NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Winter Preparation for Severe Weather Event

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Roman Carter, NERC Manager of Reliability Assurance
Hassan Hamdar, Reliability Engineer- FRCC; NERC Reliability Guideline Team
Brenda Hampton, Sr. Project Manager- Luminant; NERC Reliability Guideline Team Leader

RELIABILITY | ACCOUNTABILITY




Learning Objectives

Objectives of this Presentation:

- Importance of maintaining thorough winterization practices
  - February 2011 cold weather event
  - Comparison between 1989 event and the 2011 event
- Response to the event in the ERCOT and FRCC Regions
- Guidelines to better prepare for and prevent future seasonal weather events

February 2011 Cold Weather Event

- Coldest Texas weather since 1989
  - Single-digit sub-freezing temperatures for more than 100 hours
  - Sustained winds of 30-40 mph with gusts of 50+ mph
- New ERCOT winter peak demand record of 56,344 MW (with a second record set the following week)
- 17.6 percent of total ERCOT winter 2011 capacity out at February 2 peak
  - 225 units tripped, de-rated or failed to start (February 1-3)
  - Except for nuclear facilities, all power plant types including coal/lignite, simple cycle gas, combined cycle gas and wind resources experienced problems

Issues Leading to the Event

Precedence

The 2011 storm was not without precedent

- There was prior severe cold weather in the same geographical Region and magnitude in 1989
- In the 1989 weather event, temperatures were negative two degrees Fahrenheit, and the nature of the event was very similar to 2011 event:
  - 1,710 MW of load was lost
  - Generation Outages, derates, and failures to start totaled 11,000 MWs
  - Additional 1,500 MWs of generation capacity lost due to derates associated with switching to fuel oil

Precedence for 2011 Event

Following the 1989 Weather Event:

- Good **analyses** were conducted
- Good **reports** were written
- Good **recommendations** were developed

However, with a number of generators, recommendations were **not institutionalized** and did not result in ACTIONS to prevent another event like the February 2011 event.

What were the contributing factors for the 2011 event?

Issues Leading to the Event

While many Generators were proactive in their approach to winterization and preparedness, others were not:

- Many generators failed to adequately prepare for winter, including the following:
  - Had failed or inadequate heat traces
  - Were missing or had inadequate wind breaks
  - Had inadequate or lacked insulation
  - Failed to have or to maintain heating elements and heat lamps in instrument cabinets

ERCOT Area Generators

Follow Up Activities in the ERCOT Footprint

ERCOT Generator Follow Up

- Winter Weather Readiness Guidelines for Texas Generators were developed
  - Developed in the ERCOT during the Spring of 2011 at the request of the chair of the Public Utility Commission of Texas (PUCT)
  - Authored by top executives at Calpine, CPS Energy, LCRA, Luminant, NRG Energy
  - Team assessed the event and actions taken prior to and during the severe weather. Team developed:
    - White paper (on event and request)
    - Best practices
    - Recommended Severe Weather Preparation Guidelines

ERCOT Generator Follow Up

- ERCOT hosted a workshop on June 8, 2011 examining best Generation Weatherization practices
  - Focused on lessons learned (LL) and recommendations for preventing such events in the future
- Generators reviewed their current practices and incorporated ideas from the Severe Weather Preparation Guidelines as well as from LL
  - Generators responded to the immediate event but took further steps to improve their weatherization process
- Texas Regional Entity (RE) Winter Preparation Survey and webinar completed November 2011

ERCOT Generator Follow Up

- PUCT Substantive Rule 25.53 already in effect
  - Required ERCOT, transmission, distribution and generation companies to have Emergency Operations Plans to include:
    - Weatherization plans
    - Annual drills to test the plans and
    - Crisis communication procedures
- Texas Utilities Code 186.007, Effective September 2011
  - Requires electric utilities to submit their Emergency Operation Plans
  - PUCT reviews the plans, determines the ability of the electric grid to withstand extreme weather events

ERCOT Generator Follow Up

- Multiple surveys used to assess readiness and identify potential future concerns including:
  - Winter seasonal assessment, drought, and natural gas fuel
- ERCOT ISO required affidavits from generation entities confirming that weatherization was complete and performed spot checks of weatherization at selected units within ERCOT
- ERCOT stakeholders processed a number of protocol and procedure changes based on LL and recommendations from the FERC/NERC report

