Cold Weather Preparedness Small Group Advisory Session

General Session Webinar

May 6, 2024

Disclaimer

The Cold Weather Preparedness Small Group Advisory Sessions (SGAS) provide an educational opportunity for registered entities to meet with NERC and Regional Entity representatives to discuss the cold weather preparedness Standards and possible compliance approaches in an open and non-audit environment. During the course of those discussions, the NERC and Regional Entity representatives may provide guidance on specific approaches for implementing Reliability Standards EOP-012-2, EOP-011-4, and TOP-002-5. NERC and the Regional Entity representatives, however, cannot guarantee compliance if those approaches are used, as compliance is necessarily dependent on the manner in which the guidance is implemented. Additionally, there may be other ways to comply with the obligations of the requirements of these Reliability Standards that are not expressed during the Cold Weather Preparedness SGAS. Compliance will continue to be determined based on language in the NERC Reliability Standard(s) as they may be amended from time to time. Lastly, to encourage an open exchange of information, NERC and Regional Entity representatives will not use the content from the discussions at the SGAS as a basis to initiate a subsequent compliance or enforcement action upon the effective date of Reliability Standards EOP-012-2, EOP-011-4 and TOP-002-5.

Agenda

- Introductions
- Background
- Overview of EOP-011-4, TOP-002-5 and EOP-012-2
- Commonly asked questions
- Questions from the audience

ERO Enterprise Cold Weather Preparedness SGAS Team

- MRO
  - Jeremy Mattke, Principal Compliance Engineer
  - Richard Samec, Principal Compliance Engineer
- NPCC
  - Matthew Forrest, Senior O&P Entity Risk Analyst
- RF
  - Glenn Kaht, Principal Reliability Consultant
  - Ash Chappell, Technical Auditor
- SERC
  - Mike Kuhl, Manager, Operations and Planning Monitoring
  - Hassan Hamdar, Program Manager, Events Analysis
  - Rick Stachowicz, O&P Auditor

ERO Enterprise Cold Weather Preparedness SGAS Team

- Texas RE
  - Kenath Carver, Director, Compliance Assessments
  - Mario de la Garza, Manager, O&P Compliance Monitoring
  - Blair Griffin, O&P Compliance Engineer
- WECC
  - Curtis Holland, Senior Reliability Specialist
  - Dave Grover, Senior Reliability Engineer
  - Curtis Crews, Senior Technical Advisor
- NERC
  - Derek Kassimer, Senior Engineer, Compliance Assurance
  - Yvette Landin, Senior Advisor, Compliance Assurance
  - Kiel Lyons, Senior Manager, Compliance Assurance
  - Clayton Calhoun, Senior Engineer, Compliance Assurance
  - Ryan Mauldin, Senior Engineer, Compliance Assurance

February 2021 Event

- During the week of February 14, 2021, for over two consecutive days, ERCOT averaged 34,000 MW of generation outages, nearly half of ERCOT's 2021 all-time winter peak load of 69,871 MW.

Project 2021-07 Development Timeline

- Project was developed in three phases
- Phase 1
  - February 2022 – September 2022
  - Key Recommendations 1d, 1e, 1f and 1j
  - **EOP-011-3 and EOP-012-1**
- Phase 2
  - October 2022 – September 2023
  - Key Recommendations 1a, 1b, 1c, 1g, 1h and 1i
  - **EOP-011-4 and TOP-002-5 – Focus of this SGAS**
- Phase 3
  - October 2022 – February 2024
  - FERC Order Directives
  - **EOP-012-2 – Focus of this SGAS**

EOP-012-1 vs EOP-012-2 - Constraints

- EOP-012-1
  - GO may declare a **technical, commercial or operational constraints** precluding them the ability to implement freeze protection measures
  - More flexibility to define constraints
- EOP-012-2
  - **Generator Cold Weather Constraint** – New term added to address FERC directives and provide more clarity around constraints
    - Accelerated retirement of an existing generating unit
    - Cancellation of new generating unit(s)
    - Reduction in summer capacity
    - Introduces a risk of noncompliance with environmental regulations
  - R8 – Review constraint declaration every five calendar years

