

July 31, 2018

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. NP18-_000**

Dear Ms. Bose:

The North American Electric Reliability Corporation (NERC) hereby provides this Notice of Penalty¹ regarding Tennessee Valley Authority (TVA), NERC Registry ID# NCR01151,² with information and details regarding the nature and resolution of the violation³ discussed in detail in the Settlement Agreement attached hereto (Attachment A), 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)).⁴

¹ *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards* (Order No. 672), III FERC Stats. & Regs. ¶ 31,204 (2006); *Notice of New Docket Prefix "NP" for Notices of Penalty Filed by the North American Electric Reliability Corporation*, Docket No. RM05-30-000 (February 7, 2008). See also 18 C.F.R. Part 39 (2017). *Mandatory Reliability Standards for the Bulk-Power System*, FERC Stats. & Regs. ¶ 31,242 (2007) (Order No. 693), *reh'g denied*, 120 FERC ¶ 61,053 (2007) (Order No. 693-A). See 18 C.F.R. § 39.7(c)(2).

² TVA was included on the NERC Compliance Registry as a Balancing Authority, Distribution Provider, Generator Owner (GO), Generator Operator, Planning Authority, Reliability Coordinator, Resource Planner, Transmission Owner (TO), Transmission Operator, Transmission Planner, and Transmission Service Provider on May 31, 2007.

³ 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.

⁴ See 18 C.F.R. § 39.7(c)(2) and 18 C.F.R. § 39.7(d).

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NERC is filing this Notice of Penalty with the Commission because SERC Reliability Corporation (SERC) and TVA have entered into a Settlement Agreement to resolve all outstanding issues arising from SERC's determination and findings of a violation of PRC-005-1 R2.

According to the Settlement Agreement, TVA neither admits nor denies the violation, and has agreed to mitigate the instant violation and to ensure future compliance under the terms and conditions of the Settlement Agreement.

On August 22, 2014, in *Southwestern Power Administration (SWPA) v. FERC*,⁵ the United States Court of Appeals for the District of Columbia Circuit ruled that FERC, and by extension NERC and the Regional Entities it oversees, could not impose monetary penalties against federal government registered entities. TVA is a federal government registered entity, and SERC and NERC are bound to follow *SWPA v. FERC* in resolution of this matter. Therefore, SERC proposed no monetary penalty for the violation. If SERC could have assessed a financial penalty, it would have determined a penalty of \$852,000 for this violation.

Statement of Findings Underlying the Violation

This Notice of Penalty incorporates the findings and justifications set forth in the Settlement Agreement, by and between SERC and TVA. The details of the findings and basis for the penalty are set forth in the Settlement Agreement and herein. This Notice of Penalty filing contains the basis for approval of the Settlement Agreement by the NERC Board of Trustees Compliance Committee (NERC BOTCC).

In accordance with Section 39.7 of the Commission's regulations, 18 C.F.R. § 39.7 (2018), NERC provides the following summary table identifying each violation of a Reliability Standard resolved by the Settlement Agreement. Further information on the subject violation is set forth in the Settlement Agreement and herein.

⁵ *Southwestern Power Administration v. FERC*, 763 F.3d 27 (D.C. Cir. 2014).

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* 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*	Violation Start-End Date	Risk	Penalty Amount
SERC2015014914	PRC-005-1	R2	High/ Lower	GO, TO	SR 5/7/2015	6/18/2007- 8/4/2017	Serious	Non- monetary Sanctions

SERC2015014914 PRC-005-1 R2 - OVERVIEW

On February 10, 2015, SERC sent TVA an audit detail letter notifying TVA of a Compliance Audit scheduled to begin on May 11, 2015. TVA discovered this violation on April 14, 2015, while preparing for the audit, and found additional instances of noncompliance while performing an extent of condition review as part of its Mitigation Plan.

Shortly before and then following the Compliance Audit, TVA submitted a series of Self-Reports stating that it was in violation of PRC-005-1.1b R2. TVA failed to test and maintain several Protection System devices, including relays, batteries, DC control circuitry, and voltage and current sensing devices within the defined intervals. Some of the Protection System devices had not been tested since they were installed, which occurred before the Reliability Standard became mandatory and enforceable.

To evaluate the violation, SERC randomly sampled approximately 10 percent of TVA's Protection System device inventory, revealing additional instances of missed maintenance and testing. To mitigate this violation, TVA performed a PRC-005 asset inventory verification for all of its transmission and generation sites. TVA reported to SERC that it could not provide evidence that it tested and maintained 1,917 of 45,868 Protection System devices (4.2 percent) within the defined intervals.

TVA determined multiple causes of this violation:

1. failing to have mechanisms in place to capture all installed Protection System devices in its asset management system;
2. failing to identify PRC-005 applicability upon acquiring new assets and during ownership transitions;
3. failing to establish a consistently repeatable process for handing deferral, cancellation, or partial completion of work orders;
4. failing to recognize data retention requirements; and

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5. failing to verify test intervals were correctly applied during program changes.

SERC determined this violation posed a serious risk to the reliability of the bulk power system (BPS). TVA's failure to maintain and test Protection System devices within the defined intervals could lead to devices not operating as intended, potentially leading to false trips, remote clearing, delayed clearing, the overreach of protective relays, a loss of generating units, or reliance on other registered entities' Protection System devices to respond to a fault. The devices identified were associated with transmission and generation facilities across TVA's footprint, including multiple 161 kV, 230 kV, and 500 kV substations and switching stations and multiple coal, gas, hydro, and nuclear generation plants with a collective generation capacity of approximately 29,000 MW out of TVA's total generation capacity of approximately 36,400 MW.

TVA submitted its Mitigation Plan on September 23, 2016, to address the referenced violation.

To mitigate this violation, TVA:

1. performed asset inventory verification for all transmission and generation sites;
2. conducted required preventive maintenance on identified devices;
3. reviewed relevant change management processes;
4. reviewed and revised relevant procedures and instructions;
5. developed and deployed training for applicable personnel; and
6. created a PRC-005 NERC asset repository.

TVA certified that it had completed all mitigation activities. SERC verified that TVA had completed all mitigation activities as of August 4, 2017. Attachment A to the Settlement Agreement provides specific information on SERC's verification of TVA's completion of the activities.

Regional Entity's Basis for Penalty

According to the Settlement Agreement, SERC has assessed a would-be penalty of eight hundred fifty-two thousand dollars (\$852,000) and included non-monetary sanctions, which supplement the mitigation activities to the referenced violation. In reaching this determination, SERC considered the following factors:

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1. TVA is a federal government entity, and SERC and NERC are bound to follow *SWPA v. FERC* in resolving this matter;
2. SERC considered the instant violation as repeat noncompliance with the subject NERC Reliability Standards. SERC considered TVA's compliance history with PRC-005 R2 as an aggravating factor in the penalty determination;⁶
3. SERC did not afford TVA mitigating credit for TVA's internal compliance program;
4. TVA did not receive mitigating credit for self-reporting because the Self-Report was submitted after receiving notice of an upcoming Compliance Audit;
5. TVA was cooperative throughout the compliance enforcement process;
6. there was no evidence of any attempt to conceal a violation nor evidence of intent to do so;
7. the violation posed a serious risk to the reliability of the BPS, as discussed in Attachment A; and
8. there were no other mitigating or aggravating factors or extenuating circumstances that would affect the assessed would-be penalty.

The Settlement Agreement includes non-monetary sanctions requiring TVA to complete extensive verification activities within three years. TVA will submit quarterly status reports to SERC on TVA's progress within 30 days after the end of each calendar quarter.

TVA will verify that all PRC-005 devices are included in its maintenance and testing database and have been assigned the appropriate maintenance and testing activities. In addition, TVA will submit a report to SERC with the results of its verification of the following:

1. physical components against current drawings;
2. all devices to which PRC-005 applies are properly identified;
3. all devices are in the appropriate maintenance and testing database; and
4. all required maintenance and testing activities under PRC-005 are in the appropriate database with the correct assigned intervals for the applicable version of PRC-005.

⁶ TVA's relevant prior noncompliance with PRC-005 R2 includes NERC Violation ID SERC2013012257, SERC201000492, SERC200900271, SERC200900273, and SERC200700090.

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Where TVA identifies deficiencies while performing the activities described above and believes it has violated, or may have violated, PRC-005, TVA will submit such information in its quarterly reports to SERC. SERC will hold any such possible noncompliance in abeyance until TVA satisfactorily completes the mitigating and non-monetary sanction activities within the required three-year period.

Additionally, after the Settlement Agreement's execution, TVA provided SERC reasonable assurance that TVA is adequately planning and preparing to meet upcoming PRC-005-6 Implementation Plan due dates for Components and Facilities newly introduced by PRC-005-6 by submitting a written explanation of its activities, plans, and internal controls for transitioning to PRC-005-6. TVA will submit semi-annual status reports to SERC on TVA's progress transitioning to PRC-005-6. Where TVA identifies deficiencies while performing the non-monetary sanctions described within this paragraph and TVA believes it has violated, or may have violated, a Reliability Standard, TVA will submit Self-Report(s) and Mitigation Plan(s) to SERC within 60 days of discovering the possible violation(s). SERC will process any such Self-Report(s) by initiating a new compliance monitoring and enforcement process. SERC will neither hold such violations in abeyance nor waive sanctions for such violations.

After consideration of the above factors, SERC determined that, in this instance, the assessed non-monetary sanctions are appropriate and bear a reasonable relation to the seriousness and duration of the violation.

Statement Describing the Assessed Penalty, Sanction or Enforcement Action Imposed⁷

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,⁸ the NERC BOTCC reviewed the violation on July 12, 2018 and approved the resolution between SERC and TVA. In approving the resolution, the NERC BOTCC reviewed the applicable requirements of the Commission-approved Reliability Standards and the underlying facts and circumstances of the violation at issue.

⁷ See 18 C.F.R. § 39.7(d)(4).

⁸ *North American Electric Reliability Corporation*, "Guidance Order on Reliability Notices of Penalty," 124 FERC ¶ 61,015 (2008); *North American Electric Reliability Corporation*, "Further Guidance Order on Reliability Notices of Penalty," 129 FERC ¶ 61,069 (2009); *North American Electric Reliability Corporation*, "Notice of No Further Review and Guidance Order," 132 FERC ¶ 61,182 (2010).

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For the foregoing reasons, the NERC BOTCC believes that the non-monetary sanctions are appropriate for the violation 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 TVA executed February 28, 2018, included as Attachment A;
 - a. Disposition of Violation, included as Attachment A to the Settlement Agreement; and
 - b. TVA PRC-005 Physical Asset Verifications Prioritization Criteria, included as Attachment B to the Settlement Agreement.
2. TVA's Self-Report for PRC-005-1 R2 dated May 7, 2015, included as Attachment B;
3. TVA's Mitigation Plan designated as MIT-01-2359 for PRC-005-1 R2 submitted September 23, 2016, included as Attachment C; and
4. TVA's Certification of Mitigation Plan Completion for PRC-005-1 R2 submitted August 18, 2017, included as Attachment D.

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

<p>Holly A. Hawkins* General Counsel SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 494-7775 (704) 357-7914 – facsimile hhawkins@serc1.org</p>	<p>Sonia C. Mendonça* Vice President, Deputy General Counsel, and Director of Enforcement North American Electric Reliability Corporation 1325 G Street N.W. Suite 600 Washington, DC 20005 (202) 400-3000 (202) 644-8099 – facsimile sonia.mendonca@nerc.net</p>
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<p>Gary Taylor* President and Chief Executive Officer SERC Reliability Corporation 3701 Arco Corporate Drive, Suite 300 Charlotte, NC 28273 (704) 940-8205 (704) 357-7914 – facsimile gtaylor@serc1.org</p>	<p>Alexander Kaplen* Associate Counsel North American Electric Reliability Corporation 1325 G Street N.W. Suite 600 Washington, DC 20005 (202) 400-3000 (202) 644-8099 – facsimile alexander.kaplen@nerc.net</p>

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*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.

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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/ Alexander Kaplen

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Vice President, Deputy General Counsel,
and Director of Enforcement
Edwin G. Kichline
Senior Counsel and Director of
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cc: Tennessee Valley Authority
SERC Reliability Corporation

Attachments

Attachment A

Settlement Agreement by and between SERC and TVA executed
February 28, 2018

- a. Disposition of Violation
- b. TVA PRC-005 Physical Asset Verifications Prioritization Criteria

SETTLEMENT AGREEMENT
OF
SERC RELIABILITY CORPORATION
AND
TENNESSEE VALLEY AUTHORITY

I. INTRODUCTION

1. SERC Reliability Corporation (SERC) and Tennessee Valley Authority (TVA) enter into this Settlement Agreement (Settlement Agreement) to resolve all outstanding issues arising from a preliminary and non-public assessment resulting in SERC's determination and findings, pursuant to the North American Electric Reliability Corporation (NERC) Rules of Procedure, of one confirmed violation.

Reliability Standard	Requirement	SERC Tracking No.	NERC Tracking No.
PRC-005-1	R2	SERC2015402204	SERC2015014914

2. TVA **neither admits nor denies** the one violation and has agreed to **no penalty** in addition to other remedies and actions to mitigate the instant violation and to ensure future compliance under the terms and conditions of the Settlement Agreement.

II. STIPULATION

3. The facts stipulated herein are stipulated solely for the purpose of resolving, between TVA and SERC, the matters discussed herein and do not constitute stipulations or admissions for any other purpose. TVA and SERC hereby stipulate and agree to the following:

Background

4. See Section I of the Disposition document (Attachment A) for a description of TVA.

Violation of NERC Reliability Standards

5. See Section II of the respective Disposition document (Attachment A) for the description of the violation.

III. PARTIES' SEPARATE REPRESENTATIONS

Statement of SERC and Summary of Findings

6. SERC determined that TVA was in violation of PRC-005-1 R2 because TVA could not provide evidence that it tested and maintained 1,917 of 45,868 (4.2%) Protection System devices within the defined intervals. There was one violation included in the Disposition document, Attachment A.
7. SERC agrees that this Settlement Agreement is in the best interest of the parties and in the best interest of bulk power system reliability.

