

## Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the [NERC Help Desk](#). Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Extreme Cold Weather Grid Operations, Preparedness, and Coordination		
Date Submitted:	10/6/2021 <u>(Revised 02/09/2022)</u>		
SAR Requester			
Name:	Steven Noess & Kiel Lyons <u>(Revised by the 2021-07 SAR Drafting Team)</u>		
Organization:	NERC, as members of the 2021 FERC, NERC, Regional Entity Joint Inquiry into 2021 Cold Weather Grid Operations		
Telephone:	(404) 446-9691 (404) 446-9665	Email:	Steven.Noess@nerc.net Kiel.Lyons@nerc.net
SAR Type (Check as many as apply)			
<input checked="" type="checkbox"/> New Standard	<input type="checkbox"/> Imminent Action/ Confidential Issue (SPM Section 10)	<input type="checkbox"/> Add, Modify or Retire a Glossary Term	<input checked="" type="checkbox"/> Variance development or revision
<input checked="" type="checkbox"/> Revision to Existing Standard	<input type="checkbox"/> Other (Please specify)	<input checked="" type="checkbox"/> Withdraw/retire an Existing Standard	
Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)			
<input checked="" type="checkbox"/> Regulatory Initiation	<input type="checkbox"/> NERC Standing Committee Identified	<input type="checkbox"/> Emerging Risk (Reliability Issues Steering Committee) Identified	<input type="checkbox"/> Enhanced Periodic Review Initiated
<input type="checkbox"/> Reliability Standard Development Plan	<input type="checkbox"/> Industry Stakeholder Identified		
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
<p>To enhance reliability of the BES through improved operations, preparedness, and coordination during extreme weather, as described by the Federal Energy Regulatory Commission (FERC), NERC, and Regional Entity Joint Staff Inquiry into the February 2021 <del>Cold Weather Grid Operations</del>. See <a href="https://www.ferc.gov/media/february-2021-cold-weather-grid-operations-preliminary-findings-and-recommendations-full">https://www.ferc.gov/media/february-2021-cold-weather-grid-operations-preliminary-findings-and-recommendations-full</a>. extreme cold weather event. See <a href="#">The February 2021 Cold Weather Outages in Texas and the South Central United States   FERC, NERC and Regional Entity Staff Report   Federal Energy Regulatory Commission</a> (referred to as "the Report").</p> <p>From February 8 through 20, 2021, extreme cold weather and precipitation caused large numbers of generating units to experience outages, derates or failures to start, resulting in energy and transmission emergencies (referred to as "the Event"). The total Event firm load shed was the largest controlled firm load shed event in U.S. history and was the third largest in quantity of outaged megawatts (MW) of load</p>			

### Requested information

after the August 2003 northeast blackout and the August 1996 west coast blackout. The Event was most severe from February 15 through February 18, 2021, and it contributed to power outages affecting millions of electricity customers throughout the regions of ERCOT, SPP and MISO South.

Extreme cold weather ~~is a common occurrence, and it has~~ repeatedly jeopardized the reliable operation of the bulk-power system. The February 2021 event is the fourth in the past 10 years which jeopardized bulk-power system reliability. In February 2011, an arctic cold front impacted the southwest U.S. and resulted in numerous generation outages, natural gas facility outages and emergency power grid conditions with need for firm customer load shed. In January 2014, a polar vortex affected Texas, central and eastern U.S. This 2014 event also triggered many generation outages, natural gas availability issues and resulted in emergency conditions including ~~voluntary~~ load shed. And in January 2018, an arctic high-pressure system and below average temperatures in the south-central U.S. resulted in many generation outages and ~~the need for~~ voluntary load ~~shed~~ emergency management measures.

Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):

The new or revised ~~reliability standards~~ NERC Reliability Standards are intended to address reliability-related findings from the ~~2021 joint inquiry, which in many cases are consistent with prior reports' recommendations~~ Report.

Project Scope (Define the parameters of the proposed project):

The Project Scope will address ~~nine~~ the reliability objectives in the ten recommendations from Key Recommendation 1 for new or enhanced NERC Reliability Standards proposed ~~by the Federal Energy Regulatory Commission (FERC), NERC, and Regional Entity Joint Staff Inquiry into the February 2021 Cold Weather Grid Operations. The preliminary findings and recommendations of that joint inquiry were presented at in the September 23, 2021, (FERC) Open Commission Meeting Report, which are listed below in the Detailed Description.~~

Considering the topic areas, the submitters contemplate that the Standards Committee may convene one or more standard drafting teams to address collectively the recommendations in the ~~joint inquiry report.~~

~~The drafting team(s) should also consider the final report of the joint inquiry when it is released in late 2021, as it will contain additional context and analysis that will build upon the preliminary findings and recommendations. While the inquiry team does not anticipate material changes to the Reliability Standards Recommendations or basis for them provided in the preliminary presentation, the final SAR should reflect the final recommendations in the joint inquiry report. Report.~~

## Requested information

Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification<sup>1</sup> which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (e.g., research paper) to guide development of the Standard or definition):

Technical justification and additional information, including analysis, support, and related recommendation information is found within the work of the FERC, NERC, Regional Entity Joint Staff Inquiry Report. The proposed deliverable is new or revised Reliability Standards to enhance reliability during extreme cold weather. Any proposed NERC Reliability Standards shall be cost-effective, consensus based standards to address the reliability objectives in the following recommendations from the Report.