EOP-012-1 vs EOP-012-2 - Corrective Action Plans

- EOP-012-1
  - Implement a CAP or explain why corrective actions are not being implemented due to a constraint
  - Update CAP timetables as necessary
- EOP-012-2
  - FERC directive to establish requirements for duration of CAP timelines
  - Actions to address **existing** equipment or protection measures – 24 mos.
  - Actions to address **new** equipment or protection measures – 48 mos.
  - A Generator Cold Weather Constraint may be declared if unable to implement actions in CAP

EOP-012-1 vs EOP-012-2 – Applicability

- EOP-012-1
  - Facilities
    - "…continuous run of four hours or more at or below a temperatures of 32 degrees"
    - Exemptions defined within the Facilities section
- EOP-012-2
  - Applicability
    - All BES resources needed for reliable operation during cold weather and only exclude generation not relied upon during "freezing conditions"
    - BES resource, Inclusion I2 and I4, as well as BSR, Inclusion I3.
    - Exclusions removed from Applicability section

EOP-012-1 vs EOP-012-2 –Implementation

- EOP-012-1
  - R3, R5, R6, R7 – 10/1/2024
  - R1, R2 – 4/1/2028
  - R4 – 10/1/2029
- EOP-012-2
  - FERC directed the SDT to shorten and stagger the timeline, however, it was decided to simply shorten the entire implementation plan
  - 10/1/2024 for all requirements except for R3 – 10/1/2025

EOP-011-4

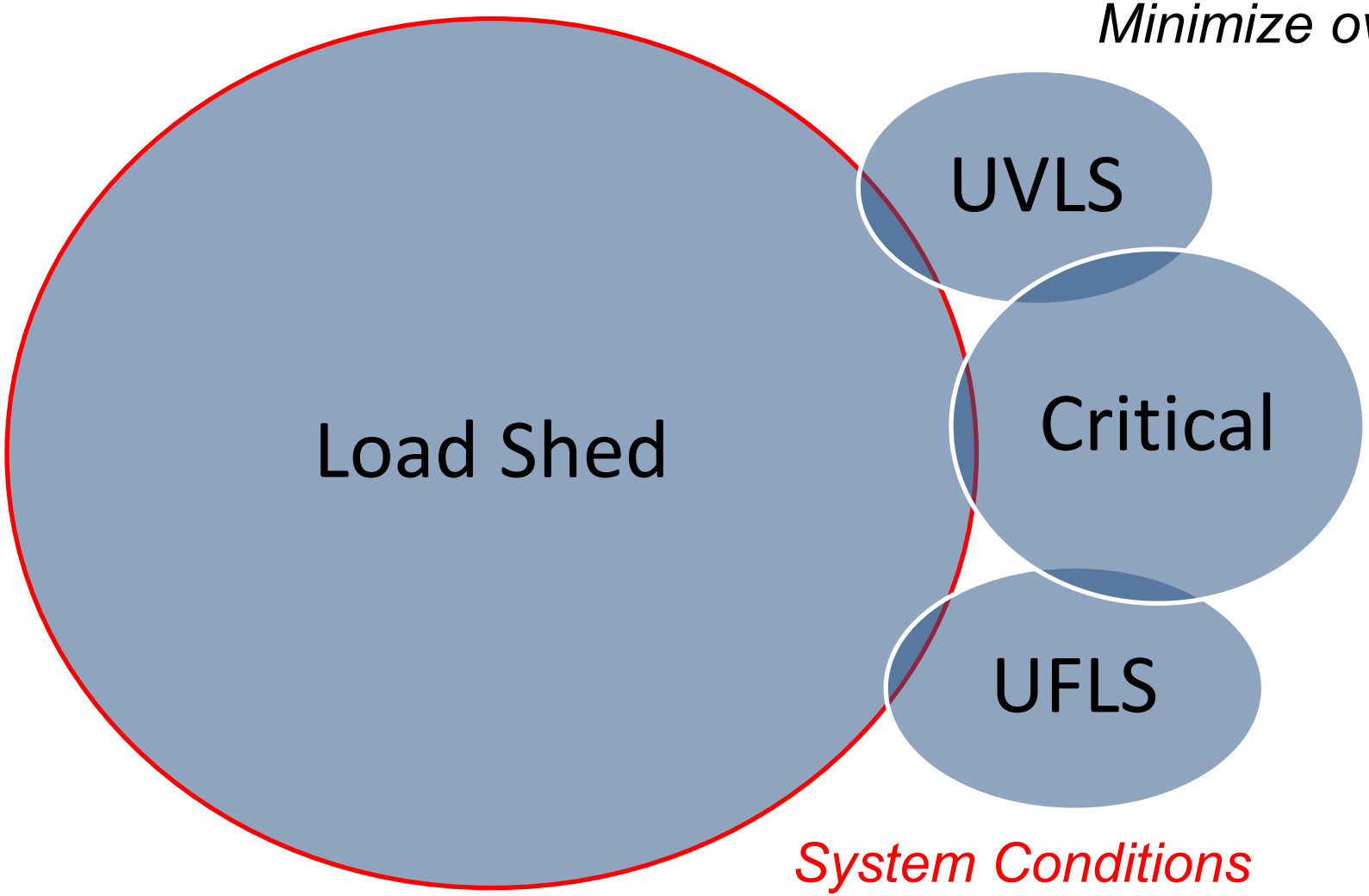
- Key Recommendations
  - 1j – TO, TOP, and DP separation of circuits used for manual load shed
    - See R1 part 1.2.5, R2 part 2.2.9, R7 and R8
  - 1h – BAs operating plans prohibit use of demand response of critical natural gas infrastructure loads
    - See R2 part 2.2.8
  - 1i – To protect critical natural gas infrastructure loads from manual and automatic load shedding
    - See R1 part 1.2.5, R7 and R8

EOP-011-4 Establishes:

- Introduced “designated critical natural gas infrastructure loads”
- Established TO, DP, DP UVLS obligations for Load shedding plan
  - Plan for operator-controlled manual Load shedding, UVLS, and UFLS during an Emergency including:
    - Adequacy of implementation timeframe
    - Minimizing overlap of designated for manual/UVLS/UFLS and critical loads
    - Minimize overlap of manual and UFLS/UVLS
    - Limiting utilization of UFLS/UVLS circuits in manual load shed(system condition dependent)
    - Identify and prioritize designated critical natural gas infrastructure loads

EOP-011-4 Visual

Minimize overlap!



System Conditions

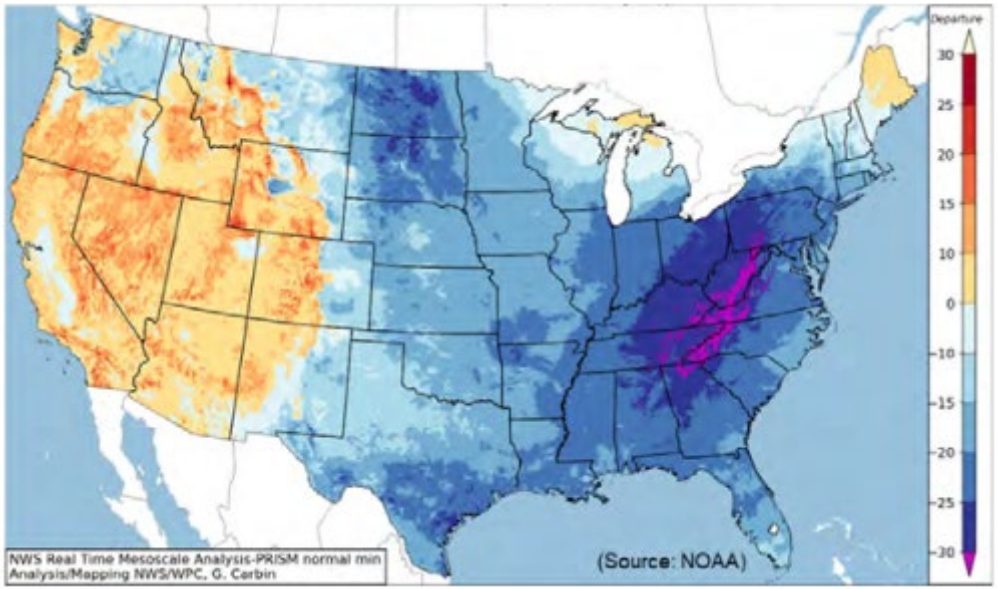
TOP-002-5

- Key Recommendation
  - 1g – Provide specificity about roles of Generator Owner, Generator Operator, and Balancing Authority in determining the generating unit capacity that can be relied upon during “local forecasted cold weather”
    - See R8
  - New BA extreme cold weather Operating Process unique from the BA Operating Plan required in R4
    - Operating Process Definition per NERC Glossary of Terms: A document that identifies general steps for achieving a generic operating goal. An Operating Process includes steps with options that may be selected depending upon Real-time conditions

