NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Questions and Answers

2024 Cold Weather Preparedness Small Group Advisory Sessions

Background

The week of May 6, 2024, the ERO Enterprise hosted a Cold Weather Preparedness Small Group Advisory Sessions General Session Webinar as well as one-on-one sessions for registered entities focused on frequently asked questions and compliance monitoring approaches related to EOP-012-2, EOP-011-4 and TOP-002-5. The following are the questions and answers discussed during the general session as well as during the one-on-one sessions. It should be noted that with the FERC Order approving EOP-012-2 and directing modifications on June 27, 2024, the FAQ was updated to be relevant to EOP-012-2 and some of the responses may be further impacted after EOP-012-3 is effective. Note that approved definitions will change as a result of the FERC Order (see Project 2024-03.) FERC directed modifications in the following five areas:

1. Modify Generator Cold Weather Constraint language and remove all references to "reasonable cost," "unreasonable cost," "cost," and "good business practices"
2. Modify EOP-012-2 for NERC to receive, review, evaluate and confirm the validity of each Generator Cold Weather Constraint
3. Shorten and clarify the corrective action plan implementation timelines and deadlines within R7
4. Modify EOP-012-2 R7 to ensure NERC pre-approves the extension of corrective action plans and that Generator Owners inform relevant registered entities of the extension
5. Modify EOP-012-2 R8, part 8.1, to implement more frequent reviews of Generator Cold Weather Constraint declarations

Define Terms

Generator Cold Weather Critical Component - 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).

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.

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;
3. A Forced Outage

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.

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.

Fixed Fuel Supply Component

Q1: Under the definition of Fixed Fuel Supply Component, can you clarify if the term fuel includes water, in the context of a hydroelectric generating unit?

A: As stated by the 2021-07 Drafting Team, "Water for a hydroelectric plant is considered outside the control of the generating unit. Therefore, it is not intended to be freeze protected."

Q2: Please describe your expectations regarding fuel sources and how they fit within this definition.

A: 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. For example, If the shutoff value owned by the Generator Owner failed, the fuel loss would be

the responsibility of Generator Owner and not the gas supplier. Mobile equipment such as trains, bulldozers, or other equipment that are not fixed in one location are excluded.

Design Temperature

Q3: Please provide guidance on how deep an investigation is needed if using design temperature data to establish the cold weather capability.

A: If original equipment manufacturer design temperature data has been requested and is not available, Generator Owners should continue researching the issue and document any findings. Additionally, if the design temperature is not available, the Generator Owner may use either of the following:

- Historical operating temperature at least one hour in duration, and if available, the concurrent wind speed and precipitation; OR
- Current cold weather performance temperature determined by an engineering analysis, which includes the concurrent wind speed and precipitation.

Generator Cold Weather Constraint

Q4: Will Constraint declarations have to be submitted to NERC?

A: Constraint declarations are currently not required to be submitted to NERC as part of the Standard, however as indicated in the Cold Weather Data Collection Plan[1], the ERO Enterprise will be the recipient of certain data related to Generator Owner declared Generator Cold Weather Constraints. More details will be provided as the project is implemented. A Generator Owner should maintain all the documentation associated with Generator Cold Weather Constraints for compliance evaluation throughout the life of the constraint.

Q5: For Generator Cold Weather Constraint, please differentiate between definition of 'optimum' and 'acceptable'.

A: The Standard Drafting Team intentionally provided flexibility and relied upon the industry's long practice of using "good business practice" as a basis for new practices, methods, or technology. Optimum and acceptable are facets of mitigation efforts each GO may consider in determining what level of freeze protection measures are needed based on the risks. An example of optimum may be permanently enclosing a Generator Cold Weather Critical Component versus temporarily enclosing it with tarps/portable heaters/etc. The key point is to protect the Generator Cold Weather Critical Component in a manner that avoids a Generator Cold Weather Constraint and Generator Cold Weather Reliability Event. Generator Cold Weather Constraints should be the exception.

Q6: For Generator Cold Weather Constraints is there an expected type of documentation to show compliance with the standard?

A: At a minimum, a narrative explaining what the declaration is, the expected timeframe or duration of the declaration, reasons why the issue is not mitigated, and documentation to support the declaration would be needed. As the Standard Drafting Team stated, "Ultimately, it will be the Generator Owner's responsibility to document in the declaration the circumstances and reasons why the modification needed

[1] Compliance Filing of the NERC for Cold Weather Data Collection, 2-16-24

to address the freezing issue was not implemented. A declaration that no further corrective actions will be taken is expected to be used sparingly."

Q7: For the five-calendar year review of a Generator Cold Weather Constraint will a signature page or attestation page suffice as evidence of completion, or does it need to be a more thorough documented review with supporting evidence?
A: Additional evidence should be provided with the signature page or attestation. A review of the Generator Cold Weather Constraint declaration must be performed, and an assessment of whether the Generator Cold Weather Constraint declaration is still valid should be performed and documented.

Q8: For Plants that have a retirement date within 2 to 3 years of the implementation date would a Generator Cold Weather Constraint with the retirement as the reason suffice for compliance with the standard?
A: The Standard Drafting Team provided some examples of what may constitute a Generator Cold Weather Constraint that included "Accelerated retirement of an existing generating unit" but did not elaborate on what "accelerated" may mean. A Generator Owner would have to document in the declaration the circumstances and reasons why the modification needed to address the freezing issue was not implemented. Generator Owners are expected to implement freeze protection measures that are "generally implemented by the electric industry in areas that experience similar winter climate conditions." Simply saying a unit is retiring in X years is not a reason to forego what risk mitigation efforts, in terms of acceptable practices, methods, or technologies for freeze protection measures, need implemented.

Q9: Please describe expectations for Generator Cold Weather Constraints as it pertains to documenting and communicating with other entities. As this relates to R8, is the expectation that the Balancing Authority will revise their data specification to request documented Generator Cold Weather Constraints? As of now, the Independent System Operator addresses operating limitations through the outage submittal process.
A: Please see the Cold Weather Data Collection Plan[2] regarding sharing information with NERC in the future. The Balancing Authority/Reliability Coordinator/Transmission Operator data specifications may very well be altered as a result depending upon each of the entity's approach. GOs should be working with their Balancing Authority/Reliability Coordinator/Transmission Operator now to understand what may be required.

Q10: Can we have one Generator Cold Weather Constraint declaration for the same issue (e.g., blade icing) that multiple CAPs can refer to?
A: Yes, however, care needs to be taken to ensure all Cold Weather Constraint factors are identical.

Q11: What level of detail would ERO Enterprise staff expect to see as evidence for an entity's analysis for Generator Cold Weather Constraints? Any recommendations on how to keep track of whether the constraint has a change of status?

[2] Compliance Filing of the NERC for Cold Weather Data Collection, 2-16-24

A: A well-documented and supported analysis is expected. A declaration of a Generator Cold Weather Constraint should include sufficient detail to support the declaration (including the criteria used per the definition) See the three (3) criteria listed in the definition and provide supporting documentation for whichever criteria is used. The ERO Enterprise suggests periodically communicating with vendors as part of the five-calendar year review of Generator Cold Weather Constraint declarations to determine if the cost to remove the Generator Cold Weather Constraint has changed significantly, and if any new technology is available.

Q12: For Generator Cold Weather Constraint criteria, define 'reasonable cost'.
A: The Standard Drafting Team provided guidance on establishing a cost as "unreasonable" within the definition of Generator Cold Weather Constraint. "A cost may be deemed "unreasonable" when implementation of selected freeze protection measure(s) is uneconomical to the extent that they would require prohibitively expensive modifications or significant expenditures on equipment with minimal remaining life." Ultimately, the decision to declare a Generator Cold Weather Constraint based on cost must be supported by an analysis that is "consistent with good business practices, reliability, or safety." The analysis should be available during a compliance monitoring activity (i.e., Audit, Spot Check, etc.).

Q13: Does the declaration for a Generator Cold Weather Constraint need to be part of a Corrective Action Plan or can this be stand-alone if there are no known corrective actions?
A: A Corrective Action Plan would be necessary prior to a Generator Cold Weather Constraint being declared. Additionally, Generator Cold Weather Constraints should not be viewed as an exemption for developing and implementing a Corrective Action Plan. To the extent possible, a Corrective Action Plan and its specific actions must be completed. Generator Cold Weather Constraints should only be used when select actions within a Corrective Action Plan cannot be completed (EOP-012-2 Requirement 7 Part 7.4)

Q14: How detailed does a Constraint declaration need to be for wind turbine de-icing to justify its non-economic nature?
A: Details are necessarily dependent on the facts of the Generator Cold Weather Constraint. At a minimum, a narrative explaining what the declaration is, the expected timeframe or duration of the declaration, reasons why the issue is not mitigated, and documentation to support the declaration would be needed.

Freeze Protection Measures

Q15: In the past freeze protection measures to decrease outages and de-rates due to ice on the blades have been researched. Nothing was acceptable. The technology just isn't available. How do we show compliance that it is not feasible to add freeze protection to prevent icing on the blades?
A: A well-documented and supported analysis is expected. A declaration of a Generator Cold Weather Constraint should include sufficient detail to support the declaration (including the criteria used per the definition) See the three (3) criteria listed in the definition and provide supporting documentation for whichever criteria is used. The ERO Enterprise suggests periodically communicating with vendors to determine if the cost to remove the Generator Cold Weather Constraint has changed significantly, and if any new technology is available.

Q16: Is there a compliance expectation to include freeze protection measures that are not protecting Generator Cold Weather Critical Components?
A: No, freeze protection measures are only required to protect Generator Cold Weather Critical Components. However, it is suggested Generator Owners should take measures to maintain the reliability of their generating units.

Q17: Do cold weather operating procedures count as freeze protections (e.g., draining a system or putting a system in recirculation mode)?
A: The ERO Enterprise would consider these as freeze protection measures. The cold weather preparedness plan should include references to actions and possibly include periodicity based on conditions.

Generator Cold Weather Critical Component

Q18: 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 Generator Cold Weather Critical Components? Or would the HVAC system be considered a freeze protection measure?
A: The definition of Generator Cold Weather Critical Component 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. Evidence should be available demonstrating how the Generator Owner monitors the temperature in these spaces. The HVAC/heating system is not a freeze protection measure in terms of being included in the cold weather preparedness plan as it is not protecting a Generator Cold Weather Critical Component nor is it a Generator Cold Weather Critical Component. The ERO Enterprise urges the HVAC/heating system to be part of routine maintenance and monitoring to ensure that the heating building remains above 32 degrees Fahrenheit.

Q19: If equipment owned and maintained by the gas supplier (e.g., regulator) is within the (gas) generation facility footprint, is it a Generator Cold Weather Critical Component?
A: If not under the control of the Generator Owner, it is out of scope. The ERO Enterprise would suggest working with the natural gas supplier to ensure freeze protection measures have been implemented accordingly.

Q20: What are examples of Generator Cold Weather Critical Components for wind turbines?
A: A Generator Owner will need to review their components and systems that are under their control and susceptible to freezing issues that likely would lead to a Generator Cold Weather Reliability Event. Some examples include anemometers, gear boxes, turbine blades, and station batteries.

Q21: Please can you advise if the anemometer in the nacelle is heated, is it a critical component? Is the heater a critical component?
A: The anemometer is a Generator Cold Weather Critical Component if it meets the criteria in the definition, and the heating which keeps the anemometer from freezing may be a freeze protection measure.

Q22: Please confirm that "identifying" Generator Cold Weather Critical Components in R4.3 of EOP-012-2 does not necessarily mean listing them. That is, generic descriptions (e.g., "instrument air system"), marked-up piping and instrumentation diagrams, and the like can also be used.
A: Generator Owners may use any means necessary to identify Generator Cold Weather Critical Components and the freeze protection measures implemented on those per R4.4. Listing the Generator Cold Weather Critical Component in a way that ensures freeze protection measures are applied per the cold weather preparedness plan is a logical approach. Training on the freeze protection measures should include how the measures are applied on the Generator Cold Weather Critical Component. Care should be taken to ensure a generic listing does not lead to misunderstanding and misapplication of a freeze protection measure.

Q23: I'm having difficulty identifying Generator Cold Weather Critical Components, especially for new units that have not yet gone through the winter season. The definition is unclear ("susceptible to freezing issues"), contributing to the difficulty a) Is a Generator Cold Weather Critical Component one whose design temperature is above Extreme Cold Weather Temperature, or is identification of a Generator Cold Weather Critical Component independent of Extreme Cold Weather Temperature? b) Is it possible for a unit to have no Generator Cold Weather Critical Components, especially if there are no components with a design temperature (or minimum operating temperature) above Extreme Cold Weather Temperature? Or must one or more Generator Cold Weather Critical Component be identified for each unit? c) Do you have any suggestions on how to generate documentation for the identification of Generator Cold Weather Critical Components?
A: a) Identification of Generator Cold Weather Critical Components is independent of Extreme Cold Weather Temperature or design temperature. b) Using the definition of Generator Cold Weather Critical Component, it is possible for a unit to have none, however, evidence of how this conclusion was reached should be maintained. c) Documentation should be per unit and clearly identify the Generator Cold Weather Critical Component in such a way that freeze protection measures are applied and maintained. Lists of Generator Cold Weather Critical Components and associated freeze protection measures per site is a logical approach. How definitive the lists are (e.g., "air systems" versus "air system for X, Y, Z") should be reflective of what may be contained within a cold weather preparedness plan (and associated training). A Generator Owner will be asked how Generator Cold Weather Critical Components are determined and how they manage application of the freeze protection measures.

Q24: In the EOP-012-2 technical rationale document, it is stated that Generator Cold Weather Critical Components in a permanent structure that has a heating source that maintains the space at a temperature above 32F can be excluded from being labelled as a critical component. The technical rationale indicated containers for Inverter Based Resources or Battery Energy Storage Systems is one example. Can Generator Cold Weather Critical Components inside a wind turbine qualify for exclusion if the space inside the nacelle is maintained above 32F?
A: Yes, the key is maintaining the space above 32 degrees Fahrenheit and being able to show evidence of this fact.

Q25: In the Technical Rationale provided by the drafting team, it is stated that: The Standard Drafting Team's intent with the use of the phrase "permanent building" is to refer to a structure that is in place

year round, shall accommodate personnel entry, and has a heating source that regularly maintains the space at a temperature above 32 degrees Fahrenheit for the purpose of protecting components from freezing (e.g., heated container that protects inverter-based resources or battery energy systems). Based on this, can inverters and BESS be excluded from the critical component list?
A: Yes, if they are located in a "permanent building" that is maintained above 32 degrees Fahrenheit. The ERO Enterprise recommends that heating systems used to provide heat to the "permanent building" are included as part of routine maintenance and monitoring to help ensure their proper operation prior to and during the cold weather season.
Q26: Regarding the Generator Cold Weather Critical component list, to what level of detail should we show? What criteria is needed for the critical component list?
A: Generator Cold Weather Critical Components by definition are a unit component or system and need to be identified in the cold weather preparedness plan. It is imperative that the freeze protection measures are implemented for Generator Cold Weather Critical Component in such a manner that the entire system or component is protected. How an entity chooses to provide details will vary but the entity should be able to explain and demonstrate what the Generator Cold Weather Critical Components are within a site.

Q27: Can components be removed from the Generator Cold Weather Critical Components list?
A: Yes. The ERO Enterprise recommends maintaining documentation around the removal of the component from the Generator Cold Weather Critical Component list.

Q28: If in the process of implementing an updated maintenance checklist including all Generator Cold Weather Critical Components and not all turbines can be inspected prior to 10/1/24 will the entity be non-compliant, or can they justify completion after 10/1/24?
A: The EOP-012-2 Implementation Plan only explicitly states entities shall be compliant with Requirement R1 by the effective date, 10/1/2024. Annual inspection and maintenance on freeze protection measures for Generator Cold Weather Critical Components should be done in accordance with cold weather preparedness plan(s) and by the end of the calendar year 2024. However, the ERO Enterprise would strongly suggest that Generator Owners should perform the inspection and maintenance of generating unit freeze protection measures prior to the winter season.

Q29: With regards to "Generator equipment", does a Generator Owner need to generally consider equipment within its collector substation for consideration of a Generator Cold Weather Critical Component?
A: Yes, 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. For example, this would include any generator step-up (GSU), breaker, or support systems for those items.

Q30: With regards to the Generator Cold Weather Critical Component list, what level of detail is necessary?
A: Generator Cold Weather Critical Components by definition are a unit component or system and need to be identified in the cold weather preparedness plan. It is imperative that the freeze protection measures are implemented for Generator Cold Weather Critical Component in such a manner that the entire system

or component is protected. How an entity chooses to provide details will vary but the entity should be able to explain and demonstrate what the Generator Cold Weather Critical Components are within a site.

Q31: With regards to the Generator Cold Weather Critical Component list, is it only critical if it affects MWs?
A: No, per the definition a Generator Cold Weather Critical Component is a component/system that is susceptible to freezing that could cause a Generator Cold Weather Reliability Event. The Generator Cold Weather Reliability Event is defined as one (1) of three (3) things: forced derate with caveats (10% of capacity >20MWs for longer than four hours), start-up failure where the unit fails to synchronize within a specified start-up time or Forced Outage. So, if a component/system that manages MVAR output could cause a Generator Cold Weather Reliability Event, it is a Generator Cold Weather Critical Component.

Generator Cold Weather Reliability Event

Q32: What temperature data source or sources can be used to determine whether a Generator Cold Weather Reliability Event has occurred? Is it based on the weather station data used to determine the Extreme Cold Weather Temperature or the on-site met (meteorological) station temperature data?
A: The onsite meteorological data would be the best source of comparison knowing that there may be differences in the weather station data based on physical differences. Overall, an entity should use their best judgement and may either use the weather station data used to determine the Extreme Cold Weather Temperature or the on-site meteorological station temperature data may be used.

Q33: The requirement stipulates cause(s) of a "Generator Cold Weather Reliability Event" must be determined. Determining the root cause(s) could potentially be difficult within the complexities of the operating conditions and the equipment involved. Is there an allowance for a Generator Owner to demonstrate that an effective and thorough analysis was conducted for an 'event' and have determined no conclusive findings?
A: Yes, this would be acceptable but the detailed analysis that led an entity to that conclusion would need to be provided and supported during a compliance monitoring activity.

Q34: Event type 1, "forced derate of more than 10% of the total capacity" – is that total capacity of the unit based on its nameplate, the amount bid into the market at the time of forced derating, or another measure of total capacity?
A: For a Generator Cold Weather Reliability Event, it is the capacity of the generating unit at the time of the event. That is, either its full capacity or a derated amount due to a documented preexisting maintenance/operational issue that limits capacity.

Q35: Is the following approach appropriate to identify Generator Cold Weather Reliability Events? The events that would trigger a Generator Cold Weather Reliability Event (forced outage, derate, or startup failure) are captured using the Generating Availability Data System (GADS). The entity is developing a process to review all GADS events that occur in December through February to determine if a Generator Cold Weather Reliability Event has occurred. This review would occur monthly and include a review of GADS data, ambient temperature data, and any root cause analyses associated with the GADS events.

This review would be documented, and a corrective action plan would be developed for any identified events.
A: This approach seems reasonable as long as the review was completed in accordance with the Requirement language and meeting the required timeline. (Per R6: The Corrective Action Plan shall be developed within 150 days or by July 1, whichever is earlier.)

Implementation Plan

Q36: What is the predicted effective date of EOP-011-4 and EOP-012-2? FERC approved EOP-011-4 but did not approve the IP, so the effective date for the EOP-011 revision is not clear for entities. Additionally, does EOP-011-4 supersede EOP-011-2 or EOP-011-3? What will happen to these two revisions once the EOP-011-4 Implementation Plan is approved?
A: FERC approved EOP-011-4 and EOP-012-2 and their implementation plans (see Project 2021-07) on June 27, 2024. In that Order, FERC also approved the retirement of EOP-011-2, EOP-011-3, and EOP-012-1, immediately prior to the effective date of EOP-012-2, 10/1/2024.

Q37: When can we expect a Reliability Standard Audit Worksheet (RSAW) for either EOP-012-1 or EOP-012-2? RSAWs provide much needed clarity of the measures within a standard.
A: With the FERC approval of EOP-012-2 on June 27, 2024, a RSAW for EOP-012-1 will not be needed. The RSAW for EOP-012-2 has been posted.

Q38: If an entity is preparing its internal documentation to be in line with EOP-012-2, could this be a problem if EOP-012-2 is not approved by FERC?
A: With the FERC approval of EOP-012-2 on June 27, 2024, entities should be prepared to meet the requirements of EOP-012-2 in accordance with its Implementation Plan.

Q39: Are entities expected to be in compliance with EOP-012-2 at the time it becomes enforceable, or will there be a phased implementation for some of the requirements?
A: With the FERC approval of EOP-012-2 on June 27, 2024, all requirements apart from R3 take effect on October 1, 2024. R3 will be effective on October 1, 2025.

Q40: If EOP-012-2 is approved by FERC and effective on 10/1/2024, will activities such as annual inspection, maintenance and training have to be completed by that date?
A: The EOP-012-2 Implementation Plan only explicitly states entities shall be compliant with Requirement R1 by the effective date, 10/1/2024. Annual inspection and maintenance should be done in accordance with cold weather preparedness plan(s) and by the end of the calendar year 2024. However, the ERO Enterprise would strongly suggest that Generator Owners should perform the inspection and maintenance of generating unit freeze protection measures prior to the winter season.

Q41: Do you have additional information on the new Section 1600 data request regarding cold weather data?
A: NERC provided a Cold Weather Data Collection plan to FERC on February 16, 2024. Details of what data is required will be provided as the plan is implemented. FERC approved this plan on May 23, 2024.

Q42: Would you provide clarity around the implementation of EOP-011-4?
A: EOP-011-4 will supersede EOP-011-3 and be effective on October 1, 2024, however, some parts will not be enforceable until April 1, 2027. Please see the Implementation Plan for additional details.

