

Essential Actions to Industry

Cold Weather Preparations for Extreme Weather Events III

Initial Distribution: May 15, 2023

NERC is issuing this Level 3 Alert: Essential Actions for Cold Weather Preparations for Extreme Weather Events to increase the Reliability Coordinators' (RC), Balancing Authorities' (BA), Transmission Operators' (TOP), and Generator Owners' (GO) readiness and enhance plans for, and progress toward, mitigating risk for the upcoming winter and beyond.

As the November 2021 FERC/NERC Joint Inquiry Report¹ into the Causes of the February 2021 Cold Weather Event (Winter Storm Uri) found, the bulk power system (BPS) cannot operate reliably unless generators and System Operators are prepared for cold weather. When cold weather events such as Winter Storm Uri occur, System Operators may need to shed firm customer load to prevent uncontrolled load shedding and cascading outages which may not only result in major disruption but also have very real human consequences.

Several extreme winter weather events have occurred in recent years, causing major interruptions to resources, transmission paths, and ultimately, end-use customers including:

- (i) The January 17, 2018² South Central United States Cold Weather Event;**
- (ii) The February 2021 cold weather event affecting Texas and the South-Central United States³; and**
- (iii) The December 2022 cold weather event Winter Storm Elliott⁴, that impacted parts of the Eastern Interconnection, where several RCs declared Emergency Energy Alerts (EEA3) and implemented firm load shed to help mitigate the loss of generation due to forced outages, higher than expected load and forecasting errors.**

NERC developed the Cold Weather Reliability Standards, EOP-011-2, TOP-003-5, and IRO-010-4, which became effective on April 1, 2023. NERC also issued the following alerts:

¹ Winter Storm Uri: <https://www.ferc.gov/news-events/news/final-report-february-2021-freeze-underscores-winterization-recommendations>

² *The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018* (nerc.com)

³ *Overview of Winter Storm Elliott December 23, Maximum Generation Event* (misoenergy.org)

⁴ *Item-0x---Winter-Storm-Elliott-Overview* (pjm.com)

- (i) ***2021 Cold Weather Preparations for Extreme Weather Events alert on August 18, 2021; and***
- (ii) ***2022 Cold Weather Preparations for Extreme Weather Events II alert issued on September 12, 2022.***

In addition, the Federal Energy Regulatory Commission (FERC) recently approved the revised and new Cold Weather Reliability Standards, EOP-011-3 and EOP-012-1.^{5,6}

Additional information can be found at:

- [Project 2021-07 Extreme Cold Weather Grid Operations, Preparedness, and Coordination](#)

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Status:

**Acknowledgement Required by Midnight Eastern on May 22, 2023
Reporting Required by Midnight Eastern on October 6, 2023**



PUBLIC: No Restrictions

[More on handling >>](#)

Instructions:

Essential Actions are specific actions that NERC has determined to be essential for certain segments of owners, operators, or users of the BPS to undertake to ensure the Reliable Operation of the BPS. Pursuant to Rule 810 of NERC’s Rules of Procedure (ROP),⁷ NERC registered entities shall (1) acknowledge receipt of these Essential Actions within the NERC Alert System, and (2) report to NERC on the status of their activities in relation to these Essential Actions (as provided below). For entities in the United States, NERC will aggregate the responses and provide an anonymized report to FERC.

This Level 3 NERC alert is not the same as a Reliability Standard. Your organization will not be subject to penalties under Section 215 of the Federal Power Act for failure to implement the Essential Actions. Further issuance of these Essential Actions does not alter the requirements of any approved Reliability Standard, nor would it excuse the failure to follow the practices discussed in these Essential Actions if such failure constitutes a violation of a Reliability Standard. Registered entities must continue to comply with applicable Reliability Standards.

