

# NATF Redacted Operating Experience Report

## Near Miss – Incomplete Switching and Tagging for Neighboring Utility

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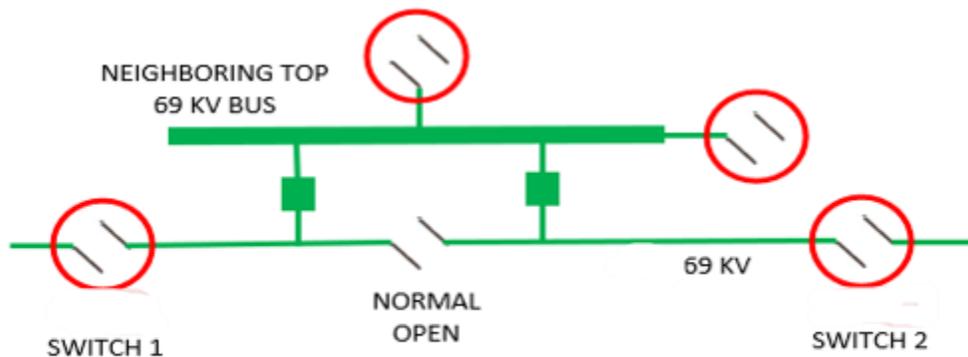
## Topic

Near Miss – Incomplete Switching and Tagging for Neighboring Utility

## Description

Our company and a neighboring transmission operator (TOP) had scheduled maintenance in the vicinity of a 69 kV bus that is owned and operated by the neighboring TOP. The clearance zone included the 69 kV bus and two three-phase, gang-operated switches (see switch 1 and switch 2 in figure 1 below) on our 69 kV lines that terminated at the neighboring TOP's 69 kV bus. The switches were to have our company hold cards placed for our transmission construction personnel and hold cards for the neighboring TOP because both companies had construction/commissioning work to complete.

Our TOP incorrectly issued our company hold cards to the neighboring TOP prior to our switches being opened or hold carded. The issued switch order was still in progress. This resulted in a near miss when the neighboring TOP field staff tested the connections to our 69 kV line and found the line energized at nominal voltage.



**Figure 1: Planned Clearance Zone**

On the morning of the near miss, a switch order was issued to a switch person from our company to reconfigure a section of our 69 kV system in support of the scheduled outage. The switch order included a step to notify our TOP once the reconfiguration steps were complete. At that point, our TOP was to contact the neighboring TOP to open two breakers prior to the final switching steps being completed (open and place our company hold cards on switch 1 and switch 2).

After the reconfiguration steps were completed, and our switch person notified our TOP. Our TOP verified what was completed with the switch person and reported that he would contact the neighboring TOP to open the two 69 kV breakers as planned before continuing with the switch order.

Our TOP requested the neighboring TOP to open the two 69 kV circuit breakers. The circuit breakers were opened and reported open to our TOP.

Before our switch person could be contacted to continue with the switch order, multiple phone calls were taken by our TOP, including items related to scheduled breaker maintenance switch orders, scheduled line maintenance switch orders, Reliability Coordinator (RC) communications, and scheduled work requests that required attention (from other neighboring TOPs). These communications had a negative impact on the situational awareness of our TOP, who lost awareness of what step he was on in relation to the issued switch order. Our switch person was still on standby, waiting for the confirmation from our TOP that the 69 kV breakers were opened by the neighboring TOP and then he could complete the steps of the switch order, which were to open and place our company hold cards on switch 1 and switch 2.

Our switch person contacted our TOP to inquire about the progress. He noted that the neighboring TOP's field personnel were there and wondering what the delays were in establishing the clearance zone. Our TOP noted that he was very busy that morning. After completing that call, our TOP contacted the neighboring TOP and reported that the switching was complete and issued hold cards on switch 1 and switch 2 to the neighboring TOP; however, the switches were not open, and the expected hold cards were not yet placed.