- **Requirement 1 Part 1.2.5 (new/revised portions applicable to UVLS, UFLS, critical natural gas infrastructure loads): April 1, 2027**

> **1.2.5.** Operator-controlled manual Load ~~shedding~~shed, undervoltage load shed (UVLS), or underfrequency load shed (UFLS) during an Emergency that accounts for each of the following:
>
> **1.2.5.1.** Provisions for manual Load shedding capable of being implemented in a timeframe adequate for mitigating the Emergency;
>
> **1.2.5.2.** Provisions to minimize the overlap of circuits that are designated for manual Load shed, UVLS, or UFLS and circuits that serve designated critical loads which are essential to the reliability of the BES;
>
> **1.2.5.3.** Provisions to minimize the overlap of circuits that are designated for manual Load shed and circuits that are utilized for ~~underfrequency load shed (~~UFLS~~)~~ or ~~undervoltage load~~UVLS;
>
> ~~shed (UVLS); and~~
>
> **1.2.5.4.** Provisions for limiting the utilization of UFLS or UVLS circuits for manual Load shed to situations where warranted by system conditions~~.~~;
>
> **1.2.5.5.** Provisions for the identification and prioritization of designated critical natural gas infrastructure loads which are essential to the reliability of the BES as defined by the Applicable Entity; and

- **Requirement 2 Parts 2.2.8-2.2.9 (new/revised portions applicable to UVLS, UFLS, critical natural gas infrastructure loads): April 1, 2027**

> **2.2.8.** Provisions for excluding critical natural gas infrastructure loads which are essential to the reliability of the BES, as defined by the Applicable Entity, as Interruptible Load, curtailable Load, and demand response during extreme cold weather periods within each Balancing Authority Area;
>
> ~~2.2.8.~~**2.2.9.** Provisions for Transmission Operators to implement operator-controlled manual Load ~~shed~~shedding, undervoltage Load shedding, or underfrequency Load shedding in accordance with Requirement R1 Part 1.2.5; and

- **Requirement 8: The later of: (1) April 1, 2027, or (2) 30 months following notification by a Transmission Operator under EOP-011-4 Requirement 7 to assist with the mitigation of Operating Emergencies.**

EOP-012-2 R1.2. Generating unit(s) cold weather data

Q43: In Requirement R1, Sub-part 1.2.2, is the requirement to provide only one of the three minimum temperatures; or to provide the design temperatures and either historical operating temperature or performance temperature determined by engineering analysis?

A: As written, only one of the three (3) (Design temperature, historical operating temperature, or current cold weather performance temperature) is required.

Q44: Option 3 indicates "Current cold weather performance temperature determined by an engineering analysis, which includes the concurrent wind speed and precipitation." How is concurrent wind speed and precipitation integrated into an engineering analysis?

A: As explained in the Technical Rationale document for EOP-012-2, if no information about wind or precipitation is known, wind and precipitation are assumed to be zero at the minimum temperature until further information is obtained.

EOP-012-2 R1.2 NOTE

Please note with the transition to EOP-012-2 becoming effective on 10/1/2024 and not EOP-012-1, ensure all the Parts are addressed as some were not within EOP-012-1. These include "Start-Up issues" within 1.2.1.3 as well as the references to "concurrent wind speed and precipitation" within 1.2.2.

Miscellaneous

Q45: 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 to a statistical estimate of likelihood of being able to run under any given weather conditions.

A: "Capability" is not necessarily limited to the "normal" maximum net MW output. IRO-010 and TOP-003 data specifications from the Balancing Authority, Transmission Operator, and Reliability Coordinator would determine what was expected with respect to capability and availability and Generator Owners should seek clarity from the entities requesting the data.

Q46: Please elaborate on 'similar equipment' within R6.2.

A: "Similar equipment" may be used in the context of whether there is a potential (cold weather) vulnerability at other units based on the similar equipment/configuration. The ERO Enterprise would suggest review of the root cause and see if freeze protection measures are adequately applied at other locations containing the same functional type of equipment (e.g., a sensing line or transmitter frozen at plant A. The Generator Owner should review its freeze protection measures on sensing lines or transmitters at other locations to see if the same conditions could manifest based on what was learned and the freeze protection measures in place.) Generator Owners should not necessarily limit their review based on a model or vendor.

Q47: Please elaborate on 'self-commit'.

A: Per the Consideration of Comments document from 10/27/2023, the Standard Drafting Team stated:" "Self-commits" refers to units that are intended to run below 32 degrees.

Per the Consideration of Comments document from 01/10/2024, the Standard Drafting Team stated: " The inclusion of "self-commits or is required to operate at or below a temperature of 32 degrees Fahrenheit", and the footnote language was found to be acceptable by the majority of industry"

Footnote 1 from EOP-012-2 states: "Generating unit(s) that do not self-commit or are not required to operate at or below a temperature of 32 degrees Fahrenheit (zero degrees Celsius) but may be called upon to operate in order to assist in the mitigation of BES Emergencies, Capacity Emergencies, or Energy Emergencies during periods at or below a temperature of 32 degrees Fahrenheit (zero degrees Celsius), are exempt from this requirement."

Q48: We would like to better understand NERC's guidance on the increase of convective heat transfer due to wind which decreases the amount of time it takes equipment to freeze. It seems there is a false security by solely on dry bulb temperature for safe start-up and operating temperatures.
A: The 2021-07 Extreme Cold Weather 2021-07 Drafting Team decided the use of "dry bulb temperature" was appropriate within the Generator Cold Weather Reliability Event and was supported by industry.

Q49: I'm curious what sort of documentation would be sufficient to show the inside temperature of a permanent building is maintained at 32 degrees or higher?
A: Documentation may include preventative maintenance checking and testing building temperature, operator logs monitoring any temperature alarms, and cold weather checklists completed rounds by operators during walkdowns/rounds. Keep in mind, temperature differences can exist within a building, so it is important to ensure all portions of building are above 32 degrees Fahrenheit especially those near components that may otherwise be considered Generator Cold Weather Critical Components.

Q50: Currently EOP-012-2 is applicable to BES generating units, will Generator Owner/Generator Operator Category 2 generating units be required to comply as well once registration for those units is finalized?
A: In its current form, no. The Applicability section of EOP-012-2 would need to be revised to include GO/GOP Category 2 units in the future.

Q51: I looked over the RSAWs for TOP-002 and TOP-003. Based on what the RSAWs says about the evidence an auditor should be looking at, I do not believe that an auditor would ever compare the data specification to the Operating Plan output. How does the cold weather data requested by Transmission Operators and Balancing Authorities as required by the data specification within TOP-003 impact the Operating Planning Analysis, Operating Plans, Real-time Assessments, etc. performed as required within TOP-001 and TOP-002?
A: ERO Enterprise compliance monitoring staff will continue to determine compliance based upon the language in the NERC Reliability Standards. Accordingly, entities should expect, as with all information requested within the data specification, how cold weather data is used in analysis functions and Real-time monitoring. The cold weather data requested by Transmission Operators and Balancing Authorities will better inform Real-time Assessments, Operating Planning Analysis, Operating Plans, etc. required for reliable operation. The cold weather data will provide the entities with a better understanding of operating

limitation impacts during cold weather as well as potential performance issues at varying temperature points.

Q52: Would an Anchor or Frazzle Ice event on a hydro generation facility count as an Ice event per the definition of a Cold Weather Reliability Event and therefore require the implementation of R6 and R7 of EOP-012-1
A: If equipment freezes and causes an event meeting the criteria of a Generator Cold Weather Reliability Event, Requirement R6 would be applicable if the unit meets Requirement R6 language (i.e., Extreme Cold Weather Temperature at or below 32 degrees Fahrenheit and self-commits OR required to operate at or below 32 degrees Fahrenheit). The Corrective Action Plan developed as a result of the Generator Cold Weather Reliability Event would need to follow Requirement R7 language.

