

April 28, 2016

**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. NP16-\_-000**

Dear Ms. Bose:

The North American Electric Reliability Corporation (NERC) hereby provides this Notice of Penalty<sup>1</sup> regarding Tennessee Valley Authority (TVA), NERC Registry ID# NCR01151,<sup>2</sup> with information and details regarding the nature and resolution of the violation 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)).<sup>3</sup>

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 the violation of VAR-002-1.1b R2.

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<sup>1</sup> *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 (2016). *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).

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

<sup>3</sup> See 18 C.F.R § 39.7(c)(2) and 18 C.F.R § 39.7(d).

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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 nonprofit agency that is a federal government entity, and SERC and NERC are bound to follow *SWPA v. FERC* in resolution of this matter.

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

**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. 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 (2016), 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.

\*SR = Self-Report / SC = Self-Certification / CA = Compliance Audit / SPC = Spot Check / CI = Compliance Investigation

NERC Violation ID	Standard	Req	VRF/ VSL	Applicable Function(s)	Discovery Method* Date	Violation Start-End Date	Penalty Amount
SERC2013012973	VAR-002-1.1b	R2	Medium/ Severe	GOP	SR 9/20/2013	5/12/2012 – 7/31/2017 <sup>4</sup>	No penalty

**SERC2013012973 VAR-002-1.1b R2- OVERVIEW**

SERC determined that TVA, as a GOP, failed to maintain the generator voltage output as directed by the Transmission Operator (TOP), which is also TVA. In total, TVA reported 172 deviations from its voltage schedule without providing proper notification to the TOP or receiving an exemption from the TOP over a period of nearly three years. This violation affected five TVA generation facilities connected

<sup>4</sup> The violation end date is July 31, 2017, at which time TVA anticipates that alarms at its nuclear generation sites will be fully functional. TVA also anticipates that alarms will be fully functional at its non-nuclear sites by October 1, 2016.

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to the bulk power system (BPS) via 500 kV transmission lines and five TVA generation facilities connected to the BPS via 161 kV transmission lines.

SERC determined that this violation posed a moderate and not a serious or substantial risk to the reliability of the BPS. Attachment B1 includes the facts regarding the violation that SERC considered in its risk assessment.

TVA submitted its Mitigation Plan designated SERCMIT010391-1 to address the referenced violation on November 13, 2015. Attachment B1 includes a description of the mitigation activities TVA took to address this violation. A copy of the Mitigation Plan is included as Attachment B3.

SERC states in the Settlement Agreement, “As part of the Mitigation Plan...TVA estimates that it will spend \$2.9 million to implement the identified projects for the automated alarm and operator response strategy requiring installation of monitoring and alarms on designated switchyard bus voltages consistent with direction from the...TOP. Projects have been planned and initiated to install alarms at each applicable nuclear, coal, gas, and hydro generation site.” In addition, TVA retrained all generator unit operators. In this violation, 168 of the 172 voltage deviations (97%) occurred before TVA’s retraining. SERC determined that TVA’s completion of the agreed-upon mitigation activities should prevent large-scale recurrence of the types of voltage deviations involved in this violation. NERC staff reviewed TVA’s mitigation of the violation and determined that the mitigation actions should continue to reduce the frequency of TVA’s voltage deviations.

TVA’s completion of its Mitigation Plan is a term of its Settlement Agreement with SERC. TVA’s failure to complete the Mitigation Plan would breach the agreement with SERC and allow SERC to pursue enforcement of the terms of the Settlement Agreement through administrative and judicial proceedings.

#### Regional Entity’s Basis for Penalty

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

1. SERC considered the instant violation as repeat noncompliance with the subject NERC Reliability Standard, which SERC considered to be an aggravating factor in determining the disposition track;<sup>5</sup>

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<sup>5</sup> TVA had a compliance history with VAR-002 R2 (SERC201000519).

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2. TVA had an internal compliance program at the time of the violation which SERC considered a mitigating factor, as discussed in Attachment B1;
3. TVA self-reported the violation;
4. TVA was cooperative throughout the compliance enforcement process;
5. there was no evidence of any attempt to conceal a violation nor evidence of intent to do so;
6. the violation posed a moderate and not a serious or substantial risk to the reliability of the BPS, as discussed in Attachment B1;
7. there were no other mitigating or aggravating factors or extenuating circumstances that would affect the disposition.

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

#### NERC Enforcement Review

NERC Enforcement staff considered the risk posed by the violation to the reliability of the BPS and supports SERC's determination of "moderate." NERC Enforcement staff considered the volume of TVA's failures to maintain its voltage schedule or contact its TOP to coordinate deviations to display inadequate operating procedures and insufficient training of its generation unit operators. During some of the instances, when TVA exceeded its scheduled high-voltage limit, the transmission system was also experiencing high voltage, thereby reducing the system's ability to withstand TVA's deviations.

The operating practices of the TOP, also TVA, partially mitigated these risks. The TOP actively monitors system voltages and performs real-time contingency analyses to identify potential operating problems. Further, TVA's deviations were within a narrow band, between 98% of its scheduled voltage at the lower end and 103% of its scheduled voltage at the higher end. The TOP has transmission system voltage alarms that respond to low or high voltage conditions in order to maintain reliability. TVA's voltage deviations did not reach the levels that would activate the TOP's transmission system voltage alarms. Based on these factors, NERC staff agrees with SERC's assessment that this violation posed a moderate risk and did not pose a serious or substantial risk to the reliability of the BPS.

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## Statement Describing the Assessed Penalty, Sanction or Enforcement Action Imposed<sup>6</sup>

### 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,<sup>7</sup> the NERC BOTCC reviewed the Settlement Agreement and supporting documentation on April 7, 2016, and approved the Settlement Agreement. In approving the Settlement Agreement, the NERC BOTCC reviewed the applicable requirements of the Commission-approved Reliability Standards and the underlying facts and circumstances of the violation at issue.

For the foregoing reasons, the NERC BOTCC approved the Settlement Agreement as appropriate for the violation and circumstances at issue and 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:

- a) Settlement Agreement by and between SERC and TVA executed February 26, 2016, included as Attachment A;
- b) Record documents for the violation SERC2013012973 VAR-002-1.1b R2, included as Attachment B:
  1. Disposition of Violation Document dated January 8, 2016;
  2. TVA's Self-Report dated September 20, 2013; and
  3. TVA's Mitigation Plan designated as SERCMIT010391-1 submitted November 13, 2015.

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<sup>6</sup> See 18 C.F.R. § 39.7(d)(4).