⁵ [Petition Of The North American Electric Reliability Corporation For Approval Of Proposed Reliability Standards EOP-011-3 And EOP-012-1 And Request For Expedited Action](#)

⁶ [Order Approving Extreme Cold weather Reliability Standards](#)

⁷ [NERC Rules of Procedure](#)

Distribution: **Initial Distribution:** Balancing Authority (BA), Generator Owner (GO), Transmission Operator (TOP)

[Who else will get this alert? >>](#)

Primary Interest Groups:

Generation Engineering, Generation Operations, System Operations – Transmission Engineering, System Operators, Transmission Planning

Essential Actions:

Identifies actions deemed to be essential to BPS reliability and requires NERC Board of Trustees' approval prior to issuance. Like Recommendations, Essential Actions also require recipients to respond as defined in this alert.

These Essential Actions to Industry, which is a Level 3 NERC alert, do the following:

- Requires Registered Entities to acknowledge receipt of these Essential Actions within the NERC Alert System;
- Requires Registered Entities to respond to the questions; and
- Urges Registered Entities to take the Essential Actions 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 acknowledgment and reporting pursuant to this alert.

For Essential Actions #3 and #4 which are applicable to GOs, they may exempt the following Bulk Electric System (BES) generating units:

- BES generating units that do not:
 - Operate in December – February (e.g., summer peaking units); or
 - Experience freezing conditions as determined by calculating the Extreme Cold Weather Temperature (ECWT) for the location

Essential Action #1: Each GO should calculate⁸ the ECWT for each plant location. ECWT⁹ is defined as 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. This number should be included in the cold weather preparedness plan prepared pursuant to EOP-011-2 Requirement R7.¹⁰

⁸ [Calculating Extreme Cold Weather Temperature](#) (nerc.com)

⁹ [Extreme Cold Weather Preparedness: Technical Rationale and Justification for EOP-012-1](#) (nerc.com)

¹⁰ This will be required in future versions of EOP-012

Essential Action #2: Each GO should, pursuant to EOP-011-2 Requirement R7, identify in the cold weather preparedness plan, the Generator Cold Weather Critical Component(s),¹¹ and freeze protection measures implemented on those components prior to the 2023-2024 winter season.

Generator Cold Weather Critical Component¹² is defined as any generating unit component or associated fixed fuel supply component, that is under the GO's control, and is susceptible to freezing issues, the occurrence of which would likely lead to a Generator Cold Weather Reliability Event.

Generator Cold Weather Reliability Event is defined as one of the following events for which the apparent cause(s) is due to the freezing of equipment within the GO's control and the dry bulb temperature at the time of the event was at or above the ECWT: (1) a forced derate of more than 10% of the total capacity of the unit and exceeding 20 MWs for longer than four hours in duration; (2) a start-up failure where the unit fails to synchronize within a specified start-up time; or (3) a Forced Outage.

Essential Action #3: Each GO should identify which units are capable of operating at the ECWT as currently built and which units require additional freeze protection measures to operate at that temperature. For units that require additional freeze protection measures, GOs should determine which can be implemented prior to the 2023–2024 winter season and implement such measures.

Essential Action #4: Each GO should identify which units experienced a Generator Cold Weather Reliability Event in the 2022–2023 winter season and:

- Identify the cause(s);
- Determine applicability to similar equipment at other generating units;
- Determine corrective actions that can be implemented prior to the 2023–2024 winter season and implement such actions; and
- Identify any temporary operating limitations or impacts to the cold weather preparedness plan.

Essential Action #5: Per EOP-011-3, each TOP should update their Operating Plan(s) to include:

- Provisions to minimize the overlap of circuits that are designated for manual load shed and circuits that serve designated critical loads;

¹¹ This will be required in future versions of EOP-012

¹² [Extreme Cold Weather Preparedness: Technical Rationale and Justification for EOP-012-1](#) (nerc.com)

- 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 shed (UVLS);
- Provisions for limiting the utilization of UFLS or UVLS circuits for manual load shed to situations where warranted by system conditions; and
- Provisions for manual load shedding capable of being implemented in a timeframe adequate for mitigating the emergency.

These plans should be provided to the RC for review.

Essential Action #6: Per EOP-011, each BA should update their Operating Plan(s) prior to the next winter season, to include:

- Provisions for TOPs to implement operator-controlled manual load shed in accordance with Requirement R1 Part 1.2.5; and
- Managing generating resources in its BA Area to address:
 - Capability and availability;
 - Fuel supply and inventory concerns;
 - Fuel switching capabilities; and
 - Environmental constraints.

These plans should be provided to the RC for review.

Essential Action #7: Per Essential Actions #1 and #2, each GO should provide its RC, BA, and TOP the ECWT for its location prior to the next winter season and whether Generator Cold Weather Critical Component freeze protection measures will not be implemented on components prior to the 2023–2024 winter season.

Essential Action #8: Per the questions below on net winter capacity¹³ Megawatts (MW), each GO should share their responses with their respective BAs and TOPs to allow for updates to any operating plans before the 2023–2024 winter season.

¹³ [Glossary - U.S. Energy Information Administration \(EIA\)](#)

Reporting Instructions:

Initial acknowledgment of receipt is required by May 22, 2023, 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, 2023, Midnight Eastern.

To ensure a valid response in the NERC Alert System the submitting entity must:

- Acknowledge the Alert
- Submit a Response
- Approve the Response Being Submitted

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 BA, TOP, and GO functional groups are required to acknowledge receipt of this alert and respond, as applicable.

All registered entities covered by this Essential Action are required to provide an approved response as defined above to the following questions. Additionally, GO entities must complete and submit the provided Data Submission Worksheet. Use the “Add Additional Document” link on the NERC Alert System response web page to submit the completed worksheet(s).

GO Questions

NOTE: *In all questions requesting “MWs”, the MW capacity shall be defined as the **net winter capacity MW**, NOT nameplate or any other measure.*

*The MWs requested are only for the GO entity on behalf of which the response is being submitted. If your company is organized into multiple separate GOs, **do not provide total answers for the entire company** – ONLY provide answers for the MW owned by the registered entity.*

Please ensure that the answers to the multiple choice questions are consistent with the answers in your Data Submission Worksheet. Both items – the answers to the questions below, and the completed Data Submission Worksheet, are required to complete the alert response for GO entities.

- 1) How many total net winter capacity MWs does your entity own? (Answer the MWs owned ONLY for the GO Entity for which you are responding. If your organization has multiple registrations, each answer should be only

for the MWs owned by that entity, **NOT the total MWs owned by the organization**)

- A. 0 MW
- B. 1 – 100 MW
- C. 101 – 500 MW
- D. 501 – 1500 MW
- E. 1501 – 5000 MW
- F. Over 5000 MW
- G. Not applicable, we are not registered as a GO

2) In the free text box below, write the number of net winter capacity MWs your GO entity owns as a number, without any abbreviations or units (For example, if the GO owns four 235MW units, type '940'). **This number should be consistent with your answer to Question 1.** If your entity is registered in multiple regions, provide region-specific answers. If you are not a GO, type "NA".

3) Have you calculated, or expect to calculate prior to the 2023–2024 winter season, an ECWT (as described in Essential Action 1) for some or all of your units?

- A. Yes, we have calculated, or expect to calculate, an ECWT for all of our units
- B. Yes, we have calculated, or expect to calculate, an ECWT for some, but not all of our units
- C. No, we have not performed this calculation and have no plans to perform this calculation
- D. Not applicable, we are not registered as a GO or we have not calculated an ECWT

4) What percentage of your net winter capacity MWs are capable of operating at the ECWT at their location?