Statement of TVA

8. **TVA neither admits nor denies** the facts set forth and agreed to by the parties for purposes of this Settlement Agreement constitute a violation of the Standard and Requirement listed in the table above.
9. TVA has agreed to enter into this Settlement Agreement with SERC to avoid extended litigation with respect to the matters described or referred to herein, to avoid uncertainty, and to effectuate a complete and final resolution of the issues set forth herein. TVA agrees that this Settlement Agreement is in the best interest of the parties and in the best interest of BPS reliability.
10. With respect to the potential and actual impact to the reliability of the BES, TVA's position is that the violation posed only a low risk to the reliability of the BES. The risk of not performing scheduled maintenance and testing on Protection System devices is that an entity would not identify issues that could cause the devices to not function as intended. None of TVA's devices classified as deficiencies failed due to late maintenance and testing activities. Of TVA's 1,917 deficient PRC-005 devices, 1,177 (61%) were classified as such because original test records could not be located within the mitigation period. Subsequently recovered dated field test records substantiated compliance for 562 (48%) of those devices. Closed work orders demonstrated that some or all of the required PRC-005 activities were performed for an additional 396 (33%) of those devices. TVA has reasonable belief, based on dated documentation, that compliant maintenance and testing was performed for up to 81% of the devices with missing test records (50% of all deficiencies reported).

The deficient devices were associated with generation and transmission facilities located across TVA's footprint. Due to the location of individual devices, it is unlikely that the failure of the devices would result in any impact to the BES. To illustrate, 96% of the deficiencies were associated with devices that would impact less than 600 MVA, and 78% would impact less than 300 MVA of generation capacity. On a system with a total generation capacity of approximately 36,400 MW, and with a single largest balancing contingency of 1,347 MW, individual device failures would not affect the reliability of the BES. On the transmission side,

only 16% of TVA’s deficiencies occurred at 500 kV facilities, 1.9% occurred at 230 kV facilities, and 12% occurred at 161 kV facilities, again indicating the unlikelihood that failure of individual devices would cause a significant impact to the BES. From TVA’s perspective based on its operational experience, only a simultaneous (or a rapidly sequential) failure of myriad devices could trigger a serious or substantial impact to BES reliability. TVA believes the likelihood of such a failure is extremely remote.

IV. MITIGATING ACTIONS, REMEDIES AND SANCTIONS

11. SERC and TVA agree that TVA will complete the mitigating actions and SERC will verify the completion of the mitigating actions set forth in Section IV of the Disposition document identified as Attachment A. The Mitigating Actions, Remedies and Sanctions are discussed in detail in the Disposition document (Attachment A).
12. SERC staff also considered the specific facts and circumstances of the violation and TVA’s actions in response to the violation in determining a proposed penalty that meets the requirement in Section 215 of the Federal Power Act that “[a]ny penalty imposed under this section shall bear a reasonable relation to the seriousness of the violation and shall take into consideration the efforts of an entity to remedy the violation in a timely manner.”¹ The factors considered by SERC staff in the determination of the appropriate penalty are set forth in Section V of the Disposition document.
13. Based on the above factors, as well as the mitigation actions and preventative measures taken, TVA shall pay **no monetary penalty** to SERC as set forth in this Settlement Agreement. However, TVA shall complete the actions as specified in Section V of the Disposition document.
14. Failure to comply with any of the terms and conditions agreed to herein, or any other conditions of this Settlement Agreement shall be deemed to be either the same alleged violations that initiated this Settlement Agreement and/or additional violations and may subject TVA to new or additional enforcement, penalty or sanction actions in accordance with the NERC Rules of Procedure. TVA shall retain all rights to defend against such additional enforcement actions in accordance with NERC Rules of Procedure.

V. ADDITIONAL TERMS

15. The signatories to the Settlement Agreement agree that they enter into the Settlement Agreement voluntarily and that, other than the recitations set forth herein, no tender,

¹ 16 U.S.C. § 824o(e)(6).

offer or promise of any kind by any member, employee, officer, director, agent or representative of SERC or TVA has been made to induce the signatories or any other party to enter into the Settlement Agreement. The signatories agree that the terms and conditions of this Settlement Agreement are consistent with the Commission's regulations and orders, and NERC's Rules of Procedure.

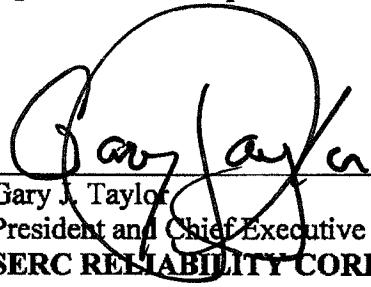
16. SERC shall report the terms of all settlements of compliance matters to NERC. NERC will review the settlement for the purpose of evaluating its consistency with other settlements entered into for similar violations or under other, similar circumstances. Based on this review, NERC will either approve the settlement or reject the settlement and notify SERC and TVA of changes to the settlement that would result in approval. If NERC rejects the settlement, NERC will provide specific written reasons for such rejection and SERC will attempt to negotiate a revised settlement agreement with TVA including any changes to the settlement specified by NERC. If a settlement cannot be reached, the enforcement process shall continue to conclusion. If NERC approves the settlement, NERC will (i) report the approved settlement to the Commission for the Commission's review and approval by order or operation of law and (ii) publicly post this Settlement Agreement.
17. This Settlement Agreement shall become effective upon the Commission's approval of the Settlement Agreement by order or operation of law as submitted to it or as modified in a manner acceptable to the parties.
18. TVA agrees that this Settlement Agreement, when approved by NERC and the Commission, shall represent a final settlement of all matters set forth herein and TVA waives its right to further hearings and appeal, unless and only to the extent that TVA contends that any NERC or Commission action on the Settlement Agreement contains one or more material modifications to the Settlement Agreement. SERC reserves all rights to initiate enforcement, penalty or sanction actions against TVA in accordance with the NERC Rules of Procedure in the event that TVA does not comply with the Mitigation Plans and compliance program agreed to in this Settlement Agreement. In the event TVA fails to comply with any of the stipulations, remedies, sanctions or additional terms, as set forth in this Settlement Agreement, SERC will initiate enforcement, penalty, or sanction actions against TVA to the maximum extent allowed by the NERC Rules of Procedure. Except as otherwise specified in this Settlement Agreement, TVA shall retain all rights to defend against such enforcement actions, also according to the NERC Rules of Procedure.
19. TVA consents to the use of SERC's determinations, findings, and conclusions set forth in this Settlement Agreement for the purpose of assessing the factors, including the factor of determining the company's history of violations, in accordance with the NERC Sanction Guidelines and applicable Commission orders and policy statements. Such use may be in any enforcement action or compliance proceeding undertaken by NERC and/or any Regional Entity; provided, however, that TVA does not consent to the use of the specific acts set forth in this Settlement Agreement as

the sole basis for any other action or proceeding brought by NERC and/or SERC, nor does TVA consent to the use of this Settlement Agreement by any other party in any other action or proceeding.

20. Each of the undersigned warrants that he or she is an authorized representative of the entity designated, is authorized to bind such entity and accepts the Settlement Agreement on the entity's behalf.
21. The undersigned representative of each party affirms that he or she has read the Settlement Agreement, that all of the matters set forth in the Settlement Agreement are true and correct to the best of his or her knowledge, information and belief, and that he or she understands that the Settlement Agreement is entered into by such party in express reliance on those representations, provided, however, that such affirmation by each party's representative shall not apply to the other party's statements of position set forth in Section III of this Settlement Agreement.
22. The Settlement Agreement may be signed in counterparts.
23. This Settlement Agreement is executed in duplicate, each of which so executed shall be deemed to be an original.

*Remainder of page intentionally blank.
Signatures to be affixed to the following page.*

Agreed to and accepted:



Gary A. Taylor
President and Chief Executive Officer
SERC RELIABILITY CORPORATION

Date

2/26/18



James R. Dalrymple
Senior Vice President, Transmission & Power Supply
TENNESSEE VALLEY AUTHORITY

Date

2/26/18

DISPOSITION OF VIOLATION¹

February 28, 2018

NERC TRACKING NO.
SERC2015014914

SERC TRACKING NO.
SERC2015402204

NOC#

REGISTERED ENTITY
Tennessee Valley Authority (TVA)

NERC REGISTRY ID
NCR01151

REGIONAL ENTITY
SERC Reliability Corporation (SERC)

I. REGISTRATION INFORMATION

ENTITY IS REGISTERED FOR THE FOLLOWING FUNCTIONS IN THE SERC REGION
(BOTTOM ROW INDICATES REGISTRATION DATE):

BA	DP	GO	GOP	PA	RC	RP	RSG	TO	TOP	TP	TSP
X	X	X	X	X	X	X		X	X	X	X
5/31/07	5/31/07	5/31/07	5/31/07	5/31/07	5/31/07	5/31/07		5/31/07	5/31/07	5/31/07	5/31/07

* VIOLATION(S) APPLIES TO SHADED FUNCTIONS

DESCRIPTION OF THE REGISTERED ENTITY

TVA is a federally owned corporation created by the TVA Act of 1933 with a total generation capacity of 36,387 MW with an additional 1,515 MW of contract generation capacity from Power Purchasing Agreements (PPAs). TVA has a total of 14,260 miles of transmission line ranging from 100 kV to 500 kV and 67 interconnections with various entities on the Bulk Electric System (BES).

IS THERE A SETTLEMENT AGREEMENT YES NO

WITH RESPECT TO THE VIOLATION(S), REGISTERED ENTITY

NEITHER ADMITS NOR DENIES IT (SETTLEMENT ONLY) YES
ADMITS TO IT YES
DOES NOT CONTEST IT (INCLUDING WITHIN 30 DAYS) YES

WITH RESPECT TO THE ASSESSED PENALTY OR SANCTION, REGISTERED ENTITY

ACCEPTS IT/ DOES NOT CONTEST IT YES

¹ For purposes of this document and attachments hereto, each violation at issue is described as a "violation" regardless of its procedural posture and whether it was a possible, alleged or confirmed violation.

II. VIOLATION INFORMATION

RELIABILITY STANDARD	REQUIREMENT(S)	SUB-REQUIREMENT(S)	VRF(S)	VSL(S)
PRC-005-1 ²	R2		High	Lower ³

PURPOSE OF THE RELIABILITY STANDARD AND TEXT OF RELIABILITY STANDARD AND REQUIREMENT(S)/SUB-REQUIREMENT(S)

The purpose statement of PRC-005-1 provides:

To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.

PRC-005-1 R2 provides:

R2. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation or generator interconnection Facility Protection System shall provide documentation of its Protection System maintenance and testing program and the implementation of that program to its Regional Entity on request (within 30 calendar days). The documentation of the program implementation shall include:

R2.1. Evidence Protection System devices were maintained and tested within the defined intervals.

R2.2. Date each Protection System device was last tested/maintained.

VIOLATION DESCRIPTION

On February 10, 2015, SERC sent Tennessee Valley Authority (TVA) an audit detail letter notifying it of a Compliance Audit scheduled for May 11, 2015 through May 29, 2015.

On May 7, 2015, TVA submitted a Self-Report stating that, as a Transmission Owner, it was in violation of PRC-005-1.1b R2. On May 11, 2015, TVA submitted two additional Self-Reports stating that, as a Generator Owner (GO), it was in violation of PRC-005-1.1b R2. On November 23, 2015, TVA submitted an expansion of scope, stating that as a GO, it was in violation of PRC-005-1.1b R2. TVA failed to test and maintain several Protection System devices, including relays, batteries, DC control circuitry, and voltage and current sensing devices, within the defined intervals. Some of the Protection System devices had not been tested since they were installed, which occurred before the Standard became mandatory and enforceable. Thus, SERC determined that the violation extended back to PRC-005-1 R2.

TVA discovered this violation on April 14, 2015 while preparing for the SERC Compliance Audit and found additional instances of noncompliance while performing an extent of condition review as part of its Mitigation Plan.

² Entity's violation applies from Version 1 through Version 1.1b of the Standard since the duration spans the enforceable dates of each version. The language of the Requirement remained the same in each version.

³ SERC assessed a Violation Severity Level (VSL) of "Lower" in accordance with the August 5, 2014 VSL Matrix because evidence Protection System devices were maintained and tested within the defined intervals (R2.1 and R2.2) was missing for 5% or less of the applicable devices.

Using a random sample, SERC selected approximately 10% of TVA's Protection System device inventory to assess. SERC reviewed the sampled Protection System devices, which confirmed TVA's self-reporting and revealed additional instances of missed maintenance and testing. To mitigate this violation, TVA performed a PRC-005 asset inventory verification for 100% of its transmission and generation sites, by completing the following four tasks:

- (1) reviewed engineering drawings and other documentation to confirm it identified all assets;
- (2) remediated its work management system records to correct any discrepancies discovered during the document review;
- (3) reviewed records to determine most recent and previous maintenance and testing dates for each device; and
- (4) verified whether test records existed and were readily accessible to substantiate maintenance and testing dates.

TVA submitted a "final" report on the results of its asset inventory verification to SERC on March 31, 2017 and April 1, 2017. Thereafter, TVA identified certain additional PRC-005 devices through reviews of other documentation. These devices were not included in TVA's final report.

On April 7, 2017, TVA submitted a corrected report to SERC, informing SERC that TVA had overlooked one sensing device, which was compliant to PRC-005, and failed to include it in its PRC-005 asset inventory due to a processing error in compiling the inventory database. TVA made additional corrections: (a) shortened intervals for previously identified control circuits; and (b) corrected the number of station batteries tested or maintained out of interval and the number of station batteries with no records, which had been inadvertently reversed. As a result, one compliant device was added to the inventory population, and 13 devices were re-categorized as deficient.

On April 22, 2017, TVA submitted an update to the report, noting its failure to include the following additional devices in its PRC-005 asset inventory: (a) nine relays, the corresponding nine DC control circuits, and 51 associated sensing devices at its Kingston Fossil Plant facility, all of which were compliant with the requirements of PRC-005; (b) three relays at its Raccoon Mountain Pumped Storage facility; (c) three breaker failure relays at its Johnsonville Fossil Plant switchyard facility, all of which were compliant with the requirements of PRC-005; and (d) one breaker failure relay at its Widows Creek Fossil Plant switchyard facility, which was also compliant with the requirements of PRC-005. TVA identified seven of these additional devices during a focused review of breaker failure relays, and identified 69 while comparing misoperation records to its PRC-005 asset inventory records. This update increased the inventory population by 73 compliant devices and three deficient devices. In addition, station DC supply deficiencies were reduced by three assets which had each been counted twice. All of the additional devices were accurately represented on TVA's engineering drawings, but not identified as PRC-005 assets.

SERC determined that TVA's subsequent identification of additional PRC-005 devices that were not included in its original final report revealed inconsistencies in TVA's review of engineering documents during its inventory effort.

In the April 22, 2017 updated and corrected report to SERC, TVA stated that it could not provide evidence that it tested and maintained 1,917 of 45,868 Protection System devices (4.2%) within the defined intervals.