<sup>7</sup> *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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**Notices and Communications:** Notices and communications with respect to this filing may be addressed to the following:

<p>James M. McGrane*                  Managing Counsel – Enforcement                  SERC Reliability Corporation                  3701 Arco Corporate Drive, Suite 300                  Charlotte, NC 28273                  (704) 494-7787                  (704) 357-7914 – facsimile                  jmcgrane@serc1.org</p> <p>Drew R. Slabaugh*                  Legal Counsel                  Rebecca A. Lindensmith*                  Legal Counsel                  SERC Reliability Corporation                  3701 Arco Corporate Drive, Suite 300                  Charlotte, NC 28273                  (704) 414-5244                  (704) 414-5230                  (704) 357-7914 – facsimile                  dslabaugh@serc1.org                  rlindensmith@serc1.org</p> <p>Gary Taylor*                  Vice President and Chief Operating 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>Sonia C. Mendonça*                  Vice President of Enforcement and Deputy                  General Counsel                  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> <p>Edwin G. Kichline*                  Senior Counsel and Associate Director,                  Enforcement                  North American Electric Reliability                  Corporation                  1325 G Street N.W.                  Suite 600                  Washington, DC 20005                  (202) 400-3000                  (202) 644-8099 – facsimile                  edwin.kichline@nerc.net</p>
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<p>Richard T. Saas* Senior Attorney Tennessee Valley Authority 1101 Market Street Chattanooga, TN 37402 (423) 751-8220 (423) 751-3285 – facsimile rtsaas@tva.gov</p> <p>Jacinda B. Woodward* Senior Vice President, Transmission &amp; Power Supply Tennessee Valley Authority 1101 Market Street Chattanooga, TN 37402 (423) 751-2022 (423) 751-4357 – facsimile jbwoodward@tva.gov</p>	<p>*Persons to be included on the Commission’s service list are indicated with an asterisk. NERC requests waiver of the Commission’s rules and regulations to permit the inclusion of more than two people on the service list.</p>
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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/ Edwin G. Kichline

Sonia C. Mendonça  
Vice President of Enforcement and Deputy  
Edwin G. Kichline  
Senior Counsel and Associate Director,  
Enforcement  
North American Electric Reliability  
Corporation  
1325 G Street N.W.  
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Washington, DC 20005  
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cc: Tennessee Valley Authority  
SERC Reliability Corporation

Attachments



## **Attachment A**

**Settlement Agreement by and between  
SERC and TVA executed  
February 26, 2016.**

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**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.

<b>Reliability Standard</b>	<b>Requirement</b>	<b>SERC Tracking No.</b>	<b>NERC Tracking No.</b>
VAR-002-1.1b	R2	SERC2013-401947	SERC2013012973

2. TVA neither admits nor denies the one violation that has been addressed in one Disposition document. TVA has agreed to **no penalty** in addition to other remedies and actions to mitigate the instant violations 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.

**Violations of NERC Reliability Standards**

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

[REDACTED]

[REDACTED]

### III. PARTIES' SEPARATE REPRESENTATIONS

#### Statement of SERC and Summary of Findings

1. SERC determined that TVA was in violation of VAR-002 R2 because it failed to maintain the generator voltage schedule as directed by the TOP and did not receive an exemption from its voltage schedules from the TOP. There was one violation included in the Disposition document, Attachment A.
2. 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

3. TVA neither admits nor denies the facts set forth and agreed to by the parties for purposes of this Settlement Agreement constitute violations of the Standard and Requirement listed in the table above.
4. 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.
5. TVA instituted a numerical methodology for verification of operator actions required when TVA is unable to maintain the respective Voltage Schedule for each applicable site. This methodology is executed for each calendar month (or more frequently) and has been the method of discovery for all instances Self-Reported by TVA, except one, since September 20, 2013. As a result of the increased awareness and accountability documented by this methodology and the breadth of other mitigating activities, TVA's self-reportable instances have declined from 168 in two years prior to April 14, 2014, to substantially fewer in the period following.

### IV. MITIGATING ACTIONS, REMEDIES AND SANCTIONS

6. SERC and TVA agree that TVA will complete the mitigating actions set forth in Section IV of the Disposition document (Attachment A). The Mitigating Actions, Remedies and Sanctions are discussed in detail in the Disposition document (Attachment A).
7. SERC staff also considered the specific facts and circumstances of the violations and TVA's actions in response to the violations in determining a proposed penalty that meets the requirement in Section 215 of the Federal Power Act that "[a]ny penalty

[REDACTED]

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.”<sup>1</sup> The factors considered by SERC staff in the determination of the appropriate penalty are set forth in Section II of the Common Disposition document.

8. Based on the above factors, as well as the mitigation actions and preventative measures taken, TVA shall pay **no penalty** to SERC as set forth in this Settlement Agreement.
9. 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 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

10. 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, 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.
11. 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.

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<sup>1</sup> 16 U.S.C. § 824o(e)(6).

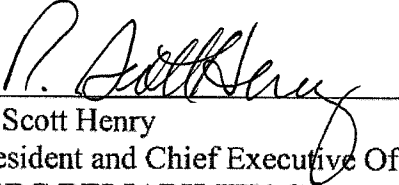
- [REDACTED]
- [REDACTED]
- [REDACTED]
12. This Settlement Agreement shall become effective upon the Commission's approval of the Settlement Agreement by order or operation of law as submitted to it or as modified in a manner acceptable to the parties.
  13. TVA agrees that this Settlement Agreement, 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 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 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.
  14. 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.
  15. 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.
  16. 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.
  17. The Settlement Agreement may be signed in counterparts.



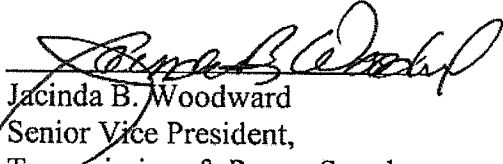
18. This Settlement Agreement is executed in duplicate, each of which so executed shall be deemed to be an original.

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

Agreed to and accepted:

  
R. Scott Henry  
President and Chief Executive Officer  
**SERC RELIABILITY CORPORATION**

2/26/2016  
Date

  
Jacinda B. Woodward  
Senior Vice President,  
Transmission & Power Supply  
**TENNESSEE VALLEY AUTHORITY**

2/23/2016  
Date

## **Attachment B**

**Record documents for the violation of  
VAR-002-1.1b R2 (SERC2013012973):**

**B-1. Disposition of Violation Document  
dated January 8, 2016.**

**B-2. TVA's Self-Report dated September  
20, 2013.**

**B-3. TVA's Mitigation Plan designated  
SERCMIT010391-1, submitted November  
13, 2015.**

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**DISPOSITION OF VIOLATION<sup>1</sup>**  
**Dated January 8, 2016**

NERC TRACKING NO.  
**SERC2013012973**

SERC TRACKING NO.  
**SERC2013-401947**

NOC#

**NOC-2474**

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	LSE	PA	RC	RP	RSG	TO	TOP	TP	TSP
X	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	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 39,037 MW with an additional 1,185 MW of generation capacity from Independent Power Producers (IPPs) within its footprint. TVA has a total of 14,335 miles of transmission line ranging from 100 kV to 500 kV and 66 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

<sup>1</sup> 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.



WITH RESPECT TO THE ASSESSED PENALTY OR SANCTION, REGISTERED ENTITY

ACCEPTS IT/ DOES NOT CONTEST IT

YES

## **II. VIOLATION INFORMATION**

RELIABILITY STANDARD	REQUIREMENT(S)	SUB-REQUIREMENT(S)	VRF(S)	VSL(S)
<b>VAR-002-1.1b</b>	<b>R2</b>		<b>Medium</b>	<b>Severe<sup>2</sup></b>

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

**The purpose statement of VAR-002-1.1b provides:**

VAR-002-1.1b ensures that generators provide reactive and voltage control necessary to ensure voltage levels, reactive flows, and reactive resources are maintained within applicable Facility Ratings to protect equipment and the reliable operation of the Interconnection.”

**VAR-002-1.1b R2 provides:**

**R2.** Unless exempted by the Transmission Operator, each Generator Operator shall maintain the generator voltage or Reactive Power output (within applicable Facility Ratings) as directed by the Transmission Operator.

**R2.1.** When a generator’s automatic voltage regulator is out of service, the Generator Operator shall use an alternative method to control the generator voltage and reactive output to meet the voltage or Reactive Power schedule directed by the Transmission Operator.

**R2.2.** When directed to modify voltage, the Generator Operator shall comply or provide an explanation of why the schedule cannot be met.

