North American Transmission FORUM

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NATF Redacted Operating Experience Report

Failure of 138 kV Vee Switch

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

Disclaimer

Topic

Failure of 138 kV Vee Switch

Description

An employee was opening a 138 kV gang-operated vee switch when one of the insulators failed. A pipe buss and half of one phase of the switch fell to the ground. The pipe and insulator fell in the clear, but nearly struck the employee operating the switch.

The investigation into this failure was not conclusive. Possibilities for the failure include:

- Pre-existing damage from installation, shipping, or manufacturer's defect
- Age or environment
- Cantilever stress induced by the weight of the insulator itself

Figure 1. Remainder of Failed Vee Switch

Figure 2. Portion of Failed Insulator and Buss that Fell to Ground

Lessons Learned

1. Always wear proper PPE to safeguard against the potential for falling parts or debris from a failed component in the substation yard, especially when switching or manipulating other equipment with moving parts.
2. Maintain situational awareness while working in the substation yard. Despite our best plans, there is no such thing as zero risk. Equipment may fail in close proximity to employees, and maintaining awareness may be an employee's best defense against a physical hazard.

Actions Taken

1. The other phases of the failed switch were replaced due to the similar age, installation, and manufacture.
2. The gang mechanism has been redesigned so that the handle is not directly underneath the switch itself.
3. The failed components have been shipped for further inspection.
4. Employees performing monthly substation inspections have been notified of this event. Each has been issued a pair of high-resolution binoculars to aid in the possible detection of small cracks in substation insulators.
5. This failure has been shared with all transmission services employees and circulated to our transmission customers who may own similar equipment.

Extent of Condition

Our company has identified all remaining locations with switches that may also be at risk of having similar failures based on age of equipment. These switches will be replaced on a planned (non-emergency) schedule.