Our switch person then contacted our TOP reporting that the neighboring TOP's field staff were issued a clearance from their System Operator, and when the line was tested, they found voltage still present. Our switch person noted that he had not completed his switch order and that switch 1 and switch 2 were still closed. Our TOP realized his mistake and contacted the neighboring TOP to report the error.

## Lessons Learned

1. Call Volume: High call volume at the transmission desk can often coincide with peak workload periods of the operating day (when most operating instructions are being issued). Increases in non-critical communications to the transmission desk are an added distraction when concentration and clarity is critical. Human performance research identifies disruptions/distractions as a top error precursor. The data from that morning indicates that the total call volume, and more specifically the call volume around the time of the near miss, was high. The data also indicates that the total number of non-critical communications (calls not related to switching, clearances, live line permits, etc.) on the morning of the near miss was higher than normal.
2. Switch Order Record Review: The design of the switch order record form has space for a single "removal from service" switching step, a single clearance order, and a single "return to service" switching step. If additional switching, clearances, or hold cards for neighboring TOPs are needed, a separate switch order record form is necessary. When additional clearances or hold cards are required, the separate switch order record form will not have switch orders documented on the separate records. The only section filled out on the separate record is the middle clearance / hold card section. Any additional forms are maintained with the rest of the paperwork related to that specific outage request at the transmission desk. Our TOP is tasked with keeping all related outage request materials organized throughout the life of the outage request. For this particular near miss, the switch order record design may have contributed to the temporary loss of dispatcher situational awareness prior to incorrectly informing the neighboring TOP that our switch 1 and switch 2 were open and that our company hold cards were attached.

3. Role of Split Control Center Operations During a Pandemic: Since March 2020, our control center personnel have been split into two groups working from both the primary control center (PCC) and the backup control center (BCC). The TOP is assigned to the PCC, and the local balancing authority (LBA) is assigned to the BCC. An audio/video link was established between the PCC and BCC so that the TOP and LBA could easily communicate in real-time and visually observe each other. Feedback received from operators since starting the split operations indicates that the audio/video link is very helpful, given the circumstances, but it does not replicate having a second NERC Certified System Operator in the same room / operating environment. It is more difficult for the LBA to provide meaningful assistance to the TOP when operating out of the BCC. In addition, while working in a location remote from the PCC, it is less likely that the LBA would maintain a level of awareness of transmission operations to permit meaningful intervention when needed.
4. Work Methods and Attention to Detail: In the middle of a switch order that involves multiple communications and checkpoints among our switch person, our TOP, and the neighboring TOP, our TOP allowed his focus to be pulled away from the ongoing switching evolution by numerous business calls related to other jobs. It appears that this sequence set in motion the loss of situational awareness ultimately leading to the near miss.

## Actions Taken

1. Our control center staff has implemented work practices to review upcoming daily workloads to identify potential risks. Control center and outage coordination personnel work together to minimize any identified work scheduling issues and potentially overloading real-time operating staff. A second NERC-certified System Operator is scheduled to assist with transmission activities on days deemed beneficial due to high workload. Control Center staff will meet with our outage coordinators to discuss the feasibility of developing basic rules and guidance related to the total amount of transmission work that can be scheduled on a given day.
2. The switch order record has been modified to insert a human performance critical step in the switching/tagging process. The critical step will prompt our TOP to perform a verification check that all switching and tagging steps have been completed prior to issuing a clearance to our personnel or hold cards to a neighboring utility control center.
3. Our SOC is promoting the use of existing and exploring potential new human performance tools for our department. The goal is to proactively prevent unwanted outcomes triggered by human error and elevate the overall level of System Operator performance. Human performance steps to include:
  - Questioning attitude
  - Task previews
  - Self-checking
  - Stopping when unsure
  - Place keeping

## Extent of Condition

The risk of repeating this type of event is heightened during similar high-workload days when several complex jobs are scheduled within a compressed period.