### VIOLATION DESCRIPTION

On September 20, 2013, TVA submitted a Self-Report to SERC stating that, as a Generator Operator (GOP), it was in violation of VAR-002-1.1b R2. TVA failed to maintain the generator voltage output as directed by the Transmission Operator (TOP), which is also TVA. Following the initial Self-Report, TVA submitted five additional Self-Reports detailing additional instances of VAR-002 R2 violations on December 19, 2013, April 21, 2014, May 13, 2014, March 2, 2015, and May 11, 2015.<sup>3</sup> SERC

<sup>2</sup> SERC assessed a Violation Severity Level (VSL) of “Severe” in accordance with the October 30, 2013 VSL Matrix because when directed by the TOP to maintain the generator voltage or reactive power schedule TVA failed to meet the directed values for more than 75 minutes.

<sup>3</sup> Respectively, NERC Tracking Nos. (SERC Tracking Nos.): SERC2013013279 (SERC2013-401987), SERC2014013739 (SERC2014-402034), no NERC Tracking No. (SERC2014-402045), SERC2015014735 (SERC2015-402176), and SERC2015014920 (SERC2015-402205).

determined that the additional Self-Reports represented an expansion of scope to the initial September 20, 2013 Self-Report and consolidated the violations.

#### Initial Discovery and General Background

While preparing for a Self-Certification submittal in 2013, TVA conducted a review of its adherence to the TOP-provided voltage schedule for the period from May 12, 2012 through August 26, 2013. The voltage schedules for all TVA units are kept on the TVA corporate intranet and are also available within the supervisory control and data acquisition (SCADA) system. Pursuant to TVA's procedure for voltage control, reactive reserve, and load shedding, effective October 2, 2012, TVA, as the GOP, was required to check the bus voltage against the scheduled voltage at least once per hour. TVA obtained these hourly readings from the TOP's SCADA system. If it found that the bus voltage was outside of the scheduled voltage, TVA was required to act to return the voltage within the prescribed schedule within 15 minutes or to notify the TOP so that the TOP could work with TVA to determine the best course of action. TVA's procedures give the TOP the discretion to modify the voltage schedule or grant an exemption based on the readings reported to it by the GOP. However, without proper notification to the TOP, TVA would be considered to outside of the voltage schedule.

As a result of this review, TVA identified 35 instances at two nuclear generation sites (three generating units) in which it did not maintain the relevant voltage schedule as required. This failure resulted in the submittal of the initial September 20, 2013 Self-Report to SERC. As part of the mitigating activities for the initial Self-Report, TVA performed a review of all of its operating instructions related to VAR-002 compliance. As a result of this review, TVA implemented a new procedure for grid voltage monitoring that retained the hourly review of the switchyard bus voltage obtained from the TOP's SCADA system, but extended the time that TVA had to return to within the voltage schedule or to notify the TOP for coordination purposes from 15 minutes to 30 minutes. In addition, TVA instituted periodic verifications of VAR-002 adherence for all nuclear generating units beginning August 27, 2013 and all non-nuclear generating units beginning March 8, 2014, and TVA retrained all generating unit operators by July 5, 2014. Following these initial four Self-Reports, TVA discovered other instances in which it did not maintain the voltage schedule at some of the same units, as well as one additional nuclear unit, resulting in two additional Self-Reports.

In total, TVA reported 172 excursions from its voltage schedule without providing proper notification to the TOP or receiving an exemption from the TOP over a period of nearly three years. TVA discovered 168 of these excursions (97%) prior to TVA's Self-Report on April 21, 2014, and prior to retraining all generator unit operators and implementation of additional mitigating activities. This violation affected five TVA generation facilities connected to the bulk power system (BPS) via 500 kV transmission lines and five TVA generation facilities connected to the BPS via 161 kV transmission lines.

#### Failure to maintain voltage schedule at generation units connected to the BPS via 500 kV transmission lines

TVA had five generation facilities that connected to the BPS via 500 kV transmission lines for which TVA did not follow its TOP-provided voltage schedule and did not properly notify the TOP or receive an exemption from the TOP.

At Browns Ferry Nuclear Plant (BFN), TVA had a voltage schedule of 510-530 kV. On one occasion in February 2015, TVA recorded a voltage at BFN of 500 kV, 98.04% of the lower end of its voltage schedule. The excursion lasted for approximately 14.5 hours.

At Cumberland Fossil Plant (CUF), TVA had a voltage schedule of 510-530 KV. On 69 occasions between August 2013 and March 2015, TVA recorded voltages at CUF between 531 and 544 kV, which at its maximum was 102.6% of the higher end of its voltage schedule. All but one of these voltage schedule exceedances occurred between August 2013 and January 2014. On one occasion in January 2014, TVA recorded a voltage of 508 kV, 99.61% of the lower end of its voltage schedule. The excursions lasted between approximately 1.9 hours and 10 days.

At Paradise Fossil Plant (PAF), TVA had a voltage schedule of 505-525 kV. On 35 occasions between September 2013 and May 2014, TVA recorded voltages at PAF between 526 and 530 kV, which at its maximum was 101.0% of the higher end of its voltage schedule. The excursions lasted between approximately 2 hours and 3.3 days.

At Sequoyah Nuclear Plant Unit 1 (SQN1), TVA had a voltage schedule of 510-530 kV. On 23 occasions between May 2012 and May 2013, TVA recorded voltages at SQN1 between 530.1 and 536.4 kV, which at its maximum was 101.2% of the higher end of its voltage schedule. The excursions lasted between approximately 1.4 and 18.6 hours.

At Watts Bar Nuclear Plant (WBN), TVA had a voltage schedule of 510-530 kV. On seven occasions between May 2013 and October 2014, TVA recorded voltages at WBN between 531 and 534 kV, which at its maximum was 100.8% of the higher end of its voltage schedule. The excursions lasted between approximately 2.9 and 18.6 hours.

#### Failure to maintain voltage schedule at generation units connected to the BPS via 161 kV transmission lines

TVA had five generation facilities that connected to the BPS via 161 kV transmission lines for which TVA did not follow its TOP-provided voltage schedule and did not properly notify the TOP or receive an exemption from the TOP.

At Allen Fossil Plant (ALF), TVA had a voltage schedule of 165-171 kV. On 14 occasions between September 2013 through February 2014, TVA recorded voltages at ALF between 163 and 164 kV, which at its minimum was 98.79% of the lower end of its voltage schedule. The excursions lasted between approximately 2.5 hours and 2.4 days.

At Apalachia Hydro Plant (APH), TVA had a voltage schedule of 161-167 kV. On three occasions between September 2013 and February 2014, TVA recorded voltages at APH of 168 kV, which was 100.6% of the higher end of its voltage schedule. The excursions lasted between approximately 1.8 and 10.3 hours.

At Norris Hydro Plant (NOH), TVA had a voltage schedule of 161-167 kV. On six occasions between September 2013 and October 2013, TVA recorded voltages at NOH between 168 and 169 kV, which at its maximum was 101.2% of the higher end of its voltage schedule. The excursions lasted between approximately 1.8 and 5.8 hours.

At Sequoyah Nuclear Plant Unit 2 (SQN2), TVA had a voltage schedule of 164-170 kV. On nine occasions between August 2012 and May 2013, TVA recorded voltages at SQN2 between 170.1 and 170.9 kV, which at its maximum was 100.5% of the higher end of its voltage schedule. The excursions lasted between approximately 1.6 and 7 hours.

At Widows Creek Fossil Plant (WCF), TVA had a voltage schedule of 163-169 kV. On five occasions between November 2013 and January 2014, TVA recorded voltages at WCF of 170 kV, which was 100.6% of the higher end of its voltage schedule. The excursions lasted between approximately 2.5 and 27 hours.