TOP-002-5 Establishes:

- Established BA obligations for extreme cold weather Operating Process. Operating Process shall include methodology(ies) to
  - Identify extreme cold weather period
  - Determine adequate reserve margin considering experienced operating limitations including:
    - Capability and availability; fuel supply and inventory concerns, start-up issues, fuel switching capabilities, and environmental constraints
  - Determine a five-day hourly forecast during the extreme cold weather period including:
    - Expected generation resource commitment and dispatch, demand patterns, capacity and energy reserve requirements (including deliverability capability), and weather forecast

TOP-002-5 Visual



How long will the BA footprint be subject to extreme cold weather? What is an adequate reserve margin based on what has happened? What resources can perform for each hour of the next 5 days based on what is expected?

EOP-012-2

- Key Recommendations
  - 1a – GO identification of cold-weather-critical components and systems
    - See R4 part 4.3., Generator Cold Weather Critical Component and Fixed Fuel Supply definitions
  - 1b – GO identification and implementation of freeze protection measures on each of the elements identified per 1a
    - See R4, R6 part 6.3., Generator Cold Weather Critical Component and Fixed Fuel Supply definitions
  - 1c – GO requirement to account for the effects of precipitation and wind
    - See R1 part 1.2.2. and R4 part 4.4.

EOP-012-2

- Key Recommendations
  - 1d – GO Corrective Action Plan
    - See R6, R7, and Generator Cold Weather Reliability Event definition
  - 1e – Revise GO training requirement to include annual periodicity completed
    - See R5
  - 1f – GO operation to specific ambient temperature and weather conditions
    - See R2, R3 and Extreme Cold Weather Temperature definition

Definitions

- Terms, defined or otherwise, are critical in any Standard
- SDT invested a great deal of time and effort to determine the defined terms
- SDT allowed flexibility in many cases that will be guided by entities collecting the cold weather data (e.g., IRO-010/TOP-003 data specifications should provide entities insight on expectations)
- Some terms determined in earlier versions of Standards were updated for use in the most recent versions based on feedback and FERC direction
- The basic tenet behind the suite of Standards is reliable operations versus compliance acceptance and should be a focus for all entities.

Definitions

- **Preserved "Extreme Cold Weather Temperature"** – The temperature equal to the lowest 0.2 percentile of the hourly temperatures measured in December, January, and February from 1/1/2000 through the date the temperature is calculated.
- **Updated Generator Cold Weather Critical Component (GCWCC)**– Any generating unit component or system, or associated Fixed Fuel Supply Component, that is under the Generator Owner's control, and is susceptible to freezing issues, the occurrence of which would likely lead to a Generator Cold Weather Reliability Event. This definition excludes any component or system or associated Fixed Fuel Supply Component located inside a permanent building with a heating source that regularly maintains the space at a temperature above 32 degrees Fahrenheit (0 degrees Celsius)

Definitions

- **Updated Generator Cold Weather Reliability Event** – One of the following events for which the apparent cause(s) is due to freezing of equipment or impacts of freezing precipitation (e.g., sleet, snow, ice, and freezing rain) on equipment within the Generator Owner's control, and the dry bulb temperature at the time of the event was at or above the Extreme Cold Weather Temperature: (1) a forced derate of more than 10% of the total capacity of the unit, but not less than 20 MWs for longer than four hours in duration; (2) a start-up failure where the unit fails to synchronize within a specified start-up time; or (3) a Forced Outage
- **NEW Fixed Fuel Supply Component** – Non-mobile equipment that supports the reliable delivery of fuel to the generating unit and under the control of the Generator Owner at a plant site. Gaseous, liquid, or solid fuel handling components that are installed on site as fixed parts of the fuel delivery system that are under the Generator Owner's control are included. Mobile equipment such as trains, bulldozers, or other equipment that are not fixed in one location are excluded

