North American Transmission FORUM

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NATF Redacted Operating Experience Report

Transmission Line Trip Due to Grounds Left in Place

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.

Topic

Transmission Line Trip Due to Grounds Left in Place

Description

A 230 kV transmission line tripped following a reconductoring project due to grounds left in place on a structure.

A contract transmission line crew was tasked with reconductoring a section of line between structures A1 and A3 on the Substation FC to Substation MG 230 kV line (as shown in figure 1). In the same transmission right-of-way, a 230 kV line was being built between the new Substation FL and the existing Substation TP.

A clearance was requested and issued to allow for the reconductoring. The line section had a temporary jumper from the air-gapped Substation FL to Substation TP line. Temporary protective grounds (TPGs) were placed on the line section to be reconductored at structure A2, and the clearance on the Substation FC to Substation MG line was released to system operations.

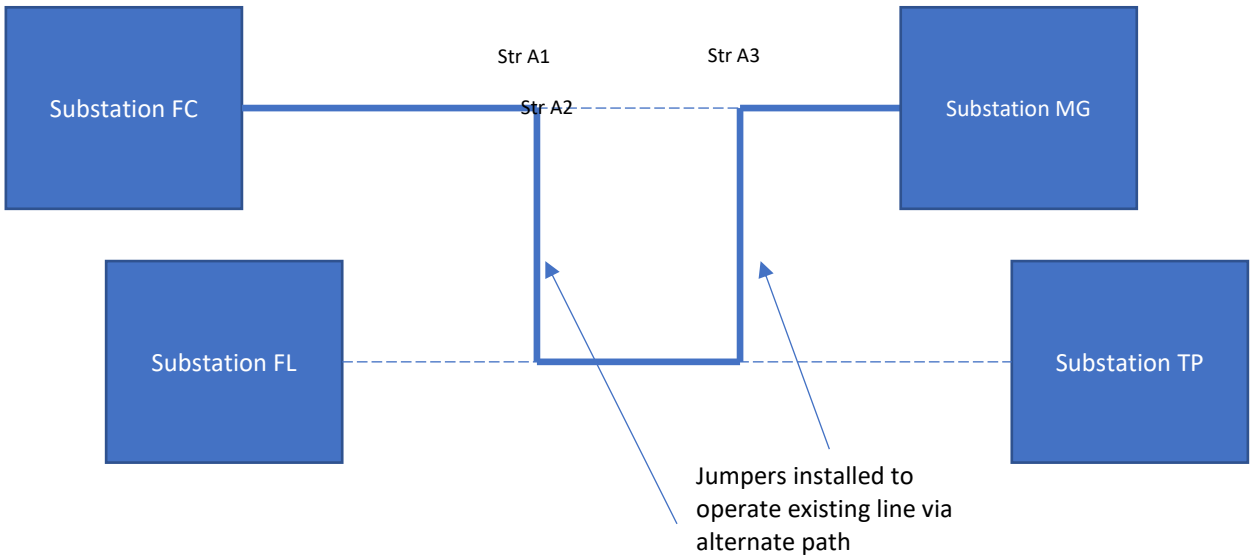

Figure 1: Simplified one-line diagram

After reconductoring work was complete days later, a clearance on the Substation FC to Substation MG line was requested and issued. TPGs were placed at structures A1 and A3, the jumpers to the adjacent Substation FL to Substation TP line were removed, and the jumpers were relocated back to the original line. TPGs at structures A1 and A3 were removed, and the clearance was released back to system operations by the contract crew foreman.

Reference: NATF-OER-517

When releasing the clearance, the system operations dispatcher asked the contract transmission line crew foreman if any grounds were installed other than those listed on the clearance request (at structures A1 and A3). The foreman confirmed all grounds had been removed from the Substation FC to Substation MG line. The dispatcher closed the breakers at Substation MG to re-energize the line, and the Substation FC to Substation MG line tripped as designed on a 3-phase fault. After the line was patrolled, it was discovered that TPGs were left by the contract crew at structure A2 from the previously completed work, and those TPGs were not noted on the clearance holder form.

Lessons Learned

1. The contractor failed to include the TPGs installed at structure A2 on the clearance holder form that was tracking grounds for the clearance on the Substation FC to Substation MG line.

2. Neither the clearance holder (contract transmission line crew) nor the company construction lead patrolled the reconductored line section prior to releasing the clearance. This is a mandatory practice prior to energizing all new facilities.

Actions Taken

1. Company leadership held a statewide stand-down with contractor crews.

2. Going forward, prior to clearance release, an independent verification must be performed to ensure TPGs have been removed on all transmission lines involved in the work.

3. Going forward, all grounds will be logged by contract crews and independently verified and signed-off by a company representative when performing work on a facility that is not under the control of the company's Bulk Electric System dispatcher and/or outside the clearance holder process (e.g., new construction).

4. Removed the specific contractor from the clearance holder list.

5. Removed the specific contractor and construction lead from this project.

Extent of Condition

This condition could occur anywhere on the Bulk Electric System if established clearance processes are not followed.