NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Recommendation to Industry

Cold Weather Preparations for Extreme Weather Events – II

Initial Distribution: September 12, 2022

Several extreme winter weather[1] events have occurred over the past few years, causing major interruptions to resources, transmission paths and ultimately, end-use customers. In light of these events, as well as the February 2021 Texas cold weather event, the recently expedited Federal Energy Regulatory Commission (FERC) approval of the Cold Weather Reliability Standard, and the 2021 Cold Weather Preparations for Extreme Weather Events alert, it is necessary to understand how entities are taking steps to mitigate this risk. The Cold Weather Reliability Standard becomes enforceable on April 1, 2023. In the interim, this second Cold Weather Preparations for Extreme Weather Events Alert is being issued to further understand how Reliability Coordinators (RCs), Balancing Authorities (BAs), Transmission Operators (TOPs), and Generator Owners (GOs) plan for and progress toward mitigating risk for the upcoming winter and beyond.

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Status:	**Acknowledgement Required by Midnight Eastern on September 19, 2022** **Reporting Required by Midnight Eastern on October 6, 2022**
	**PUBLIC:** No Restrictions More on handling >>
Instructions:	This Level 2 NERC alert provides specific recommended actions that NERC registered entities should consider in response to a particular issue. Pursuant to Rule 810 of NERC's Rules of Procedure,[2] NERC registered entities shall (1) acknowledge receipt of this advisory within the NERC Alert System, and (2) report to NERC on the status of their activities in relation to this recommendation (as provided below). For United States entities, NERC will aggregate the responses and provide an anonymized report to FERC. This Level 2 NERC alert is not the same as a Reliability Standard and it does not create a mandatory obligation to take the recommended actions. Your organization will not be subject to penalties for failure to implement the recommendations. Issuance of this recommendation, however, does not alter the requirements of any approved Reliability Standard nor excuse the failure to follow the practices discussed in the recommendation if such failure

[1] Extreme Winter Weather is using the same definition of Extreme Cold Weather as defined in the Polar Vortex Review dated September 2014; Extreme Cold Weather conditions occurred in lower latitudes than normal, resulting in temperatures 20 to 30° F below average.
[2] https://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx

	constitutes a violation of a Reliability Standard. Registered entities must continue to comply with applicable Reliability Standards.
Distribution:	**Initial Distribution:** Balancing Authority, Generator Owner, Reliability Coordinator, and Transmission Operator Who else will get this alert? >>
Primary Interest Groups:	Generation Engineering, Generation Operations, System Operations – Transmission Engineering, System Operators, Transmission Planning
Recommendation:	This Recommendation to Industry, a Level 2 NERC alert, requests NERC registered entities to: • Acknowledge receipt of this advisory within the NERC Alert System. • Respond to the questions and recommendations below. • Review and complete the reporting instructions below. To the extent that Canadian jurisdictions have implemented laws or requirements that vary from Section 810 of the ROP, NERC requests that entities in such jurisdictions voluntarily participate in acknowledgement and reporting pursuant to this alert. **Recommendation #1:** RCs, BAs, and TOPs should create, or add to, seasonal operating plans for the upcoming winter season at least two months prior to their winter seasons, with special emphasis on meeting extreme winter weather energy requirements (while also considering resource limitations such as extreme winter temperatures for a prolonged period of time along with the effects that icing and snow impacts may have on equipment, etc.). Energy aspects of this plan should be informed and updated as per seasonal planning operating plans. RCs, BAs, and TOPs should train operators on these plans and communicate the specific, relevant expectations of these plans to applicable GOs within their operating area when needed. Winter seasonal operating plans should include: a. Potential energy constraints for the upcoming season. Evaluate capacity impacts throughout extreme winter weather to consider overall energy needs, in addition to peak periods. b. Identification of resource startup time and variability concerns (e.g., intermittent resources) to improve response time related to ramping capability.

c. Expected import and export capability of the system and resource availability constraints on external systems during extreme winter weather events, including events spanning multiple RC and BA areas.

d. Load forecasting practices that consider extreme winter weather.