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%

- F. 41 – 50%
 - G. 51 – 60%
 - H. 61 – 70%
 - I. 71 – 80%
 - J. 81 – 90%
 - K. 91 – 100%
 - L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them
- 5) What percentage of your net winter capacity MWs are assessed as having an ECWT above 32 °F?
- A. 0%
 - B. 1 – 10%
 - C. 11 – 20%
 - D. 21 – 30%
 - E. 31 – 40%
 - F. 41 – 50%
 - G. 51 – 60%
 - H. 61 – 70%
 - I. 71 – 80%
 - J. 81 – 90%
 - K. 91 – 100%
 - L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them
- 6) What percentage of your net winter capacity MWs are assessed as having an ECWT between 31°F and 20 °F?
- A. 0%
 - B. 1 – 10%
 - C. 11 – 20%
 - D. 21 – 30%

- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

7) What percentage of your net winter capacity MWs are assessed as having an ECWT between 19°F and 10 °F?

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

8) What percentage of your net winter capacity MWs are assessed as having an ECWT between 9°F and 0 °F?

- A. 0%
- B. 1 – 10%
- C. 11 – 20%

- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

9) What percentage of your net winter capacity MWs are assessed as having an ECWT between -1°F and -10 °F?

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

10) What percentage of your net winter capacity MWs are assessed as having an ECWT between -11°F and -20 °F?

- A. 0%
- B. 1 – 10%

- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

11) What percentage of your net winter capacity MWs are assessed as having an ECWT below -20 °F?

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or we have not calculated an ECWT, or we have calculated the temperature for some of our units but not all of them

12) For what percentage of your net winter capacity MWs have you identified as the Generator Cold Weather Critical Components as described in Essential Action #2?

- A. 0%

- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO

13) Did any of your units experience a Generator Cold Weather Reliability Event(s) in the 2022–2023 winter season as described in Essential Action #4?

- A. Yes
- B. No
- C. Not applicable, we are not registered as a GO

14) If your answer to Question 13 was “Yes,” please describe in the text box the cause or causes of the event(s). If your answer to Question 13 was not “Yes,” type “NA”

15) If your answer to Question 13 was “Yes,” what percentage of your net winter capacity MWs do you consider to be at risk of being impacted by the same cause(s) for the upcoming 2023–2024 winter season? (due to a known limitation or issue not mitigated by that time)

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%

- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or our answer to Question 13 was not “Yes”

16) If your answer to Question 13 was “Yes,” what percentage of your net winter capacity MWs do you consider to be at risk of being impacted by the same cause(s) for the 2024–2025 winter season? (due to a known limitation or issue not mitigated by that time)

- A. 0%
- B. 1 – 10%
- C. 11 – 20%
- D. 21 – 30%
- E. 31 – 40%
- F. 41 – 50%
- G. 51 – 60%
- H. 61 – 70%
- I. 71 – 80%
- J. 81 – 90%
- K. 91 – 100%
- L. Not applicable, we are not registered as a GO, or our answer to Question 13 was not “Yes”

TOP Question

17) Have you updated, or expect to update prior to the 2023–2024 winter season, your Operating Plans as described in Essential Action #5?

- 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 Coordinated Functional Registration (CFR), Joint Registration Organization (JRO), or other agreement

BA Question

- 18) Have you updated, or expect to update prior to the 2023–2024 winter season, your Operating Plans as described in Essential Action #6?
- A. Yes
 - B. No
 - C. 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

All Entities

- 19) Did you voluntarily complete any of the Essential Actions listed above for **Winter 2022–2023**?
- A. Yes, for all Essential Actions
 - B. Yes, but not for all Essential Actions
 - C. No
 - D. Not completed yet but we plan to have them complete by the start of Winter 2023–2024
- 20) If you did not complete all or some of the Essential Actions prior to Winter 2022–2023, will you complete the outstanding Essential Actions for **Winter 2023–2024**?
- A. Yes, and we plan to complete all the outstanding Essential Actions prior to Winter 2023–2024
 - B. Yes, and we will start working on some or all of the Essential Actions prior to Winter 2023–2024 but are not likely to complete all by that time
 - C. No, and we have no plans to work on the Essential Actions prior to Winter 2023–2024

**Additional
Information:**

The resource mix is undergoing significant change at a rapid pace. The system is becoming more reliant on variable energy resources and natural gas. Extreme winter weather events have stressed the 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](#)

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