NATF Redacted Operating Experience Report

Failure of 138 kV Vee Switch

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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
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.