e. Plans to use additional transmission capacity (by calculating transmission limits based on real-time system conditions).

f. Procedures/protocols for coordinating and minimizing approvals of major transmission and/or resource maintenance outages during forecasted periods of extreme winter weather events.

g. Plans to seek temporary relief from local, state, and federal environmental regulations if applicable.

h. Communication protocols and requirements with government, media, and the public (as appropriate).

i. Plans for communicating with coal, oil, and natural gas (suppliers and transporters) to assess availability (fuel survey) and to coordinate gas/electric interactions during emergencies if applicable.

j. Plans for black-start resources' availability and restoration plans' implementation in anticipation of and throughout extreme winter weather events.

During periods of extreme winter weather, RCs, BAs, and TOPs should continue real-time activities that promote a high-level of situational awareness related to regional energy supply and limitations. This includes, but is not limited to, maintaining awareness of fuel inventories and replenishment plans at critical facilities, status of dual fuel and demand response resources, and maintaining communications with neighboring areas, regulators, generating resources, and fuel suppliers. In the event emergency actions are required, attempts should be made to minimize duration and unintended consequences of more extreme actions, such as load shedding.

Recommendation #2: GOs should provide requested information to RCs, BAs, and TOPs so that RCs, BAs, and TOPs can include this information in their current seasonal operating plans to ensure they contain the generator availability, fuel supplies, and other related assumptions. Actions should be taken as appropriate based on weather forecasts, resulting capacity, and energy analyses to facilitate readiness while allowing adjustments to be made with time for GOs to make the necessary arrangements to maximize the availability of the resources, including, but not limited to, the replenishment of fuel, supplies, labor, and equipment. GOs should maintain communications with fuel suppliers and be prepared to manage resources.

GOs should communicate with RCs, BAs, and TOPs regarding generating unit(s) cold weather data ahead of upcoming winter season including, generating unit(s) operating limitations in cold weather, and generating unit(s) minimum cold weather operating temperatures, to better assess generating unit availability.

GOs with wind and solar resources should communicate with RCs, BAs, and TOPs, ahead of upcoming winter season, regarding units with cold weather packages, such as de-icing capability, to better assess generating unit availability.

Recommendation #3: GOs should communicate to their RCs, BAs, and TOPs, forecast and actual unit de-rates during extreme winter weather events and conditions considering the following factors: unavailability due to weather, fuel constraints (gas restrictions refueling limitations), de-rates for alternate fuels, and potential concerns with increased outages or delayed starts based on unit ambient ratings (including accounting for the effect of precipitation and accelerated cooling effect of wind, etc.), and historical performance.

RCs, BAs, and TOPs should incorporate the generation unit de-rate information into their generation capacity and energy analyses and operating plans. Factors to consider include unavailability due to extreme winter weather, fuel constraints (gas restrictions and refueling limitations), de-rates for alternate fuels, potential concerns with increased outages or delayed starts based on unit ambient ratings (including accounting for the effect of precipitation and accelerated cooling effect of wind, etc.), and historical performance.

Recommendation #4: Manual and Automatic Load Shedding

a. RCs, BAs, and TOPs manual and automatic load shedding plans should be reviewed with the designated load shedding entities' critical interdependent subsector electrical loads (as defined by each entity) to avoid being included as part of automatic (i.e. underfrequency) or manual load shedding. This review should be factored into seasonal preparation plans.

b. RCs, BAs, and TOPs should confirm and test manual load shedding processes and capability periodically. These processes and capabilities should be updated with the most recent load forecasts. If these load-shedding processes are called upon during real time operations, they should be monitored during execution as well as recovery.

c. RCs, BAs, and TOPs should track demand response capability and verify that critical interdependent sub-sector loads are excluded. Operating plans should also take into consideration any limitations on the duration and magnitude of demand response capabilities.

Recommendation #5: GOs with dual fuel capability should conduct dual fuel assessments to ensure resources can switch to the alternate fuel and monitor how much alternate fuel is on site as well as the estimated time to replenish alternate fuel.

