

## Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard is adopted by the NERC Board of Trustees (Board).

### Description of Current Draft

This is the second draft of the proposed standard posted for a 38-day formal comment period with additional ballot.

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	July 19, 2023
SAR posted for comment	August 8 – September 27, 2023
45-day formal comment period with initial ballot	March 20 – May 3, 2024

Anticipated Actions	Date
38-day formal comment period with additional ballot	July 16 – August 22, 2024
45-day formal comment period with additional ballot	September 2024
10-day final ballot	November 2024
Board adoption	December 2024

## **New or Modified Term(s) Used in NERC Reliability Standards**

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. Terms used in the proposed standard that are already defined and are not being modified can be found in the *Glossary of Terms Used in NERC Reliability Standards*. The new or revised terms listed below will be presented for approval with the proposed standard. Upon Board adoption, this section will be removed.

### **Term(s):**

**Extreme Temperature Assessment** – Documented evaluation of future Bulk Electric System performance for extreme heat and extreme cold temperature benchmark events.

## A. Introduction

1. **Title:** Transmission System Planning Performance Requirements for Extreme Temperature Events
2. **Number:** TPL-008-1  
**Purpose:** Establish Transmission system planning performance requirements to develop a Bulk Power System (BPS) that will operate reliably during extreme heat and extreme cold temperature events.
3. **Applicability:**
  - 3.1. **Functional Entities:**
    - 4.1.1. Transmission Planner
    - 4.1.2. Planning Coordinator
4. **Effective Date:** See Implementation Plan for Project 2023-07.

## B. Requirements and Measures

- R1.** Each Planning Coordinator, in conjunction with its Transmission Planner(s), shall identify each entity's individual and joint responsibilities for completing the Extreme Temperature Assessment. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*
- M1.** Each Planning Coordinator, in conjunction with its Transmission Planner(s), shall provide documentation of each entity's individual and joint responsibilities, such as meeting minutes, agreements, copies of procedures or protocols in effect between entities or between departments of a vertically integrated system, or email correspondence that identifies an agreement has been reached on individual and joint responsibilities for completing the Extreme Temperature Assessment.
- R2.** Each responsible entity, as identified in Requirement R1, shall select at least one extreme heat benchmark temperature event and at least one extreme cold benchmark temperature event, from the benchmark library, approved and maintained by the Electric Reliability Organization (ERO), for completing the Extreme Temperature Assessment. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
- M2.** Each responsible entity, as identified in Requirement R1, shall have evidence in either electronic or hard copy format of selecting at least one extreme heat benchmark event and at least one extreme cold benchmark temperature event for completing the Extreme Temperature Assessment.
- R3.** Each Planning Coordinator shall develop and implement a process for coordinating the development of benchmark planning cases, using the selected benchmark temperature events identified in Requirement R2, among adjacent impacted Planning Coordinator(s), Transmission Planner(s), and other designated study entities, within an Interconnection. This process shall include seasonal and temperature dependent adjustments for Load, generation, Transmission, and transfers to represent the selected benchmark temperature events. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*
- M3.** Each Planning Coordinator shall have dated evidence that it developed and implemented a process for coordinating the development of benchmark planning cases as specified in Requirement R3 that includes seasonal and temperature dependent adjustment for Load, generation, Transmission, and transfers to represent the selected benchmark temperature events.
- R4.** Each responsible entity, as identified in Requirement R1, shall use the coordination process developed in accordance with Requirement R3 and data consistent with that provided in accordance with the MOD-032 standard, supplemented by other sources as needed, to develop and maintain the following: *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

