

# NATF Redacted Operating Experience Report

Limited Scope – Employee Receives Electrical Shock at Remote Site

## 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 © 2018 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

Employee Receives Electrical Shock at Remote Site

## Description

While attempting to adjust an auto transfer switch (ATS) timer for an emergency generator at a remote radio site, an employee received an electrical shock. The employee traveled to a remote radio site to apply shock and arc-flash (AF) stickers. Upon arrival at the site, the employee realized he was unsure of which cabinets to install the AF stickers. He then called his local craftsman to find out which cabinets to apply the AF stickers. While on the phone, the craftsman reminded him that the ATS timer was off schedule and needed adjusting. The employee then applied the AF stickers to two electrical panels and an ATS case for the emergency generator. He then opened the door to the ATS case and realized it was a mechanical timer of a type that he had never adjusted before. He had previously adjusted only the digital type of timer. The employee called the craftsman again and asked for guidance on adjusting the timer. The craftsman and employee walked through the procedure over the phone, and they hung up. The employee thought that because the timer dial was de-energized, there was no shock hazard. He then reached in to adjust the timer, and as he did so his right hand brushed up against the timer terminal block, which had 240 volts phase-phase and 120 volts phase-to-ground present, resulting in a brief electrical shock to the left side of his right hand. Upon feeling the shock, the employee instinctively retracted his hand from the ATS case and stepped back. He then took voltage measurements at different locations in the ATS case to determine the cause of the shock. He determined that the terminal block beneath the mechanical dial was energized and determined this to be the cause of the shock. The employee was medically evaluated at a local hospital and released.

## Lessons Learned

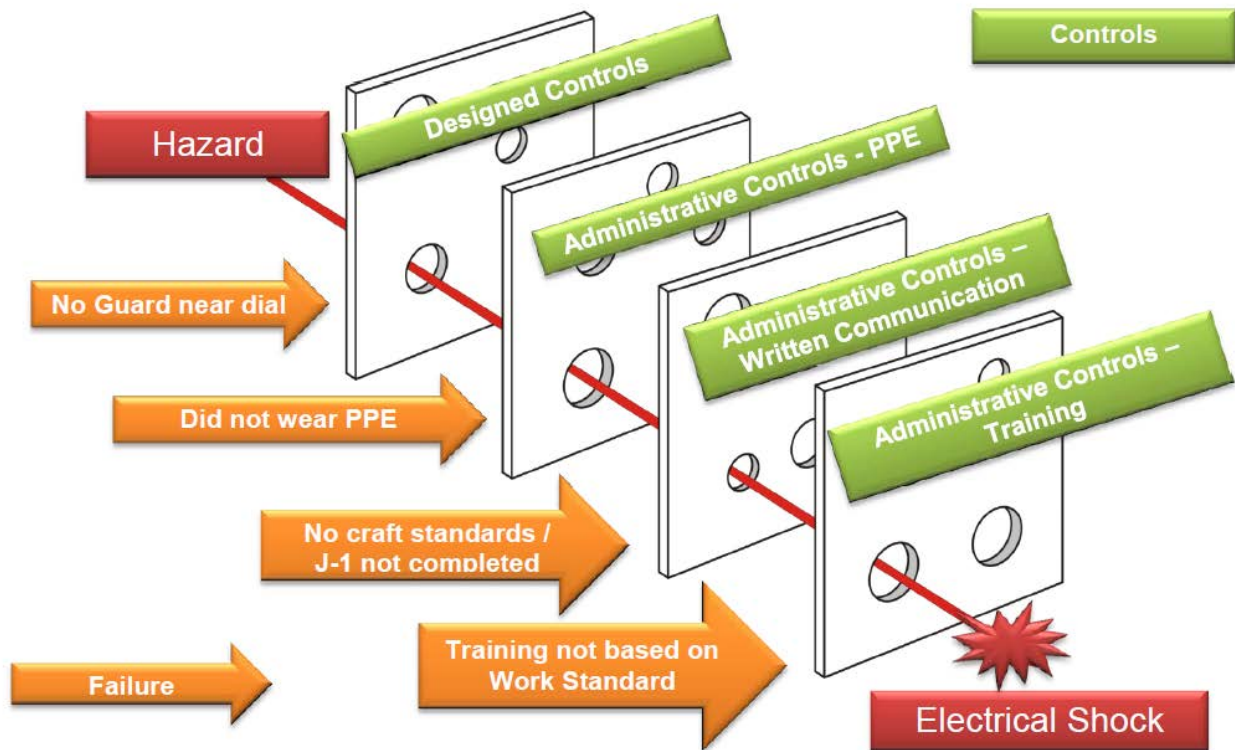
The main factors that led to the shock were:

1. This employee was unfamiliar with this model of ATS and had never reset the timer dial on this particular model of ATS; therefore, he was not aware that the terminals near the ATS timer dial were energized.
2. There are culture pockets in which work on circuits 50 to 600 V is still conducted without a full assessment of hazards or PPE requirements as would be required by current policy and standards. Simply stated, the employee did not classify the risk because he did not recognize it.
3. The last line of defense against shock, such as designed controls like physical barriers, were not incorporated into this model of ATS.

## Actions Taken

The team conducted a barrier analysis to determine the presence and strength of controls (defenses) and determined that multiple controls failed and discovered opportunities for reinforcing defenses in the future.

*Note: The below is an adaptation of Dr. James Reason's Swiss cheese model of an event, controls present (green) and weaknesses (orange) within each control.*



## Extent of Condition

An extent of condition (EOC) survey was conducted and the team determined that there are other ATS' in service at remote radio sites that have the same mechanical timer dial (condition) and that there are some craftsmen and engineers who likely adjust these timers in an energized state (work practice).