Specifically, TVA could not provide evidence that the following Protection System devices were compliant with PRC-005-1 R2: (a) 545 of 12,981 protective relays (4.2%); (b) 166 of 993 associated communication systems (16.7%); (c) 664 of 18,016 sensing devices (3.7%); (d) 39 of 897 station batteries and charges (4.3%); and (e) 503 of 12,981 control circuits (3.9%). Of those noncompliant devices, 574 were within TVA's transmission and power supply business unit's total known inventory of 31,316 devices (1.8%), 24 were within TVA's nuclear power group's total known inventory of 1,092 devices (2.2%), and 1,319 were within TVA's power operations business unit's total known inventory of 13,460 devices (9.8%).

TVA determined multiple causes of this violation: (a) failure to have mechanisms in place to capture all installed Protection System devices in its asset management system; (b) failure to identify PRC-005 applicability upon acquiring new assets and during ownership transitions; (c) failure to establish a consistently repeatable process for handling deferral, cancelation, or partial completion of work orders; and (d) failure to recognize data retention requirements. While reviewing records later during the inventory effort, TVA identified an additional cause, namely the failure to verify test intervals were correctly applied during program changes.

RELIABILITY IMPACT STATEMENT- POTENTIAL AND ACTUAL

This violation posed a serious or substantial risk to the reliability of the bulk power system. TVA's failure to maintain and test Protection System devices within the defined intervals could lead to devices not operating as intended, potentially leading to false trips, remote clearing, delayed clearing, the overreach of protective relays, a loss of generating units, or reliance on other entities' Protection System devices to respond to a fault. The non-compliant devices identified were associated with transmission and generation facilities across TVA's footprint, including multiple 161 kV, 230 kV, and 500 kV substations and switching stations, and multiple coal, gas, hydro, and nuclear generation plants with a collective generation capacity of about 29,000 MW out of TVA's total generation capacity of about 36,400 MW. In TVA's transmission facilities, 16% of PRC-005 deficiencies occurred at 500 kV facilities, 1.9% occurred at 230 kV facilities, and 12% occurred at 161 kV facilities. TVA has 67 interconnection points with neighboring Balancing Authorities at voltage levels ranging from 69 kV to 500 kV.

III. DISCOVERY INFORMATION

METHOD OF DISCOVERY

SELF-REPORT	<input checked="" type="checkbox"/>
SELF-CERTIFICATION	<input type="checkbox"/>
COMPLIANCE AUDIT	<input type="checkbox"/>
COMPLIANCE VIOLATION INVESTIGATION	<input type="checkbox"/>
SPOT CHECK	<input type="checkbox"/>
COMPLAINT	<input type="checkbox"/>
PERIODIC DATA SUBMITTAL	<input type="checkbox"/>
EXCEPTION REPORTING	<input type="checkbox"/>

DURATION DATE(S)

6/18/2007 (when the Standard became mandatory and enforceable on TVA) through 8/4/2017
(when TVA completed required testing and maintenance for all identified Protection System devices)

DATE DISCOVERED BY OR REPORTED TO REGIONAL ENTITY 5/7/2015⁴

IS THE VIOLATION STILL OCCURRING	YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>
IF YES, EXPLAIN				
REMEDIAL ACTION DIRECTIVE ISSUED	YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>
PRE TO POST JUNE 18, 2007 VIOLATION	YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>

IV. MITIGATION INFORMATION

FOR FINAL ACCEPTED MITIGATION PLAN:

MITIGATION PLAN NO.	SERCMIT012359
DATE SUBMITTED TO REGIONAL ENTITY	9/23/2016
DATE ACCEPTED BY REGIONAL ENTITY	10/18/2016
DATE APPROVED BY NERC	11/7/2016
DATE PROVIDED TO FERC	11/7/2016

IDENTIFY AND EXPLAIN ALL PRIOR VERSIONS THAT WERE ACCEPTED OR REJECTED, IF APPLICABLE

MITIGATION PLAN COMPLETED YES NO

EXPECTED COMPLETION DATE	8/4/2017
EXTENSIONS GRANTED	N/A
ACTUAL COMPLETION DATE	8/4/2017
DATE OF CERTIFICATION LETTER	8/18/2017
CERTIFIED COMPLETE BY REGISTERED ENTITY AS OF	8/4/2017
VERIFIED COMPLETE BY REGIONAL ENTITY ON	9/6/2017

⁴ TVA submitted two additional Self-Reports on May 11, 2015 and an expansion of scope on November 23, 2015.

ACTIONS TAKEN TO MITIGATE THE ISSUE AND PREVENT RECURRENCE

To mitigate this violation, TVA:

1. Performed a PRC-005 asset inventory verification for 100% of its transmission and generation sites. Specifically, TVA's transmission and power supply, power operations, and nuclear power group organizations each reviewed appropriate engineering records to identify all PRC-005 assets, updated the asset inventories, and confirmed maintenance and testing dates along with the most recent test records. TVA provided SERC with progress updates and a final report on performing this inventory verification for all of its PRC-005 assets;
2. Reviewed the working asset inventory and verified that it assigned the correct preventive maintenance (PM) activity to each Protection System device;
3. Conducted the required PM activities on the non-compliant devices.
4. Transmission and power supply. In the area of transmission and power supply (TPS), TVA conducted a review of TPS change management processes, which addressed upcoming CIP Version 5 as well as potential gaps regarding PRC-005 compliance. TVA maintained the principle checks that have been successful since implementation in 2012 in revising its transmission asset cut in and cut out process;
5. Power operations. In the area of power operations, TVA:
 - a. Reviewed and revised power operations internal battery maintenance testing and inspection documents to ensure the documents included PRC-005 R2 requirements, place-keeping with initials, and data sheets.
 - b. Developed and conducted training for hydro generation technicians to correctly perform the prescribed battery maintenance and to correctly fill out the internal battery maintenance testing and inspection documents and data sheets.
 - c. Performed required maintenance and testing for the missing relays TVA reported to SERC. Specifically, TVA tested DC circuits and sensing devices, and performed calibration and functional tests for lock feeder relays and transformer protective relays.
 - d. Reviewed power operations change management design change notice process. TVA issued its revised design change control process document and included a sign-off sheet specifically for the power operations NERC compliance manager or designee to review all proposed additions, modifications, or removals of assets during the initial design phase for power operations sites to ensure NERC assets are properly identified; and
 - e. Created a PRC-005 NERC asset repository. TVA assigned the power operations group the responsibility for maintaining the asset repository;
6. Nuclear power group. In the nuclear power group, TVA conducted a review of its change management processes. TVA included the review results in revising its nuclear power group design output procedure.
7. Used an enhanced version of SERC's PRC-005 asset inventory template (TVA enhanced it to account for ownership and compliance responsibility interfaces) to identify responsibility by entity or business unit and note whether responsibilities have been resolved for each applicable device.

8. Reviewed and revised procedures and instructions for PM deferrals as necessary to ensure it explicitly states new PM late dates in each request for approval;
9. Reviewed and revised procedures and instructions for PM work order cancellations to require appropriate concurrence or approval to ensure TVA satisfies NERC required activities and intervals by an alternative means prior to the cancellation of a NERC PM work order;
10. Reviewed and revised NERC PM job plans, work instructions, or other appropriate documents to state a requirement for completion of all steps unless the employee obtains appropriate concurrence or approval;
11. Developed and deployed training for applicable engineering, maintenance, and work management personnel to ensure understanding of the regulatory implications in the administration and execution of NERC PMs. The training addressed the following concepts:
 - a. being aware of when a PM is required for NERC compliance;
 - b. accounting for completion of such PMs;
 - c. the absolute nature of the NERC maximum intervals, even when a deferral is approved;
 - d. the requirement for retention of evidence of PM activities and completion dates (i.e., test records); and
12. Reviewed and revised procedures and instructions to ensure PRC-005 data retention requirements are adequately represented to ensure availability of evidentiary information.

LIST OF EVIDENCE REVIEWED BY REGIONAL ENTITY TO EVALUATE COMPLETION OF MITIGATION PLAN OR MILESTONES (FOR CASES IN WHICH MITIGATION IS NOT YET COMPLETED, LIST EVIDENCE REVIEWED FOR COMPLETED MILESTONES)

SERC reviewed the following evidence submitted by TVA to evaluate completion of its Mitigation Plan:

1. Reports and excel workbooks for the PRC-005 asset inventory verification, indicating TVA's transmission and power supply, power operations, and nuclear power group organizations each reviewed appropriate engineering records to identify known PRC-005 assets, updated the asset inventories, and confirmed maintenance and testing dates along with the most recent test records. The reports also indicated TVA reviewed the working asset inventory and verified that it assigned the correct preventive maintenance (PM) activity to each Protection System device and that TVA conducted the required PM activities on the non-compliant devices;
2. Test records indicating TVA conducted the required PM activities on non-compliant devices;
3. Program and process documents indicating TVA's transmission and power supply group updated its change management process to add principle checks to its cut in and cut out process, and thereafter periodically reviewed the processes and maintained the principle checks;
4. Procedure documents indicating TVA's power operations group revised battery maintenance testing and inspection documents to ensure the documents included PRC-005 R2 requirements, place-keeping with initials, and data sheets;

5. Training presentation indicating TVA developed training for hydro generation technicians on how to correctly perform the prescribed battery maintenance and how to correctly fill out the revised battery maintenance testing and inspection documents and data sheets. SERC also reviewed attendance records and emails indicating TVA conducted such training for all hydro generation technicians;
6. Updated power operations change management design change notice process documents indicating TVA added a sign-off sheet specifically for the power operations NERC compliance manager or designee to review all proposed additions, modifications, or removals of assets during the initial design phase for power operations sites to ensure NERC assets are properly identified;
7. An updated design output procedure, indicating future changes to TVA's nuclear power group facilities would be routed through the corporate NERC program manager;
8. Excel workbooks indicating TVA created a PRC-005 asset repository and identified responsibility for each device by entity or business unit;
9. A deferral tracking list, deferral request form, and updated PM procedure documents indicating TVA revised procedures and instructions for PM deferrals to ensure it explicitly states new PM late dates in each request for approval and to ensure NERC required activities will be completed by alternate means before the PM Work Order is cancelled;
10. Instruction documents indicating TVA's power operations group revised its processes for battery maintenance and testing to require completion of all steps unless the employee obtains appropriate concurrence or approval;
11. Training presentation indicating TVA developed training for applicable engineering, maintenance, and work management personnel to ensure understanding of the regulatory implications in the administration and execution of NERC PMs. The training presentation indicated TVA specifically addressed when a PM is required for NERC compliance, accounting for completion of such PMs, the absolute nature of the NERC maximum intervals, even when a deferral is approved; and evidence retention requirements for PM activities and completion dates (i.e., test records). SERC also reviewed training records from TVA's learning management system indicating TVA delivered such training to appropriate staff; and
12. An email indicating TVA revised procedures and instructions to ensure PRC-005 data retention requirements are adequately represented to ensure availability of evidentiary information.

V. PENALTY OR SANCTION INFORMATION

TOTAL ASSESSED PENALTY OF NO MONETARY PENALTY FOR ONE VIOLATION OF RELIABILITY STANDARDS.⁵ SERC WOULD HAVE ASSESSED A MONETARY PENALTY OF EIGHT HUNDRED FIFTY TWO THOUSAND DOLLARS (\$852,000) FOR THIS VIOLATION IN SIMILAR CIRCUMSTANCES INVOLVING A NON-FEDERAL GOVERNMENT ENTITY.

NONMONETARY SANCTIONS ASSESSED FOR ONE VIOLATION OF RELIABILITY STANDARDS INCLUDE THE FOLLOWING:

1. TVA shall verify all PRC-005 devices are included in its maintenance and testing database and the appropriate maintenance and testing activities are assigned. TVA shall complete the verification by performing the following tasks:
 - a. Verify physical components against current drawings.
 - i. TVA shall perform a full walk-down of all transmission power supply (TPS) business unit and power operations (PO) business unit facilities containing PRC-005 devices and compare physical components against current drawings. TVA shall complete the verification at its TPS and PO facilities prioritized based on the following criteria, which is further defined in **Attachment B** to this Settlement Agreement:
 1. Existing outage scheduling process;
 2. Early piloting of the verification process at each facility type; and
 3. Risk-based criteria:
 - a. For Generation Facilities, TVA will give higher priority for earlier completion to its larger units and black-start units when more than one outage is scheduled for a unit within the 3-year duration.
 - b. For Transmission Facilities, TVA will give higher priority for earlier completion to its Facilities with a CIP Critical Facility Rating of Medium Impact, followed by Low Impact.
 - ii. TVA shall perform a sampled walk-down of its nuclear units containing PRC-005 devices and compare physical components against current drawings. TVA will complete a walk-down of one unit as the initial sample. If TVA finds no missing PRC-005 devices for the one unit sampled, TVA would not complete any additional walk-downs of nuclear units. If TVA finds any missing PRC-005 devices, TVA would complete a walk-down of more units, up to 100% of units, at SERC's discretion, based on risk, within a three year period or as early as its outage schedule allows;

⁵ 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 Circuit ruled that FERC and, by extension, NERC and the Regional Entities it oversees 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.

- iii. As of the date of the Notice of Alleged Violation and Proposed Penalty or Sanction, TVA has 542 facilities containing PRC-005 devices, but that number is subject to change over time;
- b. Verify that all devices to which PRC-005 is applicable are properly identified;
- c. Verify that all devices are in the appropriate maintenance and testing database;
- d. Verify that all required maintenance and testing activities under PRC-005 are in the appropriate database with the correct assigned intervals for the applicable version of PRC-005; and
- e. Submit a report to SERC with the results of the above assessment which includes:
 - i. The total count of devices reviewed by device type;
 - ii. A list of all devices erroneously excluded from the appropriate maintenance and testing database;
 - iii. Discovery date of each exclusion;
 - iv. Apparent cause of each exclusion; and
 - v. Potential and actual risks of each exclusion.

TVA shall submit quarterly status reports to SERC on TVA's progress, including information identified in section 1.e above, within 30 days after the end of each calendar quarter. Specifically, TVA will submit reports to SERC in accordance with the following schedule:

Report covering activity completed through:	Report Due Date
1st quarter 2019; 2020; and 2021	April 30, 2019, 2020, and 2021
2 nd quarter 2018, 2019, and 2020	July 30, 2018, 2019, and 2020
3 rd quarter 2018, 2019, and 2020	October 30, 2018, 2019, and 2020
4th quarter 2018, 2019, and 2020	January 30, 2019, 2020, and 2021

Where TVA identifies deficiencies while performing the activities described under this section 1 (including performing the assessment and reporting pursuant to 1.a-1.e above) and TVA believes it has violated, or may have violated, Reliability Standard PRC-005-1.1b, TVA will submit such information in its quarterly reports to SERC. SERC will hold any such possible noncompliance in abeyance until TVA satisfactorily completes the mitigating and nonmonetary sanction activities within the required three-year period.

