March 11, 2014

VIA ELECTRONIC FILING

Veronique Dubois
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Re: *North American Electric Reliability Corporation*

Dear Ms. Dubois:

The North American Electric Reliability Corporation ("NERC") hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standards MOD-032-1 and MOD-003-1. NERC requests, to the extent necessary, a waiver of any applicable filing requirements with respect to this filing.

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ Holly A. Hawkins
Holly A. Hawkins
Assistant General Counsel for
North American Electric Reliability Corporation

Enclosure

BEFORE THE
RÉGIE DE L'ÉNERGIE
THE PROVINCE OF QUÉBEC

NORTH AMERICAN ELECTRIC	**)**
RELIABILITY CORPORATION	**)**

NOTICE OF FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF PROPOSED RELIABILITY STANDARDS MOD-032-1 AND MOD-033-1

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March 11, 2014

TABLE OF CONTENTS

BEFORE THE
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NORTH AMERICAN ELECTRIC	**)**
RELIABILITY CORPORATION	**)**

NOTICE OF FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF PROPOSED RELIABILITY STANDARDS MOD-032-1 AND MOD-033-1

The North American Electric Reliability Corporation ("NERC") hereby submits proposed Reliability Standards MOD-032-1 – Data for Power System Modeling and Analysis and MOD-033-1 – Steady-State and Dynamic System Model Validation. Proposed Reliability Standards MOD-032-1 and MOD-033-1 (Exhibit A) are just, reasonable, not unduly discriminatory or preferential, and in the public interest.[1] NERC also provides notice of (i) the associated Implementation Plan (Exhibit B), (ii) the associated Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs") (Exhibits A and F), and (iii) the retirement of the currently effective Reliability Standards MOD-010-0 and MOD-12-0 and the withdrawal of pending Reliability Standards MOD-011-0, MOD-013-1, MOD-014-0, and MOD-015-0.1 (collectively, the "Existing MOD B Standards"), as detailed in this filing.

This filing presents the technical basis and purpose of proposed Reliability Standards MOD-032-1 and MOD-033-1, a summary of the development history (Exhibit G) and a demonstration that the proposed Reliability Standards meet the Reliability Standards criteria

[1] Unless otherwise designated, all capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* (the "NERC Glossary"), *available at* http://www.nerc.com/files/Glossary_of_Terms.pdf

(Exhibit C). The NERC Board of Trustees approved proposed Reliability Standards MOD-032-1 and MOD-033-1 on February 6, 2014.

I. EXECUTIVE SUMMARY

Proposed Reliability Standards MOD-032-1 and MOD-033-1 are designed to replace, consolidate and improve upon the "Existing MOD B Standards" in addressing system-level modeling data and validation requirements necessary for developing planning models and the Interconnection-wide cases[2] that are integral to analyzing the reliability of the Bulk-Power System. Models are the foundation of virtually all power system studies used to assess the reliability of the Bulk-Power System. In particular, power system studies rely on models to predict system performance under various conditions. Calculation of operating limits, planning studies for assessments of new generation and load growth, and performance assessments of system integrity protection schemes are examples of studies that depend on accurate mathematical representations of transmission, generation and load. If models are too optimistic, it could result in grid under-investment, unsafe operating conditions, and power outages. In contrast, pessimistic models can result in overly conservative grid operation and under-utilization of network capacity. It is thus vital that models, including all of their data, are complete, accurate, and up to date. The purpose of the proposed Reliability Standards is to establish comprehensive modeling data requirements, reporting procedures, and validation requirements necessary to effectively model the interconnected transmission system for the Near-Term Transmission Planning Horizon and the Long-Term Transmission Planning Horizon.[3]

[2] "Interconnection-wide case" refers to a compilation of model information that represents an entire Interconnection.

[3] As defined in the NERC Glossary, the Near-Term Transmission Planning Horizon is the "transmission planning period that covers Year One through five." The Long-Term Transmission Planning Horizon is defined as the "Transmission planning period that covers years six through ten or beyond when required to accommodate any known longer lead time projects that may take longer than ten years to complete."