- 4.1.** Benchmark planning cases that include seasonal and temperature dependent adjustments for Load, generation, Transmission, and transfers to represent the System conditions of the selected benchmark temperature events as identified in Requirement R2 for one of the years in the Long-Term Transmission Planning Horizon. The rationale for the year selected for evaluation shall be available as supporting information. This establishes Category P0 as the normal System condition in Table 1.
- 4.2.** Sensitivity cases to demonstrate the impact of changes to the basic assumptions used in the benchmark planning cases. To accomplish this, the sensitivity cases shall have changes to at least one of the following conditions:
- Generation;
  - Real and reactive forecasted Load; or
  - Transfers.
- M4.** Each responsible entity shall have dated evidence in either electronic or hard copy format that it developed and maintained benchmark planning cases and sensitivity cases for completing the Extreme Temperature Assessment.
- R5.** Each responsible entity, as identified in Requirement R1, shall have criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and applicable Facility Ratings for completing the Extreme Temperature Assessment.  
*[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
- M5.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence such as electronic or hard copies of the documentation specifying the criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and applicable Facility Ratings for completing the Extreme Temperature Assessment.
- R6.** Each responsible entity, as identified in Requirement R1, shall define and document the criteria or methodology used in the Extreme Temperature Assessment analysis to identify instability, uncontrolled separation, or Cascading within an Interconnection.  
*[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
- M6.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence such as electronic or hard copy documentation of the criteria or methodology used to identify instability, uncontrolled separation, or Cascading within an Interconnection.
- R7.** Each responsible entity, as identified in Requirement R1, shall identify the planning events for each category in Table 1 that are expected to produce more severe System impacts on its portion of the Bulk Electric System. The rationale for those Contingencies selected for evaluation shall be available as supporting information.  
*[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

- M7.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence such as electronic or hard copy documentation of the planning events for each event category in Table 1 that are expected to produce more severe System impacts on its portion of the Bulk Electric System along with supporting rationale.
- R8.** Each responsible entity, as identified in Requirement R1, shall complete steady state and transient stability analyses in its Extreme Temperature Assessment at least once every five calendar years using the Contingencies identified in Requirement R7, and shall document the assumptions and results of the steady state and transient stability analyses. The Extreme Temperature Assessment shall include the following: *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
- 8.1.** Analysis of the benchmark planning cases developed in accordance with Requirement R4 Part 4.1.
- 8.2.** Analysis of the sensitivity cases developed in accordance with Requirement R4 Part 4. 2.
- M8.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence that it completed the steady state and transient stability analyses in its Extreme Temperature Assessment, such as electronic or hard copies of the analyses, meeting all the requirements in Requirement R8.
- R9.** Each responsible entity, as identified in Requirement R1, shall develop a Corrective Action Plan(s) (CAPs) when the assessment of a benchmark planning case, in accordance with Requirement R8 Part 8.1, indicates its portion of the Bulk Electric System is unable to meet performance requirements for Table 1 P0 or P1 Contingencies. For each Corrective Action Plan, the responsible entity shall: *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
- 9.1.** Make their CAP available and solicit feedback from applicable regulatory authorities or governing bodies responsible for retail electric service issues.
- 9.2.** Document the alternative(s) considered, and notify the applicable regulatory authorities or governing bodies responsible for retail electric service issues when Non-Consequential Load Loss is utilized as an element of a CAP for the Table 1 P1 Contingency.
- 9.3.** Be permitted to utilize Non-Consequential Load Loss as an interim solution, which normally is not permitted in Table 1, in situations that are beyond the control of the Planning Coordinator or Transmission Planner that prevent the implementation of a Corrective Action Plan in the required timeframe. The use of Non-Consequential Load Loss as an interim solution in this situation is permitted, provided that each responsible entity documents the situation causing the problem, alternatives evaluated, and takes actions to resolve the situation.