FRCC Follow Up

FRCC Follow Up Activities

2011 Cold Weather Snap

- February 2011 - Cold weather event due to prolonged freezing temperatures
- August 2011 - FERC/NERC Event Analysis (EA) report released
- November 2011 - NERC staff determined that they needed follow up on recommendations from report
- November 8, 2011 – A call of the RE Situational Awareness (SA) representatives was requested

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Pre-Winter Survey

- As a result of the call, the REs were asked to develop a survey; the survey replaced a NERC Alert or formal data request
- December 1, 2011 - FRCC survey issued to generator owners (GOs) and generator operators (GOPs) in FRCC with a response requested by December 14, 2011
  - GO/GOP responses were promptly received

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FRCC Survey Results

- Over 93 percent of the generation within FRCC utilize cold weather preparatory (prep) plans
- About 25 percent of those who replied to the survey made revisions to their cold weather prep plan as a result of the LL from the Southwest Cold Weather Event

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FRCC Reports

- January 9, 2012- FRCC staff provided NERC a report of the responses to the survey
  - FRCC notified NERC responses were positive and FRCC registered entities understand that Florida is susceptible to prolonged cold weather
    - (FRCC response forwarded to FERC)
- FRCC staff reported the results of the survey to the FRCC Planning Committee, Operating Committee (OC), and the FRCC Board of Directors.

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FRCC Cold Weather Workshops

- December 2011 FRCC held a Cold Weather Prep Webinar to share the recommendations and LL from the FERC/NERC report.
- December 2012 FRCC held a follow-up webinar to discuss actions taken by several GO/GOPS to prepare for a severe winter weather event. LL and best practices were provided and shared by:
  - Florida Power & Light
  - Progress Energy Florida (Duke Energy Florida)
  - JEA

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FRCC Cold Weather Prep Webinar

Going Forward:

- FRCC will continue to communicate improvement opportunities with FRCC registered entities.
- Registered entity participation in the EA Program is key to sharing information.

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ERO Follow up Activities

- On June 13, 2012, an industry Cold Weather Review Team was assembled to review the need for further response to the event.
- No final decisions were reached; however, two options were raised for consideration:
  1. Revision to standards to add a requirement for GOPs to develop, maintain, and implement a set of plans to mitigate operating emergencies.
  2. Use of the new OC Guidelines to publish a best practices-type document for winter weather preparation to be issued annually prior to the winter season.

ERO Follow up Activities

To address GOPs developing and implementing a set of plans to mitigate operating emergencies:

- A Standard Authorization Request (SAR) was created by Salt River Project to address one of the key findings of the NERC/FERC Final Report:
  - *The lack of any state, regional or reliability standards that directly require generators to perform winterization left winter-readiness dependent on plant or corporate choices*

Winter Prep SAR

- With input by the Cold Weather Team, the SAR was approved for standard consideration by the Standards Committee (SC) in September 2012.
- The SAR was posted for public comments with comments due on October 24.
- SC appointed a SAR drafting team to review comments and recommend a course of action.

RISC Recommended Activities

- The Reliability Issues Steering Committee (RISC) also considered cold weather preparations and made three recommendations to the NERC OC:
  - Development of a NERC OC Guideline that assists entities in preparing for cold weather.
  - Annual reminders, such as webinars, to remind all entities of the need to prepare for cold weather.
  - Establishment of an industry voluntary review process through which entities can verify their preparedness.

Draft Reliability Guideline

- The NERC OC addressed the first recommendation by forming a drafting team to develop a “Winter Preparation Reliability Guideline”
- The Reliability Guideline is not to be used to establish mandatory reliability standards, or create parameters by which compliance to standards is enforced

Winter Prep Reliability Guideline

- It provides general concepts that may be considered when developing a winter weather readiness program
- It shares current winter weather readiness practices and procedures from across the industry
- To be applied as appropriate based on geographic location, technology and plant configuration

ERO Follow up Activities

- The RISC's second recommendation to the NERC OC was to conduct annual reminders such as webinars to annually remind entities of the need to prepare for cold weather.
- Today's Webinar follows through on that recommendation and encourages entities to prepare for severe winter weather events.
- As you've seen already, this webinar also includes information about what entities are doing in the ERCOT and FRCC Regions to prepare for severe winter weather events.

