

Lesson Learned

Controlled Islanding due to Wildfire Event

Primary Interest Groups:

System Operators (SOs)

Transmission Owners (TOs)

Transmission Operators (TOPs)

Generator Owners (GOs)

Generator Operators (GOPs)

Balancing Authorities (BAs)

Problem Statement:

A registered entity experienced a wildfire in a transmission right of way (ROW) on a critical transmission corridor. To enable the firefighters to use aerial suppression agents on the fire, the entity was requested to de-energize all the transmission lines in the corridor, forming an electrical island. The registered entity was able to successfully separate a part of the system in a controlled manner and was able to assist firefighters in controlling the fire effectively.

Details:

A forest fire in the transmission ROW required the opening of all lines in a portion of a system that is between an area with a large amount of conventional generation and a load center.

Upon receiving the first informational report regarding a forest fire, many concerns had to be quickly evaluated. The main concern was the amount of transfer from the area with generation and whether it was near its peak or a more manageable value. If the same scenario had occurred at a higher transfer level, it would have been difficult to perform a controlled separation without interrupting load.

Shifting the generation or interrupting firm load at a higher transfer level would have required additional balancing actions. If conventional generation near the load center had been off-line, there would only have been a few options for balancing the system in the time frame required to de-energize facilities to facilitate controlling the spread of the fire. Also, the amount of power available to replace the isolated generation would be dependent upon the transmission network and capacity of the remaining ties to the load center.

The requirement to balance load and generation was also challenging as it could require shedding load on the synchronized part of the system while balancing the generation in the island. Taking all this into account and based on the intensity of the fire, there may not have been enough time to accomplish controlled islanding. Leaving lines powered would have required the firefighting teams to find an alternative means to control the fire.

Before the separation, the transfers in the corridor were reduced to zero. The generation in both portions of the system was balanced. Wind generation was curtailed in the area to be islanded (< 200 MW) to improve stability.

Once both portions of the system were balanced, the lines in the ROW were opened. The generation rich area was now an island, while the load center still had some attachment to the bulk network. At all times, the system was stable and able to survive the next contingency.

Corrective Actions:

- Utilization of an available HVDC tie, which had frequency controller functionality, helped regulate the frequency of the island. It assisted the entity in having less frequency variation on the islanded system and reduced the stress on the generators for controlling the frequency.
- The ability of large industrial plants to regulate their load based on system requirements helped to maintain more generation in the island. An energy consumer cooperated by bringing up their demand in the island so that the entity could keep more generators on-line, thereby avoiding startup time delay when the system returned to a normal mode of operation.
- Minor updates are required in the internal control document on forest fire response procedure to change the wordings for better clarity.

Lessons Learned:

- Clear instructions need to be provided concerning the use of aerial fire suppression and the de-energization of the corridor for that purpose or similar events.
- The location of HV equipment and appropriate entity contact information should be shared with local first responders and large-scale fire response personnel. (Security of this information must be paramount.)
- Review wildfire mitigation guides and investigate industry standards followed by other utilities within the area.
- When wildfire aerial fire suppression is known to be occurring, any retardant dropped on the conductors or insulators would prevent the line(s) from being re-energized. Therefore, coordination with firefighters is paramount. Also, whenever a wildfire burns through a ROW, inspection of transmission structures (whether wood, concrete, or metal) for fire damage is appropriate. Insulators with smoke contamination or melted polymer may also need attention. A visual inspection for all the impacted structures on the lines involved is recommended.
- To obtain better control, request and collaborate with GOs and GOPs to provide and assess their latest copy of their procedures for operating in islanded mode. The procedures should include contacting large energy consumers to determine what options exist to manage demand.
- To obtain a better understanding of their performance under islanded operation, hold discussions with GOs and request that they perform the frequency response test on their blackstart capable machines as part of the MOD-027 requirement in order to prioritize blackstart machines.
- SOs need to be cognizant of overcurrent and distance elements for the transmission lines that could be affected from reduced fault levels.

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information that assists them with maintaining the reliability of the bulk power system. NERC is asking entities who have taken action on this lesson learned to respond to the short survey provided in the link below.

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Category: Bulk Power System Operations, Generation Facilities, Transmission Facilities

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