Wind and Precipitation

Q53: 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 Generator Cold Weather Critical Component.
A: That is the correct intention of Requirement R4.4; however, there may be benefit to plant personnel in adding additional detail to distinguish freeze protection measures that are temperature related (heat loss), wind related, and precipitation related freeze protection measures.

Q54: R4 (4.4) states, "Documentation of freeze protection measures implemented on Generator Cold Weather Critical Components which 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 (e.g., sleet, snow, ice, and freezing rain)". Can the group provide insight on expectations for documenting measures to reduce cooling effects of wind and freezing precipitation?
A: The ERO Enterprise would expect to see evidence the freeze protection measures were implemented which could include a work order showing the measure was installed (e.g., wind break, enclosures, etc.) or operator checklists showing measures were completed and verified to be complete.

Q55: Please expand on what is meant by 'reduce the cooling effects of wind' and 'effects of freezing precipitation'
A: Wind generally increases the heat transfer rate between a heated piece of equipment and the ambient air around that piece of equipment. Reducing the "cooling effects of wind" is equivalent to reducing the heat transfer rate. This may be accomplished by wind barriers (i.e., insulation, enclosures, etc.).

- Examples of the effects of freezing precipitation (e.g., sleet, snow, ice, and freezing rain) include (but are not limited to):
  - Wind turbine blades or solar panels covered with sleet/snow/ice/freezing rain which reduces the power output.

  - Restrictions in the air inlet volume due to sleet/snow/ice/freezing rain in air intakes to a gas/oil fired generator which reduces generator output.
  - Restricted air filter inlet flow on an outdoor instrument air compressor due to sleet/snow/ice/freezing rain, which may result in the unit tripping offline due to the lack of instrument air to equipment in the plant.
- Reducing the effects of freezing precipitation may be accomplished by various methods applicable to the equipment affected. Examples of methods to reduce the effects of freezing precipitation include (but are not limited to):
  - Prevention or removal of sleet, snow, ice, and freezing rain on wind turbine blades and solar panels via heating or other methods.
  - Prevention or removal of sleet, snow, ice, and freezing rain on air intakes to a gas/oil fired generator via the introduction of heated air to or on the air intake (e.g., louvers), or an extended structure over the air intake that ensures the formation of sleet/snow/ice/freezing rain in the air intake will not occur.
  - Prevention or removal of sleet, snow, ice, and freezing rain on an instrument air compressor inlet filter by enclosing the outdoor air compressor (and possibly heating the enclosure).

Wind Turbines

Q56: Is there a chance that heat in blades will become a requirement later?
A: While the ERO Enterprise cannot provide a definitive answer to the question, blade heating technologies may increase in use in the future. The increase of use could change the understanding and applicability of Generator Cold Weather Constraint declarations which require at least a five-calendar year review (or upon a status change).

Q57: Regarding windfarms, specifically wind turbines, the inspection and maintenance are performed throughout the year. It cannot be performed within a couple of months during fall season. So, some of the turbines may be performed in the spring, others in the summer and the rest completed in the fall. Is that acceptable?
A: Entity's will determine how annual maintenance and inspections will occur throughout the year. It would be beneficial to consider the inspection and maintenance of those freeze protection measures intended to protect Generator Cold Weather Critical Components to be reviewed just prior to the cold weather season. It is understood that some freeze protection measures will be more transient in nature (e.g., temporary tarps) than others and inspection may occur during implementation with maintenance occurring during the cold weather season (e.g., tarp re-positioning/taping/replacement).

Q58: There is no generally accepted Wind Industry practice for identification, monitoring & quantifying blade icing impact, both underperformance (derated) operation & full inability to operate that we are aware of, will NERC be providing guidance on how to do this/consistently?
A: Blade icing may be identified by monitoring the actual output of a given WTG and comparing it to the expected output at a given wind speed. Differences between the actual and expected output may be attributed to icing on the blades. At this time, no additional ERO Enterprise guidance on this topic has been

provided but we encourage entities to work with other entities and their trade groups such as the American Wind Energy Association or the North American Generator Forum.

Q59: Generator Owners on the renewables side are still trying to figure out how to factor in 20mph wind speed for projects that will reach commercial operation in Oct 2027 and beyond. Our subject matter experts have been having difficulties in obtaining information from OEMs/manufacturers on the 20mph wind criterion. Without much information to rely on, the expectation is that Generator Owners will have to make certain assumptions in identification of Generator Cold Weather Critical Components to comply with EOP-012-2 R2. Will the ERO Enterprise consider flexibility in accepting the methodology employed by Generator Owners during the first round of audits while experience and lessons learned are built up over the next couple of years to allow further changes in methodology?
A: Generator Owners will need to document their Generator Cold Weather Critical Components based on the definition provided within the Standard. For Requirement R2, the physical location of the Generator Cold Weather Critical Component may help indicate the impact of a sustained 20 mph wind speed. If outside the nacelle (e.g., blades or anemometer), the impact could be different and may be used to help determine the freeze protection measures needed to perform at the Extreme Cold Weather Temperature. The Standard Drafting Team provided a lot of flexibility within the Standard as it was developed. The ERO Enterprise is obligated to determine compliance based on the Standard language and expects that lessons will be learned through various oversight activities including compliance monitoring. The ERO Enterprise strongly suggests coordinating and communicating with industry peers who have yet to express concerns regarding the availability of this data.

Cold Weather Preparedness Plan

Q60: Does the cold weather preparedness plan required in R4 need to only cover the requirements in R4 and its sub-requirements? Or does it have to cover everything from R1 through R8?
A: Cold weather preparedness plans should include aspects of other Requirements, as necessary. Freeze protection measures, in general and specifically for Generator Cold Weather Critical Components, need to be within the plan (see R2 and R3 relationship to subparts of R4.) Managing Generator Cold Weather Reliability Event responses, development of Corrective Action Plans, and training may be in separate documents but could impact the cold weather preparedness plan in various ways.

Q61: An entity plans on developing a common cold weather plan for all BESS and Solar facilities and a different plan for Wind facilities. Is this acceptable? Freeze protection measures will be site specific.
A: It is critical to ensure that cold weather preparedness plans consider site specific issues. Per R4, each unit's Extreme Cold Weather Temperature, cold weather data, Generator Cold Weather Critical Components, freeze protection measures on the Generator Cold Weather Critical Components, and annual inspection and maintenance of the Generator Cold Weather Critical Components freeze protection measures are considered as minimal requirements to be within a cold weather preparedness plan. It is expected that commonalities will exist, which is why the Standard Drafting Team provided the "one or more" language in the Standard.

Q62: Can an entity request to have their Cold Weather Preparedness Plan or training material reviewed by NERC or the Region to see if there are any gaps?

A: Please contact your Regional Entity to discuss further.

Q63: If a plan is updated during the winter months, is the expectation to immediately notify all applicable employees of the changes? If yes, what type of documentation would be required to show the information was communicated to applicable employees?
A: It is dependent on the nature of the change. For example, if the change would impact day-to-day routine activities performed throughout the winter season, an immediate communication (and training if necessary) to appropriate personnel would make sense. If the change would not be implemented until the following winter season, then the annual training session may be more appropriate.