Recommendation #6: GOs should assess generating unit weatherization plans, the implementation of freeze protection measures and factors that could impact availability including minimum operating temperature, and application of heat tracing equipment and wind breaks. GOs should inspect and maintain their weatherization measures ahead of the upcoming winter season, before the onset of, and during extreme winter weather conditions.

Recommendation #7: TOPs should assess, and encourage their Transmission Owners (TOs) and Distribution Providers (DPs) to assess, their applicable transmission and distribution facilities' weatherization plans, the implementation of freeze protection measures and factors that could impact equipment performance and availability including minimum operating temperature, and application of heating equipment and wind breaks. TOPs should request their TOs and DPs to inspect and maintain their weatherization measures ahead of the upcoming winter season, before the onset of, and during extreme winter weather conditions.

Recommendation #8: RCs, BAs, and TOPs should review their applicable emergency assistance agreements to ensure they de-risk, to the extent possible, the potential for reliability issues.

Reporting Instructions:

Initial acknowledgement of receipt is required by September 19, 2022, Midnight Eastern via the NERC Alert System. Responses to the questions below are required to be submitted via the NERC Alert System by October 6, 2022, Midnight Eastern.

A valid response in the NERC Alert System consists of the following three steps by the submitting entity:

- Acknowledgement of Alert
- Submission of Response
- Approval of Response

The NERC Alert System contains menu options for each of the above commands that are available to authorized individuals upon login. A response will not be considered valid until all three steps have been completed.

All registered entities belonging to the RC, BA, TOP, and GO functional groups are required to acknowledge receipt of this alert and respond, as applicable.

All registered entities covered by this recommendation are required to provide an approved response as defined above to the following questions:

RC Questions

1. Do your Operating Plans account for situational awareness of GO fuel (supply and transportation) and unit availability?
   A. Yes
   B. No, however, we plan to modify our plans to include
   C. No, and we have no plans to modify our plans
   D. Not applicable, we are not registered as a RC
2. Do you provide training to your System Operators on extreme winter weather preparedness?
   A. Yes
   B. No, however, we plan to develop and provide such training
   C. No, and we have no plans to conduct the training
   D. Not applicable, we are not registered as a RC

BA Questions

1. Do you conduct a seasonal energy and capacity assessment for extreme winter weather scenarios at least two months prior to the winter season?
   A. Yes
   B. No, however we plan to conduct such an assessment
   C. No, and we have no plans to conduct such an assessment
   D. Not applicable, we are not registered as a BA or another registered entity is responsible for performing this function according to a Coordinated Functional Registration (CFR), Joint Registration Organization (JRO), or other agreement
2. Do you analyze electric import and export capability for widespread, extreme, multi-day winter weather events, and determine under what

conditions emergency transfer capability can be used to increase imports into the deficient area ahead of the winter season or ahead of pending extreme winter weather events, taking into account Balancing Authority Areas and RCs' extreme winter weather capabilities and the ability to provide aid during extreme winter weather?

A. Yes, we have performed this analysis

B. No, however, we plan to perform this analysis

C. No, and we have no plans to perform this analysis

D. Not applicable, we are not registered as a BA or another registered entity is responsible for performing this function according to a CFR, JOR. or other agreement

3. Do you provide training to your System Operators on extreme winter weather preparedness?

A. Yes

B. No, however, we plan to develop and provide such training

C. No, and we have no plans to conduct the training

D. Not applicable, we are not registered as a BA or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

4. Do you require GOPs and GOs to inform BA operating personnel of the capabilities and limitations of Generators for extreme winter conditions such that BA operators can include this information in their system analysis when extreme winter conditions are occurring or expected which includes the following, as applicable:

   - Generator availability and de-rates
   - Fuel supply and inventory concerns
   - Fuel switching capabilities
   - Environmental constraints

A. Yes, we require GOs and GOPs to provide the applicable extreme winter condition capability and limitation information for their generators

B. No, we do not require all but do require some extreme winter condition capability and limitation information from GOs and GOPs

C. No, we do not currently require extreme winter condition capability and limitation information from GOs and GOPs but we plan to for the upcoming winter

D. No, we do not require extreme winter condition capability and limitation information from GOs and GOPs and we will not require this information prior to the upcoming winter.

E. Not applicable, we are not registered as a BA or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

TOP Questions

1. Do you analyze electric import capability for widespread extreme multi-day winter weather events, and determine ahead of the winter season or ahead of pending extreme winter weather events under what conditions emergency transfer capability can be used to increase imports into the deficient area, taking into account the following factors:
   - For stability-based import limits, use real-time tools to determine import limits
   - Understand neighboring Balancing Authority Areas and RCs' extreme winter weather capabilities and the ability to provide aid during extreme winter weather
   - Evaluate/consider the use of ambient temperature adjusted limits on all transmission facilities where the conductor rating is the limitation

   A. Yes

   B. No, however, we plan to perform this analysis

   C. We have performed, or plan to perform, a partial analysis – taking into account some or all of these factors, and/or including some, or all of, the assets in our system

   D. No, and we have no plans to perform this analysis

   E. Not applicable, we are not registered as a TOP or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

2. Do you conduct transmission system winter season assessments for both planned and unplanned transmission and generation outages and transfer capabilities during those outages that could limit transfer capability and/or resource availability?

   A. Yes

   B. No, however, we plan to conduct such an assessment

C. We have performed, or plan to perform, a partial assessment – taking into account some or all of these factors, and/or including some or all of the assets in our system

D. No, and we have no plans to conduct such an assessment

E. Not applicable, we are not registered as a TOP or another registered entity is responsible for performing this function according to a CFR, JOR. or other agreement

3. Do you account for pre-winter maintenance of transmission facilities' capability of performing during extreme winter weather conditions? Note: most cold weather breaker trips relate to low air in the breaker, low sulfur hexa-fluoride (SF6) gas pressure, failed or inadequate heaters, bad contacts, or gas leaks.

   A. Yes

   B. No

   C. Not applicable, we are not registered as a TOP or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

4. Do you perform operator training of firm load shed and operations scenarios, to train system operators to administer rotating load shed, avoid cascading outages and system collapse?

   A. Yes, we have conducted operator training on load shedding and restoration scenarios

   B. No, however, we intend to conduct operator training on load shedding and restoration scenarios prior to winter

   C. No

   D. Not applicable, we are not registered as a TOP or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

5. Do you perform operator training of firm load shed scenarios to protect critical natural gas infrastructure customers?

   A. Yes, we have conducted operator training on load shed scenarios for protecting critical natural gas infrastructure customers

   B. No, however, we intend to conduct operator training on load shed scenarios for protecting critical natural gas infrastructure customers

   C. No

D. Not applicable, we are not registered as a TOP or another registered entity is responsible for performing this function according to a CFR, JOR, or other agreement

6. Which of the following choices best describes how many miles of transmission you operate?

   A. 0 – 5000

   B. 5001 – 10,000

   C. 10,001 – 20,000

   D. 20,001 – 50,000

   E. 50,001 – 100,000

   F. Over 100,000

   G. Not applicable, we are not registered as a TOP

GO Questions

1. Do you have one or more cold winter weather preparedness plan(s) for your generating units?

   A. Yes

   B. No, however, we intend to develop cold winter weather preparedness plan(s)

   C. No

   D. Not applicable, we are not registered as a GO

   1a. If your answer to (1) was A or B, does/will it include generating unit(s) freeze protection measures based on geographical location and plant configuration?

      A. Yes

      B. No

      C. Not applicable, we are not registered as a GO, or our answer to (1) was not A or B

   1b. If your answer to (1) was A or B, does/will it include annual inspection and maintenance of generating unit(s) freeze protection measures?

      A. Yes

      B. No

      C. Not applicable, we are not registered as a GO, or our answer to (1) was not A or B

2. Do your generating unit(s)' operating limitations during extreme winter weather account for:

   2a. Capability and availability

   A. Yes

   B. No, we do not account for all of our units capability and availability but we do for some of our units

   C. No

   D. Not applicable, we are not registered as a GO

   2b. Fuel supply and inventory concerns

   A. Yes

   B. No, we do not review fuel supply and inventory concerns for all of our units but we do for some of our units

   C. No

   D. Not applicable, we are not registered as a GO, or we do not own any fossil-fired units

   2c. Communication with fuel providers (suppliers and transporters)

   A. Yes

   B. No, we do not communicate with all of our fuel providers but we do communicate with some

   C. No

   D. Not applicable, we are not registered as a GO, or we do not own any fossil-fired units

   2d. Fuel switching capabilities

   A. Yes

   B. No

   C. Not applicable, we are not registered as a GO, or we do not own any fossil-fired units or units capable of fuel-switching

   2e. Environmental constraints, including a process to obtain an emissions waiver in the event one is needed

   A. Yes

   B. No

   C. Not applicable, we are not registered as a GO, or we do not own any fossil-fired units

3. Does your winter weather preparedness plan include inspection of heat tracing components, thermal insulation, and wind breaks prior forecasted extreme winter weather?
   A. Yes
   B. No, however we plan to include these points
   C. No
   D. Not applicable, we are not registered as a GO, or our answer to (1) was not (A) or (B)
4. Do you provide a cold weather cut-out temperature (as referenced in Standard EOP-12-01[3]) to your RCs, BAs, and TOPs that has been validated by the default factory setting?
   A. Yes
   B. No, however we plan to include these points
   C. No
   D. Not applicable, we are not registered as a GO, or our answer to (1) was not (A) or (B), or we do not have the default factory setting
5. Do you provide training to appropriate BES generating unit personnel on extreme winter weather preparedness?
   A. Yes
   B. No, however, we plan to develop and provide such training
   C. No, and we have no plans to conduct the training
   D. Not applicable, we are not registered as a GO
6. If you own any fossil-fired units, have you coordinated with fuel providers to evaluate your capability to support ramping rates and durations?
   A. Yes
   B. No, however, we plan to coordinate with them
   C. We will coordinate, or plan to coordinate, for some of the assets we own but not all of them
   D. No, and we have no plans to coordinate with them
   E. Not applicable, we are not registered as a GO, or we do not own any fossil-fired units
7. If you own solar-powered units, have you reviewed the unit weatherization and availability for the following factors:

[3] https://www.nerc.com/pa/Stand/Project202107ExtremeColdWeatherDL/2021-07%20Second%20Ballot_EOP-012-1_082022_updated.pdf

- De-icing capability
- Low ambient temperature constraints
- Actions for snow cover
- Unit maintenance schedule
- Evaluate increasing likelihood of forced outages and de-rates under extreme conditions

A. Yes, we include all of these factors

B. Yes, we include some of these factors

C. No, however, we plan to survey these factors

D. No, and we have no plans to survey these factors

E. We have collected, or plan to collect, this information for some of the assets that we own but not all of them

F. Not applicable, we are not registered as a GO, or we do not own any solar facilities

8. If you own wind-powered units, are the units equipped with cold weather packages?

   A. Yes

   B. No, however, we plan to equip our units with cold weather packages

   C. Some of our units are equipped with cold weather packages but not all of them

   D. No, and we have no plans to equip our units with cold weather packages

   E. Not applicable, we are not registered as a GO, or we do not own any wind facilities

9. For solar farms, wind farms, or large battery installations having large liquid-cooled inverters – Do you have a freeze-prevention method(s) (anti-freeze additives, heaters, etc., for extreme low temperatures) for the liquid cooling loops?