TVA shall complete the verification, including all required tasks detailed above, within three years, to begin on April 1, 2018 and conclude on March 31, 2021, unless additional time is required due to TVA's nuclear outage schedule to accommodate additional walk-downs of nuclear units. TVA shall provide a verification schedule reflecting priorities in (a)(i)(1)-(3) above by 30 days after execution of the Settlement Agreement. For Power Operations, TVA shall identify milestones based on the percentage of generating units completed and according to the submitted schedule. The Power Operations schedule will reflect completion of approximately 50% of generating units by September 30, 2019. For Transmission, TVA shall identify milestones based on the percentage of PRC-005 devices completed and according to the submitted schedule. The Transmission schedule will reflect completion of approximately 50% of the Transmission PRC-005 devices by September 30, 2019. The milestones will be subject to TVA's outage scheduling

process as the first priority throughout the duration of the verification process. TVA will include the status of milestones and any changes in its quarterly status reports.

2. By 30 days after execution of the Settlement Agreement, TVA shall provide SERC reasonable assurance that TVA is adequately planning and preparing to meet upcoming PRC-005-6 Implementation Plan due dates for Components and/or Facilities newly introduced by PRC-005-6, by submitting a written explanation of its activities, plans, and internal controls for transitioning to PRC-005-6. Thereafter, TVA shall submit semi-annual status reports to SERC on TVA's progress transitioning to PRC-005-6. TVA shall submit its first semi-annual report to SERC on or before May 30, 2018 reflecting the last two most recently completed calendar quarters (4th quarter 2017 and 1st quarter 2018). Subsequent reports will be submitted within 60 days after the end of the next six-month period. Specifically, TVA will submit reports to SERC in accordance with the following schedule:

Report covering activity completed during:	Report Due Date
4 th quarter 2017 – 1 st quarter 2018	May 30, 2018
2 nd quarter 2018 – 3 rd quarter 2018	November 30, 2018
4 th quarter 2018 – 1 st quarter 2019	May 30, 2019
2 nd quarter 2019 – 3 rd quarter 2019	November 30, 2019
4 th quarter 2020 – 1 st quarter 2021	May 30, 2021

Where TVA identifies deficiencies while performing the nonmonetary sanctions described under this section 2 and TVA believes it has violated, or may have violated, a Reliability Standard, TVA will submit a Self-Report(s) and Mitigation Plan(s) to SERC within 60 days of discovering the possible violation(s). SERC will process any such Self-Report(s) by initiating a new compliance monitoring and enforcement process. SERC will not hold such violations in abeyance nor waive sanctions for such violations.

TVA estimates the cost of compliance with the non-monetary sanctions assessed by SERC to be \$10-15 million.

FACTORS AFFECTING PENALTY OR SANCTION DETERMINATION:

(1) REGISTERED ENTITY'S COMPLIANCE HISTORY

PREVIOUSLY FILED VIOLATIONS OF ANY OF THE INSTANT RELIABILITY STANDARD(S) OR REQUIREMENT(S) THEREUNDER IN THE SERC REGION
YES NO

LIST VIOLATIONS AND STATUS

SERC considered TVA's PRC-005 R2 compliance history in determining the disposition track. TVA's relevant prior noncompliance with PRC-005 R2 includes: NERC Violation ID SERC2014014106, SERC2013012257, SERC201000492, SERC200900271, SERC200900273 and SERC200700090.

SERC considered TVA's PRC-005-1 R2 compliance history to be an aggravating factor in determining the disposition track.⁶

ADDITIONAL COMMENTS

TVA's four prior PRC-005 R2 enforcement packages demonstrate that TVA's mitigation efforts and internal controls have not been sufficient to prevent recurrence of PRC-005 R2 violations.

PREVIOUSLY FILED VIOLATIONS OF OTHER RELIABILITY STANDARD(S) OR REQUIREMENTS THEREUNDER IN THE SERC REGION

YES NO

LIST VIOLATIONS AND STATUS

TVA had previously filed violations of other NERC Reliability Standards and Requirements in the SERC Region. A Settlement Agreement covering a violation of PRC-005-1 R1 and R2 was filed with FERC under NP09-36-000 on September 25, 2009.⁷ On October 23, 2009, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

A Settlement Agreement covering violations of FAC-008-1 R1 and VAR-002 R1 and R3 was filed with FERC under NP12-27-000 on May 30, 2012.⁸ On June 29, 2012, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

A Find, Fix, Track and Report (FFT) informational filing addressing remediated issues for certain registered entities including noncompliance with INT-006-3 R1 for TVA was filed with FERC under RC12-12-000 on May 30, 2012.⁹ The 60 day review period passed on July 29, 2012.

A Settlement Agreement covering violations of FAC-003-1 R2 was filed with FERC under NP12-34-000 on June 29, 2012.¹⁰ On July 27, 2012, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

A Settlement Agreement covering violations of PRC-005-1 R2, PRC-018-1 R2, PRC-023-1 R1, and VAR-002-1 R2 was filed with FERC under NP13-5-000 on October 31, 2012.¹¹ On November 29, 2012, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

⁶ NERC Violation ID SERC2014014106 was filed as a Compliance Exception informational filing and SERC determined it was not an aggravating factor in determining the disposition track.

⁷ NERC Violation IDs SERC200700019 and SERC200700090.

⁸ NERC Violation IDs SERC201000526, SERC201000516, SERC201000517, and SERC2011006541.

⁹ NERC Violation ID SERC2011008005.

¹⁰ NERC Violation ID SERC201000598.

¹¹ NERC Violation IDs SERC2011008776, SERC2011007382, SERC201000519, and SERC201000492.

A Find, Fix, Track and Report (FFT) informational filing addressing remediated issues for certain registered entities including noncompliance with INT-004-2 R2 for TVA's affiliate, Tennessee Valley Authority –TVAM, was filed with FERC under RC13-7-000 on March 27, 2013.¹² The 60 day review period passed on May 26, 2013.

A Settlement Agreement covering violations of PRC-023-1 R1 was filed with FERC under NP13-51-000 on August 30, 2013.¹³ On September 27, 2013, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

A Find, Fix, Track and Report (FFT) informational filing addressing remediated issues for certain registered entities including noncompliance with BAL-005-0 R17 for TVA was publicly posted on November 27, 2013.¹⁴ The 60 day review period passed on January 26, 2014.

A Find, Fix, Track and Report (FFT) informational filing addressing remediated issues for certain registered entities including noncompliance with INT-004-2 R2 for TVA's affiliate, Tennessee Valley Authority –TVAM, was publicly posted on November 27, 2013.¹⁵ The 60 day review period passed on January 26, 2014.

A Find, Fix, Track and Report (FFT) informational filing addressing remediated issues for certain registered entities including noncompliance with PRC-008-0 R2 and MOD-030-2 R5 for TVA was publicly posted on October 30, 2014.¹⁶ The 60 day review period passed on December 29, 2014.

A Compliance Exception informational filing addressing remediated issues for certain registered entities including noncompliance with INT-004-2 R2 for TVA's affiliate, Tennessee Valley Authority – TVAM, was publicly posted on May 28, 2015.¹⁷ The 60 day review period passed on July 27, 2015.

A Compliance Exception informational filing addressing remediated issues for certain registered entities including noncompliance with PER-005-1 R2 for TVA was publicly posted on June 30, 2015.¹⁸ The 60 day review period passed on August 29, 2015.

A Compliance Exception informational filing addressing remediated issues for certain registered entities including noncompliance with EOP-001-0.1b R6 for

¹² NERC Violation ID SERC2012010846.

¹³ NERC Violation ID SERC2012011582.

¹⁴ NERC Violation ID SERC2013012361.

¹⁵ NERC Violation ID SERC2013012788.

¹⁶ NERC Violation IDs SERC2013013133, SERC2013013140, and SERC2014013914.

¹⁷ NERC Violation ID SERC2014014313.

¹⁸ NERC Violation ID SERC2014014314.

TVA was publicly posted on August 31, 2015.¹⁹ The 60 day review period passed on October 30, 2015.

A Settlement Agreement covering a violation of VAR-002-1.1b R2 was filed with FERC under NP16-15-000 on April 28, 2016.²⁰ On May 27, 2016, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

A Compliance Exception informational filing addressing remediated issues for certain registered entities including noncompliance with PRC-008-0 R2 for TVA was publically posted on April 28, 2016.²¹ The 60 day review period passed on June 27, 2016.

A Settlement Agreement covering violations of VAR-002-1.1b R3.1, TOP-003-1 R1.2, and VAR-002-1.1b R1 was filed with FERC under NP17-12-000 on December 29, 2016.²² On January 27, 2017, FERC issued an order stating that it would not engage in further review of the Notice of Penalty.

ADDITIONAL COMMENTS

Aside from the PRC-005 R2 violations discussed above, SERC did not consider the prior TVA violations and issues to be an aggravating factor in determining the disposition track. The prior violations and issues were unrelated to the PRC-005 R2 violation in this enforcement action.

(2) THE DEGREE AND QUALITY OF COOPERATION BY THE REGISTERED ENTITY (IF THE RESPONSE TO FULL COOPERATION IS “NO,” THE ABBREVIATED NOP FORM MAY NOT BE USED.)

FULL COOPERATION YES NO
IF NO, EXPLAIN

(3) THE PRESENCE AND QUALITY OF THE REGISTERED ENTITY’S COMPLIANCE PROGRAM

IS THERE A DOCUMENTED COMPLIANCE PROGRAM
YES NO
EXPLAIN

TVA has a documented internal compliance program (ICP), which it created in July 2008 in order to establish the structure of TVA’s ICP. TVA annually conducts a review of its ICP and modifies it as necessary. TVA revised its ICP in April 2011 and October 2014. TVA maintains the ICP in a “Procedure Center” that is accessible to all employees.

¹⁹ NERC Violation ID SERC2014014140.

²⁰ NERC Violation ID SERC2013012973.

²¹ NERC Violation ID SERC2015014913.

²² NERC Violation IDs SERC2013012974, SERC2013013260, SERC2015014921, SERC2016015698, and SERC2016015699.

TVA's documented ICP establishes the structure of its ICP, including the Reliability Standards Oversight Group (RSOG), the Reliability Standards Working Group (RSWG), and the Transmission Regulatory Compliance & Support (TRCS) group, and the relationships between those groups and the responsibilities of each group. The RSOG is composed of executives from TVA business units and provides guidance and oversight of TVA's compliance program. The RSWG is composed of subject matter experts from TVA business units, and provides organization-specific direction and executes activities as directed by the RSOG. The TRCS group is an internal, independent NERC compliance oversight organization within TVA that is separate from the business units responsible for the day-to-day execution activities and compliance with applicable Reliability Standards.

TVA's director of TRCS is responsible for overseeing the ICP within TVA. The director of TRCS reports directly to the senior vice president of transmission at TVA, who in turn has independent access to the executive vice-president of operations and direct access to the TVA chief executive officer (CEO) as needed.

TVA's RSOG meets quarterly and provides oversight and subject matter expert resources needed for TVA to achieve and sustain its compliance with all applicable Reliability Standards. TVA's RSWG meets monthly to review any emerging issues associated with compliance with applicable Reliability Standards, the status of any Reliability Standards in the development process, and the status of Reliability Standards applicable to TVA. The RSOG and RSWG meetings include discussions of training topics and issues. TVA's TRCS group conducts general training regarding compliance activities and specific training for subject matter experts occurs within the affected business units. TVA's ICP does not address disciplinary actions against employees involved in violations of Reliability Standards, but TVA would handle such actions through its separate employee discipline policy.

TVA's ICP includes self-assessments to prevent recurrence of violations. Different business units use different methods to achieve this goal, including the use of independent staff for monitoring, second party verification, and third party vendors to provide performance assessments and reviews. The RSOG provides additional oversight and guidance to this process, and serves as forum to discuss the most effective practices to prevent recurrence of violations.

EXPLAIN SENIOR MANAGEMENT'S ROLE AND INVOLVEMENT WITH RESPECT TO THE REGISTERED ENTITY'S COMPLIANCE PROGRAM, INCLUDING WHETHER SENIOR MANAGEMENT TAKES ACTIONS THAT SUPPORT THE COMPLIANCE PROGRAM, SUCH AS TRAINING COMPLIANCE AS A FACTOR IN EMPLOYEE EVALUATIONS, OR OTHERWISE.

TVA's senior management is involved in the development, guidance, and oversight of TVA's ICP. As noted above, TVA executives from TVA's business

units are part of the RSOG, which meets quarterly and provides direction and oversight to the RSWG, approves and monitors key performance indicators for compliance goals, and ensures training and awareness for Reliability Standard compliance are developed and conducted at appropriate intervals. Finally, TVA's senior vice president of transmission is ultimately responsible for ICP governance and oversight, and has independent access to the EVP of operations and direct access to the CEO as needed.

(4) ANY ATTEMPT BY THE REGISTERED ENTITY TO CONCEAL THE VIOLATION(S) OR INFORMATION NEEDED TO REVIEW, EVALUATE OR INVESTIGATE THE VIOLATION.

YES NO
IF YES, EXPLAIN

(5) ANY EVIDENCE THE VIOLATION(S) WERE INTENTIONAL (IF THE RESPONSE IS "YES," THE ABBREVIATED NOP FORM MAY NOT BE USED.)

YES NO
IF YES, EXPLAIN

(6) ANY OTHER MITIGATING FACTORS FOR CONSIDERATION

YES NO
IF YES, EXPLAIN

(7) ANY OTHER AGGRAVATING FACTORS FOR CONSIDERATION

YES NO
IF YES, EXPLAIN

(8) ANY OTHER EXTENUATING CIRCUMSTANCES

YES NO
IF YES, EXPLAIN

OTHER RELEVANT INFORMATION:

NOTICE OF ALLEGED VIOLATION AND PROPOSED PENALTY OR SANCTION ISSUED

DATE: November 21, 2017 OR N/A

SETTLEMENT DISCUSSIONS COMMENCED

DATE: January 11, 2017 OR N/A

NOTICE OF CONFIRMED VIOLATION ISSUED

DATE: OR N/A

SUPPLEMENTAL RECORD INFORMATION
DATE(S) OR N/A

REGISTERED ENTITY RESPONSE CONTESTED
FINDINGS PENALTY OR SANCTION ²³ BOTH
NO CONTEST

HEARING REQUESTED

YES NO

DATE

OUTCOME

APPEAL REQUESTED

EXHIBITS:

SOURCE DOCUMENT
TVA Self-Report dated May 7, 2015

MITIGATION PLAN
TVA Mitigation Plan submitted on September 23, 2016²⁴

CERTIFICATION BY REGISTERED ENTITY
TVA Certification of Completed Mitigation Plan dated August 18, 2017

VERIFICATION BY REGIONAL ENTITY
This Disposition document serves as SERC's Verification of Mitigation Plan Completion.

²³ On December 19, 2017, TVA contested the proposed nonmonetary sanctions in the November 21, 2017 Notice of Alleged Violation.

²⁴ TVA submitted its first Mitigation Plan on August 13, 2015.

Attachment B:
TVA PRC-005 Physical Asset Verifications Prioritization Criteria
February 26, 2018

Prioritization Criteria for Non-Nuclear Generation Facilities

- 1. First Priority: Existing Outage Scheduling Process**
 - a. Generation units must be off-line to perform effective physical verifications of PRC-005 assets without increased risk to assets, personnel safety or BES reliability.
 - b. Existing outage scheduling process is prioritized based upon factors such as reliability, demand, load balancing, river management, and environmental risks. Additional unit or plant outages solely for the purpose of asset verification could result in negative impacts to reliability and other risks as optimized in the fleet outage schedule.
- 2. Second Priority: Early Piloting**
 - a. Physical verifications will be completed for at least one unit of each facility type (Coal, Combustion Turbine, Combined Cycle, and Hydro Generation) as early as possible in the verification process to ensure each type is piloted early in the process regardless of other prioritization criteria.
 - b. Lessons learned will be applied to improve standardization and optimize methodologies for safe, effective and timely completion of all physical verifications.
- 3. Third Priority: When more than one outage is scheduled within the agreed duration for the physical verifications, an earlier outage will be chosen for any given unit as follows (listed from highest to lowest priority)**
 - a. Units having larger generation capacity.
 - b. Blackstart units.
 - c. Units for which the most PRC-005 Asset Identification deficiencies were discovered.
 - d. Units for which the most PRC-005 deficiencies of all types were discovered.

Prioritization Criteria for Transmission Facilities

- 1. First Priority: Existing Generation Outage Schedules**
 - a. In situations where generation sensitive equipment is involved in generation switchyards, verification activities will be coordinated with the Generator Owner/Operator and may be subject to existing generation outage schedules for the reasons described above.
- 2. Second Priority: Early Piloting**
 - a. Physical verifications will be completed for at least two Transmission facilities regardless of other priority criteria.
 - b. Lessons learned will be applied to improve standardization and optimize methodologies for safe, effective and timely completion of all physical verifications.
- 3. Third Priority: CIP Critical Facility Rating (listed from highest to lowest priority based on 2017 inventory facilities)**
 - a. Facilities with a CIP Critical Facility Rating of "Medium" (an estimated 48 facilities at 500kV, and 1 facility at 161kV).
 - b. Facilities with a CIP Critical Facility Rating of "Low" (an estimated 1 facility at 115kV, 227 facilities at 161kV, 8 facilities at 230kV, and 5 facilities at 500kV).
 - c. Remaining Transmission facilities with no rating will receive the lowest priority for completion (currently no facilities estimated at this priority)

Attachment B

TVA's Self-Report for PRC-005-1 R2
Dated May 7, 2015

i This item was submitted by Andrew Tudor (ajtudor@tva.gov) on 5/7/2015 ✖

i 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: Andrew Tudor

REPORTING INFORMATION

Applicable Standard: PRC-005-1.1b

Applicable Requirement: R2.

Applicable Sub Requirement(s): R2.1.

Applicable Functions: TO

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

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

SERC2013-012257

Date Reported to Region or Discovered by Region:

5/28/2013

Monitoring Method for previously reported or discovered:

Self-Report

Has the scope of the Possible Violation expanded:

No

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

Date Possible Violation was discovered: 4/14/2015

Beginning Date of Possible Violation: 11/25/2013

End or Expected End Date of Possible Violation: 4/17/2015

Is the violation still occurring? No

Provide detailed description and cause of Possible Violation:

During review of the West Ringgold Dispatch Single Line (DSL) drawing, two relays on the DSL were not in the TVA Transmission asset management system (AMS) thus a PM had not been created in the TVA work management system. These relays were initially installed in 2003, which was prior to NERC PRC-005 becoming effective. The TVA Transmission asset cut-in policy (the process to place new assets into our AMS) at the time lacked several mechanisms to catch errors like this that were added after PRC-005 became effective.

Are Mitigating Activities in progress or completed? Yes

If Yes, Provide description of Mitigating Activities:

PM# 81187 was created and job plans for DC Control Check and Functional Test was immediately completed for both relays - April 17, 2015

The principle checks that have been added to our asset cut-in process since 2005 that help prevent this type of error today are:

- Assets are added to the AMS by a design tech as they are engineered. Local maintenance personnel then review the new assets in AMS for accuracy prior to the assets being placed in service.
- Relay assets in the AMS are then checked a second time by the corporate TVA Transmission Work Management group as relay settings are issued; the Work

Management group checks every relay setting sheet issued to the field to verify that particular relay is correctly entered into the AMS.
• User-friendly software tools were developed and maintenance personnel are trained to use these tools to identify any incorrect data in the AMS database, which includes missing assets. To date, we have not identified any other than these two relays at West Ringgold.

Provide details to prevent recurrence:

In order to determine if any relays were added before the PRC standards went into effect which might not be included in the AMS, 25% of all PRC-005 applicable Transmission stations will be reviewed. Using the RAT-STATS tool for random selection, the evaluation should reveal any systemic issues. This review would be completed within 6 months. TVA will share the results of that review with SERC to determine if further review is necessary - September 30, 2015.

The current Asset Cut-In Process should prevent a recurrence of this type for new assets put in place.

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

9/30/2015

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:

Back up relays were being maintained within the program correctly.

Provide detailed description of Actual Risk to Bulk Power System:

There were no misoperations of these two relays and, when tested, the relays operated as designed.

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.)

Attachment C

TVA's Mitigation Plan designated as MIT-01-2359 for PRC-005-1 R2
Submitted September 23, 2016

A previous version of this Mitigation Plan exists



This item was signed by Tina Broyles Conerly (tibroyles@tva.gov) on 9/23/2016



This item was marked ready for signature by M Lee Thomas (mlthomas@tva.gov) on 9/23/2016



SECTION A: COMPLIANCE NOTICES & MITIGATION PLAN REQUIREMENTS

A.1 Notices and requirements applicable to Mitigation Plans and this Submittal Form are set forth in "[Attachment A - Compliance Notices & Mitigation Plan Requirements](#)" to this form.

[Yes] A.2 I have reviewed Attachment A and understand that this Mitigation Plan Submittal Form will not be accepted unless this box is checked.

SECTION B: REGISTERED ENTITY INFORMATION

B.1 Identify your organization

Company Name: Tennessee Valley Authority

Company Address: 1101 Market St. - MR 3H

Chattanooga, Tennessee 37402

Compliance Registry ID: NCR01151

B.2 Identify the individual in your organization who will be the Entity Contact regarding this Mitigation Plan.

Name: M Lee Thomas

SECTION C: IDENTIFICATION OF ALLEGED OR CONFIRMED VIOLATION(S) ASSOCIATED WITH THIS MITIGATION PLAN

C.1 This Mitigation Plan is associated with the following Alleged or Confirmed violation(s) of Reliability Standard listed below.

Standard: PRC-005-1

Requirement	Regional ID	NERC Violation ID	Date Issue Reported
R2.	SERC2015-402204	SERC2015014914	5/7/2015

C.2 Identify the cause of the Alleged or Confirmed violation(s) identified above:

TVA's operating organizations subject to NERC compliance consist of three Business Units: Transmission & Power Supply, the Nuclear Power Group (nuclear generation), and Power Operations (non-nuclear generation).

Transmission & Power Supply (TPS) - West Ringgold Missing Relays SERC2015-402204

During review of the Dispatch Single Line (DSL) drawing for TVA's West Ringgold 230kV Substation, two relays were identified as missing from the TVA Transmission Asset Management System (AMS), and thus a preventive maintenance activity (PM) had not been created in the TVA Work Management System (WMS). These relays were installed prior to NERC PRC-005 becoming effective on 6/18/2007. At that time, the TVA TPS Asset Cut-In Policy, by which new assets are placed into the AMS, lacked the mechanisms to capture 100% of installed PRC-005 assets. Such mechanisms were added after PRC-005 became effective and are outlined in Section D.1 of this Mitigation Plan.

Power Operations (PO) - Hydro Generation (HG) Battery Test Records SERC2015-402207

In preparation for TVA's May 2015 Audit, Station Battery field test records from 1/2014 thru 4/2015 for HG Douglas Hydro Plant (DGH) and Watts Bar Hydro Plant (WBH) were collected for submittal. It was discovered that some of the Battery Inspection Forms were not completely filled out as required and, in some cases, older versions of the forms were used that did not contain fields to collect all of the data required by the current Hydro Generation PRC-005 program. Form deficiencies and lack of procedure adherence were determined to be human performance errors.

PO - HG Missing Relays SERC2015-402208

While preparing for the May 2015 Audit, it was discovered that TVA did not identify twenty-four (24) devices as PRC-005 assets when the standard became enforceable on 6/18/2007. Also, TVA did not correctly categorize six (6) protective devices as PRC-005 assets when they were installed.

The 24 missing relays were due to departmental deficiency in properly applying the NERC PRC-005 Standard at the time of regulatory inception in 2007. The methodology for identifying PRC-005 assets was based on drawing reviews and walk-downs of relay board arrangements, but only the Generator and GSU Transformer relays were emphasized, overlooking the relays for exciters, station service transformers, and lock-feeder transformers.

The failure to categorize the six (6) protective devices as PRC-005 assets was caused by weakness in the Change Management, Design Change Notice (DCN), process. This process relied solely on the project initiator to have the knowledge to classify the protective devices as NERC regulatory assets.

The thirty (30) devices were discovered in 2013 and PER 793740 was issued. However, the devices were not added to the inventory, and verification of test intervals was deferred. The last corrective action in PER 793740, to verify test records of the subject devices, was subsequently reassigned and deferred a number of times during two business reorganizations from 2013 to 2014 without proper recognition of potential compliance implications. Ultimately, the cause was human performance error for failing to immediately file a Self-Report to address the 30 identified PRC-005 assets.

Extent of Condition Discoveries

The following arose during the preparation of TVA's PRC-005 Asset Inventory submitted to SERC for Assessment (a 10% sample) and as a Milestone Activity from the

previous revision of this Mitigation Plan that requires a complete Inventory.

Allowed intervals in TVA's PRC-005 program are as follows:

PRC-005 Ver. 1: TVA's base interval plus grace (without approved deferral), or, when a deferral is executed, the allowed interval is extended to the new PM Late Date approved in the deferral.

PRC-005 Ver. 2 and later: Maximum interval as listed in PRC-005-6 Tables.

Transmission & Power Supply

TVA cannot substantiate completion of more than one PM on a breaker failure relay at Benton, MS 500kV Switching Station (#17305002). The relay was commissioned on or about 9/9/2002 but was not added to the WMS (EMPAC) until 11/6/2007. The first PM scheduled in EMPAC was due in 2013 and was completed on 9/20/2013. As such, the PM performance for 3 devices at this station exceeded the allowed interval under TVA's PRC-005 program.

At TVA's South Nashville 161kV Switching Station (S5177), breaker failure relay device 9499 was commissioned 6/18/2003, but had not been listed as an asset in TVA's WMS (EMPAC) at that time. As a result, this relay was not included in TVA's current WMS (Maximo), and was not addressed in TVA's PRC-005 Maintenance & Testing program. While certain components of the relay were tested, the relay itself had not been tested. The relay was entered into Maximo (location #1332110) on November 19, 2015 and tested on December 22, 2015. As such, the PM performance for 3 devices at this station exceeded the allowed interval under TVA's PRC-005 program.

The cause for these instances was TVA's failure to have the mechanisms in place to effectively capture 100% of installed assets in its PRC-005 program.

Nuclear Power Group (NPG)

TVA's Bellefonte Nuclear site (BLN) is a partially completed nuclear power plant whose units never operated. As a Generator Owner, NPG did not operate or maintain any BLN PRC-005 assets in its Maintenance & Testing program. While compiling PRC-005 Inventory, TPS personnel identified the BLN battery and charger as the DC Power Supply for TPS protective devices in the BLN switchyard and requested the necessary information from NPG. Maintenance & Test records were insufficient to substantiate compliance to PRC-005-1.1b and PRC-005-2. BLN notwithstanding, TVA had previously reported 100% compliance to the PRC-005-2 implementation milestone for intervals of less than one year. This discovery negates TVA's full compliance with that implementation milestone. The cause for these instances is that TVA failed to identify PRC-005 applicability across ownership boundary.

TVA cancelled PRC-005 PM Work Orders at its Browns Ferry Nuclear plant (BFN) to Post-Modification Tests (PMT) of protective devices on BFN Unit 3. The PRC-005 PM Work Orders were closed without adequate verification that the scope of the PMT covered the full scope of the PM Work Orders. As a result, TVA cannot substantiate that all required activities under its PRC-005-1.1b program were completed within the program interval for 2 Protection System devices at BFN. The cause for these instances is that TVA failed to establish a consistently effective process for handling deferral, cancellation, or partial completion of PM activities.

One PRC-005 PM Work Order at BFN Unit 3 was closed with an incomplete test record that remained without a notation or a corrective action having been identified. As a result, TVA cannot substantiate that all required activities under its PRC-005-1.1b program were completed within the program interval for 2 Protection System devices at BFN. This Human Performance failure to recognize the regulatory implications of leaving a test record incomplete is due to TVA's failure to establish a consistently effective process for handling deferral, cancellation, or partial completion of PM activities.

Power Operations

At two TVA sites, Colbert Combustion Turbine site (CCT) and Gallatin Combustion Turbine site (GCT), TVA could not identify adequate records to establish a previous test date for a total of 20 Protection System devices and therefore could not substantiate compliant PM intervals had been maintained. Prior to 2013, PM activities were tracked and documented in TVA's previous Work Management System (EMPAC). Full EMPAC database records were maintained until October 2015. Some primary tables from the EMPAC system were retained in a more universal format, but native tables were deleted that may have provided information that could have established previous performance dates for some devices. These instances are due to TVA's failure to recognize retention requirements for data necessary to substantiate previous performance dates that occurred more than three years ago and prior to the last audit of PRC-005 at TVA. TVA currently uses MAXIMO as its Work Management System.

At TVA's Paradise Fossil Plant (PAF), two generator circuit breakers, CB-864 and CB-868, each have breaker failure relays. At the time of PM performances in 2013, the CB-864 relay had been identified as a PRC-005 asset but the CB-868 relay had not. A deferral letter was properly executed for CB-864 in accordance with PO's PRC-005-1.1b program that allowed performance of the PM at up to a 72 month interval, rather than the normally allowed 60-month interval. When the PM was performed at 66 months, it was noted that CB-868 was not flagged as a PRC-005 asset and had been "back-logged" as a non-regulatory device. PMs for both circuit breakers were completed and CB-868 was added to the PRC-005 program. As a result, TVA cannot produce records that 9 devices at PAF associated with the CB-868 relay were maintained within the allowed interval prior to 2013. The cause for these instances is TVA's failure to have the mechanisms in place to effectively capture 100% of installed assets in its PRC-005 program.

At TVA's Lagoon Creek Combustion Turbine Unit 9 (LCT-09), a deferral letter was approved and executed for PRC-005 PMs on two relay terminals. The letter stated the new interval was 60 months, but the PMs were not completed until just over 67 months. The new PM late date was not documented in the letter and it was not clear whether an additional 12 months of grace beyond the new base interval of 60 months was the intent. If an additional 12 months grace was intended, no substantiation of this intention is available. As a result, TVA cannot produce records that 30 Protection System devices were maintained within the allowed interval. The cause for these instances at LCT-09 was that TVA failed to establish a consistently effective process for handling deferral, cancellation, or partial completion of PM activities.

Also at LCT-09, a work order for the annual PM on the station battery was discovered to have been closed with an incomplete test record. Terminal resistance data was missing. As a result TVA cannot substantiate completion of required activities within the allowed interval pursuant to its PRC 005 1.1b program for this battery. The cause for this instance was that TVA failed to establish a consistently effective process for handling deferral, cancellation, or partial completion of PM activities.

With the purchase of the Ackerman Combined Cycle site (AKC) in April 2015, TVA retained a temporary contract with Intellibind to support certain NERC compliance execution activities during an initial transition period. Initial PRC-005-2 quarterly PM activities for three AKC DC Supplies were performed on 9/24/2015 for compliance to the Implementation Milestone on 10/1/2015. However, TVA asset ID numbers and recurring PMs had not been established yet. After the new asset ID numbers were assigned, the quarterly PMs were set up in the WMS (Maximo). However, a system-level number was mistakenly applied to the Unit 1, Unit 2, and Common battery bank PMs, rather than the correct equipment-level ID numbers. As a result, no PM work orders were generated by the WMS (Maximo) for the next quarterly PM after 10/1/2015. When this was discovered, the PMs were immediately scheduled and performed on 2/11/2016, 11 days beyond the maximum interval of 4 calendar months pursuant to PRC-005-2. The cause for these 3 instances at AKC is TVA's failure to properly identify and maintain PRC-005 applicability during ownership transitions.

Attachments ()

C.3 Provide any additional relevant information regarding the Alleged or Confirmed violations associated with this MitigationPlan:

This Mitigation Plan addresses the following Self-Reports:

- SERC2015-402204 (05/07/15) – the single violation ID for this group of 3
- SERC2015-402207 (05/11/15) – rolled-in with SERC2015-402204
- SERC2015-402208 (05/11/15) – rolled-in with SERC2015-402204

In addition, this revision of the Mitigation Plan addresses 97 instances discovered during execution of TVA's PRC-005 Asset Inventory as a required Mitigation Activity under the previous version of the Mitigation Plan.

Attachments ()

SECTION D: DETAILS OF PROPOSED MITIGATION PLAN

D.1 Identify and describe the action plan, including specific tasks and actions that your organization is proposing to undertake, or which it undertook if this Mitigation Plan has been completed, to correct the Alleged or Confirmed violations identified above in Part C.1 of this form:

TVA Wide PRC-005 Asset Inventory Verification

TVA's Transmission & Power Supply, Power Operations, and Nuclear Power Group organizations will each conduct an inventory true-up for all PRC-005 assets. This initiative will consist of reviewing appropriate engineering records to identify all PRC-005 assets, updating the respective organizations' asset inventories, and confirming maintenance and testing dates along with the most recent test records. The working asset inventory will be reviewed for proper asset to PM activity association which will be updated appropriately. All discrepancies will be recorded and reported to SERC no less often than the inventory progress updates scheduled as milestones in this Mitigation Plan. TVA responded to SERC's Request for Information by providing PRC-005 inventory data for 10% of its Transmission and Generation sites. In addition, one Inventory True-up progress update was completed on 3/14/2016 as a milestone under the previous revision of this Mitigation Plan.

Transmission & Power Supply

Activities Completed
PM# 81187 was created and job plans for DC Control Check and Functional Test were immediately completed on 4/17/ 2015 for both relays at TVA's West Ringgold Substation originally reported to SERC in SERC2015-402204.

The TVA TPS Asset Cut-In Policy existed in various procedures since 2005. Conditions that led to TVA's self-report that assets had not been included in its PRC-005 program are attributable to events that occurred from 2002 to 2007. In 2012, TPS recognized that the Cut-in and Cut-out procedure did not clearly define responsibilities between the applicable groups within TPS and the procedure was revised to address the potential gaps. The following principle checks were added to the TPS asset Cut-in process at that time: 1) Preliminary Asset Cut-in sheets are created by TPS design technicians during design development; 2) The TPS Work Management group confirms all relays on each Relay Settings Sheet are listed in the AMS; 3) Local maintenance personnel review new assets in the AMS prior to the assets being placed into service; and 4) User-friendly software tools have been developed and maintenance personnel are trained to use these tools to identify any incorrect or missing data in the AMS. To date, TPS has not identified instances of failure to identify PRC-005 applicability for assets placed into service since these revisions were implemented.

TPS conducted a review of its Change Management processes. This review addressed upcoming CIP Version 5 as well as potential gaps regarding PRC-005 compliance. The principle checks that have been successful since implementation in 2012 were maintained in Revision 2 of TRANS-SPP-06.011, "Transmission Asset Cut In and Cut Out Process," as submitted to SERC with completion of the milestone on 3/31/2016 under the previous revision of this Mitigation Plan.

Ongoing Activities

In order to determine if any additional PRC-005 assets are missing from the AMS, 100% of all TPS stations subject to PRC-005 will be reviewed as described in the inventory verification above. The current asset cut-in process, revised with improvements since the reported instances occurred, should prevent a recurrence of this type of omission.

Power Operations

Activities Completed

Power Operations (PO) internal battery maintenance testing and inspection documents were reviewed and revised to ensure the documents include PRC-005 R2 requirements, place-keeping with initials, and data sheets. This originally was reported to SERC in SERC2015-402207 and completed as a milestone on 11/5/2015 under the previous revision of this Mitigation Plan. Documents addressed in this revision process were

- PO-SPP-09.033, "NERC Station Batteries PM Program"
- HMP-011, "Stationary Battery Installation and Maintenance"
- SMP-0615A "Annual Battery PM, SMP-0615B Qtrly Battery PM"
- SMP-0615C "Monthly Battery PM"
- TVA Form 6451B, "Hydro Plant Storage Battery Inspection Form"

PO developed and conducted training for HG technicians to correctly perform the prescribed battery maintenance and to correctly fill out the internal battery maintenance testing and inspection documents and data sheets. Training development was reported to SERC on 11/5/2015, and completion of the training was reported on 2/5/2016 as milestones under the previous revision of this Mitigation Plan.

As of 5/13/2015, Power Operations (PO) completed performance of all required maintenance and testing for the missing relays reported in SERC2015-402208. The specific activities included DC circuit tests, sensing device tests, calibration, and functional tests for Fort Loudoun Hydro (FLH) Lock Feeder 86 Relays, Watts Bar Hydro (WBH) Lock Feeder 86 Relays, and Wilson Hydro (WLH) Station Service Transformers C and D protective relays.

An analysis and review was performed by PO to identify all generator connected transformer protective relay assets in HG that are subject to PRC-005. This included an evaluation to identify other lock-feeder transformer relays in HG that have a "Breaker Failure (50BF)" function subject to PRC-005. This was completed on 4/20/2015.

PO completed a review of its Change Management Design Change Notice (DCN) process which was reported to SERC as a completed milestone on 7/1/2015 under the previous revision of this Mitigation Plan. PO-SPP-09.022, Rev 0, "Design Change Control," was issued and included a sign-off sheet specifically for the PO NERC Compliance Manager or designee to review all proposed additions, modifications, or removals of assets during the initial design phase for PO sites to ensure NERC assets are properly identified.

Ongoing Activities

In order to determine if additional PRC-005 assets are missing from the inventory, an extent of condition will be performed to reassess all PO PRC-005 assets by thoroughly reviewing all associated drawings and validate relay performance test dates to identify gaps. A PRC-005 NERC asset repository will be created and maintained by the Power Operations (PO) NERC Compliance team. The new PRC-005 asset inventory will be compared with the 2013 inventory to help identify any non-compliance gaps. This effort will be handled as part of the TVA-wide inventory verification described above.

Nuclear Power Group

Activities Completed

TVA's Nuclear Power Group (NPG) conducted a review of its Change Management processes. Results from this review were included in Revision 19 of the NPG Department Procedure NEDP-10, "Design Output," as reported to SERC with completion of the milestone on 3/31/2016 under the previous revision of this Mitigation Plan.

Ongoing Activities

In order to determine if any PRC-005 assets are missing from the NPG PRC-005 program, all NPG generating stations will be reviewed as described in the inventory verification above.

Extent of Condition Discoveries

To address causes attributed to the instances discovered so far during TVA's PRC-005 Asset Inventory effort, the following additional Mitigation Activities will be performed in the three TVA Business Units (TPS, PO and NPG), unless otherwise noted, to address each indicated cause category.

Any additional discoveries made after submittal of this Mitigation Plan that cannot be attributed to one the indicated cause categories listed below will be mitigated by appropriate additional activities to be completed before 8/4/2017.

Inadequate Asset Identification Mechanisms

Activities previously noted as Completed or Ongoing will address this cause through completion of the PRC-005 Asset Inventory Effort and Engineering Change Management processes.

TVA will complete activities required in NPG's PRC-005 Version 1 program for annual PMs, as well as the performance test that is required at least every 5 years, to bring the Battery and Charger at the Bellefonte Nuclear Plant (BLN) into compliance.

Ownership or Responsibility Uncertainties

TVA has enhanced SERC's PRC-005 asset inventory template to account for ownership and compliance responsibility interfaces that will be identified by entity or Business Unit and whether responsibilities have been resolved for each applicable device. This information will be fully developed with completion of TVA's inventory.

TVA will document ongoing NERC compliance responsibility for the BLN DC Supply components within either the NPG or TPS Business Unit.

Inconsistent PM Administration or Execution

Procedures and instructions for PM deferrals will be reviewed and revised as necessary to ensure new PM Late Dates are explicitly stated in each request for approval.

Procedures and instructions for PM Work Order cancellations will be reviewed and revised as necessary to require appropriate concurrence or approval so that NERC required activities and intervals will be satisfied by an alternative means prior to the cancellation of a NERC PM Work Order.

NERC PM Job Plans, Work Instructions, or other appropriate documents will be reviewed and revised as necessary to state a requirement for completion of all steps unless appropriate concurrence or approval is obtained.

Inconsistent Evidence Retention

TVA will review and revise procedures and instructions as necessary to ensure PRC-005 data retention requirements are adequately represented to ensure availability of evidentiary information.

TVA will Develop and deploy training for applicable engineering, maintenance, and work management personnel to ensure understanding of the regulatory implications in the administration and execution of NERC PMs. Concepts to be addressed include 1) being aware of when a PM being worked is required for NERC compliance; 2) accounting for completion of such PMs; 3) the absolute nature of the NERC maximum intervals, even when a deferral is approved; and 4) the requirement for retention of evidence of PM activities and completion dates (i.e., Test Records). These concepts are common to all of TVA's operating business units, each of which has slightly different procedures and practices. As a result, this training will not be procedure-specific.

Attachments ()

D.2 Provide the date by which full implementation of the Mitigation Plan will be, or has been, completed with respect to the Alleged or Confirmed violations identified above.
State whether the Mitigation Plan has been fully implemented:

8/4/2017

D.3 Enter Milestone Activities, with due dates, that your organization is proposing, or has completed, for this Mitigation Plan:

MS-01: Power Operations: Update Design Change Control Procedure.

Milestone Completed (Due: 7/1/2015 and Completed 7/1/2015)

MS-01: Power Operations will revise the Design Change Control procedure to include a sign-off sheet specifically for the NERC Reliability Manager or designee to review all new additions, modifications, or removals of NERC assets during the initial project design phase for the Power Operations Plants.
PO-SPP-09.022, Design Change Control, Rev.0000

MS-02: Power Operations: Battery Maintenance Documentation Review and Revision

Milestone Completed (Due: 11/5/2015 and Completed 11/5/2015)

MS-02: PO-SPP-09.033 NERC Station Batteries PM Program,
HMP-011 Stationary Battery Installation and Maintenance,
SMP-0615A Annual Battery PM,
SMP-0615B Qtrly Battery PM,
SMP-0615C Monthly Battery PM,
TVA Form 6451B, Hydro Plant Storage Battery Inspection Form

MS-03: Power Operations: Develop HG Battery Training

Milestone Completed (Due: 11/5/2015 and Completed 11/5/2015)

MS-03: Develop Battery Training Presentation for Hydro Generation (HG)

MS-04: Power Operations: Complete HG Battery Training

Milestone Completed (Due: 2/5/2016 and Completed 2/5/2016)

MS-04: PO Hydro Generation (HG) to Complete Battery Training

MS-05: TVA PRC-005 Asset Inventory True-up Update

Milestone Completed (Due: 3/15/2016 and Completed 3/14/2016)

MS-05: Review of appropriate drawings and engineering records to update inventory is estimated to be greater than 25% complete.

MS-06: Transmission: Change Management Process Review

Milestone Completed (Due: 4/1/2016 and Completed 3/31/2016)

MS-06: Conduct a review of Change Management (Cut-in) process to ensure it effectively captures PRC-005 Assets.

MS-07: Nuclear Power Group: Change Management Process Review

Milestone Completed (Due: 4/1/2016 and Completed 3/31/2016)

MS-07: Conduct a review of Change Management process to ensure it effectively captures PRC-005 Assets.

MS-08: PRC-005 Asset Inventory True-up Progress Update

Milestone Pending (Due: 10/7/2016)

MS-08: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Progress will be reported as an estimated percentage of effort based on completed review of engineering records, performance dates, and test records that are required. Inventory records that have been completed to date will also be provided.