NERC Winter Reliability Guideline

- NERC's "Draft" Winter Weather Reliability Guideline was completed and submitted to the NERC OC on November 20 and is currently under review by the NERC OC.
- NERC OC will discuss the next course of action at this week's Standing Committee Meeting in Atlanta.
- The following slides provide a broad overview of the draft Reliability Guideline submitted.

Management Roles

- Senior Management
  - Sets expectations for the organization from the “top down” for safety, environment compliance, and generation reliability.
  - Ensures that a winter preparation process exists including severe winter weather event preparedness, and executed as necessary.
- Plant Management
  - Ensure severe weather preparation procedure includes processes, staffing plans, and timelines that direct all key activities before, during and after severe winter events.

Evaluate Potential Problem Areas

- Identify components, systems, and other areas of vulnerability for freezing problems or other cold weather operational issues. This includes equipment that has the potential to:
  - Initiate an automatic unit trip or runback,
  - Impact unit start-up,
  - Cause damage to the unit,
  - Adversely affect environmental controls that could cause full or partial outages,
  - Adversely affect the delivery of fuel or water

Evaluate Potential Problem Areas

Typical problem areas during cold weather include:

1. Pressure Transmitters and Sensing Lines
2. Flow Transmitters and Sensing Lines
3. Instrument Air System
4. Motor-Operated and Solenoid Valves
5. Drain Lines and Steam Vents
6. Emergency Generators
7. Water Pipes and Fire Suppression Systems
8. Fuel Supply

Processes and Procedures

- A winter weather preparation procedure should be developed for seasonal and severe winter weather preparedness.
- Components of an effective preparation procedure are included as Attachment 1 in the Reliability Guideline.
- Procedures should be reviewed and updated after every winter event to institutionalize knowledge from prior events (what worked well or did not work well during the event).

Training

- Coordinate annual training in winter specific and plant specific awareness and maintenance. This may include topics such as:
- Response to freeze protection panel alarms,
- Troubleshooting and repair of freeze protection circuitry,
- Identification of plant areas most affected by winter conditions, and
- Knowledge of the ambient temperature for which the freeze protection system is designed.

Winter Event Communications

- Before a severe winter weather event, plant management should communicate and confirm that the preparation procedures have been completed.
- Before and during a severe winter weather event, update the Balancing Authority (BA) on changes to plant availability.
- After a generating plant trip, derate, or failure to start due to severe winter weather, conduct an analyses and develop any LL and best practices.

Attachment 1-Elements of Procedure

1. Work Management System
   - Review to ensure adequate annual preventative work orders exist for freeze protection and preparedness.
2. Critical Instrumentation and Equipment Protection
   - Ensure all critical site specific problem have adequate protection to ensure operability during a severe winter event.
3. Processes and procedures for Insulation, Heat Trace, and Other Protection Options to verify adequate protection and necessary functionality.

Attachment 1-Elements of Procedure

4. Supplies – Prior to the onset of the winter season, ensure adequate inventories of all commodities, equipment and other supplies are available.
5. Staffing
   - Consideration of enhanced staffing (around the clock) during events.
   - Arrangements for lodging and meals.
6. Communications
   - Ensure appropriate communication protocols are followed
   - Identify a back-up communication option
7. Special Operations Instruction: For example, test dual fuel capability and ensure adequate fuel supply

Reference Materials

SW Cold Weather Event Final:

http://www.nerc.com/files/SW_Cold_Weather_Event_Final_Report.pdf

SW Cold Weather Event NERC Reference Material:

http://www.nerc.com/page.php?cid=5|393

"Draft" NERC Winter Readiness Reliability Guideline :

http://www.nerc.com/docs/docs/oc/OC_Winter_Weather_Readiness_Reliability_Guideline_20121120.pdf

PUCT Substantive Rule Chapter 25:

http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.53/25.53ei.aspx

Questions ?

Roman Carter
Roman.carter@nerc.net
609.651.1496