Definitions

- **NEW Generator Cold Weather Constraint** – Any condition that would preclude a Generator Owner from implementing freeze protection measures on one or more Generator Cold Weather Critical Components using the criteria below. Freeze protection measures are not intended to be limited to optimum practices, methods, or technologies, but are also intended to include acceptable practices, methods, or technologies generally implemented by the electric industry in areas that experience similar winter climate conditions. Criteria used to determine a constraint include practices, methods, or technologies which, given the exercise of reasonable judgment in light of the facts known at the time the decision to declare the constraint was made:
  - Were not broadly implemented at generating units for comparable unit types in regions that experience similar winter climate conditions to provide reasonable assurance of efficacy;
  - Could not have been expected to accomplish the desired result; or
  - Could not have been implemented at a reasonable cost consistent with good business practices, reliability, or safety. A cost may be deemed "unreasonable" when implementation of selected freeze protection measure(s) are uneconomical to the extent that they would require prohibitively expensive modifications or significant expenditures on equipment with minimal remaining life.

Mapping Document(nerc.com)

Think Internal Controls for all Requirements!!

Document ECWT (value/date/source) at least once every 5 calendar years

Update plan if ECWT lower. Evaluate need for CAP

Document cold weather performance data

- Operating limitations (capability, availability, fuel supply/inventory/switching, environmental)
- Minimum temperature-design, historical operating, OR performance by analysis

What internal controls are in place?

Specific to units with COD on/after 10/1/2027

- ECWT ≤ 32◦F, self-commits or is required to operate ≤ 32◦F (Exemption allowed per footnote 1!)

Implement FPM for GCW Critical Component

- Capability to operate at ECWT with 20 mph wind for not less than 12 hrs. or max duration if < 12 hrs. (e.g., solar) OR
- Develop CAP to add new or modify freeze protection measures (FPM)

What internal controls are in place?

Specific to units with COD prior to 10/1/2027

- ECWT ≤ 32◦F, self-commits or is required to operate ≤ 32◦F (Exemption allowed per footnote 1!)

Implement FPM for GCWCC

- Capability to operate at ECWT OR
- Develop CAP to add new or modify FPM

What internal controls are in place?

Implement/maintain cold weather preparedness plan(s) including:

- Lowest ECWT for each unit (note—lowest ever)
- Generating unit cold weather data
- Documentation identifying GCWCC
- FPM on GCWCC including measures to reduce wind chill and effects of freezing precipitation (where necessary)
- Annual inspection and maintenance of FPM (all)

Key Points for R5 (GO/GOP)

Generator Owner and Generator Operator identify entity responsible for providing unit-specific training

- Coordination
- Designation
- Unit-specific training

Entity responsible shall provide training to its maintenance or operating personnel implementing plan

- Provision of training
  - Identification of personnel (may include contractors)
  - Training materials relevant to site cold weather plan
  - Timing aspects (prior to implementation of plan!)

Think Internal Controls!!

What internal controls are in place?

Specific to units experiencing a Generator Cold Weather Reliability Event (GCWRE)

- ECWT ≤ 32◦F, self-commits or is required to operate ≤ 32◦F (Exemption allowed per footnote 4!)

Develop a CAP within 150 days or by July 1 and contain (as a minimum):

- Summary of cause(s) for GCWRE and relevant data
- Review of applicability to other units owned
- Identification of operating limitations or impacts to cold weather preparedness plan until CAP completed

Key Points for R7 (GO)

What internal controls are in place?