~~The specific recommendations from the inquiry team have recommended “implementation timeframes,” which means in this context that the new and/or revised Reliability Standards that address the recommendation have been completed through the NERC Reliability Standards Development Process and are proposed (filed) for approval within the timeframes listed within the recommendations. For these recommendations, “Implementation Timeframe” means that the proposed Reliability Standards are complete and filed by November 1, 2022, for the Winter 2022/2023 timeframes and by November 1, 2023 for the Winter 2023/2024 timeframes. Each Reliability Standards recommendation below is accompanied by one of those two implementation timeframes.~~

~~There are nine recommendations each of which is Key Recommendation 1, from the inquiry team, contains ten recommendations which are designed to support the reliable operation of the bulk power system during cold weather conditions and/or stressed system conditions, with associated timeframes as described above: through revisions to NERC Reliability Standards. These recommendations each have a recommended implementation timeframe. Within the context of the Report, the term “implementation timeframes” refers to the period of time in which the new and/or revised Reliability Standards that address the recommendations have been completed through the NERC Reliability Standards Development Process and are proposed (filed) for approval with FERC.~~

~~Generator Owners are to identify and protect~~

~~For the purpose of the SAR, the recommendations will have an associated Standard Development Timeframe. The recommendations will be addressed through the Standard development process in two phases.~~

~~Phase 1 Standards Development Timeframe means that the proposed Reliability Standards have passed industry ballot by September 30, 2022, are submitted to NERC Board in October 2022 and are filed by November 1, 2022 with FERC and addresses recommendations associated with “Winter 2022/2023” from the Report. The following recommendations will be addressed during Phase 1:~~

<sup>1</sup> The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

## Requested information

1. Generator Owners that experience outages, failures to start, or derates due to freezing are to review the generating unit's outage, failure to start, or derate and develop and implement a corrective action plan (CAP) for the identified equipment, and evaluate whether the CAP applies to similar equipment for its other generating units. Based on the evaluation, the Generator Owner will either revise its cold weather preparedness plan to apply the CAP to the similar equipment, or explain in a declaration (a) why no revisions to the cold weather preparedness plan are appropriate, and (b) that no further corrective actions will be taken. The Standards Drafting Team should specify the specific timing for the CAP to be developed and implemented after the outage, derate or failure to start, but the CAP should be developed as quickly as possible, and be completed by no later than the beginning of the next winter season. (Report Key Recommendation 1d)
2. To revise EOP-011-2, R8, to require Generator Owners and Generator Operators are to conduct annual unit-specific cold weather preparedness plan training. (Report Key Recommendation 1e)
3. To require Generator Owners to retrofit existing generating units, and when building new generating units, to design them, ~~to operate to a specified ambient temperature and weather conditions (e.g., wind, freezing precipitation).~~ The specified ambient temperature and weather conditions should be based on available extreme temperature and weather data for the generating unit's location. (Report Key Recommendation 1f)
4. In minimizing the overlap of manual and automatic load shed, the load shed procedures of Transmission Operators, Transmission Owners (TOs) and Distribution Providers (DPs) should separate the circuits that will be used for manual load shed from circuits used for underfrequency load shed (UFLS)/undervoltage load shed (UVLS) or serving critical load. UFLS/UVLS circuits should only be used for manual load shed as a last resort and should start with the final stage (lowest frequency). (Report Key Recommendation 1j)

Phase 2 Standards Development Timeframe means that the proposed Reliability Standards have passed industry ballot by September 30, 2023, are submitted to NERC Board in October 2023 and are filed by November 1, 2023 with FERC and addresses recommendations associated with "Winter 2023/2024" from the Report. The following recommendations will be addressed during Phase 2:

- ~~4.5.~~ To require Generator Owners to identify cold-weather-critical components and systems for each generating unit. Cold-weather-critical components and systems are those which are susceptible to freezing or otherwise failing due to cold weather, and which could cause the unit to trip, derate, or fail to start. ~~(Implementation Timeframe before Winter 2023/2024).~~ (Report Key Recommendation 1a)
6. To require Generator Owners ~~are to design new or retrofit existing~~ identify and implement freeze protection measures for the cold-weather-critical components and systems. The Generator Owner should consider previous freeze-related issues experienced by the generating units ~~to operate to a specified ambient temperature and weather conditions (e.g., wind, freezing precipitation).~~ ~~The specified ambient temperature and~~ unit, and any corrective or mitigation