#### Causes of the violations

There were several causes for TVA's excursions from its various voltage schedules. In most cases, TVA identified human performance errors caused by failures to communicate and reinforce the need to contact the TOP within the specified timeframe in order to remain compliant with VAR-002 R2 and gaps in operating instructions. In other cases, TVA identified human performance errors caused by complex manual control room processes during voltage excursion events and inadequate training, which led to operators not clearly understanding the necessary timing required for communications to the TOP regarding voltage excursions. In a small number of cases, TVA identified human performance errors caused by operators not understanding that they had to contact the TOP to report a new voltage excursion if they had already contacted the TOP for a different excursion occurring earlier. Many of the excursions occurred during the late evening and early morning hours, and TVA reported to SERC that it regularly has difficulty maintaining the voltage schedule at night, and that it frequently notifies the TOP that it is out of the voltage schedule but the TOP does not direct TVA to make adjustments.

SERC determined that TVA was in violation of VAR-002-1 R2 and subsequent versions of the Standard because TVA failed to maintain the generator voltage schedule as directed by the TOP and did not receive an exemption from its voltage schedules from the TOP.

#### **RELIABILITY IMPACT STATEMENT- POTENTIAL AND ACTUAL**

This violation posed a moderate risk and did not pose a serious or substantial risk to the reliability of the BPS. TVA's failure on 172 occasions to maintain its voltage schedule or to contact the TOP for coordination purposes is indicative of inadequate procedures and insufficient training of generation unit operators. In addition, some of the voltage excursions exceeded the high voltage limit at times when the transmission system was experiencing high voltage. These failures to maintain the voltage schedule or to contact the TOP to inform it of the GOP's inability to correct excursions from the voltage

schedule within a timely manner could have delayed the TOP’s ability to respond to deviations in the voltage of the transmission system, potentially resulting in damage to the system or BPS instability had the TOP failed to independently monitor system voltages and all other means of adjustment had not been available TOP. However, TVA, as the TOP, was monitoring system voltages and was performing real-time contingency analyses that would have identified potential thermal and voltage issues. TVA’s voltage excursions did not dip below 98% of the lower end of its voltage schedule and did not exceed 103% of the higher end of its voltage schedule. In addition, the TOP reviewed its transmission logs for the times of the voltage excursions and found no issues in the area of the affected generation units. TVA’s next-contingency reliability historical results indicated no reliability issues in the areas surrounding the effected plants. Finally, TVA reviewed the net system load during the violation period and found that the exceedances of high voltage limits when the system was experiencing high voltage were not at an extreme level associated with equipment damage. TVA also has transmission system voltage alarms for both low and high voltage and would respond to maintain the reliability of the BPS in the event of low or high voltage on the transmission system. The voltage excursions in this violation did not dip below or exceed the low or high transmission system voltage alarms.

**III. DISCOVERY INFORMATION**

**METHOD OF DISCOVERY**

- SELF-REPORT <sup>4</sup>
- SELF-CERTIFICATION
- COMPLIANCE AUDIT
- COMPLIANCE VIOLATION INVESTIGATION
- SPOT CHECK
- COMPLAINT
- PERIODIC DATA SUBMITTAL
- EXCEPTION REPORTING

**DURATION DATE(S)**

5/12/2012 (the date of the first documented voltage schedule excursion) until mitigated

**DATE DISCOVERED BY OR REPORTED TO REGIONAL ENTITY** 8/22/2013

**IS THE VIOLATION STILL OCCURRING** YES  NO   
**IF YES, EXPLAIN**

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<sup>4</sup> Self-Reports dated September 20, 2013 (NERC Tracking No. SERC2013012973/SERC Tracking No. SERC2013-401947), December 19, 2013 (NERC Tracking No. SERC2013013279/SERC Tracking No. SERC2013-401987), April 21, 2014 (NERC Tracking No. SERC2014013739/SERC Tracking No. SERC2014-402034), May 13, 2014 (no NERC Tracking No./SERC Tracking No. SERC2014-402045), March 2, 2015 (NERC Tracking No. SERC2015014735/SERC Tracking No. SERC2015-402176), and May 11, 2015 (NERC Tracking No. SERC2015014920/SERC Tracking No. SERC2015-402205).

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.	SERCMIT010391
DATE SUBMITTED TO REGIONAL ENTITY	11/13/2015
DATE ACCEPTED BY REGIONAL ENTITY	12/15/2015
DATE APPROVED BY NERC	TBD
DATE PROVIDED TO FERC	TBD

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

MITIGATION PLAN COMPLETED      YES       NO

EXPECTED COMPLETION DATE	7/31/2017 <sup>5</sup>
EXTENSIONS GRANTED	N/A
ACTUAL COMPLETION DATE	TBD
DATE OF CERTIFICATION LETTER	TBD
CERTIFIED COMPLETE BY REGISTERED ENTITY AS OF	TBD
VERIFIED COMPLETE BY REGIONAL ENTITY ON	TBD

**ACTIONS TAKEN TO MITIGATE THE ISSUE AND PREVENT RECURRENCE**

To mitigate this violation, TVA:

1. Performed operating crew meetings to reinforce expectations and requirements regarding the monitoring, documentation, and reporting required for compliance to VAR-002;
2. Performed a review of all operating instructions and other procedures related to VAR-002 compliance to identify potential inaccuracies or inconsistencies that could have contributed to misinterpretation or lack of understanding of requirements for VAR-002 compliance;
3. Updated, revised and reissued operating instructions and other procedures related to VAR-002 compliance;
4. Completed a gap analysis to identify any training or communication gaps;
5. Drafted lessons learned incorporating the elements of site specific communications and shared with the TVA generating fleet;
6. Established and implemented methodologies for periodic review and analysis to verify VAR-002 compliance at each applicable generating site;

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<sup>5</sup> The expected completion date is July 31, 2017 because TVA must coordinate Mitigation Plan alarm installation at nuclear facilities with planned nuclear outages.

7. Implemented computer-based training for VAR-002 Voltage Schedule adherence and ensured all generating unit operators completed the training;
8. Convened a cross-functional team that determined a TVA-wide strategy to ensure voltage schedule and degree of automation to facilitate proper operator response to switchyard voltage excursions in accordance with VAR-002; and
9. Implemented disciplinary actions for individuals involved in repeat occurrences.

To mitigate this violation, TVA will:

1. Update and reissue a computer-based training module for VAR-002 compliance and ensure all generating unit operators complete the training; and
2. Execute projects as necessary to implement an automated alarm and operator response strategy at each applicable generation site.

As part of the Mitigation Plan discussed above, TVA estimates that it will spend \$2.9 million to implement the identified projects for the automated alarm and operator response strategy requiring installation of monitoring and alarms on designated switchyard bus voltages consistent with direction from the Transmission Operator (TOP). Projects have been planned and initiated to install alarms at each applicable nuclear, coal, gas, and hydro generation site. TVA anticipates that alarms at the non-nuclear sites will be fully functional by October 1, 2016. TVA reports that all TVA generating sites, including nuclear, are scheduled for completion before July 31, 2017.

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

To be determined

**V. PENALTY INFORMATION**

**TOTAL ASSESSED PENALTY OR SANCTION OF NO PENALTY FOR ONE VIOLATION OF RELIABILITY STANDARDS.<sup>6</sup>**

**(1) REGISTERED ENTITY'S COMPLIANCE HISTORY**

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<sup>6</sup> 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.

