NERC Lessons Learned:

“Automatic Capacitor Operations along Radial Feed Result in Load Shed”

“Enhanced Alarming Can Help Detect State Estimator and Real-Time Contingency Analysis Issues”

“Telecom Provider Failure Induced Loss of ICCP from Regional Neighbors”

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• **Title**
  – Automatic Capacitor Operations along Radial Feed Result in Load Shed

• **Source of Lesson Learned**
  – ReliabilityFirst

• **Date Published**
  – May 15, 2019
Problem Statement

• In an area with ongoing 138 kV outages, an unplanned 138 kV bus outage created a radial load pocket
  – Bus tripped when a mini-excavator made contact with a control cable due to the absence of a section of protective barrier board
  – No initial voltage or thermal violations after the trip
• One area capacitor already in service
• After approximately 90 minutes, another area capacitor switched in service automatically spiking voltage and tripping and locking out both capacitors
• Approximately 30 MW load shed to restore voltages to acceptable levels
Lesson Learned

• Consider varying load conditions and operating scenarios
• Determine if larger capacitor banks need to be replaced by smaller banks
• Increase system operator situational awareness of crews working near facilities
• Confirm contingency results with load flow analysis
• Limit in-service construction work when load pockets can be formed
• Disable the AVC on the capacitor banks
• Care should be taken when responding to unplanned events to identify additional risks such as newly formed topologies that may become radial
• **Title**
  – Enhanced Alarming Can Help Detect State Estimator and Real-Time Contingency Analysis Issues

• **Source of Lesson Learned**
  – ReliabilityFirst

• **Date Published**
  – May 15, 2019
Several entities in RF have experienced state estimator or real-time contingency analysis outages that could have been mitigated more quickly with better alarming.

Five EMS outages reviewed.

Entities had real-time monitoring alarms and additional alarms to detect the health of the EMS and alarming functions.

There were circumstances that created the need for an additional alarm to notify the operator of the loss of SE or RTCA functionality.
• Perform a risk assessment to help determine any gaps in alarming
  – Risk assessment is critical due to the different registrations, responsibilities, and duties of the entity that owns and operates an EMS
  – Alarming quantity, visualization, and sound effects widely vary
  – It is important for the entity not only to ensure what alarms are needed, but to assess what can cause these alarms to fail or otherwise go unnoticed
• Where applicable, an independent timer may be used as an effective control for ensuring that real-time assessments are being performed on a timely basis
• **Title**
  - Telecom Provider Failure Induced Loss of ICCP from Regional Neighbors

• **Source of Lesson Learned**
  - Northeast Power Coordinating Council

• **Date Published**
  - May 15, 2019
Problem Statement

• A RC intermittently lost ICCP at both data centers from a single telco from a hardware failure at a common regional hub
  – Could not fail between the two locations
• Border Gateway Protocol (BGP) WAN configuration at both data centers favored using the primary telco
  – Since primary connection was not completely down, data center did not fail over to secondary telco
  – BGP configuration had to be adjusted to ignore primary communication pathways until the hardware problem was corrected
• Never assume geographic diversity alone provides redundancy for telecom
  – Ensure redundant circuit physical separation and independence of supporting equipment
  – Include language to maintain that separation will be preserved if the provider merges with or is sold to another telco
• Validate the independence by testing with the vendor to attempt to simulate this type of failure
• Ensure that the data center does not continually automatically “fail back” to a preferred provider under intermittent conditions