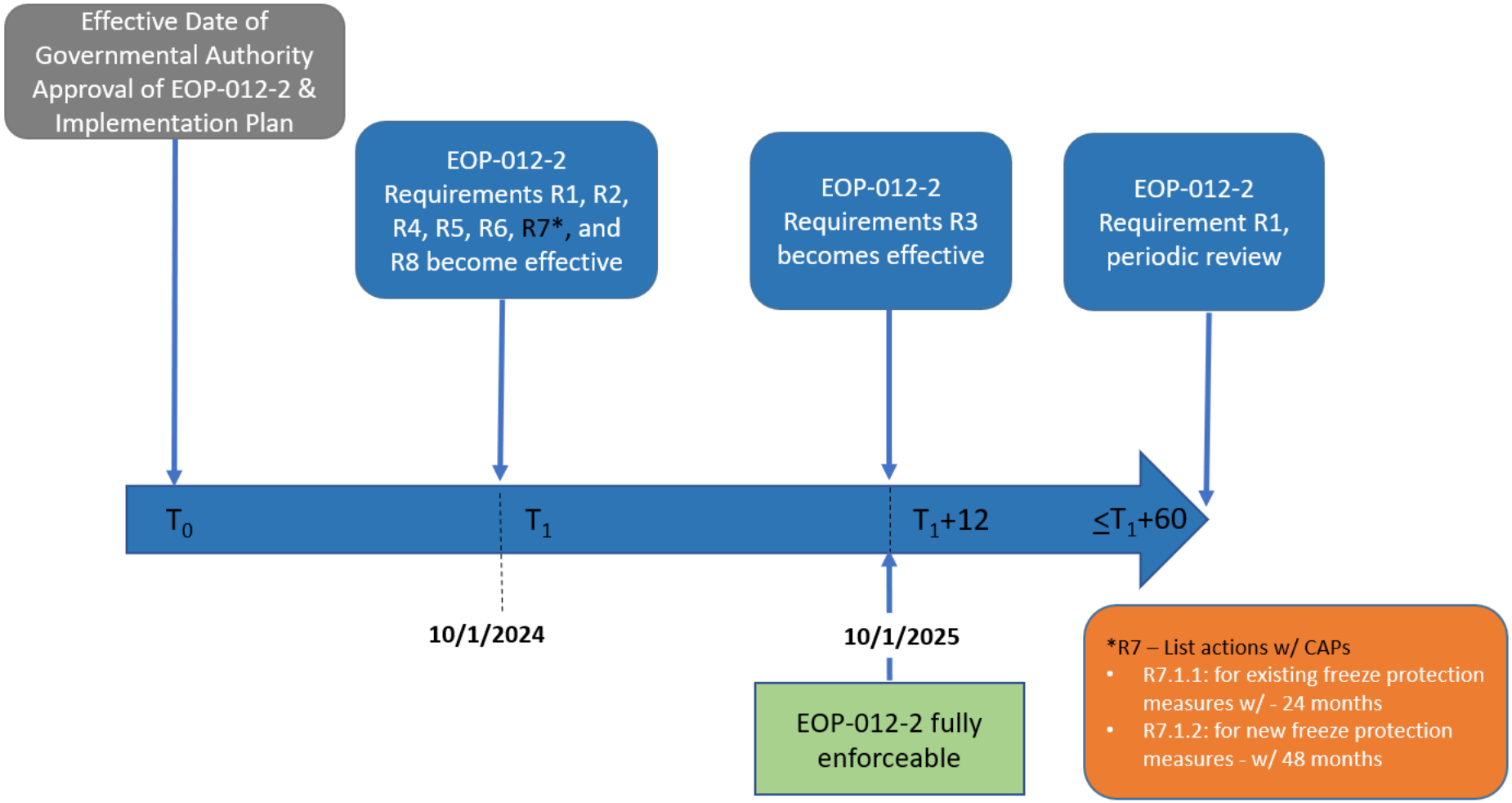
- CAPS developed for R1, R2, R3, or R6
  - Include timetable listing:
    - Actions for existing FPM to be completed in 24 calendar months
    - Actions for new equipment/FPM to be completed in 48 calendar months
    - Updates to plan identifying updates/additions to GCWCC and their FPM
  - Implement per timetable
  - Update with justification if action(s) change or timetable(s) exceeded
  - Document a declaration, with justification, any Generator Cold Weather Constraint that prevents implementation of actions in CAP
    - NOTE- Data 1600 effort to meet FERC requirement initiated

Key Points for R8 (GO)

What internal controls are in place?