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 VAR-002 R2 compliance history in determining the disposition track. TVA's relevant prior noncompliance with VAR-002 R2 includes: NERC Violation ID SERC201000519. SERC considered TVA's VAR-002 R2 compliance history to be an aggravating factor in determining the disposition track.

ADDITIONAL COMMENTS

Not applicable

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 violations of PRC-005-1 R1 and R2 was filed with FERC under NP09-36-000 on September 25, 2009.<sup>7</sup> 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 PRC-005-1 R2 was filed with FERC under NP10-180-000 on September 30, 2010.<sup>8</sup> On October 29, 2010, 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.<sup>9</sup> 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.<sup>10</sup> The 60 day review period passed on July 29, 2012.

<sup>7</sup> NERC Violation IDs SERC200700019 and SERC20070090.

<sup>8</sup> NERC Violation IDs SERC2009000271 and SERC200900273.

<sup>9</sup> NERC Violation IDs SERC201000526, SERC201000516, SERC201000517, and SERC2011006541.

<sup>10</sup> NERC Violation ID SERC2011008005.



A Settlement Agreement covering violations of FAC-003-1 R2 was filed with FERC under NP12-34-000 on June 29, 2012.<sup>11</sup> 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-018-1 R2, PRC-023-1 R1, VAR-002-1 R2, and PRC-005-1 R2 was filed with FERC under NP13-5-000 on October 31, 2012.<sup>12</sup> On November 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-004-2 R2 for TVA's affiliate, Tennessee Valley Authority – TVAM, was filed with FERC under RC13-7-000 on March 27, 2013.<sup>13</sup> 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.<sup>14</sup> On September 27, 2013, 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 was filed with FERC under NP14-4-000 on October 30, 2013.<sup>15</sup> On November 29, 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.<sup>16</sup> 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.<sup>17</sup> The 60 day review period passed on January 26, 2014.

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<sup>11</sup> NERC Violation ID SERC201000598.

<sup>12</sup> NERC Violation IDs SERC2011008776, SERC2011007382, SERC201000519, and SERC201000492.

<sup>13</sup> NERC Violation ID SERC2012010846.

<sup>14</sup> NERC Violation ID SERC2012011582.

<sup>15</sup> NERC Violation ID SERC2013012257.

<sup>16</sup> NERC Violation ID SERC2013012361.

<sup>17</sup> NERC Violation ID SERC2013012788.

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.<sup>18</sup> 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 PRC-005-1.1b R2 for TVA was publicly posted on March 31, 2015.<sup>19</sup> The 60 day review period passed on May 30, 2015.

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.<sup>20</sup> 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.<sup>21</sup> 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 TVA was publicly posted on August 31, 2015.<sup>22</sup> The 60 day review period passed on October 30, 2015.

#### ADDITIONAL COMMENTS

Aside from the prior VAR-002 R2 violation 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 VAR-002 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

<sup>18</sup> NERC Violation IDs SERC2013012361, SERC2013013140, and SERC2014013914.

<sup>19</sup> NERC Violation ID SERC2014014106.

<sup>20</sup> NERC Violation ID SERC2014014313.

<sup>21</sup> NERC Violation ID SERC2014014314.

<sup>22</sup> NERC Violation ID SERC2014014140.

(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.

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 Programs & Regulatory Compliance (TP&RC) 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 TP&RC 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 general manager of TP&RC is responsible for overseeing the ICP within TVA. The general manager of TP&RC reports directly to the senior vice president of transmission at TVA, who in turn has independent access to the TVA chief operating officer (COO) and the chief executive officer (CEO).

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 TP&RC 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 both the COO and CEO.

**(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: OR N/A

SETTLEMENT DISCUSSIONS COMMENCED

DATE: December 17, 2015 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  BOTH  NO CONTEST

HEARING REQUESTED

YES  NO

DATE

OUTCOME

APPEAL REQUESTED

EXHIBITS:

SOURCE DOCUMENT

TVA Self-Report dated September 20, 2013

MITIGATION PLAN

TVA Mitigation Plan submitted on November 13, 2015

VIEW SELF-REPORT: VAR-002-1.1B R2. (COMPLETED)

This item was submitted by Brandy Spraker (bmspraker@tva.gov) on 9/20/2013

FORM INFORMATION

Registered Entity: Tennessee Valley Authority

NERC Registry ID: NCR01151

JRO ID:

CFR ID:

Entity Contact Information: Brandy Spraker

REPORTING INFORMATION

Applicable Standard: VAR-002-1.1b

Applicable Requirement: R2.

Applicable Sub Requirement(s): R2.2.

Applicable Functions: GOP

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

If yes, provide NERC Violation ID (if known): SERC2010-00519

Date Reported to Region or Discovered by Region: 4/16/2010

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: 8/22/2013

Beginning Date of Possible Violation: 5/12/2013

End or Expected End Date of Possible Violation: 8/19/2013

Is the violation still occurring? No

Provide detailed description and cause of Possible Violation:

A comprehensive review of VAR-002 performance data from May 18, 2012 through August 26, 2013 was initiated on July 24, 2013 as early preparation for the October 1 filing. This review failed to identify documentation of notifications by TVA's Nuclear Power Group (NPG) operators to the Transmission Operators (TOp) for occurrences when notifications would have been required. For these occurrences, it is assumed that no notifications were made. TVA's Sequoyah Nuclear station Unit 2 (SQN 2) experienced nine occurrences, from 8/29/12 to 5/1/2013 (29.9 hours total), of operation outside of the published voltage schedule without documented notifications. Similarly, SQN 1 had two such occasions, on 5/12/12 and 7/3/12 (5.9 hours in total), and Watts Bar Unit 1 (WBN 1) had two such occasions, on 5/24/2013 and 8/19/2013 (8 hours total). The maximum recorded bus voltages were 534 kV (0.75% above maximum of 530 kV) and 171.97 kV (1.15% above maximum of 170 kV). The previously stated durations of operation outside of the published voltage schedule without notification represent approximately 0.11% of the total operating hours of the three NPG stations (6 units).

Investigation of the cause of these potential violations is ongoing, but TVA has identified a failure to follow all applicable procedures as a human error that is the likely cause for non-compliance. Contributing to the cause are inconsistencies found in various NPG unit specific instructions.

Are Mitigating Activities in progress or completed?

If Yes, Provide description of Mitigating Activities:

Mitigating activities are in progress. Along with performance data, NPG Operating instructions that direct actions with regards to VAR-002 requirements were reviewed. Upon closure of the review on August 26, 2013, SQN and WBN Operations were 1) notified of the potential violations, 2) requested to reinforce VAR-002 requirements to the operators, and 3) requested to implement specific revisions in operating instructions identified for each NPG site. SQN and WBN stations issued written notices to all operators re-emphasizing VAR-002 notification requirements and procedure revisions were initiated.

Provide details to prevent recurrence:

Written notices to all SQN and WBN operators have been issued as a short-term action to address awareness of VAR-002 notification requirements as the likely cause. Revisions to Site Operating Instructions have been identified to address a contributing factor. Results of the ongoing investigation will direct any additional corrective actions needed such as training.

Date Mitigating Activities are expected to be completed or were completed:

1/31/2014

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:

Any potential impact to the Bulk Power System was minimized because all of the excursions lacking notification were above the published voltage schedule by a small margin and were short in duration.



Provide detailed description of Actual Risk to Bulk Power System:


There have been no indications of significant grid stability issues noted or documented as a result of the recorded voltage excursions.

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.)