### Requested information

~~actions taken in response. At an interval of time to be determined by the Balancing Authority, the Generator Owner should analyze whether the list of identified cold-weather-conditions should be based on available extreme temperature and weather data for the generating unit's location, critical components and systems remains accurate, and whether any additional freeze protection measures are necessary. (Report Key Recommendation 1b)~~

~~2-7. To revise EOP-011-2, R7.3.2, to require Generator Owners to account for the effects of precipitation and the accelerated cooling effect of wind. (Implementation Timeframe before Winter 2023/2024), when providing temperature data. (Report Key Recommendation 1c)~~

~~3. Generator Owners and Generator Operators are to conduct annual unit specific cold weather preparedness plan training. (Implementation Timeframe before Winter 2022/2023).~~

~~4. Generator Owners that experience outages, failures to start, or derates due to freezing are to review the generating unit's outage, failure to start, or derate and develop and implement a corrective action plan for the identified equipment, and evaluate whether the plan applies to similar equipment for its other generating units. (Implementation Timeframe before Winter 2022/2023).~~

~~5-8. The Reliability Standards should be revised to provide greater specificity about the relative roles of the Generator Owners, Generator Operators and Balancing Authorities in determining the generating unit capacity that can be relied upon during "local forecasted cold weather," which is language from the revised Reliability Standard in TOP-003-5, R2.3: Each Based on its understanding of the "full reliability risks related to the contracts and other arrangements [Generator Owners/Generator Operators] have made to obtain natural gas commodity and transportation for generating units," each Generator Owner/Generator Operator should be required to provide the Balancing Authority with data on the percentage of the total generating unit's capacity that the Generator Owner/Generator Operator reasonably believes the Balancing Authority can rely upon during the "local forecasted cold weather," including reliability risks related to natural gas fuel contracts."~~

~~-Each Balancing Authority should be required to use the data provided by the Generator Owner/Generator Operator, combined with its evaluation, based on experience, to calculate the percentage of each individual total generating-unit's total capacity that it can rely upon during the "local forecasted cold weather," and share its calculation with the Reliability Coordinator.~~

~~-Each Balancing Authority should be required to use that its calculation of the percentage of total generating capacity that it can rely upon to "prepare its analysis functions and Real-time monitoring," and to "manag[e] generating resources in its Balancing Authority Area to address . . . fuel supply and inventory concerns" as part of its Capacity and Energy Emergency Operating Plans. (Report Key Recommendation 1g)~~

~~(Implementation Timeframe before Winter 2022/2023).~~

~~6. In EOP-011-2, R7.3.2, Generator Owners are to account for the effects of precipitation and accelerated cooling effect of wind when providing temperature data. (Implementation Timeframe before Winter 2022/2023).~~

## Requested information

9. To require Balancing Authorities' operating plans (for contingency reserves and to mitigate capacity and energy emergencies) to prohibit use for demand response of critical natural gas infrastructure loads. (Report Key Recommendation 1h)
10. To protect critical natural gas infrastructure loads from manual and automatic load shedding in order (to avoid adversely affecting bulk power system Bulk Electric System reliability);  
~~-To require~~ Balancing Authorities' and Transmission Operators' (TOPs) provisions for operator-controlled manual load shedding ~~are~~ to include processes for identifying and protecting critical natural gas infrastructure loads in their respective areas ~~from firm load shed. Critical natural gas infrastructure loads are natural gas production, processing and intrastate and interstate pipeline facility loads which, if de-energized, could adversely affect the provision of natural gas to bulk power system natural gas fired generation. (Implementation Timeframe before Winter 2023/2024);~~
- ~~7. To require~~ Balancing Authorities' ~~operating plans (for contingency reserves, Transmission Operators', Planning Coordinators', and Transmission Planners' respective provisions and programs for manual and automatic (e.g., underfrequency load shedding, undervoltage load shedding) load shedding to mitigate capacity and energy emergencies) are to prohibit use of~~ protect identified critical natural gas infrastructure loads ~~for demand response. (Implementation Timeframe before Winter 2022/2023).~~  
~~In minimizing the overlap of~~ from manual and automatic load shedding by manual and automatic load shed, ~~the load shed procedures of Transmission Operators, Transmission Owners (TOs) and Distribution Providers (DPs) should separate the circuits that will be used for manual load shed from circuits used for underfrequency load shed (UFLS), undervoltage load shed (UVLS) or serving critical load. UFLS/UVLS circuits should only be used for manual load shed as a last resort and for UFLS circuits, should start with the final stage (lowest frequency). (Implementation Timeframe before Winter 2023/2024).~~ entities within their footprints;  
~~-To require manual and automatic load shed entities to distribute criteria to natural gas infrastructure entities that they serve and request the natural gas infrastructure entities to identify their critical natural gas infrastructure loads; and~~  
~~-To require manual and automatic load shed entities to incorporate the identified critical natural gas infrastructure loads into their plans and procedures for protection against manual and automatic load shedding. (Report Key Recommendation 1i)~~

