

## Lesson Learned

### Identify Relay Programming Errors to Prevent Unintended Operations

#### Primary Interest Groups

Transmission Owners (TOs)

Transmission Operators (TOPs)

#### Problem Statement

An event occurred that caused the unintended activation of a SPS, which resulted in the loss of generation. Although the design and operation of the SPS was correct, an error in the programming logic of a breaker reclosing circuit—external to the SPS logic—caused the unintended triggering of the SPS subsequent to a SCADA opening command.

#### Details

On the day that the event occurred, three organizations were involved—a Reliability Coordinator (RC) and two TOPs. The system disturbance resulted in the loss of three generators with a combined output of 474 MW. The primary root cause and contributing factor in this event was a programming error in the reclosing circuit of a breaker. This programming error prevented the blocking of the reclosing circuit when the operator initiated a supervisory control command, which in turn allowed the reclosing logic to initiate an automatic reclose of the breaker. If the reclosing circuit had not been incorrectly activated due to the programming error, the SPS would not have tripped the generating units.

#### Corrective Actions

The TO quickly addressed the programming error. During the subsequent investigation, the TO found one additional breaker in the affected substation with the same error. The TO is also investigating why routine testing and mandatory peer checking did not detect the error in the programming logic for the circuit breaker.

The switching procedures for removing these lines from service were reviewed with the operators.

#### Lessons Learned

- Human performance factors played a key role in the initial programming error.
- Operators need to be familiar with switching procedures for equipment associated with an SPS.
- Periodic review is necessary to ensure that operators are familiar with any special circumstance.
- Peer review procedures for relay setting changes are recommended through a process of routine education and management oversight.

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