 [A previous version](#) of the this Mitigation Plan exists 

 This item was signed by Tina Broyles (tibroyles@tva.gov) on 11/13/2015 

 This item was marked ready for signature by M Lee Thomas (mlthomas@tva.gov) on 11/13/2015 

## 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:

VAR-002-1.1b

Requirement	Regional ID	NERC Violation ID	Date Issue Reported
R2.	SERC2013-401947	SERC2013012973	9/20/2013
R3.	SERC2013-401948	SERC2013012974	9/20/2013

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

Beginning with SERC2013-401947 submitted 9/20/2013, TVA has self-reported several instances as Possible Violations of VAR-002, R2 which occurred from 5/24/2012 through 3/17/2015. In May, 2012 two conditions occurred that were self-reported as Possible Violations of VAR-002, R3.

SERC2013-401947/SERC2013-401948:

A comprehensive review of TVA's Nuclear Power Group (NPG) VAR-002 performance data from 5/18/2012 through 8/26/2013 was initiated on 7/24/2013 as early preparation for an October 1 filing. This review failed to identify documentation of notifications by NPG operators to the Transmission Operators (TOp) for occurrences when notifications would have been required. For these instances, it is assumed that no notifications were made. From 5/24/2012 through 8/19/2013, TVA's three nuclear stations (6 units) experienced 35 instances of operation outside of the published voltage schedule without documented notifications. The maximum recorded bus voltages were 536.4 kV (1.21% above maximum of 530 kV) and 171.57 kV (0.92% above maximum of 170 kV). The total duration of operation outside of the published voltage schedule without notification represents approximately 0.35% of the total operating hours of the three NPG stations.

On two occasions operators at TVA's Browns Ferry Nuclear (BFN) Unit 3 changed the Auto/Manual status of the Automatic Voltage Regulator (AVR) without documenting the required notifications. These occurred on 5/26/2012, over a 2-minute duration, and on 5/27/2012 when BFN U3 operators made proper notification to the TOp for Manual operation, but did not notify the TOp for return to the Automatic mode approximately 79 minutes later.

Investigations identified the cause as a failure to consistently communicate and reinforce NERC VAR-002 compliance within the Operations organization. Contributing causes were 1) omission of relevant information in Operating procedures regarding NERC VAR-002 compliance, and 2) less than adequate situational awareness and questioning attitude by NPG Operators. A contributing factor noted was a lack of a programmatically established VAR-002 monitoring methodology

SERC2013-401987:

Records from monthly monitoring of Voltage Schedule adherence and VAR-002 R2 compliance show that on 11/2/2013 at 0003 hours, and again at 0637 hours, Watts Bar Nuclear (WBN) Unit 1 Operators coordinated with the TOp on an exceedance that had started at approximately 0000 hours. WBN U1 Operators noted in the Operations Log that the TOp's direction at the coordination call at 0637 hours was that WBN was not required to make adjustments and the TOp would look to other methods to lower grid voltage until load picked up. This exceedance lasted until just before WBN U1 Operators took readings at 0900 hours that indicated the voltage was within schedule again. The reading at 1000 hours also indicated that the voltage was within schedule. At this point no potential non compliance had occurred.

At 1028 hours a second exceedance began. The WBN U1 Operator's readings from 1100 hours on 11/2/2013 through 0500 hours on 11/3/2013 confirmed the exceedance. However, no notification or coordination was documented after the call on 11/2/2013 at 0637 hours until a second TOp call was made at 1811 hours on 11/2/2013, approximately 8 hours into the event. Direction from TVA's TOp requires a notification call within 30 minutes of the first hourly reading indicating an exceedance.

Investigation of the cause for this potential violation revealed that WBN Operators regarded the second exceedance at 1028 hours as a continuation of the previous event and believed that the TOp's instructions at 0637 hours had remained applicable.



SERC2014-402034:

A detailed review of Power Operations' (PO) Coal, Gas, and Hydro plant data from 9/1/2013 to 4/14/2014 revealed 132 instances of site voltage levels being out of the assigned voltage schedule tolerance band. For these instances it appears that communication was not established with the TOp within 30 minutes of the hourly reading, as directed by TVA's TOp.

The apparent cause of non-compliance was the complexity associated with manual processes in control rooms during voltage excursion events. Additionally, in some cases different voltage data points were used by operators for plant voltage schedule adherence than used by the compliance group in reviews, leading to uncertainty as to whether the plant was in compliance.

The analysis also identified the additional contributing factor of continued lack of clear understanding of the time frame requirements for communication between the Generator Operator (GO) and the TOp during a voltage schedule excursion.

SERC2015-402176:

As part of ongoing periodic reviews of VAR-002 voltage schedule adherence practices for TVA's operating nuclear plants, two instances were identified in October 2014 where WBN U1 operators failed to notify the TOp of voltages outside of the prescribed voltage schedule within 30 minutes as directed by TVA's TOp.

Event 1: 10/5/2014 at 0100 hours: WBN plant switchyard voltage was recorded outside of the prescribed voltage schedule (1kV above upper limit) and the TOp was not contacted. The Unit Supervisor had established a temporary alarm for the switchyard voltage and the TOp had previously been notified that WBN U1 was outside of the prescribed voltage. However, the actual voltage schedule parameters had not been exceeded. Only the temporary alarm had been exceeded, which was set slightly lower than the schedule limit. The temporary alarm did not clear, so the Unit Supervisor did not notify the TOp following the voltage excursion at 0100 hours. The temporary alarm remained in alarm the entire night shift. The cause for this event was determined to be a reliance on the temporary alarm and lack of consideration of the hourly readings.

Event 2: 10/19/2014 at 0000 hours: WBN plant switchyard voltage was recorded outside of the prescribed voltage schedule (1kV above upper limit) and the TOp was not contacted until 0113 hours. Note that voltage was also recorded outside of the prescribed voltage schedule at 0100 hours on 10/19/2014, which precipitated the TOp notification at 0113 hours. Following the hourly readings at 0000 hours, the Unit Supervisor was briefing maintenance workers on preventive maintenance that was to occur in the Main Control Room. The cause for this event was determined to be that the required TOp notification was not prioritized above the maintenance briefing.

SERC2015-402205:

Each of the two events described below was preceded by an occurrence in which the respective switchyard voltage was out of the voltage schedule and the required TOp communication was made within the required 30 minutes. Historical data indicates that in each case the respective switchyard voltage later returned to within schedule. The reported events occurred when the switchyard voltages then went out of the voltage schedule again without the required TOp communication being made. The cause of these events is the operator not recognizing that a notification was required after the voltage went out of schedule again.

Event 1 - 2/19/2015 at 1707 hours: Browns Ferry Nuclear Plant (BFN) switchyard voltage was recorded outside of the prescribed voltage schedule until it returned within the schedule at 0740 hours on 2/20/2015. In this case, hourly readings sheets may have either corroborated or refuted the recovery of voltage to within schedule and the subsequent voltage excursion. However, these readings could not be accessed due to an administrative gap in storage of the records. The historical data indicated the recovery was by no more than 1kV such that readings sheets may have indicated a continuous excursion that would not have required additional notification. Without this clarifying evidence, the conservative decision was to treat this event as self-reportable.

Event 2 - 3/17/2015 at 1300 hours: Cumberland Fossil Plant (CUF) switchyard voltage was recorded outside of the prescribed voltage schedule until it returned within the schedule at 2000 hours on 3/17/2015. During the time that the interim recovery of the switchyard voltage to within schedule was indicated by hourly readings, the CUF operators were reading a contingency variable while the primary variable was not in service. The subsequent excursion was indicated upon the return to the primary variable readings, and the operators assumed the primary variable would have indicated a continuous excursion such that additional TOp notification was not required.