   A. Yes

   B. No, however, we plan to develop a method

   D. No, and we have no plans to develop a method

   E. Not applicable, we are not registered as a GO, or we do not own any solar farms, wind farms, or large battery installations

10. If you own solar-powered units, do you have an extreme winter weather mitigation plan that includes at a minimum the following factors:

- Escalation of site inspection and monitoring
- Provision for keeping staff on site or near by
- Employment of ice-shedding maneuvers, if applicable
- Maintaining lube oil temperatures, if applicable

A. Yes

B. No, however, we plan to develop one

C. No, our mitigation plan does not include all of the factors but we do include some of the factors

D. No, and we have no plans to develop one

E. Not applicable, we are not registered as a GO, or we do not own any solar facilities

11. If you own wind-powered units, do you have a procedure for mitigating blade icing?

    A. Yes

    B. No, however, we plan to develop such a plan

    C. No, and we have no plans to develop a plan

    D. Not applicable, we are not registered as a GO, or we do not own any wind facilities

12. If you own coal-powered units, which of the following best describes the winter maximum output capacity of the coal-powered units that you own, and will be capable of operating in extreme winter weather conditions? If the capacity is partially owned, include only the capacity owned by your entity. If your entity is registered in multiple regions, provide region-specific answers.

    A. 0 – 500 MW

    B. 501 – 1000 MW

    C. 1001 – 2500 MW

    D. 2501 – 5000 MW

    E. 5001 – 7500 MW

    F. Over 7500 MW

    G. Not applicable, our entity is not registered as a GO, or we do not own any coal facilities

13. If you own gas or oil-powered units, which of the following best describes the winter maximum output capacity of the gas or oil-powered units that you own, and will be capable of operating in extreme winter weather

conditions? If the capacity is partially owned, include only the capacity owned by your entity. If your entity is registered in multiple regions, provide region-specific answers.

A. 0 – 500 MW
B. 501 – 1000 MW
C. 1001 – 2500 MW
D. 2501 – 5000 MW
E. 5001 – 7500 MW
F. Over 7500 MW
G. Not applicable, we are not registered as a GO, or we do not own any gas or oil facilities

14. If you own solar-powered units, which of the following best describes the winter maximum output capacity of the solar-powered units that you own, and will be capable of operating in extreme winter weather conditions? If the capacity is partially owned, include only the capacity owned by your entity. If your entity is registered in multiple regions, provide region-specific answers.

    A. 0 – 500 MW
    B. 501 – 1000 MW
    C. 1001 – 2500 MW
    D. 2501 – 5000 MW
    E. 5001 – 7500 MW
    F. Over 7500 MW
    G. Not applicable, we are not registered as a GO, or we do not own any solar-powered facilities

15. If you own wind-powered units, which of the following best describes the winter maximum output capacity of the wind-powered units that you own, and will be capable of operating in extreme winter weather conditions? If the capacity is partially owned, include only the capacity owned by your entity. If your entity is registered in multiple regions, provide region-specific answers.

    A. 0 – 500 MW
    B. 501 – 1000 MW
    C. 1001 – 2500 MW
    D. 2501 – 5000 MW
    E. 5001 – 7500 MW

F. Over 7500 MW

G. Not applicable, we are not registered as a GO, or we do not own any wind-powered facilities

16. Which of the following best describes how much total winter capacity you own that will not be available during extreme winter weather conditions?

A. 0 – 500 MW

B. 501 – 1000 MW

C. 1001 – 2500 MW

D. 2501 – 5000 MW

E. 5001 – 7500 MW

F. Over 7500 MW

G. Not applicable, we are not registered as a GO

Additional Information:

The resource mix is undergoing significant changes. The system is becoming more reliant on variable resources and natural gas. Extreme winter weather events have stressed supply of traditional fuels and the dependability of new resources. Preparation of resources for operation during extreme winter weather and situational awareness in both planning and operations by applicable registered entities is necessary for optimal reliability. The following links provide additional information and best practices:

- Reliability Guideline: Generating Unit Winter Weather Readiness
- Reliability Guideline: Gas and Electrical Operational Coordination Considerations
- Polar Vortex Review – September 2014
- Event Analysis Cold Weather Training Materials
- EOP-012-01 Extreme Cold Weather Preparedness and Operations

Contact:	For clarification or content-related questions, contact: Darrel Richardson darrel.richardson@nerc.net For login/account/registration issues, contact: Bulk Power System Awareness Group North American Electric Reliability Corporation 3353 Peachtree Road NE Suite 600 – North Tower Atlanta, GA 30326 nerc.alert@nerc.net
Alert ID:	R-2022-09-12-01

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