MS-09: PRC-005 Asset Inventory True-up Progress Update, Bellefonte DC Supply Compliance and Responsibility Agreement

Milestone Pending (Due: 12/8/2016)

MS-09: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Inventory records that have been completed to date will also be provided. Complete annual and 5-year interval activities required in NPG's PRC-005 program for batteries subject to PRC-005 such that the battery and charger at NPG's Bellefonte Nuclear Plant (BLN) are brought into full compliance.
Document agreement between TVA's Transmission & Power Supply and Nuclear Power Group business units for ongoing compliance responsibilities for the BLN DC Supply components.

MS-10: PRC-005 Asset Inventory True-up Progress Update; PM Deferral & Cancellation Process Improvements.

Milestone Pending (Due: 3/1/2017)

MS-10: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Inventory records that have been completed to date will also be provided. Review and revise TVA's PM deferral processes, including applicable procedures and forms, as necessary to ensure that proposed deferred PM Late Dates are explicitly stated in each request for approval.
Review and revise procedures and instructions as necessary to require appropriate concurrence or approval to ensure that NERC required activities and intervals will be satisfied by an alternative means prior to the cancellation of a NERC PM Work Order.

MS-11: PRC-005 Asset Inventory True-up Completion: Compliance Ownership & Responsibilities Identified

Milestone Pending (Due: 3/31/2017)

MS-11: Submit a complete PRC 005 asset inventory. Inventory will include identification of compliance ownership and responsibility interfaces by entity or Business Unit and whether responsibilities have been resolved.

MS-12: PRC-005 Evidence Retention Improvement

MS-12: Review and revise procedures, instructions, or other appropriate documents as necessary to ensure PRC-005 evidence retention requirements are adequately represented to ensure availability of evidentiary information.

[MS-13: Training & Document Updates to Reinforce Compliance Implications of NERC PRC-005 Activities.](#)

Milestone Pending (Due: 8/4/2017)

MS-13: NERC PM Job Plans, Work Instructions, or other appropriate documents will be reviewed and revised as necessary to state a requirement for completion of all steps unless appropriate concurrence or approval is obtained.

Develop and deploy training for applicable engineering, maintenance, and work management personnel to ensure understanding of the regulatory implications in the administration and execution of NERC PMs.

[MS-14: Resolve All Devices Non-Compliant to PRC-005.](#)

Milestone Pending (Due: 8/4/2017)

MS-14: Bring into compliance all PRC-005 devices discovered to be non-compliant during completion of this Mitigation Plan.

SECTION E: INTERIM AND FUTURE RELIABILITY RISK

E.1 Abatement of Interim BPS Reliability Risk: While your organization is implementing this Mitigation Plan the reliability of the Bulk Power Supply (BPS) may remain at higher risk or be otherwise negatively impacted until the plan is successfully completed. To the extent they are, or may be, known or anticipated: (i) identify any such risks or impacts; and (ii) discuss any actions that your organization is planning to take to mitigate this increased risk to the reliability of the BPS. (Additional detailed information may be provided as an attachment):

BPS Reliability Risk will not be negatively impacted as a result of the actions outlined in this Mitigation Plan. All relay maintenance and testing deficiencies identified in the original Self-Report, and all relays not previously included in TVA's PRC-005 program, have been expediently resolved as described above. The Interim BPS Reliability Risk associated with the possibility of additional missing, and therefore unmaintained, assets can only be ameliorated by the actions outlined in this Mitigation Plan.

Interim BPS Reliability Risk associated with the BLN DC Supply is minimal, because the nuclear units at this site were never commissioned and no other Generator Owner Protection Systems have been in service. Loss of the minimal BLN station load serviced by the grid here poses no risk to the BES. This DC Supplies powers TPS Protection Systems in the switchyard where the 161kV lines Widows Creek 854 and Scottsboro 924 are terminated. Should the existing TPS Protection Systems fail to operate due to a battery failure, these lines would be cleared by Protection Systems at Scottsboro and Widows Creek ends of the lines. This risk is minimal because this scenario presents the same risk as if the BLN switchyard were bypassed with no intervening breakers between the two lines.

[Attachments \(\)](#)

E.2 Prevention of Future BPS Reliability Risk: Describe how successful completion of this Mitigation Plan will prevent or minimize the probability that your organization incurs further risk of Alleged violations of the same or similar reliability standards requirements in the future. (Additional detailed information may be provided as an attachment):

Program improvements as defined in this Mitigation Plan will ensure that TVA has a complete PRC 005 asset inventory with properly associated PMs. This, along with process improvements for administration, execution, and documentation of maintenance and testing activities, will minimize the probability of failing to perform a required maintenance activity as required by PRC-005. Ensuring that change management processes are reviewed for gaps, corrected, and properly applied will help maintain this complete asset inventory. By providing visibility and accountability, TVA's enhancements to the Inventory template will drive resolution of latent issues of ownership and compliance responsibility.

[Attachments \(\)](#)

SECTION F: AUTHORIZATION

An authorized individual must sign and date this Mitigation Plan Submittal Form. By doing so, this individual, on behalf of your organization:

- a) Submits this Mitigation Plan for acceptance by SERC and approval by NERC, and
- b) If applicable, certifies that this Mitigation Plan was completed on or before the date provided as the 'Date of Completion of the Mitigation Plan' on this form, and
- c) Acknowledges:
 - I am Tina Broyles Conerly of Tennessee Valley Authority
 - I am qualified to sign this Mitigation Plan on behalf of Tennessee Valley Authority
 - I understand Tennessee Valley Authority's obligations to comply with Mitigation Plan requirements and ERO remedial action directives as well as ERO documents, including, but not limited to, the NERC Rules of Procedure, including Appendix 4 (Compliance Monitoring and Enforcement Program of the North American Electric Reliability Corporation (NERC CMEP))
 - I have read and am familiar with the contents of this Mitigation Plan
 - Tennessee Valley Authority agrees to comply with this Mitigation Plan, including the timetable completion date, as accepted by SERC and approved by NERC

SECTION G: REGIONAL ENTITY CONTACT

SERC Single Point of Contact (SPOC)

Attachment D

TVA's Certification of Mitigation Plan Completion for PRC-005-1 R2
Submitted August 18, 2017

i This item was signed by Tina Broyles Conerly (tibroyles@tva.gov) on 8/18/2017 ✖

i This item was marked ready for signature by M Lee Thomas (mlthomas@tva.gov) on 8/18/2017 ✖

MEMBER MITIGATION PLAN CLOSURE

All Mitigation Plan Completion Certification submittals shall include data or information sufficient for SERC to verify completion of the Mitigation Plan. SERC may request such additional data or information and conduct follow-up assessments, on-site or other Spot Checking, or Compliance Audits as it deems necessary to verify that all required actions in the Mitigation Plan have been completed and the Registered Entity is in compliance with the subject Reliability Standard. (CMEP Section 6.6) Data or information submitted may become part of a public record upon final disposition of the possible violation, therefore any confidential information contained therein should be marked as such in accordance with the provisions of Section 1500 of the NERC Rules of Procedure.

Name of Registered Entity submitting certification:

Tennessee Valley Authority

Name of Standard of mitigation violation(s):

PRC-005-1

Requirement	Tracking Number	NERC Violation ID
R2.	SERC2015-402204	SERC2015014914

Date of completion of the Mitigation Plan:

8/4/2017

[MS-01: Power Operations: Update Design Change Control Procedure.](#)

Milestone Completed (Due: 7/1/2015 and Completed 7/1/2015)

[Attachments \(1\)](#)

MS-01: Power Operations will revise the Design Change Control procedure to include a sign-off sheet specifically for the NERC Reliability Manager or designee to review all new additions, modifications, or removals of NERC assets during the initial project design phase for the Power Operations Plants.
PO-SPP-09.022, Design Change Control, Rev.0000

[MS-02: Power Operations: Battery Maintenance Documentation Review and Revision](#)

Milestone Completed (Due: 11/5/2015 and Completed 11/5/2015)

[Attachments \(9\)](#)

MS-02: PO-SPP-09.033 NERC Station Batteries PM Program,
HMP-011 Stationary Battery Installation and Maintenance,
SMP-0615A Annual Battery PM,
SMP-0615B Qtrly Battery PM,
SMP-0615C Monthly Battery PM,
TVA Form 6451B, Hydro Plant Storage Battery Inspection Form

[MS-03: Power Operations: Develop HG Battery Training](#)

Milestone Completed (Due: 11/5/2015 and Completed 11/5/2015)

[Attachments \(1\)](#)

MS-03: Develop Battery Training Presentation for Hydro Generation (HG)

[MS-04: Power Operations: Complete HG Battery Training](#)

Milestone Completed (Due: 2/5/2016 and Completed 2/5/2016)

[Attachments \(7\)](#)

MS-04: PO Hydro Generation (HG) to Complete Battery Training

[MS-05: TVA PRC-005 Asset Inventory True-up Update](#)

Milestone Completed (Due: 3/15/2016 and Completed 3/14/2016)

[Attachments \(1\)](#)

MS-05: Review of appropriate drawings and engineering records to update inventory is estimated to be greater than 25% complete.

[MS-06: Transmission: Change Management Process Review](#)

Milestone Completed (Due: 4/1/2016 and Completed 3/31/2016)

[Attachments \(1\)](#)

MS-06: Conduct a review of Change Management (Cut-in) process to ensure it effectively captures PRC-005 Assets.

[MS-07: Nuclear Power Group: Change Management Process Review](#)

Milestone Completed (Due: 4/1/2016 and Completed 3/31/2016)

Attachments (1)

MS-07: Conduct a review of Change Management process to ensure it effectively captures PRC-005 Assets.

MS-08: PRC-005 Asset Inventory True-up Progress Update

Milestone Completed (Due: 10/7/2016 and Completed 10/7/2016)

Attachments (3)

MS-08: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Progress will be reported as an estimated percentage of effort based on completed review of engineering records, performance dates, and test records that are required. Inventory records that have been completed to date will also be provided.

MS-09: PRC-005 Asset Inventory True-up Progress Update, Bellefonte DC Supply Compliance and Responsibility Agreement

Milestone Completed (Due: 12/8/2016 and Completed 12/8/2016)

Attachments (18)

MS-09: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Inventory records that have been completed to date will also be provided. Complete annual and 5-year interval activities required in NPG's PRC-005 program for batteries subject to PRC-005 such that the battery and charger at NPG's Bellefonte Nuclear Plant (BLN) are brought into full compliance.

Document agreement between TVA's Transmission & Power Supply and Nuclear Power Group business units for ongoing compliance responsibilities for the BLN DC Supply components.

MS-10: PRC-005 Asset Inventory True-up Progress Update; PM Deferral & Cancellation Process Improvements.

Milestone Completed (Due: 3/1/2017 and Completed 3/1/2017)

Attachments (12)

MS-10: Submit an update on progress towards completion of TVA's PRC-005 Asset Inventory. Inventory records that have been completed to date will also be provided. Review and revise TVA's PM deferral processes, including applicable procedures and forms, as necessary to ensure that proposed deferred PM Late Dates are explicitly stated in each request for approval.

Review and revise procedures and instructions as necessary to require appropriate concurrence or approval to ensure that NERC required activities and intervals will be satisfied by an alternative means prior to the cancellation of a NERC PM Work Order.

MS-11: PRC-005 Asset Inventory True-up Completion; Compliance Ownership & Responsibilities Identified

Milestone Completed (Due: 3/31/2017 and Completed 3/31/2017)

Attachments (19)

MS-11: Submit a complete PRC 005 asset inventory. Inventory will include identification of compliance ownership and responsibility interfaces by entity or Business Unit and whether responsibilities have been resolved.

MS-12: PRC-005 Evidence Retention Improvement

Milestone Completed (Due: 5/19/2017 and Completed 5/19/2017)

Attachments (12)

MS-12: Review and revise procedures, instructions, or other appropriate documents as necessary to ensure PRC-005 evidence retention requirements are adequately represented to ensure availability of evidentiary information.

MS-13: Training & Document Updates to Reinforce Compliance Implications of NERC PRC-005 Activities.

Milestone Completed (Due: 8/4/2017 and Completed 8/4/2017)

Attachments (22)

MS-13: NERC PM Job Plans, Work Instructions, or other appropriate documents will be reviewed and revised as necessary to state a requirement for completion of all steps unless appropriate concurrence or approval is obtained.

Develop and deploy training for applicable engineering, maintenance, and work management personnel to ensure understanding of the regulatory implications in the administration and execution of NERC PMs.

MS-14: Resolve All Devices Non-Compliant to PRC-005.

Milestone Completed (Due: 8/4/2017 and Completed 8/4/2017)

Attachments (2)

MS-14: Bring into compliance all PRC-005 devices discovered to be non-compliant during completion of this Mitigation Plan.

Summary of all actions described in Part D of the relevant mitigation plan:

From section D1 of the Mitigation Plan, TVA completed various activities:

D1-1 – TVA created NERC PM #81187 for the two relays at TVA's West Ringgold 230kV Substation that were the original subject of TVA's Self-Report SERC2015-402204. TVA completed DC Control Check and Functional Tests on 4/17/ 2015 for both relays.

D1-2 – TVA demonstrated that in 2012 two principal checks were added to the Cut-in/Cut-out process utilized by its Transmission & Power Supply (TPS) business unit to add or remove assets such as relays and other Protection System components.

D1-3 – TVA's Power Operations business unit (PO) completed performance of all required maintenance and testing for the four missing relays reported in SERC2015-402208.

D1-4 – TVA PO performed an evaluation to identify lock-feeder transformer relays in its Hydro Generation (HG) plants that have a Breaker Failure function subject to PRC-005.

D1-5 – With the submittal of its PRC-005 Asset Inventory in 2017, TVA identified a cause category that had not been previously addressed in its Mitigation Plan, "failure to verify test intervals were correctly applied during program changes." Program changes during which the deficiencies occurred were executed in 2007. Prior to discovery in 2017, TVA's Transmission & Power Supply (TPS) streamlined its relay categorization and interval assignments in its PRC-005 PSMP minimizing the human performance barriers in future program changes.

For Milestone 1, TVA added specific review and approval by the Cyber Security/NERC Reliability manager in its Power Operations business unit (PO) to ensure that NERC Compliance issues are given full consideration in the scope of each Design Change Notice (DCN), PO's facility modification design package. This includes verification of PRC-005 assets.

For Milestone 2, TVA's Power Operations (PO) completed a review of its Battery Maintenance program documentation (procedures and forms). However, no changes were determined necessary to HMP-011 Stationary Battery Installation, and Maintenance and SMP-0615C Monthly Battery PM, so only four procedures were revised.

For Milestone 3, TVA Power Operations has completed the development of a Hydro Generation Battery Training Presentation.