#### [Attachments \(\)](#)

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

The VAR-002 instances described were Self-Reported under several ID numbers as follows:

SERC: NERC:  
SERC2013-401947 SERC2013012973  
SERC2013-401948 SERC2013012974 (R3 instance included in original MP for SERC2013012973)  
SERC2013-401987 SERC2013013279  
SERC2014-402034 SERC2014013739  
SERC2014-402045 (Dismissed and rolled into SERC2014013739)  
SERC2015-402176 SERC2015014735  
SERC2015-402205 SERC2015014920

Although the specific circumstances vary slightly from once instance to another, the three most recent instances (SERC2015-402176 and SERC2015-402205) as well as one earlier instance (SERC2013-401987) share the common trait that the Generator Operator failed to notify the TOp of a later instance of a voltage exceedance after having properly coordinated with the TOP during an earlier voltage exceedance. Two of the latest three instances also have in common the contributing factor of the use of a contingency reading or presence of a temporary alarm that made the specific state of the exceedances unclear to the operator. Specific Mitigation Plan Activities are intended to address these common traits, having occurred during periods of sequential voltage excursions, as an emerging trend.

#### [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:

This Mitigation Plan is a consolidation of three plans previously approved by SERC along with additional activities to address more recent self-reported instances.

Original SERC2013-401947/SERC2013-401948:

This Mitigation Plan was approved, completed, and closed with all necessary evidence posted on the SERC portal.

- TVA performed a review of all NPG Operating Instructions related to VAR-002 compliance to identify potential inaccuracies or inconsistencies that could have contributed to misinterpretation or lack of understanding of requirements for VAR-002 compliance. This review was completed on 9/9/2013 and notated copies of applicable procedures were forwarded to each site.
- Several specific procedures were updated or revised. At WBN, a new procedure 1-PI-OPS-500kV was created for grid voltage monitoring. This procedure was designated as 'Continuous Use.' This designation means Operators must have a copy in hand as the procedure is performed in the specified sequence and that place-keeping must be utilized on each step.
- At BFN, Operating Instructions were revised to ensure MVAR adjustments initiated as a result of Switchyard Voltage readings are coordinated across all three units. Currently, only BFN utilizes one control room to monitor a common Switchyard Voltage.
- Site procedures were revised as necessary to document specific retention requirements for readings sheets for consistency across all three NPG sites.
- Sequoyah Nuclear (SQN) Unit 2 instructions were reviewed and revised to include a Voltage Control Appendix similar to Unit 1 instructions.

Mitigating Activities 1, 2, 5 and 6 addressed the identified cause with communication and reinforcement, while Activities 3 and 4 addressed the contributing cause regarding procedural content.

Activity 1 was completed 2/20/2014: The NPG NERC Compliance Program Manager worked with Transmission Operations, Transmission Technical Training, and NPG Operations CFAM to develop proposed content for an initial Exchange between NPG and TOp operations.

Activity 2 was completed 2/21/2014: Operations Standing Orders or other similar guidance was issued as an interim measure to provide direction to NPG Operators regarding VAR-002 compliance. This guidance included expectations regarding the monitoring, documentation, and reporting of NERC Standard VAR-002, and the significance and potential consequences associated regulatory non-compliance.

Activity 3 was completed 2/27/2014: Site procedures were reviewed and revised to ensure treatment of voltage control or generation resource status notification content and time-frames that are consistent with VAR-002 requirements and Top directions.

Activity 4 was completed 3/18/2014: A Change Management Evaluation was completed, and subsequent Training Needs Analyses were completed at each NPG site, to address changes in NPG procedures.

Activity 5 was completed 4/3/2014: A presentation for NERC Awareness for NPG Operations was prepared which included the following training objectives: Recognize NERC as a Regulatory Entity; Describe structure of NERC Reliability Standards; Explain how NERC and the Regions monitor and enforce NERC compliance; Explain the NERC compliance framework of TVA and NPG; Explain employees' responsibilities and obligations to maintain NERC compliance; and Describe Lessons Learned within the nuclear industry of confirmed violations of the NERC Reliability Standards.

Activity 6 was completed 5/23/2014: A matrix of procedures, training content and training programs/plans was developed to summarize the results for BFN, SQN, and WBN plants in regards to content addressing the VAR-002, R2 requirements. Also, a computer based training (CBT) module (LMS #50000899) was implemented in June, 2014 that focused solely on VAR-002, R2 compliance. All TVA generator operators on duty at that time completed this CBT in conjunction with a similar activity for SERC2014-402034.

Activity 7 was completed 6/19/2014: A methodology for monthly monitoring of NPG VAR-002 compliance was developed and piloted for six months. Documentation of this monitoring process was drafted and appended to NPG's NERC Compliance program document as an ongoing element of compliance.

SERC2013-401987:

Mitigating activities were completed prior to submittal of this Self-Report. The Mitigation Plan was approved, completed, and closed with all necessary evidence posted on the SERC portal.

Activity 1 was completed 12/26/2013: The WBN U1 operating instruction 1-PI-OPS-1-500KV was revised and reissued, explicitly requiring a review of the previous switchyard reading versus each current reading. If the previous reading was within schedule and the current reading indicates an exceedance, a Top notification call is required regardless of previous calls made.

Activity 2 was completed 1/10/2014: The WBN U1 Operations Supervisor communicated the clarifications in 1-PI-OPS-500KV to all operations shifts.

SERC2014-402034:

This Mitigation Plan was approved and is currently in progress. The following were completed prior to submittal of the Mitigation Plan:

- A training and awareness package was developed that was then communicated during a presentation to Power Operations (non-nuclear generation) Operations Management.
- An increased frequency of internal voltage schedule adherence reviews was established for Power Operations (PO).
- A GAP Analysis was completed to identify any training, communication, and procedural gaps to VAR-002, R2 compliance in PO.

Activities 1 through 5 were completed as progress towards implementation of an automated alarm and operator response strategy for VAR-002 compliance.

Activity 1 was completed 8/4/2014: A CBT module for Generator Operators on the current voltage schedule adherence process was developed (LMS #50000899) and completed for most operators. VAR-002-2b, R2 compliance was discussed with the Transmission Operators during their Transmission Cycle training. Emails to TVA executives were transmitted to ensure proper communication between Business Units. Voltage schedule adherence strategy meetings were held as shown by agendas, minutes, and rosters.

Activity 2 was completed 10/1/2014: Completion of the VAR-002, R2 CBT for personnel returning from extended leave of LMS #50000899 continued. An executive presentation to confirm future direction of many of the TVA plants was held. The process for projects to implement the automated alarm and operator response strategy began as shown in several meeting minutes and associated.

Activity 3 was completed 11/3/2014: TVA provided an email to SERC giving an update on progress in regards to voltage schedule adherence. Applicable evidence attachments were provided in the closure section of the portal showing progress made by each TVA Generating Business Unit towards establishing a timeline for implementation of an automated alarm and operator response strategy.

Activity 4 was completed 2/2/2015: TVA provided an email to SERC giving an update on progress in regards to voltage schedule adherence. Applicable evidence attachments were provided in the closure section of the portal showing progress made by each TVA Generating Business Unit towards implementation of an automated alarm and operator response strategy.

Activity 5 was completed 5/1/2015: TVA provided an email to SERC giving an update on progress in regards to voltage schedule adherence. Applicable evidence attachments were provided in the closure section of the portal showing progress made by TVA Generating Business Units towards implementation of an automated alarm and operator response strategy.

TVA regards the automated alarm and operator response strategy as fundamental to avoiding the occurrence of an instance similar to any of the instances addressed in this Mitigation Plan.