During the SAR process, the SAR DT discussed all recommendations. Proposed language for the Standard Drafting Team (SDT) to consider during the standard revision phase was discussed for recommendation 1f, 1g, 1i, and 1j. The SAR DT decided to leave the recommendations as stated in the Report, and allow the SDT to determine the appropriate language to address the reliability objectives in all the recommendations. Therefore, the SDT should also review comments and suggestions submitted in the SAR comment period when considering revisions.

### Requested information

Industry comments suggest the following Reliability Standards should be reviewed by the SDT and may be revised to meet the recommendations from the Report: BAL-002, EOP-004, EOP-011, FAC-001, FAC-002, FAC-008, FAC-011, FAC-014, IRO-010, MOD-025, MOD-032, PER-005, PER-006, PRC-006, PRC-010, TOP-001, TOP-002, TOP-003, and TPL-001.

Additionally, based on industry comment, if necessary and appropriate, the drafting team may develop a new standard(s) to address all or part of the recommendations and preference would be given to the FAC or EOP suite of standards.

Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):

Unknown.

Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (e.g., Dispersed Generation Resources):

The BES facilities impacted by this proposed project will all have unique characteristics including fuel type, location, design, construction, etc. These unique characteristics may need to be addressed during drafting to achieve the intended enhancements to reliability.

To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (e.g., Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):

Reliability Coordinator, Balancing Authority, Transmission Operator, Transmission Owner, Transmission Planner, Planning Coordinator, Distribution Provider, Generator Operator, and Generator Owner

Do you know of any consensus building activities<sup>2</sup> in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.

The FERC, NERC, Regional Entity Joint Staff Inquiry into the 2021 Cold Weather Grid Operations Report was publicly noticed by both FERC and NERC.

Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?

~~The proposed Reliability Standards are intended to build upon the requirements in EOP-011-2, IRO-010-4, and TOP-003-5 that were developed by Project 2019-06, and which for U.S. entities, were approved by FERC in August 2021. Additionally, several recommendations build on existing Standards related to load shedding and the development and implementation of UFLS and UVLS programs (e.g. EOP-011-2, PRC-006-5, and PRC-010-2). These Standards should be reviewed to ensure any conflicts or overlap with current requirements are mitigated.~~

~~Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.~~

The proposed Reliability Standards are intended to build (replace, supplement, etc.) upon the requirements in EOP-011-2, IRO-010-4, and TOP-003-5 that were developed by Project 2019-06, and which for U.S. entities, were approved by FERC in August 2021. Additionally, several recommendations

<sup>2</sup> Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

### Requested information

build on existing Standards related to load shedding and the development and implementation of UFLS and UVLS programs (e.g. EOP-011-2, PRC-006-5, and PRC-010-2). These Standards should be reviewed to ensure any conflicts, or overlap with current requirements, are mitigated. The Standard Drafting team should coordinate with other projects impacting the same standards which might include 2020-05, 2021-01, 2021-06, 2021-08 and 2022-02.

Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.

There have been several recommendations and guidelines that have developed over the prior noted events, but the ~~events since illustrate~~ Event illustrates that ~~they~~ NERC Reliability Standards are ~~not as widely adopted as necessary to prevent reoccurrence~~ needed.

### Reliability Principles

Does this proposed standard development project support at least one of the following Reliability Principles ([Reliability Interface Principles](#))? Please check all those that apply.

<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input checked="" type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input checked="" type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input checked="" type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input type="checkbox"/> <input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

### Market Interface Principles

Does the proposed standard development project comply with all of the following [Market Interface Principles](#)?

Enter  
(yes/no)

1. A reliability standard shall not give any market participant an unfair competitive advantage.	yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	yes

<b>Market Interface Principles</b>	
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	yes

<b>Identified Existing or Potential Regional or Interconnection Variances</b>	
Region(s)/ Interconnection	Explanation
<i>e.g.</i> , NPCC	

### For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
<input type="checkbox"/> Draft SAR reviewed by NERC Staff <input type="checkbox"/> Draft SAR presented to SC for acceptance <input type="checkbox"/> DRAFT SAR approved for posting by the SC	<input type="checkbox"/> Final SAR endorsed by the SC <input type="checkbox"/> SAR assigned a Standards Project by NERC <input type="checkbox"/> SAR denied or proposed as Guidance document

#### Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer