and (b) multiple handoffs and closeout of records with incomplete data resulting in late or missed maintenance notifications; (2) the lack of an internal control in that (a) work orders did not identify each required maintenance task and subsequent documentation required, (b) performance and scheduled work order dates were not examined to identify intervals that had been potentially compromised, (c) ownership and responsibility of maintenance for equipment at sites shared between the Entity's generation and transmission business units was not clear.

SERC determined that this violation posed a moderate and not serious or substantial risk to the reliability of the bulk power system (BPS). Attachment 1 includes the facts regarding the violation that SERC considered in its risk assessment.

The Entity submitted its mitigating activities to address the referenced violation, with an expected completion date of August 24, 2023. Attachment 1 includes a description of the mitigation activities the Entity has taken and is planning to take to address the referenced violation. SERC will verify that the Entity has completed all mitigation activities and promptly report its successful completion to NERC.

Regional Entity's Basis for Penalty

According to the Settlement Agreement, SERC assessed no penalty for the referenced violations. In reaching this determination, SERC considered the following factors:

1. The Entity is a federal government entity, and SERC and NERC are bound to follow *Southwestern Power Administration (SWPA) v. Federal Energy Regulatory Commission (FERC)*⁷ in resolution of this matter;
2. The Entity has aggravating compliance history related to both violations;
3. The Entity self-reported the violations;
4. The Entity was cooperative throughout the compliance enforcement process;
5. The Entity agreed to settle the violations;

⁷ *SW. Power Admin v. FERC*, 763 F.3d 27 (D.C. Cir. 2014).

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6. There was no evidence of any attempt to conceal a violation nor evidence of intent to do so; and
7. There were no other mitigating or aggravating factors that would affect the disposition method.

After consideration of the above factors, SERC determined that it would issue no penalty, in accordance with *SWPA v. FERC*.

Statement Describing the Assessed Penalty, Sanction, or Enforcement Action Imposed⁸

Basis for Determination

Taking into consideration the Commission's direction in Order No. 693, the NERC Sanction Guidelines and the Commission's July 3, 2008, October 26, 2009 and August 27, 2010 Guidance Orders,⁹ NERC Enforcement staff reviewed the applicable requirements of the violations at issue, and considered the factors listed above.

For the foregoing reasons, NERC Enforcement staff approved the resolution between SERC and the Entity and believes that no penalty is appropriate for the violations and circumstances at issue, and is consistent with NERC's goal to promote and ensure reliability of the BPS.

Pursuant to 18 C.F.R. § 39.7(e), the penalty will be effective upon expiration of the 30-day period following the filing of this Notice of Penalty with FERC, or, if FERC decides to review the penalty, upon final determination by FERC.

Attachments to be Included as Part of this Notice of Penalty

The attachments to be included as part of this Notice of Penalty are the following documents:

1. Settlement Agreement by and between SERC and the Entity executed November 19, 2022, included as Attachment 1;
2. The Entity's Self-Report for VAR-002-4.1 R2 dated July 2, 2019, included as Attachment 2; and
3. The Entity's Self-Report for PRC-005-6 R3 dated May 20, 2021, included as Attachment 3.

⁸ See 18 C.F.R. § 39.7(d)(4).

⁹ N. Am. Elec. Reliability Corp., "Guidance Order on Reliability Notices of Penalty," 124 FERC ¶ 61,015 (2008); N. Am. Elec. Reliability Corp., "Further Guidance Order on Reliability Notices of Penalty," 129 FERC ¶ 61,069 (2009); N. Am. Elec. Reliability Corp., "Notice of No Further Review and Guidance Order," 132 FERC ¶ 61,182 (2010).

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Notices and Communications: Notices and communications with respect to this filing may be addressed to the following:

<p>*Persons to be included on the Commission’s service list are indicated with an asterisk. NERC requests waiver of the Commission’s rules and regulations to permit the inclusion of more than two people on the service list.</p> <p>Jason Blake* President and Chief Executive Officer SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 940-8204 (704) 357-7914 – facsimile jblake@serc1.org</p> <p>Holly A. Hawkins* Vice President, General Counsel & Corporate Secretary SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 494-7775 (704) 357-7914 – facsimile hhawkins@serc1.org</p> <p>Jimmy C. Cline* Managing Counsel SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 414-5259 (704) 357-7914 – facsimile jccline@serc1.org</p>	<p>Teresina Stasko* Assistant General Counsel and Director of Enforcement North American Electric Reliability Corporation 1401 H Street NW, Suite 410 Washington, DC 20005 (202) 400-3000 (202) 644-8099 – facsimile teresina.stasko@nerc.net</p> <p>James McGrane* Senior Counsel North American Electric Reliability Corporation 1401 H Street NW, Suite 410 Washington, DC 20005 (202) 400-3000 (202) 644-8099 – facsimile james.mcgrane@nerc.net</p> <p>Amy Engstrom* Associate Counsel North American Electric Reliability Corporation 1401 H Street NW, Suite 410 Washington, DC 20005 (202) 400-3000 (202) 644-8099 – facsimile amy.engstrom@nerc.net</p>
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<p>Kevin Spontak* Senior Legal Counsel SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 414-5228 (704) 357-7914 – facsimile kcsponetak@serc1.org</p> <p>James Dalrymple* Sr. Vice President, Resource Management & Operations Services Tennessee Valley Authority 1101 Market St, MR 3H Chattanooga, TN 37402 (423) 751-7485 jrdalrymple@tva.gov</p> <p>Anthony Taylor* Director, NERC Regulatory Compliance & Support Tennessee Valley Authority 1101 Market St, MR 3H Chattanooga, TN 37402 (918) 630-4263 ataylor14@tva.gov</p>	
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Conclusion

NERC respectfully requests that the Commission accept this Notice of Penalty as compliant with its rules, regulations, and orders.

Respectfully submitted,

/s/ Amy Engstrom

James McGrane
Senior Counsel
Amy Engstrom
Associate Counsel
North American Electric Reliability
Corporation
1401 H Street NW, Suite 410
Washington, DC 20005
(202) 400-3000
(202) 644-8099 - facsimile
james.mcgrane@nerc.net
amy.engstrom@nerc.net

cc: Tennessee Valley Authority
SERC Reliability Corporation

Attachments

SETTLEMENT AGREEMENT

BETWEEN SERC RELIABILITY CORPORATION

AND

TENNESSEE VALLEY AUTHORITY¹

I. INTRODUCTION

1. SERC Reliability Corporation (SERC) and Tennessee Valley Authority (TVA) enter into this Settlement Agreement (Agreement) to resolve two Alleged Violations by TVA of the below-referenced Reliability Standards and Requirements.

Reliability Standard	Requirement	NERC Tracking No.
VAR-002-4.1	R2	SERC2019021779
PRC-005-6	R3	SERC2021025211

2. The Parties stipulate to the facts in this Agreement for the sole purpose of resolving the Alleged Violations. TVA neither admits nor denies that these facts constitute Alleged Violations of the above-referenced Reliability Standards and Requirements.

II. OVERVIEW OF TVA

3. TVA is a corporate agency and instrumentality of the United States created by the TVA Act of 1933 with a total generation capacity of 33,526 MW with an additional 3,988 MW of contract generation capacity from Power Purchasing Agreements (PPAs). TVA operates its power system facilities in a vertically integrated manner, providing electric power to 154 Local Power Companies (LPCs) and certain end-use customers, primarily large commercial and industrial loads and federal agencies. TVA has approximately 16,000 miles of transmission line and 69 interconnections with neighboring Balancing Authorities (BAs).
4. TVA is registered on the NERC Compliance Registry as a Balancing Authority (BA), Distribution Provider (DP), Generator Owner (GO), Generator Operator (GOP), Planning Authority (PA), Reliability Coordinator (RC), Resource Planner (RP), Transmission Owner (TO), Transmission Operator (TOP), Transmission Planner (TP), and Transmission Service Provider (TSP). TVA, in its capacity as a

¹ NERC Registry ID No. NCR01151

GOP, is subject to compliance with VAR-002-4.1. TVA, in its capacity as a GO and TO, is subject to compliance with PRC-005-6.

III. EXECUTIVE SUMMARY

5. This Settlement Agreement resolves two moderate risk Alleged Violations of VAR-002-4.1 R2 and PRC-005-6 R3.
6. Both Alleged Violations are composed of multiple instances of smaller risk issues which, when aggravated, increase the overall risk of both to moderate. For the VAR-002-4.1 R2 Alleged Violation, TVA had a total of 287 excursions across both Nuclear and Power Operations (e.g. non-nuclear) plants. For the PRC-005-6 R3 Alleged Violation, TVA had instances of missed maintenance within its Transmission, Nuclear groups, and Power Operations groups.
7. The causes for both Alleged Violations include multiple causes but share a theme. Both Alleged Violations were caused by ineffective or missing internal controls, a deficient change management program, and insufficient training.
8. To mitigate this Alleged Violation, TVA has modified existing procedures, added additional internal controls, clarified existing maintenance forms, and provided training on the overall maintenance program and updated internal controls.

IV. SANCTIONS

9. SERC is precluded from assessing a penalty against TVA because it is a federal government entity.²

V. ADDITIONAL TERMS

10. The Parties agree that this Agreement is in the best interest of Bulk Electric System (BES) reliability. The terms and conditions of the Agreement are consistent with the regulations and orders of the Commission and the NERC Rules of Procedure.
11. SERC shall report the terms of all settlements of compliance matters to NERC. NERC will review the Agreement for the purpose of evaluating its consistency with other settlements entered into for similar violations or under similar circumstances. Based on this review, NERC will either approve or reject this Agreement. If NERC rejects the Agreement, NERC will provide specific written reasons for such rejection and SERC will attempt to negotiate with TVA a revised settlement agreement that addresses NERC's concerns. If a settlement cannot be reached, the enforcement process will continue to conclusion. If NERC approves the

² On August 22, 2014, in *Southwestern Power Administration (SWPA) v. Federal Energy Regulatory Commission (FERC)*, the United States Court of Appeals for the District of Columbia rules that FERC and, by extension, the North American Electric Reliability Corporation (NERC) and the Regional Entities it oversees, such as SERC, could not impose monetary penalties against federal government entities. TVA is a federal government entity and SERC is bound to follow *SWPA v. FERC* in resolution of this matter. Therefore, SERC has assessed no monetary penalty for this violation.

Agreement, NERC will (a) report the approved settlement to the Commission for review and approval by order or operation of law and (b) publicly post the Alleged Violation and the terms provided for in this Agreement.

12. This Agreement binds the Parties upon execution, and may only be altered or amended by written agreement executed by the Parties. TVA expressly waives its right to any hearing or appeal concerning any matter set forth herein, unless and only to the extent that TVA contends that any NERC or Commission action constitutes a material modification to this Agreement.
13. SERC reserves all rights to initiate enforcement action against TVA in accordance with the NERC Rules of Procedure in the event that TVA fails to comply with any of the terms or conditions of this Agreement. TVA retains all rights to defend against such action in accordance with the NERC Rules of Procedure.
14. TVA consents to SERC's future use of this Agreement for the purpose of assessing the factors within the NERC Sanction Guidelines and applicable Commission orders and policy statements, including, but not limited to, the factor evaluating TVA's violation history. Such use may be in any enforcement action or compliance proceeding undertaken by NERC or any Regional Entity or both, provided however that TVA does not consent to the use of the conclusions, determinations, and findings set forth in this Agreement as the sole basis for any other action or proceeding brought by NERC or any Regional Entity or both, nor does TVA consent to the use of this Agreement by any other party in any other action or proceeding.
15. TVA affirms that all of the matters set forth in this Agreement are true and correct to the best of its knowledge, information, and belief, and that it understands that SERC enters into this Agreement in express reliance on the representations contained herein, as well as any other representations or information provided by TVA to SERC during any TVA interaction with SERC relating to the subject matter of this Agreement.
16. Upon execution of this Agreement, the Parties stipulate that the Possible Violations addressed herein constitutes Alleged Violations. The Parties further stipulate that all required, applicable information listed in Section 5.3 of the CMEP is included within this Agreement.
17. Each of the undersigned agreeing to and accepting this Agreement warrants that he or she is an authorized representative of the party designated below, is authorized to bind such party, and accepts the Agreement on the party's behalf.
18. The undersigned agreeing to and accepting this Agreement warrant that they enter into this Agreement voluntarily and that, other than the recitations set forth herein, no tender, offer, or promise of any kind by any member, employee, officer, director, agent, or representative of the Parties has been made to induce the signatories or any other party to enter into this Agreement.

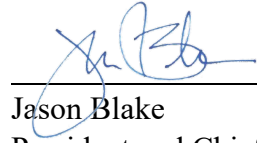
19. The Agreement may be signed in counterparts.
20. This Agreement is executed in duplicate, each of which so executed shall be deemed to be an original.

SIGNATURE PAGE TO FOLLOW³

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

³ An electronic version of this executed document shall have the same force and effect as the original.

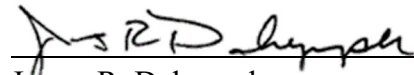
Agreed to and accepted by:



Jason Blake
President and Chief Executive Officer
SERC RELIABILITY CORPORATION

November 19, 2022

Date



James R. Dalrymple
SVP, Resource Management & Operations Services
TENNESSEE VALLEY AUTHORITY

November 17, 2022

Date

Attachment A

I. ALLEGED VIOLATION – SERC2019021779

A. VAR-002-4.1 R2

1. VAR-002-4.1 ensures that generators provide reactive support and voltage control, within generating Facility capabilities, in order to protect equipment and maintain reliable operation of the Interconnection.
2. VAR-002-4.1 R2 states:
R2. Unless exempted by the Transmission Operator, each Generator Operator shall maintain the generator voltage or Reactive Power schedule⁴ (within each generating Facility's capabilities⁵) provided by the Transmission Operator, or otherwise shall meet the condition of notification for deviations from the voltage or Reactive Power schedule provided by the Transmission Operator.
 - 2.1. When a generator's AVR is out of service or the generator does not have an AVR, the Generator Operator shall use an alternative method to control the generator reactive output to meet the voltage or Reactive Power schedule provided by the Transmission Operator.
 - 2.2. When instructed to modify voltage, the Generator Operator shall comply or provide an explanation of why the schedule cannot be met.
 - 2.3. Generator Operators that do not monitor the voltage at the location specified in their voltage schedule shall have a methodology for converting the scheduled voltage specified by the Transmission Operator to the voltage point being monitored by the Generator Operator.

Description of the Alleged Violation and Risk Assessment

3. On July 2, 2019, TVA submitted a Self-Report stating that, as a Generator Operator, it was noncompliant with VAR-002-4.1 R2. TVA failed to maintain the generator voltage schedule provided by the Transmission Operator, or otherwise meet the conditions of notifications for deviation from the voltage schedule provided by the TOP.
4. TVA submitted five scope expansions to the initial Self-Report, bringing the total number of instances to six. The six instances include sites in both TVA Nuclear (TVAN), which owns and operates the nuclear power plants in the TVA footprint,

⁴ The voltage or Reactive Power schedule is a target value with a tolerance band or a voltage or Reactive Power range communicated by the Transmission Operator to the Generator Operator.

⁵ Generating Facility capability may be established by test or other means, and may not be sufficient at times to pull the system voltage within the schedule tolerance band. Also, when a generator is operating in manual control, Reactive Power capability may change based on stability considerations.

Attachment A

and TVA Power Operations (PO), which owns and operates all of TVA's non-nuclear power plants.

5. The initial Self-Report describes three excursions related to TVAN's Watts Bar Nuclear Plant (WBN) (Instance 1).
6. WBN is a nuclear power plant with a total of 2822 MW unit capacity of 1411 MWs per unit. Its annual average capacity factor is 83% for WBN1 and 86% for WBN2.
7. Per TVA TOP (TOP) guidance, the WBN switchyard voltage schedule needs to remain between 510 kV – 530 kV. When an operator receives a switchyard voltage excursion alarm, the operator has 30 minutes to bring the switchyard voltage back within the voltage schedule. If the operator cannot bring the voltage back within the schedule within the 30 minute timeframe, the plant is required to notify the TVA TOP of the excursion.
8. On April 16, 2019, the WBN switchyard staying within and falling outside of voltage schedule due to ongoing adverse grid conditions throughout the day. The operator made required notifications, or otherwise managed the voltage schedules, for the majority of the day. The last notification to the TOP occurring at 5:15 p.m. Following that last notification, the operator took hourly readings. The operator believed this met the requirements because the procedure specifically related to VAR-002 did not specify TOP notification and TVA's Conduct of Operations guidelines, a general compliance document, state hourly records were acceptable on nuisance alarms.
9. On that date at 10:15 p.m., the operator logged the switchyard voltage as 531.4 kV, which was outside of schedule. The operator failed to notify the TOP and WBN continued to operate outside its voltage schedule until 4:15 a.m. on April, 17, 2019. The maximum voltage during this period was 532.7 kV.
10. On April 21, 2019 and April 30, 2019, WBN again failed to maintain its voltage schedule and the operators failed to notify the TOP when the operators experienced similar situations. On April 21, 2019, the voltage excursion began at 8:26 a.m. and ended at 6:22 p.m. with the maximum voltage exceedance of 532.6 kV. On April 30, 2019, the voltage excursion began at 11:05 p.m. and ended at 6:05 a.m. on May 1, 2019 with the maximum voltage excursion of 531.5 kV.
11. The excursions were discovered on May 14, 2019, during TVAN's monthly review of voltage schedules.
12. As part of the Extent of Condition (EOC) review, TVAN reviewed voltage schedules and potential excursions for all nuclear sites. No additional excursions without notice were identified.
13. The root cause of Instance 1 is a deficient procedure, specifically the VAR-002 procedure. This procedure lacked sufficient detail and guidance on reporting

Attachment A

requirements related to the specific alarms which caused the operator to refer to the TVA Conduct of Operations.

14. On July 8, 2020, TVA submitted an expansion of scope related to its Sequoyah Nuclear Plant (SQN) (Instance 2).
15. SQN is a nuclear power plant with a total of 2712 MW unit capacity of 1356.2 MWs per unit. Its annual average capacity factor is 86.0% for SQN1 and 86.2% for SQN2.
16. The TVA TOP guidance for the SQN switchyard voltage is to remain between 510 kV – 530 kV, or for the TOP to be notified within 30 minutes of failure to bring the switchyard within the voltage schedule (60 minutes in total from excursion).
17. On April 26, 2020 at 7:13 a.m., SQN received a switchyard voltage alarm. However, there is no information on this alarm in the Operator Logs. Site operations performed an evaluation and did not identify where operators made the required TVA TOP notification. TVA, acting as the TOP, searched the Transmission Operator logs and audio recordings and did not find evidence of the required notification. The excursion lasted approximately 3 hours and 17 minutes with a maximum voltage of 534.5 kV.
18. The excursion was discovered during TVAN's monthly review of voltage schedules. As TVAN had previously reviewed all historical records for all nuclear sites, the monthly review acted as the EOC.
19. The root cause of Instance 2 was a deficient procedure. Because the occurrence of the alarm is the trigger to start a 30 minute clock for reporting requirements, the alarm procedure should have been specific with applicable warnings as to the impact of failure to properly report the alarm.
20. On July 9, 2020, TVA submitted a second expansion of scope, this one related to the Johnsonville CT (JCT) plant (Instance 3).
21. JCT is a combustion turbine site with a total of 1,551.4 MW unit capacity of 73.8 MWs per units 1-16, and unit capacity of 92.65 MWs per units 17-20, with an annual average capacity factor of less than 1% for the JCT site. JCT is operated under the PO group.
22. The TOP guidance for JCT switchyard voltage schedule was 167 kV +/- 3kV, or provide notice within 30 minutes after failure to bring the switchyard back within the voltage schedule (60 minutes after excursion).
23. From January 12, 2018 through June 8, 2020, JCT experienced 262 voltage excursions without notice to the TOP, 249 which were out of the lower bounds of the voltage schedule and 13 which were outside of the upper bounds of the voltage schedule. The maximum voltage excursion was 171.1 kV at the upper bound and 160.9 kV at the lower bound.

Attachment A

24. The large number of excursions was caused by the confusion around monitoring and on whom the responsibility of monitoring the JCT switchyard voltage fell. For a long subset of the time period described above, the voltage at JCT was unmonitored.
25. Prior to January 12, 2018, a different operational site, Johnsonville Fossil (JOF), was responsible for monitoring voltage at the JCT switchyard. Both JCT operations and JOF operations knew the responsibilities prior to January 12, 2018 and of the switchover date.
26. The multiple excursions without notices were discovered during PO's first quarter review of 2020, which takes a random sample provided by TVA transmission regulatory compliance and support group. The quarterly review discovered a potential excursion which, when investigated, led to the discovery of the 262 excursions. This investigation acted as the EOC review.
27. The root cause for Instance 3 was a deficient internal control. When JCT took over responsibility for monitoring the voltage schedule, the alarms, which act as the primary preventative internal control, were not configured properly. Operators were therefore not notified of excursions and were unable to give proper notice to the TOP.
28. On February 4, 2021, TVA submitted a third expansion of scope, also related to JCT (Instance 4).
29. As part of the Mitigation Plan (MP), PO implemented an interim random sample quarterly oversight review for the JCT site. During the 2020 3rd quarter review of JCT, TVA identified additional instances of failures to maintain the voltage schedule followed by failure to make notification to the TOP.
30. TVA PO identified the following occurrences with voltage outside of the tolerance band lasting longer than 1 hour that and had no TOP notification: August 2, 2020 for JCT Bus 17-20 starting at 10:57 a.m., August 9, 2020 for JCT Bus 11-20 starting at 6:24 p.m., August 24, 2020 for JCT Bus 17-20 starting at 9:31 a.m. The maximum excursion during these instances was 171.1 kV.
31. The root cause of Instance 4 was human performance failures. Operators at JCT were trained on voltage monitoring voltage schedules and had implemented internal controls to prevent noncompliance. As a new process, some of the operators simply failed to meet the requirements.
32. On April 28, 2021, TVA submitted a fourth expansion of scope (Instance 5). During the 2020 Q4 quarterly oversight review TVA identified a voltage excursion at Nickajack Hydro Plant (NJH) 161kV bus without notification to the TOP.

Attachment A

33. NJH is a hydro power plant with a total of 62.6 MW unit capacity. Its annual average capacity factor is 31% for the plant. As a 161 kV bus, the band of the voltage schedule is set to +/- 3kV.
34. An EOC identified three additional voltage excursions without notice at NJH within the timeframe from September 26, 2020 at 7:57 a.m. through October 3, 2020 at 8:00 p.m.
35. PO identified the following occurrences with voltage outside the tolerance band lasting longer than 1 hour that required TOP notification: October 2, 2020 a voltage excursion starting at 5:03 p.m. and lasting through 6:31 p.m., October 2, 2020 a voltage excursion starting at 8:22 p.m. and lasting through 9:59 p.m., and an 80 minute voltage excursion starting a voltage excursion starting at October 3, 2020 at 1:11 p.m. and lasting through 2:31 p.m. The maximum excursion during these instances was 169.4 kV.
36. The root cause of Instance 5 was an insufficient internal control. Specifically, the alarm associated with the voltage schedule was not being displayed as intended for the operators.
37. On April 28, 2021, TVA submitted a fifth expansion of scope (Instance 6). During 2020 4th quarter review targeting JCT, TVA identified two additional failures to maintain the voltage schedule without notification.
38. PO identified the following occurrences with voltage outside of the tolerance band lasting longer than 1 hour that required TOP notification: October 20, 2020 a JCT Bus 17-20 bus voltage excursion starting at 12:30 p.m. and lasting through 1:15 p.m., and October 30, 2020 a JCT Bus 17-20 voltage excursion starting at 8:00 a.m. and lasting through 9:30 a.m. The minimum excursion during this instance was 163.0 kV.
39. The EOC was covered by the targeted monthly review of the JCT site.
40. The root cause of Instance 5 was human performance failures. Operators at JCT were trained on voltage monitoring voltage schedules and implemented internal controls to prevent noncompliance. However, the operators made mistakes within monitoring voltages.
41. On January 12, 2022, TVA submitted a sixth expansion of scope (Instance 7). During the 2021 Q3 quarterly oversight review, TVA identified a voltage excursion at Cumberland Fossil Plant (CUF) 500 kV bus without notification to the TOP.
42. CUF is a coal power plant with a total of 2888 MW plant capacity with two individual units. Its annual average capacity factor is 41% for the plant. As a 500 kV bus, the band of the voltage schedule is set to +/- 10kV.
43. The single identified excursion without notification occurred on July 8, 2021. The operator at CUF was required to make the notice before 8:03 p.m., but made the

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notification at 8:15 p.m., 12 minutes late. The maximum excursion during this instance was 534.3 kV.

44. For the EOC, TVA PO reviewed voltage logs for the CUF site and found no additional excursions without proper notification.
45. The root cause of Instance 6 was a human performance failure. There was a single excursion and notice was given, but later than required.
46. This Alleged Violation began on January 12, 2018, when TVA failed to monitor and maintain the voltage schedule or notify the TOP in Instance 3, and ended on July 8, 2021, when TVA's final failure to maintain voltage schedules concluded with Instance 7.
47. This Alleged Violation posed a moderate risk and not a serious or substantial risk to the reliability of the Bulk Power System (BPS). TVA's failure to maintain its voltage schedule or to contact the TOP to inform it of excursions from the voltage schedule within a timely manner could have delayed the TOP's ability to respond to deviations in the voltage of the transmission system, potentially resulting in damage to the system or BPS instability. However, the heavy majority of instances, 294 instances, have been confirmed less than 1.8% outside of their voltage schedule with those excursions above 1% occurring at the JCT substation which, at the time of the excursions, had an average capacity factor of less than 1%.
48. Additionally, the TOP affected by the excursions is also TVA. TVA, as the TOP, also monitored the voltages at all sites for all excursions. As the TOP, TVA has alarm points for the BPS system voltages that, had they been exceeded, would have indicated a need to provide additional resources to maintain BPS reliability.
49. No harm is known to have occurred.

Mitigating Actions

50. On July 19, 2021, TVA submitted a Mitigation Plan to SERC, addressing the Alleged Violation of VAR-002-4.1 R2. See Mitigation Plan SERCMIT014534.
51. To mitigate the Alleged Violation, TVA performed the following actions:

Instance 1

- i. issued WBN Operations Shift Order 19-15 to reinforce with all licensed operators the requirements of VAR-002-4.1 and required all operators to re-review requirements for compliance;
- ii. revised Procedures 0-PI-OPS-1-S00KV and 0-ARI-509-516, and trained on the procedure revisions. These revisions provided clarification on which alarms are subject to VAR-002, and therefore the TOP notice requirement, and which alarms are governed by the more general Conduct of Operations;

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- iii. provided Lessons Learned document of violation shared across the fleet; and
- iv. submitted a Performance Analysis Worksheet to WBN Operations training to complete a design and analysis worksheet and determine recurring training periodicity to reinforce expectations.

Instance 2

- v. clarified voltage schedule excursion requirements- updated procedures and process 1-PI-OPS-000-020.1 & 2-PI-OPS-000-022.1, Operator At The Controls Duty Station Checklists Modes 1-4 to further clarify voltage schedule excursion reporting requirements;
- vi. created Lessons Learned document on the noncompliance;
- vii. briefed all affected personnel- Briefed all SQN site operators on the violation and on the Lessons Learned document; and
- viii. shared Lessons Learned document with Fleet-sent Lesson Learned document of the violation to the other two nuclear sites and to Power Operations for them to brief operations personnel.

Instances 3, 4, and 6

- ix. implemented Interim Voltage Schedule Monitoring Process-JCT utilizing the Transmission's Voltage Schedule webpage to monitor the Plant's Voltage manually checking and recording voltage every hour and reporting to the TOP when voltage is out of tolerance band;
- x. implemented Interim Quarterly Oversight which includes an interim quarterly oversight process for JCT voltage excursions until alarm response system is returned to service and the process has quarterly action to report results;
- xi. conducted similar sites review extent-of-condition which included a review of similar gas sites tied to fossil plants to verify separate alarm systems were installed;
- xii. conducted VAR-002 Retraining which set expectation and retrained JCT personnel on GOP voltage monitoring and notification requirements in VAR-002 and retrained JCT personnel on VAR-002 procedures;
- xiii. conducted JCT Voltage Excursions Review extent-of-condition;
- xiv. updated New Hire Checklist which included an additional of VAR-002 expectation, training and webpage access to JCT new hire checklist;
- xv. reviewed training in LMS #50000899 - TVA GOP, TOP, and NRC&S review of LMS #50000899, Generator Operator Voltage Schedule Adherence (NERC Standard VAR-002) to verify if any changes are required or recommended;

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- xvi. implemented changes identified to the active course - If changes were made to LMS #50000899 MP item #15, then implement changes to the active course; and
- xvii. implemented Voltage Monitoring Project at JCT - Scope Project to Re-Install JCT MCR 161 kV and 500 kV Voltage Monitoring and Alarms.

Instance 5

- xviii. Nickajack Hydro (NJH) voltage excursion alarm restored to the HDCC Incoming Alarm Screen;
- xix. Extent of Condition of NJH voltage excursions during the period the NJH voltage excursion alarm was not alarming on the HDCC Incoming Alarm Screen; and
- xx. Review HDCC Software Update Process and revise as necessary - Review HDCC Software Update Process and revise as necessary to include re-establishing settings reset to default conditions associated with implementing software updates.

Program wide actions – Instances 1, 2, 3, 4, 5, and 6

- xxi. Required generator operating sites to sign attestations certifying they actively monitor their switchyard voltages.

TVA certified to SERC it had completed the Mitigation Plan on February 2, 2022. SERC will verify TVA's completion of mitigating actions and promptly report its successful completion to NERC

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II. ALLEGED VIOLATION – SERC2021025211

A. PRC-005-6 R3

1. PRC-005-6 ensures documentation and implementation programs for the maintenance of all Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying affecting the reliability of the Bulk Electric System (BES) so that they are kept in working order.
2. PRC-005-6 R3 states:

R3. Each Transmission Owner, Generator Owner, and Distribution Provider that utilizes time-based maintenance program(s) shall maintain its Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components that are included within the time-based maintenance program in accordance with the minimum maintenance activities and maximum maintenance intervals prescribed within Tables 1-1 through 1-5, Table 2, Table 3, Table 4-1 through 4-3, and Table 5.
3. TVA self-reported to SERC that it was noncompliant with PRC-005-6 R3. TVA failed to maintain its Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components that are included within the time-based maintenance program in accordance with the minimum maintenance activities and maximum maintenance intervals prescribed within Tables 1-4, 1-5, and Table 3.
4. SERC determined that the noncompliance extended back to PRC-005-2.
5. On May 14, 2020, during a review of drawings to prepare a work plan for routine preventative maintenance at Ackerman Combined Cycle plant (AKC), TVA discovered that two excitation transformer protective relays, two lock out relays (LORs), and associated trip paths to the generators, had not been identified as PRC-005-6 assets and tested (Instance 1).
6. AKC is a two-on-one 874 MVA combined cycle facility with a 52% annual capacity factor. The facility consists of two combustion turbines (300 MVA each) and one steam turbine (274 MVA). TVA acquired plant site 1 on April 14, 2015.
7. The work plans at AKC address relays, LORs, trip coils, control circuitry, and instrument transformers, and included such components for excitation transformers. However, because TVA failed to identify the previously referenced excitation transformer protective relays, LORs, and trip paths to the generators as PRC-005-6 Table 1-5 assets, they were not included in TVA's PRC-005 maintenance and testing program.
8. On October 10, 2020, TVA tested and documented the missed excitation transformer protective relays, LORs, and trip paths to the generators.
9. On December 15, 2020, TVA completed an extent of condition (EOC) review,

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which consisted of a reexamination of all excitation transformer feeder protection systems at all other TVA non-nuclear generation facilities. TVA did not identify any additional instances of noncompliance.

10. The root cause of Instance 1 was an ineffective internal control. During the acquisition, TVA relied on a deficient one line diagram from the previous owner to determine maintenance needs. The deficient one line diagram failed to illustrate the control circuits from the excitation transformer feeder overcurrent protection on the single line drawings obtained from the previous owner of the AKC. TVA's internal controls for its acquisition process allowed the usage of the unverified one line diagram rather than verifying it through hands-on relay testing.
11. On November 3, 2020, during a random sampling of PRC-005 compliance, TVA discovered missed maintenance at the Cumberland Fossil Plant (CUF). TVA failed to verify battery continuity or battery terminal connection resistance for all 205 volt batteries within 18 calendar months in accordance with Table 1-4(a) (Instance 2).
12. CUF is a fossil plant with two individual units, CUF1 and CUF2, each with a nameplate rating of 1,444 MVA.
13. Prior to the discovery, the last 18 calendar month maintenance activity occurred during November 2018. The next maintenance should have occurred on or before April 30, 2020.
14. On November 23, 2020, TVA performed the 18 calendar month inspection and verification testing at CUF. No abnormal issued were discovered during this maintenance.
15. On November 3, 2020, TVA discovered that Lagoon Creek Combustion Turbine Plant (LCT) had failed to verify the 125 volt battery terminal voltage during its previous four calendar month maintenance activity per Table 1-4(a) (Instance 3).
16. The last four calendar month maintenance activity occurred in May 2020, and the next maintenance should have occurred on or before September 30, 2020.
17. On November 13, 2020, LCT verified the 125 volt battery terminal voltage and updated the appropriate maintenance record.
18. On August 3, 2021, TVA began an EOC review for Instances 2 and 3. The EOC reviewed a representative sample of maintenance activities at the sampled sites. Due to the size and complexity of the TVA footprint, TVA continued to take periodic samples of maintenance records with the eventual goal of a full system review. A later periodic review discovered issues which were submitted as an expansion of scope.
19. The root cause of Instances 2 and 3 was the lack of an internal control. Specifically, the work orders for these instances did not identify each maintenance task required and the subsequent documentation required. TVA identified this failure to

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appropriately identify individual tasks as a corporate oversight at the affected sites and communicated the oversight to the plants.

20. On January 11, 2021, during a review of completed PRC-005 R3 work orders, TVA discovered at Sequoyah Nuclear Plant (SQN) that the required testing on PRC-005-6 R3 assets associated with a relay terminal on a 161kV line had not been completed within six calendar years after commissioning, in accordance with Table 3. These assets include three protective relays and LOR (Instance 4).
21. The relay terminal had an initial test date of October 9, 2014. At that time, TVA mistakenly flagged the maintenance frequency to 48 months instead of the 60 months.
22. In 2016, TVA changed the maintenance schedule from 48 months to 60 months. However, when updating the system, an error was made in entering the due date. Instead of setting the due date to October 9, 2020, the maintenance engineer made a typo and set the due date for 2021. The 2021 date is ten months beyond the regulatory 6th calendar year due date of December 31, 2020.
23. On February 24, 2021, the transmission relay group completed the relay testing of the relay terminal and all associated relays for the 161kV line. No issues were discovered during the testing.
24. On July 30, 2021, work systems personnel performed an EOC review, which consisted of a review of all relay terminals and associated relays at SQN, and confirmed there were no additional instances of noncompliance.
25. The root cause of Instance 4 was a lack of an internal control. TVA did not have an internal control in place to examine performance and scheduled work order dates to identify intervals that have been potentially compromised.
26. On July 31, 2021, TVA submitted an expansion of scope related to error in its maintenance tracking software. It missed battery four month battery maintenance at Allen Fossil Plant (AF), Widows Creek Fossil Plant (WCF), Battery Hill Substation (BH), Franklin Substation, and Harriman Substation in accordance with Table 1-4(a) (Instance 5).
27. At AF, the in service date for 250 V station battery was on April 17, 2017, but it did not received its next maintenance until October 4, 2018.
28. At the same station, the in service date for 161kV switchyard battery was on September 19, 2017, but it did not receive its next maintenance until September 5, 2018.
29. At WCF, the in service date for the 161 kV 250 station battery was on September 1, 2017, but it did not receive its next maintenance until June 18, 2018.
30. At the same station, the in service date for both 500 kV station battery A and B was

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on January 22, 2018, but they did not receive its next maintenance until March 22, 2021 as TVA was conducting the EOC for this instance.