Included in the scheduled Milestone activities in section D.3 are regular updates to SERC to show TVA's continuing progress to implement and completion of the automated alarm and operator response strategy at all generating sites subject to VAR-002, R2. In addition, the following activities have been or will be completed to address TVA's most recent self reported instances:

SERC2015-402176:

NOTE: These actions were completed prior to identification of the emerging trend following discovery of instances self-reported in SERC2015-402205.

- The WBN U1 procedure requiring voltage reading and Top notifications, 1-PI-OPS-1-500KV, has been revised to clarify the manual voltage recording and notification requirements.
- Each WBN U1 licensed operator has signed a reaffirmation letter stating understanding of the disciplinary procedure regarding NERC compliance.
- Responsible WBN Unit Supervisors have received disciplinary action.
- A stand down was held with WBN Operations Shift Managers giving direction to review hourly data sheets for 30 days following the reported instances.
- The WBN Operations Superintendent reviewed the data sheets for each shift for 30 days following the reported instances.
- Lessons learned from these WBN U1 events were shared with the TVA generating fleet (NPG, Coal, Gas and Hydro).

SERC2015-402205:

Both CUF units have fully implemented modifications, procedural revisions, and training for operation with the automated voltage alarm and operator response strategy.

Mitigating activities addressing the emergent trend completed to date:

- Communications regarding Operations specific to each site (BFN and CUF) were performed to address the duration of validity for Top directions, especially under unusual conditions, and the requirement to notify when either a primary, contingency, or alarms or other indications in use indicate a new voltage exceedance has begun.
- A process to maintain BFN Switchyard Voltage readings sheets such that they can be retrieved as permanent records was established and confirmed as functional.

Mitigating activities addressing the emergent trend to be completed:

- Lessons Learned incorporating the elements of the site-specific communications described above and relevant aspects of the previous events that fit the emergent trend (WBN 13-1987 and 15-2176) will be shared across the NPG and PO generating fleet (all TVA owned and TVA-operated generating units). This information will be discussed in a stand-down, pre-shift briefing, or similar meeting for each operating crew at each operating unit and documented with signed crew attendance rosters.
- TVA's Computer Based Training (CBT) module for VAR-002 adherence (LMS #50000899) will be updated to specifically address the need for additional notifications when subsequent exceedances occur. This update will include how to remain compliant when contingency readings must be utilized or if conflicting indications create doubt as to whether a voltage exceedance is underway. The revised CBT will be released through TVA's online Learning Management System, required for all generating unit operators, and with a completion due date of 11/10/2016.
- Training programs for NPG and PO operators will be revised as necessary to ensure all new NPG and PO operators receive training prior to operating any TVA generating unit.

#### [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:

7/31/2017

[Provide update to SERC on voltage alarm projects.](#)

Milestone Pending (Due: 12/16/2015)

Provide update to SERC on the implementation plan for voltage alarm projects.

[Provide update to SERC on voltage alarm projects and share Lessons Learned from BFN and CUF sites across TVA's nuclear and non-nuclear generating fleet.](#)

Milestone Pending (Due: 2/17/2016)

Provide update to SERC on the implementation plan for voltage alarm projects. Share Lessons Learned with operators of all TVA-owned and TVA operated generating units. These Lessons Learned will incorporate key elements of the site-specific communications from the BFN and CUF sites, and relevant aspects of previous events at WBN that fit the emergent trend in Milestone 1.

[Provide update to SERC on voltage alarm projects and issue revised VAR-002 training content.](#)

Milestone Pending (Due: 5/17/2016)

Provide update to SERC on the implementation plan for voltage alarm projects. Update and issue TVA's CBT module for VAR-002 adherence (LMS #50000899) to address 1) the need for additional notifications when subsequent exceedances occur; and 2) how to remain compliant when contingency or conflicting indications are a factor. Update training programs for the NPG and PO operating groups to ensure new operators are required to complete LMS #50000899 on VAR-002 compliance at least once prior to operating a TVA generating unit.

[Provide update to SERC on voltage alarm projects.](#)

Milestone Pending (Due: 8/15/2016)

Provide update to SERC on the implementation plan for voltage alarm projects.

[Provide update to SERC on voltage alarm projects.](#)

Milestone Pending (Due: 11/10/2016)

Provide update to SERC on the implementation plan for voltage alarm projects. Provide confirmation to SERC training module LMS #50000899 was completed for all generating unit operators.

[Provide update to SERC on voltage alarm projects.](#)

Milestone Pending (Due: 2/8/2017)

Provide update to SERC on the implementation plan for voltage alarm projects.

[Provide update to SERC on voltage alarm projects.](#)

Milestone Pending (Due: 5/8/2017)

Provide update to SERC on the implementation plan for voltage alarm projects.

[Provide to SERC evidence of completed implementation of TVA's voltage alarm projects.](#)

Milestone Pending (Due: 7/31/2017)

Provide SERC evidence of full implementation of TVA's automated voltage alarm and operator response strategy.

## 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):

While implementing these mitigation steps, no additional significant impact or risk to the BES is expected.

With the Mitigation Activities completed thus far, improvement in TVA's VAR-002 R2 compliance has been demonstrated as a reduction of the rate of instances from 73 per year (May 2013 through May, 2014) to 4 per year (May 2014 through May, 2015).

As the site-specific communications and TVA-wide sharing of Lessons Learned are underway, there is a some risk of isolated occurrences where a Generator Unit Operator does not have full understanding of VAR-002-2b communication requirements under unusual conditions, should they occur.

Continued operation of the Transmission System outside the voltage schedule, either above or below, can result in BES and customer equipment damage. The main objective of voltage schedule adherence is to maintain BES reliability while meeting customer demand within the operating range of the equipment. A secondary objective is to minimize system losses by optimally coordinating the voltage schedule among the various generators.

While one or two generation sites running below the low limit of the voltage schedule could theoretically result in degraded BES reliability, the limits of each site voltage schedule limits are more conservative than the BES Transmission System alarm thresholds. The TVA Transmission Operators (TOp) have alarm points for the BES system voltages that, if exceeded if triggered, will indicate a need to provide additional reactive power to maintain BES reliability. These alarms are triggered well before BES reliability is degraded. The trigger points for these alarms are set well before degraded BES reliability. TVA has numerous mechanisms to increase system voltage, including increasing reactive output of generators, removing reactors from service, switching shunt capacitors and adjusting BES Load Tap Changing Transformers.

Conversely, one or two generation sites running above the high voltage boundary limit could result in BES equipment damage, but as before, the TVA TOp operating desks has high voltage alarm points for on high BES the Transmission System voltages that are set outside the individual generation site voltage schedule limits. These alarms will trigger the TOp to reduce the system voltage by other means. These alarms are triggered well before BES reliability is degraded. These means include; reducing reactive output of the generator in question or other nearby generators, removing capacitor banks from service, placing shunt reactors in service, or adjusting BES Load Tap Changing Transformers. These alarms are triggered well before the equipment damage threshold.

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

[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):

TVA has continued to aggressively identify instances of potential non-compliance and common causes that can be corrected to address them. Completion of the implementation of company-wide strategy of automated alarm and operator response for voltage excursions, along with identification and communication of how to deal with unusual conditions such as contingency readings, will promote a standardized approach to process, training, and appropriate level(s) of automation, thereby reducing process complexity and ensuring effective processes consistently applied across TVA Business Units.

Recurring training of NPG and PO Operators will promote understanding of VAR-002 requirements and proper actions per TOp direction as voltage schedule excursions occur.

[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 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)