

# NATF Redacted Operating Experience Report

## Common Cause Analysis of Induction Incidents

### About NATF Redacted Operating Experience (OE) Reports

North American Transmission Forum (NATF) operating experience reports highlight positive or negative transmission (reliability or resiliency) experiences worth sharing for learning opportunities or potential trending. The overall goal is to help each other learn without experiencing the same issues first-hand. This sharing originates confidentially within the NATF membership.

Redacted operating experience reports are posted on the NATF public website to allow the NATF and its members to more broadly share information, especially safety-related alerts and learnings, with contractors and other utilities to benefit the industry at large.

The NATF member company that submitted the initial restricted distribution OE report for this topic/event has approved the NATF to issue this redacted OE report.

### **Open Distribution**

Copyright © 2021 North American Transmission Forum. Not for sale or commercial use. All rights reserved.

### **Disclaimer**

This document was created by the North American Transmission Forum (NATF) to facilitate industry work to improve reliability and resiliency. The NATF reserves the right to make changes to the information contained herein without notice. No liability is assumed for any damages arising directly or indirectly by their use or application. The information provided in this document is provided on an “as is” basis. “North American Transmission Forum” and its associated logo are trademarks of NATF. Other product and brand names may be trademarks of their respective owners. This legend should not be removed from the document.

## Topic

Common Cause Analysis of Induction Incidents

## Description

A common cause analysis was performed to determine the underlying causes of 10 induction incidents that occurred over a seven-year period. The analysis focused on commonalities across several key elements:

1. Organizational unit
2. Involved personnel (i.e., company employees or contractors)
3. Undesired actions contributing to the occurrence of the incidents
4. Human performance failure modes associated with the undesired actions
5. Organizational and programmatic failure modes associated with the undesired actions

## Lessons Learned

Inadequate establishment and verification of an effective equipotential zone<sup>1</sup> (EPZ) due to the following:

1. Less than adequate crew knowledge of induction hazards and implementation requirements of associated protection protocols.
2. Less than effective supervisory oversight in providing direction critical to performing the job safely, monitoring the job to identify and resolve performance issues, and reinforcing expectations.
3. Lack of a robust barrier to verify the adequacy of the initially established EPZ and identify when conditions change.

## Corrective Actions

1. Require the establishment of an EPZ whenever hazardous induction is present.
2. Develop a training module covering how induction incidents can occur, hazards associated with induction incidents, and how to properly establish an effective EPZ.
3. Develop and institutionalize protocols for measurement of the voltages on conductors within the boundaries of the initially established EPZ and the use of these measurements to ascertain the effectiveness of the EPZ prior to commencing work within the EPZ. Based upon these measurements, establish as necessary additional progressive personal protective equipment requirements (e.g., insulated boots, rubber gloves, working the task as a live load, etc.). Utilize industry benchmarking.

---

<sup>1</sup>An equipotential zone is a work zone in which the worker is protected from electric shock from differences in electric potential between objects in the work area. These differences in potential can be caused by induced voltage, line reenergization, or lightning.

4. Determine the feasibility of direct measurement of the continued effectiveness of the EPZ as conditions change after the initial EPZ is established. Utilize industry benchmarking.

Guidance for field personnel:

1. Ensure establishment of EPZ prior to initial entry, at the beginning of each shift, and if conditions change.
2. Always verify, test, and ground before touching any conductor.
3. Be engaged and use all available tools to ensure your safety and the safety of others.
4. Do not be afraid to voice thoughts or concerns.

## Extent of Condition

Although induction events are more likely to occur with transmission-related work activities, they can occur throughout the system.