- 9.4.** Be allowed to have revisions to the CAP in subsequent Extreme Temperature Assessments, provided that the planned BES shall continue to meet the performance requirements of Table 1.
- M9.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence, such as electronic or hard copy documentation, of each CAP developed for its Extreme Temperature Assessment, including any revision history, when the assessment of the benchmark planning cases indicate its portion of the BES is unable to meet performance requirements for Table 1 P0 or P1 Contingencies in accordance with Requirement R9.
- R10.** Each responsible entity, as identified in Requirement R1, shall evaluate and document possible actions for the following: *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*
- 10.1.** Benchmark planning cases where possible actions are designed to mitigate the consequences and adverse impacts when the study results indicate the System could result in instability, uncontrolled separation, or Cascading for the Table 1 P2, P4, and P7 Contingencies.
- 10.2.** Sensitivity cases where possible actions are designed to mitigate failures to meet the performance requirements in Table 1 for category P0, P1, P2, P4, and P7 Contingencies.
- M10.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence such as electronic or hard copy documentation that it evaluated and documented possible actions designed to mitigate the consequences and adverse impacts when the benchmark planning case study results indicate the System could result in instability, uncontrolled separation, or Cascading for the Table 1 P2, P4, and P7 Contingencies.
- R11.** Each responsible entity, as identified in Requirement R1, shall provide its Extreme Temperature Assessment results within 60 calendar days of a request to any functional entity that has a reliability related need and submits a written request for the information. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*
- M11.** Each responsible entity, as identified in Requirement R1, shall provide dated evidence, such as email notices, documentation of updated web pages, postal receipts showing recipient; or a demonstration of a public posting that it provided its Extreme Temperature Assessment to any functional entity who has a reliability need within 60 calendar days of a written request.

## C. Compliance

### 1. Compliance Monitoring Process

**1.1. Compliance Enforcement Authority:** “Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

**1.2. Evidence Retention:** The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

The applicable entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

- Each responsible entity shall retain evidence of compliance with each requirement in this standard for five calendar years or one complete Extreme Temperature Assessment cycle, whichever is longer.

**1.3. Compliance Monitoring and Enforcement Program:** As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

Table 1.1: Contingencies Category See Footnote 2 for BES Level			
Category	Initial Condition	Event	Fault type
<b>P0</b> No Contingency	Normal System	None	N/A
<b>P1</b> Single Contingency	Normal System	Loss of one of the following: 1. Generator 2. Transmission Circuit 3. Transformer 4. Shunt Device <sup>3</sup>	3Ø
		5. Single Pole of a DC line	SLG
<b>P2</b> Single Contingency	Normal System	1. Opening of a line section w/o a Fault <sup>4</sup>	N/A
		2. Bus Section Fault	SLG
		3. Internal Breaker Fault <sup>5</sup> (non-Bus-tie Breaker)	SLG
		4. Internal Breaker Fault (Bus-tie Breaker) <sup>5</sup>	SLG
<b>P4</b> Multiple Contingency (Fault plus stuck breaker <sup>6</sup> )	Normal System	Loss of multiple Elements caused by a stuck breaker <sup>6</sup> (non-Bus-tie Breaker) attempting to clear a Fault on one of the following: 1. Generator 2. Transmission Circuit 3. Transformer 4. Shunt Device <sup>3</sup> 5. Bus Section	SLG

Table 1.1: Contingencies Category See Footnote 2 for BES Level			
Category	Initial Condition	Event	Fault type
		6. Loss of multiple Elements caused by a stuck breaker <sup>6</sup> (Bus-tie Breaker) attempting to clear a Fault on the associated bus	
<b>P7</b> Multiple Contingency (Common Structure)	Normal System	The loss of: 1. Any two adjacent (vertically or horizontally) circuits on common structure 2. Loss of a bipolar DC line	SLG

**Table 1.2: Steady State & Stability Performance Requirements**

	P0	P1	P2	P4	P7
Steady State Performance Requirements	<ul style="list-style-type: none"> <li>Applicable Facility Ratings shall not be exceeded.</li> <li>System steady state voltages shall be within acceptable limits as defined in Requirement R5.</li> </ul>	<ul style="list-style-type: none"> <li>Applicable Facility ratings shall not be exceeded.</li> <li>System steady state voltages shall be within acceptable limits as defined in Requirement R5.</li> </ul>	Instability, uncontrolled separation, or Cascading, as defined in Requirement R6, shall not occur.		
Stability Performance Requirements	The System shall remain stable. Instability, uncontrolled separation, or Cascading, as defined in Requirement R6, shall not occur.	Instability, uncontrolled separation, or Cascading, as defined in Requirement R6, shall not occur.	Instability, uncontrolled separation, or Cascading, as defined in Requirement R6, shall not occur.		
Requirements for Benchmark Planning Case Assessment Results					
Corrective Action Plan Required	Yes (See Requirement R9)	Yes (See Requirement R9)	No (See Requirement R10)		
Non-Consequential Load Loss Allowed	No (See Requirement R9)	Yes (See Requirement R9)	Yes		
Interruption of Firm Transmission Service Allowed	Yes	Yes	Yes		
Requirements for Sensitivity Case Assessment Results					
Corrective Action Plan Required	No (See Requirement R10)	No (See Requirement R10)	No (See Requirement R10)		

**Table 1.2: Steady State & Stability Performance Requirements**

Non-Consequential Load Loss Allowed	Yes	Yes	Yes
Interruption of Firm Transmission Service Allowed	Yes	Yes	Yes

**Table 1.3 – Steady State & Stability Performance Footnotes**

1. Unless specified otherwise, simulate Normal Clearing of faults. Single line to ground (SLG) or three-phase (3 $\emptyset$ ) are the fault types that must be evaluated in Stability simulations for the event described. A 3 $\emptyset$  or a double line to ground fault study indicating the criteria are being met is sufficient evidence that a SLG condition would also meet the criteria.
2. Facility voltage level of Contingency is applicable to:
  - a. BES level 200 kV and above (referenced Contingency voltage)
  - b. For P7 events include Contingencies that have at least one 200kV voltage and above Facilities on common structure that has more than one mile in length.
  - c. For non-generator step up transformer outage events, the reference voltage, as used in footnote 2a, applies to the low-side winding (excluding tertiary windings). For generator and Generator Step Up transformer outage events, the reference voltage applies to the BES connected voltage (high-side of the Generator Step Up transformer). Requirements which are applicable to transformers also apply to variable frequency transformers and phase shifting transformers.
3. Requirements which are applicable to shunt devices also apply to FACTS devices that are connected to ground.
4. Opening one end of a line section without a fault on a normally networked Transmission circuit such that the line is possibly serving Load radial from a single source point.
5. An internal breaker fault means a breaker failing internally, thus creating a System fault which must be cleared by protection on both sides of the breaker.
6. A stuck breaker means that for a gang-operated breaker, all three phases of the breaker have remained closed. For an independent pole operated (IPO) or an independent pole tripping (IPT) breaker, only one pole is assumed to remain closed. A stuck breaker results in Delayed Fault Clearing.

## Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1.</b>	N/A	N/A	N/A	The Planning Coordinator, in conjunction with its Transmission Planner(s), failed to determine and identify individual and joint responsibilities for completing the Extreme Temperature Assessment.
<b>R2.</b>	N/A	N/A	The responsible entity did not select at least one extreme heat benchmark event or extreme cold benchmark temperature event from the ERO approved benchmark library for performing the Extreme Temperature Assessment.	The responsible entity did not select an extreme heat benchmark event and extreme cold benchmark temperature event from the ERO approved benchmark library for performing the Extreme Temperature Assessment.
<b>R3.</b>	N/A	N/A	N/A	The Planning Coordinator did not develop or implement a process for coordinating the development of benchmark planning cases among impacted adjacent Planning Coordinator(s), Transmission Planner(s), and other designated study entities,

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>within the same Interconnection.</p> <p>OR</p> <p>The Planning Coordinator developed and implemented a process for coordinating the development of benchmark planning cases among impacted adjacent Planning Coordinator(s), Transmission Planner(s), and other designated study entities within the same Interconnection, but this process did not modify the benchmark planning cases to include seasonal and temperature dependent adjustments load, generation, Transmission, and transfers.</p>
<b>R4.</b>	N/A	N/A	N/A	<p>The responsible entity did not develop or maintain benchmark planning cases or sensitivity cases for performing the Extreme Temperature Assessment.</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				OR The responsible entity developed and maintained benchmark planning cases or sensitivity cases for performing the Extreme Temperature Assessment but did not use data consistent with that provided in accordance with the MOD-032 standard.
<b>R5.</b>	N/A	N/A	N/A	The responsible entity, as determined in Requirement R1, did not have criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and applicable Facility Ratings for performing Extreme Temperature Assessment.
<b>R6.</b>	N/A	N/A	N/A	The responsible entity failed to define and document, the criteria or methodology used in the analysis to identify System instability, uncontrolled separation, or