Start Up Issues

Q64: R1.2.1.3 lists 'Start Up Issues' as needing to be listed for cold weather data, operating limitations. Can you provide examples?
A: Per the Technical Rationale, start-up failures for conventional generation are defined using the GADS definition with the removal of "following an outage or reserve shutdown", since the definition of reserve shutdown is different in GADS than it is in some of the Regional Transmission Organizations (RTO's) and Independent System Operators (ISOs). From the GADS data reporting instructions, the start-up period for each unit is determined by the operating company. It is unique for each unit and depends on the condition of the unit at the time of start-up (cold, warm, or hot). A typical unit start-up occurs in three phases: warm up, synchronization, and ramp up. NERC defines a start-up period to begin with the command to start and end when the unit is synchronized. A start-up failure begins when a problem preventing the unit from synchronizing occurs. The start-up failure ends when the unit is synchronized, another start-up failure occurs, or the unit enters another permissible state.

Q65: 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." If this is a correct interpretation, will IRO-010 and TOP-003 be updated to oblige BAs, RCs, and TOPs to request this information in their data specifications? Their portal systems do not presently accept free-form inputs such as those mandated in R1.2.1.3.
A: See answer to previous questions. Additionally, a Generator Owner may communicate and work with the Reliability Coordinator/Balancing Authority/Transmission Operator to develop a mutually agreeable format to enable the Generator Owner to submit relevant data. If an Entity concludes that a Standard should be revised, the Entity may submit a Standards Authorization Request (SAR).

Q66: R1.2.1.3 (Start-up issues): Can you please provide some examples of what this may look like for renewable generation?
A: There may be a variety of mechanical, electrical, or environmental issues that impact start-up capability for renewable generation. For example, the solar panel tracking mechanism suffers a failure and the solar plant cannot come online when planned.

Q67: For units that have not had a cold start-up, but have only operated in cold weather, we do not have confidence that the units can start up from a cold state (e.g., -20°F design basis). Is it acceptable to use

operating judgement to determine a cold weather temperature we feel safe providing for a cold start-up with the absence of a validated design value or operating data?
A: It is acceptable to have a different start up temperature than running temperature. It is understood that some start-up information is not available. The use of the best information a generator has at the time is acceptable. If an event does occur, that can be addressed at that time. Any additional start up time based on temperature should be communicated to the Reliability Coordinator/Balancing Authority/Transmission Operator.

Q68: What is considered Start-up issues? Are low temperatures below OEM design, ice on blades, and HOARFRST frost considered start up issues if there is a failure to start? Have other wind/solar operators documented any start up issues?
A: A start-up issue is any issue within the Generator Owner's control that precludes a unit from starting. The ERO Enterprise is unable to speak to start-up issues encountered by other wind/solar Generator Owners.

Q69: As NERC considers a start-up failure a Cold Weather Reliability Event, if the Extreme Cold Weather Temperature was -30C, for example, the plant would have to be capable of starting from a standstill at this temperature (during 20 mph winds), or warmer. So, the argument that "the equipment stays warm when current is flowing through it" doesn't work for projects with COD after October 1, 2027. Am I interpreting this correctly?
A: If there is a Generator Cold Weather Reliability Event, then a Corrective Action Plan would be implemented, and the resulting actions would dictate the measures that the entity will use to reduce the likelihood of similar events. This may mean that start-up or pre-warming of certain systems needs to take place as a measure to allow the remaining portions of the start-up to continue.

Training

Q70: I have already done training this year. Do I have to do it again prior to 10/1/2024?
A: The EOP-012-2 Implementation Plan only explicitly states entities shall be compliant with Requirement R1 by the effective date, 10/1/2024. Annual training should be done in accordance with cold weather preparedness plan(s) and by the end of the calendar year 2024. However, the ERO Enterprise would strongly suggest that Generator Owners should provide the training prior to the winter season.

Q71: Who needs to be trained?
A: Per EOP-012-2 R5 all maintenance or operations personnel responsible for implementing the cold weather preparedness plan(s) should be trained on the cold weather preparedness plan(s) developed pursuant to Requirement R4. The ERO Enterprise recommends, regardless, to provide training to all personnel who perform inspection, maintenance, or installation of freeze protection measures for Generator Cold Weather Critical Components.

Q72: Please confirm the EOP-012 Technical Rationale statement that vendors performing inspection, maintenance or installation of freeze prevention measures do not need cold weather preparedness plan training. That is, the training is operations-oriented, so contractors need to be trained only if participating in running the plant.

A: Per the Technical Rationale: "The intent of the Standard Drafting Team is that training be provided to operational personnel who are responsible for inspection, maintenance, and/or ensuring operability of freeze protection measures. The operational personnel may include employees of the registered entity as well as any dedicated on-site full-time contractors or equipment original equipment manufacturer personnel responsible for inspection, maintenance, and/or ensuring operability of freeze protection measures." Generator Owners should take care that training has occurred on the cold weather preparedness plan (i.e., not call contractors "vendors" to try to circumvent any need for training per se based on the Technical Rationale language). Compliance determination will be based on the Standard language. Robust oversight of vendors who perform inspection, maintenance, or installation of freeze protection measures is critical to operational reliability and should not be ignored.

Q73: If an entity's generator has no cold weather actions (e.g., it is not susceptible to cold weather or all equipment is located inside heated buildings), is this entity required to perform annual cold weather training? The concern is that there are no cold weather actions, so what would be the content of the training?

A: Each Generator Owner shall implement and maintain one or more cold weather preparedness plan(s) for its generating units. The cold weather preparedness plan(s) shall include at a minimum what is defined in parts EOP-012-2 R4 parts 4.1 through 4.5. Per EOP-012-2 R5, maintenance or operations personnel responsible for implementing the cold weather preparedness plan(s) need to be trained on the cold weather preparedness plan(s) developed pursuant to Requirement R4.

Q74: Are there any key takeaways or lessons learned from the initial EOP-011-2 audits?

A: The ERO Enterprise continues to collaborate on key findings and may provide lessons learned as data is collected. The ERO Enterprise recommends that training needs to be site specific and at the unit level to cover the language of the Requirements. General training may be provided but needs to be supplemented with site specific training to ensure implementation of Standard.

Q75: There are organizational departments with applicable cold weather preparation tasks to be conducted for implementing cold weather preparation procedures. Although the M5 for R5 offers many documentation alternatives for Generator Owner and Generator Operator, what is best approach to demonstrate appropriate personnel are effectively trained in cold weather preparation efforts. From NERC's perspective, what is the most useful documentation to demonstrate effective training was conducted.

A: Ultimately it is up to the entity to determine how the training is performed, and who receives the training, which will then drive what evidence is provided to show training was completed. Training may be outlined in multiple ways depending on the facility and organization. From the Technical Rationale, "This training may include response to freeze protection panel alarms, troubleshooting and repair of freeze protection circuitry, identification of plant areas most affected by winter conditions, application of portable heaters, review of special inspections or rounds implemented during severe weather, fuel switching procedures, and maintenance of freeze protection measures, etc."

Q76: Please discuss the training explanation provided in the technical rationale - it seems to suggest that training could be both in advance of the cold weather season as well as actions during cold weather. Does that suggest the training could only be hands on during the cold weather season?
A: Training will likely include presentation material and hands-on efforts to be considered a holistic approach. Training should be clear enough that personnel that are implementing the cold weather preparedness plan understand what actions are required for the site according to its plan. Note that operational inspections during a cold weather event could be considered part of the cold weather preparedness plan and used to train others by a trained individual (example of on-the-job training.)

Q77: To what level of detail should annual training be performed?
A: Training to the cold weather preparedness plan and the associated freeze protection measures that require implementation. Entity should be able to demonstrate that training activity has occurred for implementing the cold weather preparedness plan which includes data in Requirement 4.