For Milestone 4, TVA completed training for all Hydro Generation (HG) technicians responsible for battery maintenance and testing activities.

For Milestone 5, TVA provided an update to SERC on TVA's progress towards completion of its PRC-005 Inventory True-up including TVA's estimation of progress for each generation and transmission site as well as a list of four discoveries identified since the initial Self-Reports in 2015.

For Milestone 6, TVA's Transmission & Power Supply business unit (TPS) reviewed and revised its change management (Asset Cut-in) process to ensure effective capture of new PRC-005 assets.

For Milestone 7, TVA's Nuclear Power Group (NPG) completed review of its Change Management Process and determined that revisions to the procedure NEDP-10, "Design Output," were required to ensure subject matter expertise in NERC compliance is applied appropriately to any proposed changes to its facilities.

For Milestone 8, TVA provided an update to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. TVA provided status of each site's state of completion of four basic tasks involved in completion of the Inventory True-up: 1) review of Engineering Documents; 2) remediation of Work Management System records; 3) determination of Most Recent and Previous Maintenance & Test dates; and 4) verification of Test Records. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory, including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed was 48% at the time.

For Milestone 9, TVA provided an update to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. TVA provided status of each site's state of completion of the four basic tasks involved in completion of the Inventory True-up. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory, including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed was 50% at the time.

TVA also brought the 250V battery at its Bellefonte Nuclear Plant (BLN) into compliance and established a plan to maintain the battery in a compliant state.

For Milestone 10, TVA provided an update to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. TVA provided status of each site's state of completion of the four basic tasks involved in completion of the Inventory True-up. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory, including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed was 66% at the time.

TVA also reviewed and revised as necessary its processes for administering Preventive Maintenance activities (PMs) to ensure that 1) deferred PM Late Dates (also called "Deferred Dates") are explicitly stated on deferral approval forms; and 2) NERC required activities will be completed by alternate means before the PM Work Order is cancelled.

For Milestone 11, TVA completed and submitted its PRC-005 Asset Inventory as directed by SERC. The inventory consisted of seven (7) workbooks included identification of compliance ownership and responsibility interfaces by entity or Business Unit and whether responsibilities had been resolved. Also listed were risk evaluation input and one of five cause categories for each device identified as a compliance deficiency.

For Milestone 12, TVA submitted an email to SERC describing actions completed to revise as necessary TVA's procedures, instructions or other documents that ensure evidence retention requirements for PRC-005 test records are adequate. TVA's Transmission & Power Supply (TPS) revised its PSMP to explicitly require attachment of all test records to their respective work orders. In addition, a PRC-005 Evidence Checklist was implemented for each Job Plan utilized in PRC-005 Preventive Maintenance work orders. TVA's non-nuclear generation business unit, Power Operations (PO), has revised Coal and Gas Maintenance Instructions, and Hydro Generation Standard Maintenance Procedures, for battery maintenance and testing activities to include instructions to attach test forms to the respective PM work orders. In addition, the Relay Testing Job Plan common to all PO generation has been revised with similar instructions. TVA's Nuclear Power Group (NPG) must retain all completed Work Order Packages, including NERC PM work order test records, for the life of the plant plus 75 years. No instances of missing NPG test records were discovered in TVA's recently completed inventory.

For Milestone 13, TVA submitted an email to SERC describing actions completed to revise as necessary TVA's Job Plans, Work Instructions, or other appropriate documents to state a requirement for completion of all steps unless appropriate concurrence or approval is obtained.

TVA's Transmission & Power Supply (TPS) revised its PSMP to explicitly require completion of all maintenance activities described in the program and that, if one or more activities cannot be completed, compliance staff must be notified. In addition, a PRC-005 Evidence Checklist was implemented for each of twelve Job Plans utilized in PRC-005 Preventive Maintenance work orders. This checklist requires the PM performer to confirm completion of all PRC-005 required activities.

TVA's non-nuclear generation business unit, Power Operations (PO), revised its Coal and Gas Maintenance Instructions, and Hydro Generation Standard Maintenance Procedures, for battery maintenance and testing activities to include instructions to complete all PM Work Order steps unless approval or concurrence is obtained. In addition, the Relay Testing Job Plan common to all PO generation was revised with similar instructions.

TVA's Nuclear Power Group (NPG) policies and procedures already required completion of all Work Order steps and activities. A briefing presentation was performed at each site to reinforce the implications of existing procedural content concluding that all steps must be performed.

TVA developed and deployed common agency-wide PRC-005 training. A total of 782 employees with over 50 different job titles were required to complete the training. Of these employees, 780 completed the training while two remain on extended leave. Job titles included engineers, program managers, analysts, technicians, specialists, coordinators, foremen, supervisors, and managers whom TVA identified as having a role in the administration or execution of its PRC-005 program and PMs. Completion of this training by the two employees on extended leave is being tracked in TVA's Condition Report (Corrective Action) system (Maximo).

For Milestone 14, TVA performed actions necessary to address the 1917 devices identified in its PRC-005 Inventory (previously submitted to SERC) as compliance deficiencies, and bring them back into a state of compliance.

Description of the information provided to SERC for their evaluation *

From section D1 of the Mitigation Plan, TVA posted 11 evidentiary files to the Mitigation Plan on the Closure Form (not under any of the dated milestones): D1-1 – the relay test report for the two relays at the TVA's West Ringgold 230kV Substation that were the original subject of TVA's Self-Report SERC2015-402204 and a screenshot from TVA's Maximo Work Management System showing PM #81187 created for these relays

D1-2 – a copy of ED-SPP-06.011 Rev 3, effective 8/1/2012, bookmarked and notated to show that TVA's Transmission & Power Supply (TPS) business unit added two principal checks had been added to its Cut-in/Cut-out process.

D1-3 – relay test records for the four relays in TVA's Hydro Generation (HG) plants that were listed in Section D1 of the Mitigation Plan for SERC2015-402204, showing the required maintenance and testing were completed prior to 5/31/2015.

D1-4 – Two emails and a results table summarizing TVA's Power Operations' analysis of Lock Feeder Breaker relays in TVA's Hydro Generation facilities.

D1-5 – a compilation of TPS PRC-005 program documents starting with the Program Summary dated 2/25/2010 through six subsequent versions to today's PSMP procedure, TRANS-SPP-03.003. This compilation shows the complexity of relay maintenance interval assignments and how they were streamlined in 2014.

For Milestone 1, TVA's Power Operations (non-nuclear generation) conducts change control (facility modifications) according to PO-SPP 09.002, " Design Change Control." Revision 0 of this document was signed on 6/18/2015 and became effective on 7/2/2015. TVA provided a copy of this document bookmarked and notated to indicate where PO's NERC Reliability manger is written into the design development and implementation process.

For Milestone 2, TVA prepared revisions of the following documents and submitted copies of them as evidence of improvements in the Protection System Maintenance Program for the Hydro Generation (HG) group:

- PO SPP 09.033 NERC Station Batteries Preventive Maintenance Program,
- SMP-0615A Annual Battery PM,
- SMP-0615B Quarterly Battery PM, and
- TVA Form 6451 B Hydro Plant Storage Battery Inspection Form.

TVA also later posted copies of the issued revisions to demonstrate the revisions were executed. However, instead of issuing PO-SPP-09.033, PO consolidated the battery program revisions into its PRC-005 program document, PO-SPP-09.021, "NERC Generation Protection Systems and Sudden Pressure Relaying Maintenance Program," effective on 2/26/2016. A copy of this issued document was also provided.

This 6451B form is an example of the final version issued on 3/24/2016. The remaining HG site-specific battery inspection forms are available upon request.

TVA also posted a copy of its summary of Milestone 2 evidence.

HMP-011, "Stationary Battery Installation and Maintenance," and SMP-0615C, "Monthly Battery PM," and were not posted as evidence for Milestone 2.

For Milestone 3, TVA provided the training presentation developed to highlight changes and areas of concerns in TVA Power Operations Hydro Generation (HG) Battery Maintenance program.

For Milestone 4, TVA provided the final version of the HG Battery Training presentation, various dated communications regarding the training, signed rosters from all HG sites, and signed rosters for two individuals who were on extended leave during the time the presentations were originally held.

For Milestone 5, TVA provided a MS Excel workbook as its update to SERC on TVA's progress towards completion of its PRC-005 Inventory True-up. This workbook included TVA's estimation of progress for each generation and transmission site as well as a list of four discoveries identified since the initial Self-Reports in 2015.

For Milestone 6, TVA's Transmission & Power Supply (TPS) utilizes TRANS-SPP-06.011, "Transmission Asset Cut In and Cut Out Process," to provide a systematic and consistent process for ensuring that all TPS locations and assets are fully and correctly documented in the Work Management System (WMS), or Maximo. Revision 2 of this procedure became effective on 4/2/2016 and describes the use of a Asset Cut-in (ACI) Verification Web Page for tracking completion of key activities

for each new asset. In addition additional key data checkpoints have been built into the process to ensure effective verification of asset data. This document includes a flow chart and process steps in Attachment 1 which have been commented and bookmarked to highlight the verification steps.

For Milestone 7, TVA provided a copy of its Nuclear Power Group (NPG) Design Output procedure, NEDP-10 Rev 19, effective 3/31/2016. This procedure defines the requirements and methods for preparation, review, and issuance of design output documents for TVA's Nuclear Engineering Department. Revision 19 of this procedure added clarification to the review process for determining NERC compliance for proposed modification to TVA's Nuclear Power Group (NPG) generation facilities. All plant equipment changes (including settings) that could impact the Bulk Electric System must be coordinated with the NPG Corporate NERC Program Manager and TVA's Transmission & Power Supply group.

For Milestone 8, TVA submitted an email to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. For this update, TVA provided lists of all sites with each site's state of completion of four basic tasks involved in completion of the Inventory True-up: 1) review of Engineering Documents; 2) remediation of Work Management System records; 3) determination of Most Recent and Previous Maintenance & Test dates; and 4) verification of Test Records. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed is 48% at this time. In addition, TVA provided additional inventory records from its Transmission & Power Supply business unit that have been completed since TVA's 10% sample was submitted in response to SERC's RFI on 3/11/2016. TVA estimated that 15% of all of its PRC-005 assets had complete inventory records. Causes and risk classifications for these discoveries were provided on the "Causes" summary page.

For Milestone 9, TVA submitted an email to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. For this update, TVA provided lists of all sites with each site's state of completion of the four basic tasks involved in completion of the Inventory True-up. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed is 50% at this time.

In addition, TVA provided additional inventory records from its Transmission & Power Supply (TPS) and Nuclear Power Group (NPG) business units that were completed since TVA's 10% sample was submitted in response to SERC's RFI on 3/11/2016. TVA estimated that 20% of all of its PRC-005 assets had complete inventory records. No new discoveries had been made since the Milestone 8 update. Results from the inventory including 137 discoveries since the initial Self-Reports were also presented on the "Progress & Status" summary page. Causes and risk classifications for these discoveries were provided on the "Causes" summary page.

Finally, TVA NPG provided a Maintenance and Test report showing that TVA brought the 250V battery at its Bellefonte Nuclear Plant (BLN) into compliance. Along with this report, TVA provided documentation of its plan for compliant maintenance on the battery showing the necessary activities will now be performed by TPS.

For Milestone 10, TVA submitted an email to SERC describing TVA's progress metric, progress reporting, and PRC-005 Inventory records completed to date by TVA Generation and Transmission operating business units. For this update, TVA provided lists of all sites with each site's state of completion of the four basic tasks involved in completion of the Inventory True-up. A "Progress and Status" summary showed a percentage of effort completed along with results from the inventory including 137 discoveries since the initial Self-Reports. TVA's percentage of inventory effort completed is 66% at this time.

TVA also provided additional inventory records from its Transmission & Power Supply business unit that were completed since TVA's 10% sample was submitted in response to SERC's RFI on 3/11/2016. TVA estimated that 33% of all of its PRC-005 assets had complete inventory records. Results from the inventory including 137 discoveries since the initial Self-Reports were also presented on the "Progress & Status" summary page. Causes and risk classifications for these discoveries were provided on the "Causes" summary page.

Finally, TVA provided copies of PM administration procedures and forms to substantiate the existence of, or revisions to establish, requirements that PM deferral dates would be explicitly stated on deferral approval forms, and that procedures clearly state that NERC required activities will be completed by alternate means before the PM Work Order is cancelled.

For Milestone 11, TVA provided copies of the five transmittal emails sent to SERC along with seven inventory workbooks submitted to substantiate completion of the milestone, and copies of seven corrected inventory workbooks transmitted to SERC on 4/21/2017.

For Milestone 12, TVA provided copies of the TPS program document and the Job Plan Evidence Checklists. TVA also provided copies of the PO PM instructions, procedures, and Job Plans. Finally TVA provided copies of its NPG Maintenance Management System procedure along with examples of typical records retention information for NPG Work Orders at its Browns Ferry Nuclear plant (BFN). Similar documents from the Sequoyah (SQN) and Watts Bar (WBN) nuclear plants can be provided on request.

For Milestone 13, TVA provided copies of the program documents, procedures, checklists, and briefing documentation from its Transmission, Power Operations, and Nuclear Power Group business units. In addition, TVA provided PRC-005 training content and reports generated from its Learning Management System listing all employees who completed the training, and all job codes to which the training was assigned. In a separate report, two employees are identified as being on extended leave. This status is confirmed in dated communications from their supervisors confirming their status.

For Milestone 14, TVA provided a list of the deficient PRC-005 devices as evidence of the completion of this activity. Each device on this list had a date for when it was remediated to compliance along with the method of remediation. Five distinct remediation methods were required to address all deficient devices:

1) Device Tested: The device was already compliant as of its Most Recent test, or a test was completed as a "one-off" PM performance to accomplish remediation before 8/4/2017.

2) Duplicate Record: The device was already represented in the inventory as a deficiency in another record.

3) No Longer in Service: The device was removed from service or replaced in a modification already planned.

4) Reclassified: Upon further review, the device is not subject to PRC-005, for example, a relay that only alarms and does not trip a unit.

5) Test Record Recovered: Existing test records that substantiate performance of required activities were found with additional search efforts.

The Deficiency List included a summary table and chart of these remediation results. Actual records substantiating each remediation will be made available for sampling at SERC's request or direction.

I certify that the Mitigation Plan for the above-named violation has been completed on the date shown above. In doing so, I certify that all required Mitigation Plan actions described in Part D of the relevant Mitigation Plan have been completed, compliance has been restored, the above-named entity is currently compliant with all of the requirements of the referenced standard, and that all information submitted is complete, true and correct to the best of my knowledge.