

EASTERN INTERCONNECTION REGIONAL ENTITY AGREEMENT

THIS Eastern Interconnection Regional Entity Agreement (Agreement), is effective July 21, 2023, and is entered into by and among all of the Eastern Interconnection Regional Entities (REs) (individually a Party and collectively Parties):

- **Midwest Reliability Organization, Inc. (MRO)**, a non-profit corporation registered in the State of Delaware;
- **Northeast Power Coordinating Council, Inc. (NPCC)**, a non-profit corporation registered in the State of New York;
- **ReliabilityFirst Corporation (RF)**, a non-profit corporation registered in the State of Delaware; and
- **SERC Reliability Corporation (SERC)**, a non-profit corporation registered in the State of North Carolina.

WHEREAS, this Agreement addresses the Eastern Interconnection REs ongoing work to perform reliability assessments of the Eastern Interconnection to identify potential reliability issues and risks supplemented by the review of appropriate reliability assessments prepared by Eastern Interconnection Reliability Coordinators and Planning Coordinators;

WHEREAS, this Agreement allows the Eastern Interconnection REs to fulfill their obligations under the ERO Enterprise Designation process document (ERO Enterprise Designation attached as Exhibit A and incorporated herein) with the North American Electric Reliability Corporation (NERC);

NOW, THEREFORE, the Eastern Interconnection REs, as the sole members of the Eastern Interconnection Reliability Assessment Group (ERAG), agree to act collectively and collaboratively as follows:

1. DEFINITIONS

Except as otherwise defined herein, capitalized terms shall have meanings ascribed to them in the enabling Electric Reliability Organization legislation, 16 U.S.C. §824o-1 and the NERC Rules of Procedure. Hereafter, all references to REs, Planning Coordinators, and Reliability Coordinators only include those entities that are located in the Eastern Interconnection and the Québec Interconnection.

2. SCOPE OF ERAG'S WORK

The scope of the ERAG's work includes the following:

2.1 Review of periodic reliability assessments and development of its own assessments to identify key reliability issues and the risks and uncertainties affecting adequacy and security of the Bulk Power System (BPS) in the Eastern Interconnection and the Québec Interconnection. To that end, the Members of the ERAG jointly and collectively will:

- conduct workshops and coordinate interconnection-wide studies as needed, that comprehensively assess reliability in the Eastern Interconnection or applicable subareas of the Eastern Interconnection;
- review the Planning Coordinators' methods and assumptions used to

appraise the performance of the system and establish expectations and requirements for the assessments prepared by the Planning Coordinators in the Joint Area; and

- participate in the review of reliability assessments prepared by Reliability Coordinators and Planning Coordinators in the Joint Area, including evaluation of case selection, special and/or emerging issue studies, contingency selection and results and other studies as necessary.

- 2.2 Oversight of the Multiregional Modeling Working Group (MMWG), which is comprised of: (1) Planning Coordinators or group of Planning Coordinators representatives who are responsible for the development of or changes to power flow and dynamic models, interchange assumptions, model representation and error checking, and (2) RE and NERC staff who are responsible for coordination and facilitation. Oversight includes review of all process changes made to the MMWG procedures to ensure consistency with the requirements in the ERO Enterprise Designation process document.
- 2.3 Oversight of the Acceptable Model Working Group (AMWG), which is comprised of: (1) Planning Coordinators or group of Planning Coordinators who are responsible for the development and maintenance of the NERC acceptable model list, and (2) RE and NERC staff who are responsible for coordination and facilitation. Oversight includes review of all process changes made to the AMWG procedures to ensure consistency with the NERC case quality metrics.
- 2.4 Establishment of processes with assurance that roles and work of RE and NERC staff is separate from the roles of Planning Coordinator representatives.
- 2.5 Support of the creation of Eastern Interconnection-wide powerflow and dynamics cases and the modeling cases included in Exhibit A and ensuring that all of the Planning Coordinator models are included and that the processes adhere to the requirements included in Exhibit A.
- 2.6 Performance of any other duties assigned collectively by the Presidents and Chief Executive Officers (CEO) of the REs.

3. ERAG GOVERNANCE

3.1 Designation of ERAG Members

Each RE President and CEO or a designee shall appoint two RE staff employees to be a “Member” of ERAG. Each RE may change either or both of its appointed Members by providing written notice to the Members of ERAG and notification to the RE Presidents and CEOs.

3.2 Designation of ERAG's Chair and Vice Chair

The ERAG Chair and Vice Chair positions will be rotated among the REs on a two-year term.

3.3 ERAG's General Authority

The ERAG has the authority to complete the work outlined herein and as defined in Exhibit A and to establish any subgroups necessary to complete the work. All work shall be done in conformance with any applicable NERC Rules of Procedure, including those provisions governing confidentiality of information. The ERAG will establish guidelines, policies, procedures, or a work plan to govern ERAG's work.

3.4 Meetings and Notice

ERAG meetings shall be held at such times and places as determined by the Chair considering the availability of the ERAG Members. Notice of ERAG meetings shall be e-mailed to each Member at least 14 business days in advance of the meeting.

3.5 Quorum and Manner of Voting

Each RE shall have one vote, which can be exercised by either of the RE's two Members. If both Members from an RE cast a vote, the most recent vote will be counted. A quorum shall consist of three fourths of the REs represented and three quarters of the REs present must vote in the affirmative to pass any ERAG action.

3.6 Attendance by Electronic Means

Any ERAG Member may participate in any ERAG meeting by telephone, or other electronic means that enables all persons participating in the meeting to communicate with each other. A Member participating in a meeting by such means shall be deemed present at such meeting.

3.7 Action without Meeting

Any action that may be taken at an ERAG meeting may be taken without a meeting if such action is agreed to unanimously via email or other electronic means.

4. ERAG LEADERSHIP

4.1 Responsibilities of Chair and Vice Chair

The Chair shall preside at all ERAG meetings and shall be responsible for the preparation of all meeting agendas. The Chair will provide periodic reports and updates to the Presidents and CEOs of the REs and seek input on ERAG activities.

The Vice Chair shall, in the Chair's absence, perform the Chair's duties.

The Vice Chair shall be responsible for providing proper notice of meetings, timely distribution of the agendas for the meetings, and recording minutes of the meetings.

The Chair and the Vice Chair will perform any other work assigned by the Presidents and CEOs of the REs.

5. SERVICE PROVIDER

- 5.1 RF will maintain all official ERAG documents and provide administrative and accounting services to the ERAG, unless a majority of the RE Presidents and CEOs agree to change how services are provided to ERAG. RF will also act as the Single Point of Contact (SPOC) to distribute MMWG base cases to third-party requestors.

6. FINANCIAL

6.1 Fiscal Year

The ERAG's fiscal year is the calendar year.

6.2 Cost Sharing and Expenses

The ERAG's administration and operational costs shall be divided in accordance with the pro-rata Net Energy for Load (NEL) calculation below.

$$\text{RE A Pro-Rata NEL} = \text{RE A NEL} \text{ divided by the Total Eastern Interconnection NEL}$$

Each RE shall bear all travel expense costs incurred by its employees participating in the ERAG.

7. CHANGE IN DESIGNEE STATUS

The REs acknowledge that certain work under this Agreement described in Section 2, above will terminate at such time as NERC determines that the REs acting through the ERAG are no longer the interconnection-wide, base-case model creator Designee, as determined or revised in NERC Reliability Standard MOD-032. The REs also acknowledge that the ERAG's assessment work will continue and that the Eastern Interconnection Events Analysis Model Building work may be appropriate to continue. Should NERC determine that the REs acting through ERAG are no longer the Designee, the Parties will review this Agreement and will work collectively and collaboratively to make any appropriate changes to it or enter into a new agreement as needed.

8. TERMINATION

A majority of the Parties to this Agreement can vote to terminate this Agreement for which the termination will be effective 30 days from the vote to terminate. A Party may withdraw from this Agreement by providing 30 days written notice to the other Parties, but such withdrawal shall not relieve the Party from obligations it has under any other agreements. The withdrawing Party shall be liable for any fees or assessments incurred prior to the date the withdrawal is effective.

9. AMENDMENT OF AGREEMENT

The power to alter, amend, or repeal this Agreement shall be vested in the REs and requires the affirmative vote of a majority of all of the REs, as provided for in Section 3.5 of this Agreement.

10. INDEMNIFICATION

Neither the REs or the ERAG and its Members are responsible, directly or indirectly, for compliance with any Reliability Standard. Each ERAG individual Member shall be indemnified and held harmless for the work under this Agreement in the same manner and to the same extent as they are for the work the Member does as an employee of the RE for which he or she works.

11. APPLICABLE LAW

This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware without regard to its conflict of laws, principles, or rules.

12. COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original but all of which together shall constitute one instrument, binding upon all Parties hereto, notwithstanding that all of such Parties may not have executed the same counterpart.

13. THIRD PARTIES

This Agreement does not create and is not intended to create or imply the existence of any rights for or on behalf of any third party not a signatory hereto, and no such third party shall be entitled to enforce this Agreement against any person or entity.

14. INTEGRATION

Except for documents and instruments specifically referenced and incorporated herein, this Agreement constitutes the entire agreement between the Parties with respect to the work identified to be performed herein, and supersedes the August 30, 2016 agreement,

titled EASTERN INTERCONNECTION REGIONAL ENTITY ASSESSMENTS AND MODEL BUILDING AGREEMENT, and its incorporated and accompanying documents.

IN WITNESS WHEREOF, each of the Parties has executed this Agreement as of the date indicated next to the signature.

DATE: July 21, 2023

MIDWEST RELIABILITY ORGANIZATION,
INC.

By: 

Name: Sara E. Patrick

Title: President and CEO

DATE: July 21, 2023

NORTHEAST POWER COORDINATING
COUNCIL, INC.

By: 

Name: Charles Dickerson

Title: President and CEO

DATE: July 21, 2023

RELIABILITYFIRST CORPORATION

By: 

Name: Timothy Gallagher

Title: President and CEO

DATE: July 21, 2023

SERC RELIABILITY CORPORATION

By: 

Name: Jason Blake

Title: President & CEO

**ERO Enterprise Designation
MOD-032-1**

This Reliability Standard MOD-032-1 process document is being made pursuant to the certain Federal Energy Regulatory Commission ("FERC")-approved Regional Delegation Agreements ("RDA"), between the North American Electric Reliability Corporation ("NERC") and each of, Midwest Reliability Organization ("MRO"), Northeast Power Coordinating Council, Inc. ("NPCC"), ReliabilityFirst ("RF"), SERC Reliability Corporation ("SERC"), Texas Reliability Entity, Inc. ("Texas RE"), and the Western Electricity Coordinating Council ("WECC"), respectively (together the "Regional Entities"). The purpose of this process document is to establish the necessary procedures the Regional Entities, participating as Designated Entities as further described below and in **Attachment 1**, perform in supporting NERC's efforts to fulfill its regulatory obligations under Reliability Standard MOD-032-1 (or its successor) and associated events analysis activities. Together, NERC, as the Electric Reliability Organization ("ERO") and the six Regional Entities are referred to as the ERO Enterprise.

Reliability Standard MOD-032-1, requires NERC to establish consistent modeling data requirements and reporting procedures necessary to develop planning horizon cases necessary to support NERC's analysis of the reliability, resiliency, and security of the interconnected transmission system. Requirement R4 states that, "[e]ach Planning Coordinator shall make available models for its planning area reflecting data provided to it under Requirement R2 to the [ERO] or its designee to support creation of the Interconnection-wide case(s) that includes the Planning Coordinator's planning area." NERC is designating the MOD-032-1 "Designated Entity" responsibilities to the Regional Entities to support NERC in fulfilling its obligations under Requirement R4 given their expertise in their respective geographic jurisdictions as follows:

- 1) MRO, NPCC, RF, and SERC collectively perform the Interconnection-wide, base-case model creator function for the Eastern Interconnection as the Eastern Interconnection Reliability Assessment Group ("ERAG"). The base-case model creator function for the Québec Interconnection is included in the work performed by ERAG.
- 2) Texas RE, in coordination with ERCOT, will perform the Interconnection-wide, base-case model creator function for the Texas Interconnection.
- 3) WECC will perform the Interconnection-wide, base-case model creator function for the Western Interconnection.

As the ERO, NERC is responsible for overseeing and ensuring that the Designated Entities perform the MOD-32-1 Requirement R4 activities. NERC therefore maintains its discretion and authority to determine the accuracy, completeness, and overall satisfaction of the functions outlined in **Attachment 1**. Per the process in Attachment 1, each Designated Entity shall: (i) create the interconnection-wide power flow and dynamics cases that include all of the Planning Coordinators in their respective Interconnection; (ii) be responsible for developing the required modeling cases; and (iii) coordinate with NERC to address and document variations in Interconnection modeling practices and considerations in light of Reliability Standards TPL-001, MOD-032, MOD-033, and other applicable Standards. Please note, NERC and the Designee(s) shall collaborate on how best to address any NERC request pertaining to modeling which goes beyond information obtained or created under NERC Reliability Standards, the RDAs, and NERC Rules of Procedure ("ROP"). NERC and the Regional Entities shall hold a joint periodic meeting to collaborate on modeling activities. This shall include annually assessing **Attachment 1** at the final ERO Enterprise meeting

each year to discuss lessons learned and process updates for the coming year. This process document is subject to periodic review and change. Any revisions to this process shall be presented to the Operations Leadership Team (“OLT”).

For the avoidance of doubt, the RDAs and ROP shall continue to govern all delegated activities, including managing Confidential Information pursuant to Section 1500 of the ROP. The relevant regulatory structure and governing documents in each Canadian Province shall continue to govern the activities in those respective jurisdictions. This Process Document does not modify the rights and obligations of NERC and the Regional Entities as otherwise outlined in the RDA and ROP or other governing documents.

Attachment 1 on the Following Page.

Attachment 1:

Designated Entity Functions and Attributes

This Attachment 1 outlines the requirements for each Designated Entity as referenced in the accompanying process document. Any capitalized terms not defined in this Attachment 1 shall have the same meaning ascribed to them in the process document.

The Designated Entities assigned by NERC as ERO under Reliability Standard MOD-032-1 Requirement R4 to support the creation of Interconnection-wide planning cases shall have the following attributes:

- A governance structure responsive to the needs of the Planning Coordinators for its Interconnection, Regional Entities, and NERC.
 - Clear definition of roles and responsibilities related to the creation of the models
 - Transparency regarding the development of data requirements, sampling, testing, data correction, and feedback to applicable stakeholders
 - Establish timeframes that allow for the review cycle
 - Define security and access related to models
- In coordination with the Planning Coordinators of the Interconnection, Regional Entities, and NERC, annually create and make available a specific set of powerflow and dynamics cases that include, but are not limited to, the cases identified below.

Core Cases¹ for the ERO:

- Upcoming² winter peak-load case – for seasonal planning studies (interregional) and event analyses, and as external models of outside world for operational planning studies.
- Upcoming summer peak-load case – for seasonal planning studies (interregional) and event analyses, and as external models of outside world for operational planning studies.
- Upcoming year low Inertia / low load case – for use in validation of Interconnection Frequency Response Obligations and event analyses.

Typical Cases³ to Support Standard TPL-001-5.1 – Transmission System Planning Performance Requirements:

TPL 001-5.1 calls for the following cases to be available. Each Designated Entity, in collaboration with its constituent Planning Coordinators, may add additional cases as desired and choose which cases to build where latitude is given in the Standard. Since current case building practices and schedules vary among the Interconnections, a separate guidance document will be provided by NERC on case creation timing, as applicable.

¹ Needed base cases for analyzing system events and testing frequency response obligations.

² Upcoming could be interpreted as Year 1

³ ERO guidance for key years cited in Standard TPL-001-5.1, subject to enforcement July 1, 2023.

- Planning cases:
 - Planning case for year 1 or 2 system peak steady-state analysis⁴
 - Planning case for year 5 system peak steady-state analysis⁵
 - Planning case for near-term (1-5 years) system off-peak steady-state analysis⁶
 - Planning case for near-term (1-5 years) system peak stability analysis⁷
 - Planning case for near-term (1-5 years) system off-peak stability analysis⁸
 - Planning case for Long-term Transmission Planning Horizon system peak steady-state analysis⁹
 - Planning case for Long-term Transmission Planning Horizon system peak stability analysis¹⁰

Other cases and processes:

- Designated Entities shall have a process with appropriate controls consistent with Section 1500 of the ROP for identifying and vetting of qualified users of the powerflow and dynamics cases of the Interconnection. NERC, Regional Entities, Planning Coordinators, Reliability Coordinators, Transmission Operators, and Transmission Planners, within the Interconnection are pre-vetted users of the cases.
- Existing powerflow and dynamics cases shall be made available by the Designated Entity to NERC, the Regional Entities, Reliability Coordinators, Planning Coordinators, Transmission Operators, and Transmission Planners within the Interconnection under appropriate controls.
- NERC or Regional Entities may designate additional specialized cases; e.g., Year 10 off-peak load case with low inertia, high BPS-connected inverter-based resource, and representation of distributed energy resources (dynamics case, in particular). An example of special cases may include the following:
 - Year 5 low inertia/Minimum load case to produce the Frequency Measures 1, 2, and 4 of the Essential Reliability Taskforce for the NERC Long Term Reliability Assessment tracking and trending.
 - Upcoming summer short-circuit case – for use in specialized Inverter-Based Resources studies, event analysis, and designation of electromagnetic transient (EMT) zones. These would not be interconnection wide cases but collected from the PC or TO, depending on how they are currently being built.
 - Collection of EMT zones as designated by NERC, as needed

⁴ Pursuant to R2.1.1 of TPL-001-4 and TPL-001-5.1

⁵ Pursuant to R2.1.1 of TPL-001-4 and TPL-001-5.1

⁶ Pursuant to R2.1.2 of TPL-001-4 and TPL-001-5.1

⁷ Pursuant to R2.4.1 of TPL-001-4 and TPL-001-5.1

⁸ Pursuant to R2.4.2 of TPL-001-4 and TPL-001-5.1

⁹ Pursuant to R2.2.1 of TPL-001-4 and TPL-001-5.1

¹⁰ Pursuant to R2.5 of TPL-001-4 and TPL-001-5.1

- EMT cases and any special cases beyond those listed will be requested by NERC or other Regional Entities with at least 60 days advanced written notice, provided that should a Designated Entity require additional time the relevant ERO Enterprise parties shall collaborate to determine the appropriate timeline.
- Designated Entities, in conjunction with the Reliability Coordinators, Balancing Authorities, Transmission Operators, Planning Coordinators, Regional Entities, and the ERO, shall develop a process for creating powerflow and dynamics cases for analysis of system events upon request of NERC or the Regional Entities.
 - These cases will be requested in accordance with the tenets of section 804, 807, and 808 of the NERC ROP. These cases are a distinctly separate effort from the annual case creation process, requiring additional manpower and time commitments. Such cases will typically only involve the entities in and surrounding the impacted area unless there are Interconnection-wide impacts (i.e., as inter-area oscillations).
- Designated Entities shall develop a process to ensure that all Planning Coordinators in their Interconnection and all system elements defined in the Planning Coordinator's modeling procedures¹¹ be included in the data collection process through a common method (e.g. MMWG case creation process) of collecting data and model(s).
- Designated Entities shall develop¹² and maintain a case creation manual for the Interconnection, including the process by which the designated cases must be assembled, tested for quality (e.g., MOD-033 or its successor), and tested for case fidelity (ERO Metric I¹³). NERC will conduct an annual case quality assessment compared to the criteria in this Attachment. The Designee shall have a process to address any case quality deficiencies identified by NERC. The Designated Entity shall collaborate with NERC to address any case and/or process deficiencies.
- Designated Entities shall develop a feedback process to incorporate improvements identified in NERC's independent modeling assessments on Interconnection-wide base cases. Any identified issues must be addressed by the Designated Entity in coordination with the asset/model owners.
- Designated Entities shall develop a feedback process including the Planning Coordinators of the Interconnection and their constituent equipment owners and operators to prevent recurring data or models problems found during case creation or quality and validation testing. The Designated Entity shall work with the Planning Coordinator on any recurring data or model errors in a timely manner.
- Designated Entities shall develop and maintain a list of acceptable dynamics models¹⁴ for representing equipment in the base cases. The list shall be made available to all entities submitting models and shall be updated regularly to reflect changing industry practices. NERC may provide input such as the use of preferred models or may establish additional modeling requirements that shall be implemented by the Designated Entities. The Designated Entity will phase out models NERC has determined "unacceptable" in a timely manner.

¹¹ Pursuant to R1 of MOD-032

¹² The designee can either develop or adopt an existing regional or multi-regional process manual.

¹³ https://www.nerc.com/pa/RAPA/ModelAssessment/ModAssessments/2022_Case_Quality_Metrics_Assessment-FINAL.pdf

¹⁴ These lists will be maintained in a timely manner in collaboration with similar lists in the region(s).

- Designated Entities shall have a change-control process for dynamics models and/or parameters requiring appropriate documentation, with a subject matter expert peer group¹⁵ to screen proposed changes.
- Designated Entities shall have a process for correcting cases for current or future years, created in the latest case creation cycle, that are already in use. The process shall include:
 - Coordination with the involved Planning Coordinator(s) and equipment owner(s) to resolve and correct problems found.
 - Timely posting of modifications made to cases to correct problems.
 - A method to notify case recipients of problems and solutions to known case recipients.

¹⁵ Regional or Interconnection-wide.