31. At BH, the in service date for battery 87 on the 161kV switching station was on March 15, 2017, but it did not receive its next maintenance until December 6, 2018.
32. At the same station, the in service date for battery 88 on the 161kV switching station was on May 1, 2017, but it did not receive its next maintenance until December 6, 2018.
33. At Franklin, the in service date for battery at the 161 kV switching station was on September 25, 2017, but it did not receive its next maintenance until March 27, 2018.
34. At Harriman, the in service date for battery at the 161 kV switching station was on October 12, 2019, but it did not receive its next maintenance until June 16, 2020.
35. TVA continued to perform a review of representative sampled stations in the PRC-005 program. The samples were reviewed on a weekly basis and consists of comparing the works orders of a representative sample to the tracking and management software system. TVA discovered no additional instances of missed maintenance.
36. The root cause of Instance 5 was an inadequate internal control. The internal control at the time of these occurrences required multiple handoffs and the tracking and management software allowed records to closeout with incomplete data. In turn, the closeout of these records with incomplete data allowed maintenance notifications to either be late or missing entirely. TVA had previously identified the internal control as inadequate and replaced it in December of 2019, which prevented new instances of missed maintenance but failed to identify ongoing issues.
37. On September 30, 2021, TVA submitted second expansion of scope related to its Paradise Fossil (PF) plant (Instance 6)].
38. PF consists of four combined cycle units, three of which have a nameplate rating of 276 MVA, and one unit with a rating of 561 MVA. The average capacity factor for the units is at 61.1%.
39. While performing the representative sampling review as part of mitigation for Instance 5, TVA discovered one vented lead acid (VLA) battery at PF did not have documentation for all maintenance activities as required by Table 1-4(a).
40. In June of 2018, TVA performed its 18-month maintenance in accordance with Table 1-4a. The next scheduled maintenance should have occurred on or before December 31, 2019. TVA completed maintenance on June 25, 2020, but failed to verify the battery terminal connection in accordance with Table 1-4(a).

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41. On August 24, 2020, TVA completed the verification of the battery terminal connection.
42. TVA continued to complete periodic reviews of representative samples.
43. On December 31, 2021, TVA reported that on September 22, 2021, during the review of representative samples, TVA discovered that three protective relays at PF set to protect the common station service transformer (CSST) B also protect a bus with a radial line that feeds CSST B. TVA did not identify these relays as a PRC-005 assets, and test documentation was not sufficient to demonstrate compliance with Table 1-5 (Instance 7).
44. In 2018, CSST B protection system was maintained under an appropriate work order. Although the work order was generated and marked as complete, no evidence was attached to the order to show all requirements of PRC-005 were met.
45. On November 29, 2021, all three protective relays received maintenance which brought the plant site 5 back into compliance with PRC-005-6.
46. On March 31, 2022, TVA completed its EOC review, which consisted of reviewing all sites that contained BES Generation and all BES transmission sites that were in-service and part of the initial walkdown effort. The review was performed by checking the Dispatch Single Line (DSL) drawings to search for any radial feeds that were connected to a BES conductor. If any site had such a radial feeder, then a review to determine if the protection systems for the BES element that supplied the radial was included in the inventory of PRC-005 devices.
47. In addition to plant PF, the EOC discovered additional instances at Bull Run Fossil (BRF) Plant and Kingston Fossil Plant (KFP). Following the discovery of the missed assets, maintenance was performed at BRF and KFP and the equipment at both sites was added to the maintenance program.
48. The root cause of Instance 7 was a lack of an internal control. TVA failed to have an internal control in place to recognize ownership, and therefore responsibly of maintenance, on equipment at sites with ownership shared between TVA generation and TVA transmission. In this specific instance, TVA Power Operations (generation) owned the site and the relays, but transmission did not recognize TVA's maintenance obligations that applied due to transmission's reliance on the relays for protection of the transmission assets.
49. This Alleged Violation began on April 14, 2015, when TVA failed to perform maintenance in Instance 1, and ended on December 21, 2021, when TVA completed the last of its missed maintenance in Instance 7.
50. This Alleged Violation posed a moderate risk and did not pose a serious or substantial risk to the reliability of the Bulk-Power System (BPS).
51. TVA's failure to maintain the generator preventative maintenance could have

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caused the generators to not trip under a fault condition possibly causing damage to the generators (Instances 1-6). However, TVA reduced the risk because preventative maintenance was performed under non-NERC maintenance program. While the non-NERC program is line with PRC-005 for maintenance requirements, its evidence requirements are less than required by NERC Standards. For instance, the non-NERC program did not always require documentation of visual inspections which directly led to instances of noncompliance with the 18-month maintenance records.

52. TVA's failure to properly maintain its batteries could have caused protection system to not properly operate thus causing generating units to trip off line and impacting the reliability of the BPS (Instances 2, 3, 5, and 6). However, the majority of battery maintenance activities were verified in a non-NERC maintenance program. Additionally, the majority of systems with missed maintenance were new equipment which limits the potential of failure.
53. TVA's failure to properly maintain its 161kV line relays within the maximum interval could have caused the relays to not operate properly, thus causing the protection systems to fail (instance 4, 5, and 7). However, the risk was reduced because the protective relays were new microprocessor-based models, and maintenance had been recently completed on the associated circuit breaker.
54. TVA's failure to properly maintain its common station service transformer relays within the maximum interval could have caused the relays to not operate properly, thus potentially impacting various transmission BES elements and potentially causing reliability concerns for the BPS. However, the risk was limited to radial lines at the substation.
55. No harm is known to have occurred.

Mitigating Actions

56. On April 28, 2022, TVA submitted a Mitigation Plan to SERC, addressing the Alleged Violation of PRC-005-6 R3. On June 2, 2022, SERC accepted the Mitigation Plan.
57. To mitigate this Alleged Violation, TVA has performed, or will perform, the following actions:

Instance 1

- i. added the excitation transformer protection for unit 1 and unit 2 to the NERC PRC-005-6 PM program;
- ii. tested the control circuit and LOR at AKC;
- iii. reexamined excitation transformer feeder protection systems at all other TVA non-nuclear generation facilities; and

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- iv. updated Single line drawings for the AKC facility to reflect the trip function from the excitation transformer feeder overcurrent protection relays to the units;

Instances 2 and 3

- v. verified battery terminal voltage;
- vi. updated PM battery performance needs in maintenance software;
- vii. performed training for Preventive Maintenance (PM) personnel with an emphasis importance of verifying all activities are completed on NERC Battery Inspection forms;
- viii. updated battery inspection forms;
- ix. performed training with Asset Support or Outage support to ensure that forms are automatically linked to work orders; and
 - completed an instance of the EOC with additional periodic instances to continue;

Instance 4

- x. completed testing of relay terminal; and
- xi. created and piloted and potential Internal Control to monitor last test date or In Service Date versus Next Late Date;

Instance 5

- xii. performed and tested maintenance on all nine batteries;
- xiii. implemented a process to ensure that the PM ticket for NERC Station dc Supply systems is created before In Service Date; and
- xiv. trained responsible personnel on any additional action items per 'TO four month MA2' to ensure proper PM;

Instance 6

- xv. completed the PRC-005 Table 1-4a 18 month minimum maintenance activities, which brought the PRC-005 device back into compliance by meeting all required maintenance activities; and
- xvi. completed an instance of the EOC with additional periodic instances to continue

Instance 7

- xvii. completed testing required to remediate three devices for PAF Common Station Service Transformer B to a compliant state;

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xviii. established NERC PM Designation for applicable Relay Terminals at affected plants;

xix. completed reviews of TVA agency and BU procedures and processes to determine changes needed; and

xx. created an updated procedure focusing on maintenance needs of relays with multiple examples and evidential needs throughout;

To mitigate this Alleged Violation, TVA will perform the following actions related to its overall PRC-005 program:

xxi. complete reviews and revise all procedures within the PRC 005 program and create Training Modules; and

xxii. issue revisions to PRC-005 wide procedures updates and train affected personnel

SERC accepted TVA's Mitigation Plan on June 2, 2022, including future actions to be performed. SERC will verify TVA's completion of mitigating actions, currently scheduled to conclude in August of 2023, and promptly report its successful completion to NERC.

VIEW SELF-REPORT: VAR-002-4.1 R2. (COMPLETED)

This item was submitted by Gabe Kurtz (bgkurtz@tva.gov) on 7/2/2019

Please note that the circumstances under which an Entity would submit a Scope Expansion form are different from what would require a new Self-Report. Please review the material in [this link](#) to see clarifying information and examples of these differences before continuing with this form.

FORM INFORMATION

Registered Entity: Tennessee Valley Authority

NERC Registry ID: NCR01151

JRO ID:

CFR ID: CFR00135

Entity Contact Information: Gabe Kurtz

REPORTING INFORMATION

Applicable Standard: VAR-002-4.1

Applicable Requirement: R2.

