



NERC Lessons Learned

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- Wind Turbine Generation Loss due to Unexpected and Insufficient Ride-through Performance
- Loss of Communication to Transmission Substations

- 540 MW of wind turbine generation loss due to unexpected and insufficient ride through performance
- Loss due to transmission line fault

The largest percentage of wind turbine generator (WTG) tripping (201 turbines, 264 MW) was due to an incorrectly set logic parameter in the low voltage ride-through control scheme. This parameter is responsible for enabling or disabling a WTG's low voltage ride-through curve

Numerous WTGs (39 turbines, 55 MW) also tripped off-line due to the failure of the WTG controller's UPS system. The UPS failed to keep the WTG controllers from restarting and tripping the WTGs off-line

The GO and original equipment manufacturer coordinated to determine the parameter at fault and to specify the appropriate parameter value. The correct parameter value is currently in the process of being updated at all WTGs across the affected facilities to enable the expected low-voltage ride through capability.

The GO is currently performing upgrades on all WTG UPS systems to ensure that battery levels are monitored and maintained sufficiently and that the UPS systems will operate as expected.

It is critical that GOs analyze and determine the cause(s) of poor ride through performance when they occur even when the amount of MW loss is below reportable thresholds as the causes of small losses are often the same as larger losses

- https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20231102_Wind_Generation_Failure_to_Ride-through.pdf

- A TO experienced an unplanned interruption of fiber optics that resulted in both analog communications and digital SCADA communications were interrupted for 11 hours and 30 minutes
- Upon loss of communication, field personnel were dispatched to staff all remote transmission substations. Simultaneously, the TO started manually substituting energy management system transmission line flows at key substations

- A spare fiber optics cable was temporarily utilized to bypass the break and restore failed data communications
- The entity implemented tracing and documentation of all critical communication circuits across all facilities to ensure the appropriate design basis of communication systems.

- A more in-depth consideration of risk prior to any communication system upgrade should be considered. Contingency planning with a formal risk assessment should be incorporated into the communication systems project plan.

- https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20231101_Loss_of_Communication_to_Transmission_Substations.pdf

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