- If a GCWC declaration made:
  - Review every 5 calendar years or as needed due to status change
  - Update operating limitation associated with capability and availability

Implementation Plan



Common Questions

- When does the plan, annual inspection, annual maintenance, and training have to be completed for first time? I trained already for 2024…do I have to train again prior to EOP-012-2 effective date?
- What is “cold”? How should the effects of wind and precipitation be addressed in “historical operating conditions”?
- Is the plan, weather data, and training per unit or…? Do the GCWCC have to be uniquely identified in the cold weather preparedness plan or high level in plan with listing/location at plant for implementation?
- How long can I extend CAPs? Do I have to report CAPs to the BA/RC/TOP?

Common Questions

- If the ECWT is greater than 32F, do entities still need a cold weather plan? What should entities provide as evidence to demonstrate a "null list" or that they don't have any GCWCC or freeze protection measures?
- In the definition of Generator Cold Weather Critical Component, there is an exclusion for components located inside heated buildings. Because entities are relying on heated buildings to protect components that would otherwise be considered a GCWCC, does this mean that HVAC/heating systems are considered GCWCCs? Or would the HVAC system be considered a freeze protection measure?
- What are examples of GCWCC for wind turbines?
- For icing on wind turbine blades, it may not make economic sense for an entity to install heat tracing on all of its wind turbine blades. In a circumstance like this, would an entity remain compliant with EOP-012 by "declaring" that such CAP will not be implemented?

Common Questions

- Please confirm our understanding that the term, “susceptible to freezing issues,” in the Generator Cold Weather Critical Components definition is to be interpreted as including all cold weather-related vulnerabilities, not just the transition of liquid water to ice.
- Please confirm that “identifying” Generator Cold Weather Critical Components in R4.3 of EOP-012-2 does not necessarily mean listing them.
- Please clarify the term, “Start-up issues,” in R1.2.1.3. This requirement was not included in EOP-011-2, and seems to imply delving into detail, such as, “Cold startup time is 8 hours, unless the temperature is below 0 F, in which case it is 12 hours.”
- Please provide guidance on how deep an investigation is needed if using design temperature data to establish the cold weather capability.

Common Questions

- Please confirm that the word, “includes,” in the R4.4 statement, “includes measures used to reduce the cooling effects of wind determined necessary by the Generator Owner to protect against heat loss, and where applicable, the effects of freezing precipitation,” means that measures addressing wind and precipitation should be documented, but it is not necessary to explain the temperature-related and (separately) wind-related and (again separately) precipitation-related protection that has been provided for each GCWCC.
- Please confirm that the word “Capability” in EOP-012-2 R1.2.1.1 means the normal (not emergency) maximum net MW output, and “availability” refers to data such as startup times, as opposed calling for a statistical estimate of likelihood of being able to run under any given weather conditions.
- Please conform that, “Fuel supply and inventory concerns,” in R1.2.1.2 apply only for issues that it is reasonable to expect GOs to know. They need not, and under the anti-trust laws must not, seek closely-held fuel supplier information or probe for vulnerabilities in natural gas pipeline systems.

Common Questions

- We own one site, with four more coming online this year. Most of our sites' closest locations for weather data do not go back to 2000. Should we then:
  - A) use two weather stations, including the nearest one back to its earliest data (e.g., 2009), plus the next closest station with data that goes back to 2000, or
  - b) only use the nearest station with data that goes back to 2000?

Common Questions - Training

- Contractor vs. vendor
  - "Vendors who perform inspection, maintenance, or installation of freeze protection measures prior to the winter season **do not need** to receive the training on the cold weather preparedness plan."
  - Not a NERC Glossary of Terms defined term
  - Use the Technical Rationale (TR) as reference but not as justification to equate contractors to vendors. The TR is not an enforceable part of the Standard.
  - Timing matters – "vendors…**prior** to the winter season"
  - Robust oversight and controls around vendors and their performance are paramount to operational reliability and should not be ignored

Resource Documents

- 2019-06 Project Page
- 2021-07 Project Page
- ERO Enterprise CMEP Practice Guide Cold Weather Preparedness
- Major Events Reports
- Lessons Learned
- Reliability and Security Guidelines
- Generating Unit Winter Weather Readiness
- 2023 Cold Weather SGAS FAQ

Questions and Answers