Applicable Sub Requirement(s):

Applicable Functions: GOP

Has a Possible violation of this standard and requirement previously been reported or discovered: Yes

If yes, provide NERC Violation ID (if known):

SERC2015015428

Date Reported to Region or Discovered by Region:

6/19/2017

Monitoring Method for previously reported or discovered:

Self-Report

Has this Possible Violation previously been reported to other Regions: No

Date Possible Violation was discovered: 5/14/2019

Beginning Date of Possible Violation: 4/16/2019

End or Expected End Date of Possible Violation: 4/30/2019

Is the violation still occurring? No

Provide detailed description and cause of Possible Violation:



Per TVA Transmission guidance to meet VAR-002 switchyard voltage schedule compliance, when a switchyard voltage excursion alarm is received, the unit operator has 30 minutes to bring the switchyard voltage back within the voltage schedule. If they can't bring the voltage back within the schedule within this 30 minute timeframe, the Nuclear Unit Senior Operators are required to notify the Transmission Operator of the excursion. If the alarm is out of service, the operators switch to documenting hourly switchyard voltage readings. If an hourly reading shows the switchyard voltage is out of schedule (SI0kV - 530kV), the unit operator has 30 minutes to bring the switchyard voltage back within the voltage schedule. If they can't bring the voltage back within the schedule within this 30 minute timeframe, the Nuclear Unit Senior Operators are required to notify the Transmission Operator of the excursion.

At approximately 5:14 pm on 4/16/2019, the WBN switchyard voltage alarm was received. The unit operator was unable to bring the voltage back into schedule and made the required Transmission Operator notification which was logged at 5:15 pm. At this point, the operators transitioned to taking manual hourly switchyard voltage readings. At 9:15 pm, the operator logged the switchyard voltage to be 529.2kV, which is back within schedule. At 10:15 pm, the operator logged the switchyard voltage to be 531.4kV, which is back out of schedule and required a notification to the Transmission Operator. However, no notification was made.

This same set of circumstances occurred again on 4/21/2019 with no Transmission Operator notification made for the voltage excursion logged at 8:26 pm, and on 4/30/2019 with no Transmission Operator notification made for the voltage excursion logged at 11:05 pm.

The cause of these events to not inform the Transmission Operator was due to an incorrect assumption. The Main Control Room (MCR) Operators believed that if voltage was on the edge of the band, and would go back out again, that it was sufficient to continue taking hourly voltage readings, and not perform required notifications. WBN Operations leadership team issued Shift Order 19-15 to reinforce with all licensed operators the requirements of VAR-002-4.1. Recurring training in Licensed Operator requalification (LOR) is not currently assigned. A Performance analysis worksheet was submitted and actions are assigned to complete a design and analysis worksheet to add recurring LOR training to reinforce the expectations.

Are Mitigating Activities in progress or completed? Yes

 An informal Mitigation Plan will be created upon submittal of this Self-Report with mitigating activities. If you would like to formalize that Mitigation Plan, please contact the Region. 

If Yes, Provide description of Mitigating Activities:

WBN Operations Shift Order 19-15 was issued and required all operators to re-review requirements and ensure compliance. Procedures 0-PI-OPS-1-S00KV, and 0-ARI-509-516 have been revised, training has been scheduled to cover the procedure revisions. These revisions provided additional clarification and guidance to the required standards of VAR-002 and process to further clarify voltage schedule excursion reporting requirements. Provided Lessons Learned document of non-compliance that will be shared across the fleet.

Provide details to prevent recurrence:

Operations Shift Order 19-15 refreshed licensed Operator knowledge on the requirements. Updated procedures and process provide better guidance on how to address voltage schedule excursions. A Performance analysis worksheet (PAW) was submitted to WBN Operations training to complete a design and analysis worksheet and determine recurring training periodicity to reinforce expectations.

Date Mitigating Activities (including activities to prevent recurrence) are expected to be completed or were completed:

9/18/2019

MITIGATING ACTIVITIES

Title	Due Date	Description	Prevents Recurrence
Lessons Learned document	7/28/2019	Create Lessons Learned document (Shift Order 19-15) on the non-compliance and brief all WBN operators on it.	Yes
Share Lessons Learned document	7/28/2019	Send Lessons Learned document to the other two nuclear sites and to Power Operations for them to brief their operations personnel.	Yes
Clarify voltage schedule excursion requirements	7/28/2019	Update procedures and process to clarify voltage schedule excursion requirements.	Yes
Complete design and analysis for recurring LOR training	8/30/2019	Complete analysis and design worksheet to ensure VAR-002-4.1 training is scheduled on a recurring basis sufficient to maintain LOK. Validate ILT training covers this topic.	Yes
Cover procedure revisions in LOR changes lesson plan topic	9/18/2019	Cover the procedure revisions to O-PI-OPS-1-S00KV and 0-ARI-509-516 in LOR Changes lesson plan training.	Yes

Potential Impact to the Bulk Power System: Minimal

Actual Impact to the Bulk Power System: Minimal

Provide detailed description of Potential Risk to Bulk Power System:

There are two implications of operating outside the voltage schedule. Remaining below the minimum voltage can result in degraded BES reliability. Exceeding the high voltage boundary can result in BES and customer equipment damage. The main objective of voltage schedule adherence is to maintain BES reliability while meeting customer demand within the operating range of the equipment. A secondary objective is to minimize system losses by optimally coordinating the voltage schedule among the various generators.

While an isolated unit running below the low boundary of its voltage schedule could theoretically result in degraded BES reliability, the unit voltage schedule limits are more conservative than the BES alarm thresholds. The TVA Transmission Operators (TOP) have alarm points for the BES system voltages that, had they been exceeded, would have indicated a need to provide additional reactive power to maintain BES reliability. These alarms are triggered well before degraded BES reliability. TVA has numerous mechanisms to increase system voltage, including increasing reactive output of generators, removing shunt reactors from service, switching shunt capacitors and adjusting BES Load Tap Changing Transformers.

Conversely, an isolated unit running above the high voltage boundary could result in BES equipment damage, but as with running below the low boundary, the TVA TOP has alarm points for high BES system voltages that are outside the individual generator voltages schedule limits. These alarms would have triggered the TOP to reduce the system voltage by other means. These means include: reducing reactive output of the generator in question or other nearby generators, removing capacitor banks from service, placing shunt reactors in service, or adjusting BES Load Tap Changing Transformers. These alarms are triggered well before the equipment damage threshold.

As a Reliability Coordinator, TVA also maintains and operates a Real-Time Contingency Analysis (RTCA) application. RTCA evaluates each TVA and surrounding wide area contingency, for thermal as well as voltage exceedances. These limits are maintained and displayed on a common tool shared between the TVA RC and the TOP. Under normal system conditions, any identified N-1 voltage exceedance is mitigated before it becomes a real-time issue.

The voltage schedule excursion identified in this self report concerns a single unit running outside of schedule, but not outside the alarm limits for the BES system voltages. This unit does not operate in isolation, and is contained within the TVA BES footprint with many means of detecting and controlling voltage exceedances. Due to the fact that TVA had many reactive and voltage control devices at its disposal as well as access to historical correlated voltage data, it is the TVA TOP's judgment that the identified voltage excursions had minimal impact to the reliability of the BES.

Provide detailed description of Actual Risk to Bulk Power System:

There have been no indications of grid stability issues noted or documented as a result of the recorded voltage excursions. These voltage excursions did not exceed published equipment ratings.

Additional Comments:

NOTE: While submittal of a mitigation plan is not required until after a determination of a violation is confirmed, early submittal of a mitigation plan to address and remedy an identified deficiency is encouraged. Submittal of a mitigation plan shall not be deemed an admission of a violation. (See NERC Rules of Procedure, Appendix 4C, Section 6.4.)

VIEW SELF-REPORT: PRC-005-6 R3. (COMPLETED)

This item was submitted by Gabe Kurtz (bgkurtz@tva.gov) on 5/20/2021

Please note that the circumstances under which an Entity would submit a Scope Expansion form are different from what would require a new Self-Report. Please review the material in [this link](#) to see clarifying information and examples of these differences before continuing with this form.

FORM INFORMATION

Registered Entity: Tennessee Valley Authority

NERC Registry ID: NCR01151

JRO ID:

CFR ID: CFR00135

Entity Contact Information: Gabe Kurtz

REPORTING INFORMATION

Applicable Standard: PRC-005-6

Applicable Requirement: R3.

Applicable Sub Requirement(s):

Applicable Functions: GO; TO

Has a Possible violation of this standard and requirement previously been reported or discovered: No

Has this Possible Violation previously been reported to other Regions: No

Date Possible Violation was discovered: 5/14/2020

Beginning Date of Possible Violation: 1/1/2016

End or Expected End Date of Possible Violation: 10/10/2021

Is the violation still occurring? No

Provide detailed description and cause of Possible Violation:

Ackerman Combined Cycle Plant (AKC) - Applicable Function GO

Date Possible Violation was discovered: May 14, 2020

Beginning Date of Possible Violation: April 14, 2015

End / Expected End Date of Possible Violation: October 10, 2020

Discovery:

On 05/14/2020, drawing reviews to prepare a work plan for routine PRC-005-6 R3 Preventative Maintenance (PM) at TVA's Ackerman Combined Cycle plant (AKC) found that excitation transformer protective relays, LORs, and trip paths to the generators should have been identified as PRC-005-6 assets and had not been. No documentation was found to substantiate that the PRC-005-6 R3 required maintenance activities were completed within the maximum intervals.

Primary Causes:

This configuration was not recognized to be subject to PRC-005-6 because the control circuits from the excitation transformer feeder overcurrent protection relays were not illustrated on the single line drawings obtained from the previous owner of the AKC facility.

Internal controls:

PO.PRC-005.R3.002 (PO NERC Reliability provides and maintains the Evidence Checklists (for Protective Relay System PMs) and/or Battery Forms (for Battery Maintenance PMs) that list all requirements to verify work against the completion of the PM activity.) To complete the Evidence Checklist for a relay PM, step 7 of the evidence checklist requires all trip circuits for relays and electromechanical LORs directly in a tripping path from the protective relay to the interrupting device trip coil. During the PM preparation to perform step 7, it was discovered that the excitation transformer LOR to the respective generator LORs had not been previously recognized.

Background:

On 05/14/2020, drawing reviews to prepare a work plan for routine PRC-005-6 R3 PM at TVA's Ackerman Combined Cycle plant (AKC) were underway. The work plan addresses relays, lock-out relays (LOR), trip coils, control circuitry, and instrument transformers, and included such components for excitation transformers. PRC-005-6 applicable trip paths from each excitation transformer LOR to the respective generator LORs had not been previously recognized. Because the excitation transformer protective relays, LORs, and trip paths to the generators were not identified as PRC-005-6 assets, there is no documentation found to substantiate that the required activities were completed within the maximum intervals prescribed in PRC-005-6 R3.

Cumberland Fossil Plant (CUF) and Lagoon Creek Combustion Turbine Plant (LCT) - Applicable Function GO

Date Possible Violation was discovered: November 3, 2020

Beginning Date of Possible Violation: May 1, 2020

End / Expected End Date of Possible Violation: November 23, 2020

Discovery

TVA exceeded intervals on the following activities required under PRC-005-6.

- Cumberland Fossil Plant Unit 1 250V DC Battery did not have battery continuity or battery terminal connection resistance verified within 18 months in accordance with PRC-005-6 Table 1 4(a).
- Cumberland Fossil Plant Unit 2 250V DC Battery did not have battery continuity or battery terminal connection resistance verified within 18 months in accordance with PRC-005-6 Table 1 4(a).
- Lagoon Creek Combustion Turbine Plant 125V DC BOP Battery Bank Phase 1 did not verify station dc supply voltage within 4 months in accordance with PRC-005-6 Table 1 4(a).

These issues were discovered on November 3, 2020 as part of early proactive implementation in Power Operations (non-Nuclear generation) business unit of a random sampling process that is planned for all impacted TVA business units as a detective and preventive control for PRC-005 compliance. (See Internal Control PO.PRC-005.R3.007 below.)

Primary Causes

Two causes were identified for this violation.

1. The initial review and approval by Plant personnel of Battery PM Work Order forms did not identify that activities required to be performed were overlooked.
2. The initial work order execution gaps were identified in a corporate oversight review and communicated to the site; however, the recommendations lacked adequate follow up tracking to ensure completion.

Internal Controls:

- PO.PRC-005.R3.002 - PO NERC Reliability provides and maintains the Evidence Checklists (for Protective Relay System PMs) and/or Battery Forms (for Battery Maintenance PMs) that list all requirements to verify work against the completion of the PM activity.
- PO.PRC-005.R3.007 - PO NERC Reliability reviews a sample of the Maintenance Work completed. Any discrepancies identified are provided to the individual that performed the work (Plant, Field Service, Transmission Service Centers, or Contractors) to mitigate.

Background:

Cumberland Fossil Plant Unit 1 and Unit 2 did not measure AC Ripple Current or Terminal Resistance in accordance with the PM instructions. Discovery of the issue occurred in Internal Control PO.PRC 005.R3.007. While reviewing this non-compliance, it was found that the latest battery form was not being utilized to perform required activities. Failure to record Terminal Resistance had been noted before at other plants through application of PO.PRC-005.R3.007 and instructions had been clarified on the Battery Forms (internal control PO.PRC-005.R3.002). Further, it was found that the failure to perform required activities to measure AC Ripple Current and Terminal Resistance was discovered through application of PO.PRC-005.R3.007 and communicated to Cumberland Fossil Plant, but corrective actions were not taken.

Lagoon Creek Combustion Turbine Battery terminal voltage was not verified in the September 2020 4 month activity PM performance, but was measured in the May 2020 4 month PM performance. While the terminal voltage was not verified, each individual cell was verified to exceed its minimum cell voltage which cumulatively verifies the battery terminal voltage. This was found through application of PO.PRC-005.R3.007, but due to the short interval, corrective action was not able to be taken before the interval was exceeded.

Sequoyah Nuclear Plant (SQN) Transmission - Applicable Function TO

Date Possible Violation was discovered: January 11, 2021

Beginning Date of Possible Violation: January 1, 2021

End / Expected End Date of Possible Violation: February 24, 2021

Discovery:

On January 11, 2021, during a review of completed PRC-005-6 R3 work orders, TVA discovered that required testing on PRC-005-6 R3 assets associated with relay terminal, TOM-SQ-RLYT-102-S6058-006, SEQUOYAH NUCLEAR - HIWASSEE #2 161 KV LINE (954), had not been completed within 6 calendar years after commissioning. These assets include three PRC-005-6 R3 protective relays and a lockout relay (TOM-SQ-RLY-102-S6058-028, TOM-SQ-RLY-102-S6058-029, TOM-SQ-RLY-102-S6058-030, TOM-SQ-RLY-102-S6058-1643).

Primary Cause:

Human performance error

Internal Controls:

Future Internal Control Implementation – "SQN MA2 Pilot and potential Internal Control - Create tool for Work Systems (WS) to monitor last test date or ISD versus Next Late Date. Due 7/1/2021."



Background:

TOM-SQ-RLYT-102-S6058-006 has an initial test date of 10/9/2014 (ISD 10/16/2014). In 2016, transmission (TPS) personnel at the Sequoyah Nuclear Plant (SQN) sent Work Systems personnel an email stating that the non-plant related Preventive Maintenance (PM), including the mentioned relay terminal above, should be on a 60 month test frequency instead of a 48 month test frequency as discussed during that time.

Work Systems personnel canceled the open PM work order in 2016 and assigned what should have been the Late Date (10/9/2020) as the new Due Date causing the new calculated Late Date (10/9/2021) to be more than nine months beyond the regulatory 6th calendar year (12/31/2020). The SQN local personnel also did not recognize the mistake.

TVA Transmission PRC-005-2 (now PRC-005-6) program was effective on 10/1/2014, the relay terminal components were commissioned into compliance with PRC-005-6, so the PRC-005-6 Implementation milestone for 4/1/2021 has not been negated by this PNCI. The PRC-005-6 R3 assets listed above are subject to a maximum testing interval of 6 calendar years, making the first day of non-compliance 1/1/2021. Required 6-year interval activities for these assets were not completed on or before 12/31/2020 which was the last day of the specified interval based on the commissioning date.

Are Mitigating Activities in progress or completed? Yes

 An informal Mitigation Plan will be created upon submittal of this Self-Report with mitigating activities. If you would like to formalize that Mitigation Plan, please contact the Region. 

If Yes, Provide description of Mitigating Activities:

Ackerman Combined Cycle Plant (AKC)

The following mitigating activities will be performed to address the non-compliance, prevent recurrence, and verify extent of condition.

AKC MA1 - Add the Excitation Transformer protection for CTG 1 and CTG 2 to the NERC PRC-005-6 PM Program. Convert existing relay terminals to NERC PM relay terminals in tracking application. Completed on 05/19/2020.

AKC MA2 - Remediation Testing - As remediation, the control circuit and LOR at AKC were tested during outage AKCU02F20. As of 10/27/2020, this outage is complete and testing documents for all Preventive Maintenance activities completed during the outage are being compiled. Once compiled, the documentation of the remediated state of the subject components will be reviewed by Power Operations NERC Compliance staff. Completed on 10/10/2020.

AKC MA3 - Extent of Condition Review - As an extent of condition review, excitation transformer feeder protection systems at all other TVA non-nuclear generation facilities were reexamined. There were no Protection System configurations similar to the condition reported at the AKC facility. Completed on 12/15/2020.

AKC MA4 - AKC Drawing Update - Single line drawings for the AKC facility will be updated to reflect the trip function from the excitation transformer feeder overcurrent protection relays to the units. Any other Protection System documentation inaccuracies identified will be addressed updated drawings. Completed on 4/19/2021.

Cumberland Fossil Plant (CUF) and Lagoon Creek Combustion Turbine Plant (LCT)

To correct the non-compliance, mitigating activities 1 and 2 will perform the activities that were overlooked.

CUF_LCT MA1 - LCT Battery terminal voltage verified - Lagoon Creek Combustion Turbine September 2020 PM performance needs to be updated with the Battery terminal voltage verified. Completed on 11/13/2020.

CUF_LCT MA2 - CUF 2020 Battery PM Update - Cumberland Fossil 2020 annual battery PM performance needs to be updated with the AC ripple current and terminal

resistance measured. Completed on 11/23/2020.

Mitigating activities 3, 4, and 5 address primary cause 1 by providing operational experience describing the issue and corrections, battery forms were updated with a review checklist and PM work orders were updated so that the latest battery form is attached to the work order.

CUF_LCT MA3 - Generate OE - Generate Operational Experience (OE) emphasizing importance of verifying all activities are completed on NERC Battery Inspection forms and importance of using most recent Battery Inspection forms. Completed on 12/11/2020.

CUF_LCT MA4 - Update Battery Inspection Forms - Update review section of each battery inspection form listed below to include a checklist of NERC activities to verify as completed.

- 21081 - COAL & GAS QUARTERLY BATTERY INSPECTION
- 21082 - COAL & GAS ANNUAL BATTERY INSPECTION
- 21051 - QUARTERLY BATTERY INSPECTION
- 21071 - ANNUAL BATTERY INSPECTION VENTED LEAD ACID BATTERY

Completed on 12/17/2020.

CUF_LCT MA5 - Link Forms to PM Work Orders - Work with Asset Support or Outage support to ensure that ECM forms are automatically linked to work orders. Completed on 01/19/2021.

Mitigating activities 6 and 7 address primary cause number 2. Action 6 will establish a process to create an action when feedback was provided to a plant and hold the action open until the feedback is addressed by the plant. Action 7 will review a sampling of feedback provided to a plant and verify that the feedback was acted on as an extent of condition.

CUF_LCT MA6 - Extent of Condition Review - A representative sample of feedback provided via internal control PO.PRC-005.R3.007 will be verified to ensure corrective activities were performed. Due on 08/18/2021.

CUF_LCT MA7 - Review Response Action Tracking - Establish a process to track comments against PM work orders that are reviewed and found with a discrepancy, are addressed, and/or corrected. Due on 09/12/2021.

Sequoyah Nuclear Plant (SQN) Transmission

SQN MA1 - Complete testing of relay terminal TOM-SQ-RLYT-102-S6058-006, SEQUOYAH NUCLEAR - HIWASSEE #2 161KV LINE (954). Complete PM (79771), WO (120798838), to remediate the relays to a compliant state to minimize risk to the BES. PM 79771 was completed on 2/24/2021.

SQN MA2 - Pilot and potential Internal Control - Create tool for Work Systems (WS) to monitor last test date or ISD versus Next Late Date. Due on 7/1/2021.

SQN MA3 - Complete EOC - WS will continue to use the created tool developed under SQN MA2 and verify from 5/1/2021 to 7/30/2021 to ensure that there are no past or further violations. Due on 8/13/2021.

Provide details to prevent recurrence:

Ackerman Combined Cycle Plant (AKC)

AKC MA3 - extent of condition review ensured that no other excitation transformer protection was shown on secondary drawings, but not the main single line drawings and will prevent recurrence of the primary cause.

AKC MA1 - adds the Excitation Transformer protection for CTG 1 and CTG 2 to the NERC PRC-005-6 PM Program so it will be maintained within minimum activity and maximum interval requirements of PRC-005-6 R3.

Internal controls PO.PRC-005.R3.002 (PO NERC Reliability provides and maintains the Evidence Checklists (for Protective Relay System PMs) and/or Battery Forms (for Battery Maintenance PMs) that list all requirements to verify work against the completion of the PM activity.) prevents recurrence by requiring all trip circuits for relays and electromechanical LORs directly in a tripping path from the protective relay to the interrupting device trip coil. Drawing reviews to develop work plans for the PM activity will prevent recurrence.

Cumberland Fossil Plant (CUF) and Lagoon Creek Combustion Turbine Plant (LCT)

Mitigating activities 3,4, and 5 prevent the recurrence by creating OE to educate stakeholders, adding checks on the battery inspection form to aid in reviews, and linking updated forms to the work orders to make it as easy to use the most current form as possible.

Mitigating activity 7 will prevent recurrence by providing an action for tracking the feedback with a due date prior to the maximum interval date so that feedback that is provided is tracked to completion.

Sequoyah Nuclear Plant (SQN) Transmission

TVA is evaluating use of a reporting tool that examines performance and scheduled work order dates to identify intervals that have been potentially compromised such as in this case.

Date Mitigating Activities (including activities to prevent recurrence) are expected to be completed or were completed:

10/15/2021

MITIGATING ACTIVITIES			
Title	Due Date	Description	Prevents Recurrence
CUF_LCT MA6 - Extent of Condition Review	8/18/2021	CUF_LCT MA6 - Extent of Condition Review - A representative sample of feedback provided via internal control PO.PRC-005.R3.007 will be verified to ensure corrective activities were performed.	No
CUF_LCT MA7 - Review Response Action Tracking	9/12/2021	CUF_LCT MA7 - Review Response Action Tracking - Establish a process to track comments against PM work orders that are reviewed and found with a discrepancy, are addressed, and/or corrected.	Yes
SQN MA2 - Pilot and potential Internal Control	7/1/2021	SQN MA2 - Pilot and potential Internal Control - Create tool for Work Systems (WS) to monitor last test date or ISD versus Next Late Date.	Yes
SQN MA3 - Complete EOC	8/13/2021	SQN MA3 - Complete EOC - WS will continue to use the created tool developed under SQN MA2 and verify from 5/1/2021 to 7/30/2021 to ensure that there are no past or further violations.	Yes

Potential Impact to the Bulk Power System: Minimal

Actual Impact to the Bulk Power System: Minimal

Provide detailed description of Potential Risk to Bulk Power System:

Ackerman Combined Cycle Plant (AKC)

Ackerman Combined cycle does not have evidence that CTG Unit 1 and CTG Unit 2 Excitation Transformer Protection relays, lockout relays, and control circuits were maintained to minimum activities required from April 14, 2015 until remediation on October 10, 2020. Protection was in service and functional during the non-compliance period. PMs were performed under non-NERC PM program which is similar to NERC PM program, however, evidence is not maintained to NERC PM program standards.

As reported in TVA's 9/30/2020 Summer Net Capability, Ackerman Combined Cycle is 1 Steam Turbine generator driven by 2 combustion turbines. This generation represents 713 MW of a total TVA Operated Generating Facilities 32,750 MW or 1% of Total net Capability of TVA-Operated Generating Facilities.

Cumberland Fossil Plant (CUF) and Lagoon Creek Combustion Turbine Plant (LCT)

At CUF, the BES protective relaying is energized by a 250V DC power system. The primary power source of 250VDC is a battery charger with a battery in parallel for charger failures. Because the 18 month verification of battery continuity was not performed within the maximum interval, there was no verification that the batteries would have provided power to protective relaying were the primary battery charger to fail to provide 250V DC power. A manual transfer switch to cross tie battery boards and a standby battery and charger were available at the plant if a battery failed.

At LCT, the BES protective relaying is energized by a 125V DC power system. The primary power source of 125V DC is a battery charger with a battery in parallel for charger failures. The overall battery terminal voltage was not verified, but each individual cell was verified to exceed its minimum cell voltage which cumulatively verifies the battery terminal voltage. Based on this, there was no potential risk to the BES caused by not verifying battery terminal voltage.

Sequoyah Nuclear Plant (SQN) Transmission

The protective relays were new microprocessor-based models, and maintenance had been recently completed on the associated circuit breaker that included electrically tripping the breaker.

Provide detailed description of Actual Risk to Bulk Power System:

Ackerman Combined Cycle Plant (AKC)

There have been no known required trips involving the excitation transformer that didn't occur associated with AKC CTG units 1 or 2 due and no equipment failures were found during mitigating activities due to the condition identified in this self report.

Cumberland Fossil Plant (CUF) and Lagoon Creek Combustion Turbine Plant (LCT)

At CUF, eleven events categorized as Controlled Shutdowns, Forced Outages, Unit Trips, Loss of Redundancy, or Threat to Generation occurred during the non-compliance interval of 5/1/2020 - 11/23/2020. None of these events were caused by or contributed to by the Failure to verify AC ripple current and terminal resistance for unit 1 250V DC battery and unit 2 250V DC battery.

At LCT, no events categorized as Controlled Shutdowns, Forced Outages, Unit Trips, Loss of Redundancy, or threat to generation occurred during the non-compliance interval of 10/1/2020 - 11/18/2020.

Sequoyah Nuclear Plant (SQN) Transmission

No known misoperation on this equipment due to exceeding maintenance interval. Testing completed within 2 months after non-compliance date of 1/1/2021.

Additional Comments:

NOTE: While submittal of a mitigation plan is not required until after a determination of a violation is confirmed, early submittal of a mitigation plan to address and remedy an identified deficiency is encouraged. Submittal of a mitigation plan shall not be deemed an admission of a violation. (See NERC Rules of Procedure, Appendix 4C, Section 6.4.)