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Cascading within an Interconnection.
<b>R7.</b>	N/A	N/A	The responsible entity, as determined in Requirement R1, identified Contingencies for performing Extreme Temperature Assessment for each of the planning events in Table 1 that are expected to produce more severe System impacts within its planning area, but did not include the rationale for those Contingencies selected for evaluation as supporting documentation.	The responsible entity, as determined in Requirement R1, did not identify Contingencies for performing Extreme Temperature Assessment for each of the planning events in Table 1 that are expected to produce more severe System impacts within its planning area.
<b>R8.</b>	The responsible entity, as determined in Requirement R1, completed an Extreme Temperature Assessment, but it was performed less than or equal to six months late.	The responsible entity, as determined in Requirement R1, completed an Extreme Temperature Assessment, but it was performed more than six months but less than or equal to 12 months late.	The responsible entity, as determined in Requirement R1, completed an Extreme Temperature Assessment, but it was performed more than 12 months but less than or equal to 18 months late.	The responsible entity, as determined in Requirement R1, performed an Extreme Temperature Assessment, but it was more than 18 months late.  OR The responsible entity, as determined in Requirement R1, did not perform an

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>Extreme Temperature Assessment.</p> <p>OR</p> <p>The responsible entity, as determined in Requirement R1, performed an Extreme Temperature Assessment, but it was missing one or more of the required elements in Requirement R8.</p>
<b>R9.</b>	N/A	N/A	<p>The responsible entity, as determined in Requirement R1, developed a Corrective Action Plan meeting each of the elements in Requirement R9, but failed to make their Corrective Action Plan available to, or solicit feedback from, applicable regulatory authorities or governing bodies responsible for retail electric service issues.</p>	<p>The responsible entity, as determined in Requirement R1, failed to develop a Corrective Action Plan meeting each of the elements of Requirement R9 when the benchmark planning case study results indicate the System is unable to meet performance requirements for the Table 1 P0 or P1 Contingencies.</p>
<b>R10.</b>	N/A	N/A	N/A	<p>Each responsible entity, as determined in Requirement R1, failed to evaluate and</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				document possible actions, mitigate the consequences, and adverse impacts when the benchmark planning case study results indicate the System could result in instability, uncontrolled separation, or Cascading for the Table 1 P2, P4, and P7 Contingencies.
<b>R11.</b>	The responsible entity, as determined in Requirement R1, distributed its Extreme Temperature Assessment results to functional entities having a reliability related need who requested the information in writing, but it was more than 60 days but less than or equal to 80 days following the request.	The responsible entity, as determined in Requirement R1, distributed its Extreme Temperature Assessment results to functional entities having a reliability related need who requested the information in writing, but it was more than 80 days but less than or equal to 100 days following the request.	The responsible entity, as determined in Requirement R1, distributed its Extreme Temperature Assessment results to functional entities having a reliability related need who requested the information in writing, but it was more than 100 days but less than or equal to 120 days following the request.	The responsible entity, as determined in Requirement R1, distributed its Extreme Temperature Assessment results to functional entities having a reliability related need who requested the information in writing, but it was more than 120 days following the request.  OR  The responsible entity, as determined in Requirement R1, did not distribute its Extreme Temperature Assessment results to functional entities having a reliability related need who

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				requested the information in writing.

### D. Regional Variances

None.

### E. Associated Documents

- Implementation Plan for 2023-07
- Technical Rationale Document
- Consideration of Issues and Directives for FERC Order 896.

## Version History

Version	Date	Action	Change Tracking
1	TBD	Addressing FERC Order 896	New Standard