Q78: In the Technical Rationale, it is stated that: "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." This appears to be contrary to what we have been informed during the 2023 SGAS session and also CMEP interactions with a Regional Entity. Can NERC provide further guidance on this? For windfarms, our understanding is that there are many Generator Owners utilizing vendors (e.g., General Electric (GE) personnel) to perform maintenance work on the wind turbines. So, in terms of this example, does that mean GE personnel will not be trained on the particular Generator Owner's cold weather plan?
A: The Technical Rationale is not an enforceable part of the Standard. Per EOP-012-2 R5 all maintenance or operations personnel responsible for implementing the cold weather preparedness plan(s) should be trained on the cold weather preparedness plan(s) developed pursuant to Requirement R4. The ERO Enterprise recommends, regardless, to provide training to all personnel who perform inspection, maintenance, or installation of freeze protection measures.

Corrective Actions Plans

Q79: For icing on wind turbine blades, it may not make economic sense for an entity to install heat tracing on all its wind turbine blades. In a circumstance like this, would an entity remain compliant with EOP-012 by "declaring" that such Corrective Action Plan will not be implemented?
A: The Standard Drafting Team provided guidance on establishing a cost as "unreasonable" within the definition of Generator Cold Weather Constraint. "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." Ultimately, the decision to declare a Generator Cold Weather Constraint based on cost must be supported by an analysis that is "consistent with good business practices, reliability, or safety." The analysis should be available during a compliance monitoring activity (i.e., Audit, Spot Check, etc.).

Q80: Corrective Action Plans are required when a facility experiences a Cold Weather Reliability Event. What are the expectations for demonstrating that no Cold Weather Reliability Events occurred during a given cold weather season?

A: Internally document that no Generator Cold Weather Reliability Event occurred. Note that GADs data, outage data, event data, operating logs, and other operational related documentation should support the fact that no Generator Cold Weather Reliability Event has occurred.

Q81: Can we have one Corrective Action Plan that covers all derates/outages due to icing at a windfarm for the whole winter season?
A: With the scenario provided, one Corrective Action Plan at the same windfarm that covers all derates/outages due to icing at the windfarm is acceptable provided the Corrective Action Plan adheres to Requirement R6 and R7 language.

Q82: Can the same Corrective Action Plan be utilized for events that have the same root cause? Example: blade icing at the same site (may impact different turbines at different times).
A: Yes, as long as the actions and timelines are documented for the units experiencing the reason for Corrective Action Plan.

Q83: When does the Corrective Action Plan need to be created for generator projects that are expected to reach commercial operation date (COD) 10/1/2027 and beyond? Should it be developed as of COD or is it reasonable to develop it post COD?
A: Per the EOP-012-2 Implementation Plan, Requirement 2 "shall become effective on the later of: (1) October 1, 2024; or (2) the first day of the first calendar quarter that is three (3) months after the effective date of the applicable governmental authority's order approving the standard, or as otherwise provided for by the applicable governmental authority." It is expected that generating units will be implementing freeze protection measures per the cold weather preparedness plan prior to, or within (depending upon the nature of the freeze protection measures), the first cold weather season the unit is operating (including synchronization period prior to commercial operations date). As such, a Corrective Action Plan would be needed if it was determined a unit could not operate at its Extreme Cold Weather Temperature with the associated weather criteria required in Requirement 2. The reason an Oct 1, 2027, date was provided for new entities was to allow the freeze protection measures to be considered during the design and construction phases of generating units. A detailed analysis would be needed to support a Corrective Action Plan for a unit not yet in operation.

Q84: Can NERC provide guidance on the implementation plan for R2 and R3? When do Corrective Action Plans need to be created for each of R2 and R3? Are the Corrective Action Plans required to be developed by the effective dates or by the time the project reaches COD?
A: If a known issue exists, a Corrective Action Plan should be developed prior to the effective date of the Requirements. For Requirement R3, the Standard Drafting Team stated the following in the Technical Rationale: "One expectation of the Standard Drafting Team is that generating units will be able to operate at this temperature as soon as possible, but not later than the timetable requirements laid out in Requirement R7." Units under design and construction should be striving to meet the criteria for operating per Requirement R2. Delaying development of Corrective Action Plans may exacerbate operational reliability concerns due to extreme weather.

Q85: If we have a site that has an Extreme Cold Weather Temperature that is lower than the OEM design minimum temperature, and no further freeze protection measures will be added to the site in-order to operate lower than the design temperature, is a Corrective Action Plan necessary?
A: Yes, a Corrective Action Plan would be needed if the Extreme Cold Weather Temperature was at or below 32 degrees Fahrenheit (R2, R3, and/or R6). The expectation set by the Standard Drafting Team is to perform to the Extreme Cold Weather Temperature and provide a Corrective Action Plan if incapable of that performance expectation. Furthermore, if actions in the Corrective Action Plan cannot be implemented a Generator Cold Weather Constraint, with justification, is required.

Q86: There is nothing we can do about Ice-On-Blades. Is a CAP for each facility required?
A: Corrective Action Plans can cover multiple units as long as timetables/actions are listed appropriately and in accordance with the Requirements. The Corrective Action Plan should list each unit that is covered by the actions or declarations within.

Q87: Technical Rationale states "If one or more actions within a Corrective Action Plan fall under a constraint declaration, it is the intent of the Standard Drafting Team that only those affected actions would not be implemented as part of the Corrective Action Plan. The remaining actions should be implemented." If a similar Event occurs and the documented constrained elements continue to be identified as the cause, would this eventually lead to a more wholistic constraint declaration on the unit?
A: Yes, that is possible.

Q88: Is the temperature trigger range for requiring a Corrective Action Plan after a cold weather reliability start at 32 degrees F and go down to Extreme Cold Weather Temperature?
A: In accordance with the definition of a Generator Cold Weather Reliability Event, with respect to temperature, "the dry bulb temperature at the time of the event was at or above the Extreme Cold Weather Temperature." A Corrective Action Plan would be required when a Generator Cold Weather Reliability Event occurs which implies the event occurred at a temperature at or above the unit's Extreme Cold Weather Temperature.

Q89: If an initial Corrective Action Plan with exception (blade icing) has been established but a site continues to be affected by blade icing, will additional Corrective Action Plans be required each time?
A: If a Generator Cold Weather Reliability Event occurs due to icing on the blades, a Corrective Action Plan would be necessary and then a Generator Cold Weather Constraint declaration may be made as applicable. Generator Cold Weather Constraints require review at least every five calendar years or as needed when a change of status to the Generator Cold Weather Constraint occurs. No additional Corrective Action Plans would be required prior to the five-calendar year review.

Q90: Would the derate of wind turbines due to blade icing that causes a cold weather event require the creation of a Corrective Action Plan and, depending on the root cause analysis, the creation of a declaration? Or would it be sufficient to outline this as an environmental constraint under requirement R1.2.1.5?
A: Yes, a Corrective Action Plan would be necessary. The declaration of a Generator Cold Weather Constraint would be based upon the findings of the Generator Cold Weather Reliability Event review and

subsequent Corrective Action Plan. R1.2.1.5 only pertains to the documentation of cold weather data for the generating units.

Extreme Cold Weather Temperature

Q91: If the Extreme Cold Weather Temperature 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 Generator Cold Weather Critical Component or freeze protection measures?
A: Yes, in accordance with EOP-012-2 R4, "Each Generator Owner will have evidence documenting that its cold weather preparedness plan(s) was implemented and maintained in accordance with Requirement R4." Entities should state they have no Generator Cold Weather Critical Components or freeze protection measures and provide whatever assessment that was performed that determined that conclusion.

Q92: Can an entity use the R1 Extreme Cold Weather Temperature to satisfy EOP-011-4 R1.2.2?
A: Calculation of the Extreme Cold Weather Temperature may support the engineering analysis but may not capture the concurrent wind speed and precipitation as required. A Generator Owner would have to demonstrate how the calculation was derived.

Q93: We calculated Extreme Cold Weather Temperature for our site's last year, based on an anticipated release of EOP-012-2. Is that acceptable to start the five-year clock or does the calculation need to be performed after the Effective Date of EOP-012-2?
A: Calculation of the Extreme Cold Weather Temperature occurring last year based on the anticipated release of EOP-012-2 is an acceptable start point for the five-calendar year clock.

Q94: 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?
A: According to the EOP-012-2 Technical Rationale: "If reliable data is not available at a single weather station back to January 1, 2000, the Generator Owner should document the methodology they use to determine their Extreme Cold Weather Temperature, such as appending data from multiple weather stations or selecting a complete data set from a weather station further away from the facility. Please reference the Calculating Extreme Cold Weather Temperature document drafted by the Standard Drafting Team for more information on how to calculate the Extreme Cold Weather Temperature."

Q95: Prior to 10/1/2024, will Generator Owners need to run another calculation of Extreme Cold Weather Temperature to account for the latest winter season data (Dec 2023 – Feb 2024) if they have already calculated the Extreme Cold Weather Temperature for Level 3 NERC alert last year (based on data up through Dec 2022 – Feb 2023)?
A: No. The Extreme Cold Weather Temperature that was calculated for the Level 3 NERC alert last year may be used as the initial Extreme Cold Weather Temperature per R1 Part 1.1.

Q96: For the Extreme Cold Weather Temperature calculation, does the generator have to be operating at full load or above Minimum Dispatchable?

A: Extreme Cold Weather Temperature calculation is independent of the generating unit running or not.

Q97: Do the regions expect that the Extreme Cold Weather Temperature calculation will have data for every hour to be a valid calculation of Extreme Cold Weather Temperature?
A: Hourly is specified in the definition of Extreme Cold Weather Temperature so yes it must be hourly data, but the concept of "best available information" factors in here. The Standard Drafting Team recognized there may be instances for some locations where hourly data is not available the whole way back to Jan 1, 2000. The entity should use the best available information and show due diligence in trying to obtain hourly data. Good engineering principles for calculations that can involve missing data points should be utilized.

Q98: Do not agree with using two stations for Extreme Cold Weather Temperature calculation. We have stations that are 50 miles away and 3000 ft different elevations that provide inaccurate information.
A: Each entity should calculate Extreme Cold Weather Temperature in accordance with EOP-012-2 R1 and have evidence showing how it was derived. See preceding answer regarding the Standard Drafting Team's Technical Rationale.

Q99: For EOP-012-2 R3 and R6, if the calculated Extreme Cold Weather Temperature for generating units is above 32 degrees F, are these requirements not applicable to those generating units?
A: EOP-012-2 Requirements 3 and 6 do not apply to generating units with a calculated Extreme Cold Weather Temperature above 32 degrees Fahrenheit (zero degrees Celsius)

Q100: For the Extreme Cold Weather Temperature re-calculation, what is the data range that should be used for the re-calculation?
A: The date range should be 1/1/2000 through the date of the recalculation.

Q101: Do sites with Extreme Cold Weather Temperature above 32 degrees still need a cold weather preparedness plan?
A: Yes, regardless of Extreme Cold Weather Temperature, in accordance with EOP-012-2 R4, "Each Generator Owner will have evidence documenting that its cold weather preparedness plan(s) was implemented and maintained in accordance with Requirement R4."

Q102: If a wind turbine has a design temperature that is below its Extreme Cold Weather Temperature, do they need to identify the blades as a Generator Cold Weather Critical Component?
A: Yes, if the blades meet the Generator Cold Weather Critical Component definition.

Q103: In the event of Extreme Cold Weather Temperature being lower than the design temperature of the generator, it is expected of the Generator Owner to develop a Corrective Action Plan. For new generation that is still in construction, if it is determined that the Corrective Action Plan has to be drafted and implemented, when will the clock start for corrective action(s) under R7? Since compliance date for new generation starts from COD, will the clock start from the COD, or will it start from the time the Corrective Action Plan was developed?
A: Currently, the Corrective Action Plan timeline would initiate at the time of commercial operation date.

EOP-012-2 Requirements 2 and 3

Q104: GOs will have to maintain a breakdown for sites that are in operation prior to 10/1/2027 -vs- those that will be in operation on 10/1/2027 and beyond. The reason being that sites that are operational prior to 10/1/2027 will not have taken into consideration the 20mph in their design and construction. A) Is that correct? B) What documentation should be saved as compliance evidence to show "maximum operational duration" for renewables? C) Please provide more guidance on how to evaluate capability of generating unit to operate at Extreme Cold Weather Temperature with sustained 20mph wind for renewable resources?

A: A) Yes, tracking site specific information will be critical in applying the actions required within the Standard. B) Documentation will vary depending upon the technology, but tests or operational data (and supporting documentation) will be examples of evidence that may show "maximum operational duration." C) The ERO Enterprise cannot speak to how an entity will evaluate the capability of their generating units. The ERO Enterprise suggests possibly discussing with trade groups that share common issues such as the American Wind Energy Association or North American Generator Forum.

Q105: Can you give more detail for EOP-012-2 R2 for how we should determine the maximum operational duration for intermittent energy resources if less than 12 hours?

A: "Maximum operational duration for intermittent energy resources" is the longest amount of time the intermittent energy resource is expected to operate between 32 degrees Fahrenheit (zero degrees Celsius) and the Extreme Cold Weather Temperature (generators applicable to R2 have an Extreme Cold Weather Temperature below 32 degrees Fahrenheit).

Q106: Per EOP-012-2 R3 for units with COD prior to Oct 1, 2027, how should "capability to operate at the unit's Extreme Cold Weather Temperature" be applied with no time period given now? How do we prove this in audit? Would it primarily be based on design?

A: Documentation will vary depending upon the technology, but tests or operational data (and supporting documentation) are possible examples of evidence that may show operational capability down to at least the Extreme Cold Weather Temperature. Another possible example would be to accurately identify Generator Cold Weather Critical Components and implement appropriate freeze protection measures such that the unit is ensured to operate down to at least the Extreme Cold Weather Temperature.

Q107: With regards to compliance with R3 of EOP-012-2, can it be demonstrated by documenting that historical operating temperatures are below the Extreme Cold Weather Temperature and that current freeze protection mechanisms have been identified and properly maintained on critical components?

A: Yes, this is a reasonable approach.

Q108: If we have units already in service what is the difference between R3 and R4 & R6 combined as they seem to be the same?

A: R3 is about implementing freeze protection measures or providing a Corrective Action Plan to add new or modify existing freeze protection measures to operate at the Extreme Cold Weather Temperature for Generator Cold Weather Critical Components on units in commercial operation prior to October 1, 2027. R4 is about implementing and maintaining a cold weather preparedness plan inclusive of Extreme Cold Weather Temperature, cold weather data, documentation identifying the Generator Cold Weather Critical

Component, freeze protection measures for those (including caveats for wind/precipitation as well as annual inspection and maintenance of Generator Cold Weather Critical Component freeze protection measures.) In short, R4 is about documenting a variety of data requirements (including implementation of freeze protection measures on Generator Cold Weather Critical Components), while R3 is about implementing the freeze protection measure or creating a Corrective Action Plan. R6 is designed around the Generator Cold Weather Reliability Event actions for generators with an Extreme Cold Weather Temperature at or below 32 degrees Fahrenheit.