Proposed Reliability Standards MOD-032-1 and MOD-033-1 were developed to address: (i) directives from Federal Energy Regulatory Commission ("FERC") Order Nos. 890[4] and 693[5] to modify the Existing MOD B Standards; and (ii) recommendations from a white paper drafted by the NERC Planning Committee's System Analysis and Modeling Subcommittee (the "SAMS Whitepaper") proposing improvements to the Existing MOD B Standards.[6] Consistent with FERC directives and the SAMS Whitepaper, the proposed Reliability Standards improve upon the Existing MOD B Standards by: (i) clarifying data collection requirements by clearly articulating "who" provides "what" data to "whom"; (ii) expanding the coverage of the Existing MOD B Standards beyond steady-state and dynamics modeling data to include short circuit modeling data; (iii) providing a mechanism to address any technical concerns with the modeling data collected; and (iv) requiring the validation of steady-state and dynamics models against actual system responses.

As discussed below, proposed Reliability Standard MOD-032-1 consolidates the Existing MOD B Standards and requires, among other things, applicable registered entities (i.e., Balancing Authorities, Generation Owners, Load Serving Entities, Resource Planners, Transmission Owners and Transmission Service Providers) to provide steady-state, dynamics, and short circuit modeling data to their respective Planning Coordinators[7] and Transmission

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[4] *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, 72 FR 12266 (Mar. 15, 2007), FERC Stats. & Regs. ¶ 31,241 at P 290 (2007), order on reh'g, Order No. 890-A, 73 FR 2984 (Jan. 16, 2008), FERC Stats. & Regs. ¶ 31,261 (2007), order on reh'g, Order No. 890-B, 123 FERC ¶ 61,299 (2008), order on reh'g, Order No. 890-C, 126 FERC ¶ 61,228 (2009).

[5] Order No. 693 at PP 1131-1222.

[6] The white paper is available from the December 2012 NERC Planning Committee's agenda package, item 3.4, beginning on page 99, available at: http://www.nerc.com/comm/PC/Agendas%20Highlights%20and%20Minutes%20DL/2012/2012_Dec_PC%20Agenda.pdf.

[7] As provided in the NERC Glossary, a Planning Coordinator is the same functional entity as a Planning Authority. Both are defined as "[t]he responsible entity that coordinates and integrates transmission facility and service plans, resource plans, and protection systems." The Reliability Functional Model uses the phrase "Planning

Planners to support the Interconnection-wide case building process for their Interconnection. Proposed MOD-032-1 creates a framework for collecting modeling data that supports existing practices for developing planning models and Interconnection-wide cases and is also flexible enough to accommodate any changes to those practices that become necessary or preferable over time. Proposed Reliability Standard MOD-032-1 establishes the Planning Coordinator and Transmission Planner as the functional entities obligated to develop modeling data requirements and reporting procedures that applicable entities in their planning area must follow. The Planning Coordinator is also responsible for making available models for its planning area to the ERO (or its designee), who, in turn, facilitates the development of the Interconnection-wide cases.

Proposed Reliability Standard MOD-033-1 requires each Planning Coordinator to implement a documented process for performing steady-state and dynamics model validation. Implementation of validation processes in accordance with proposed Reliability Standard MOD-033-1 should result in more accurate steady-state and dynamics models for assessing the reliability of the Bulk-Power System. Specifically, the validation requirements will help promote better correlation between system flows and voltages in power flow studies and the actual values observed by system operators. Similar improvements should be expected for dynamics studies, such that the results will more closely match the actual responses of the power system to disturbances.

For the reasons discussed in this filing, the proposed Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

Coordinator" to refer to such entities while NERC's registration criteria uses the term "Planning Authority." Applicability Section 4.1.1 of the proposed Reliability Standards lists both Planning Coordinators and Planning Authorities to avoid confusion as to which registered entities are subject to the proposed Reliability Standards. As explained in Applicability Section 4.1.1, however, the requirements of the proposed Reliability Standards only use the term "Planning Coordinator."

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:

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III. BACKGROUND

A. NERC Reliability Standards Development Procedure

The proposed Reliability Standards were developed in an open and fair manner and in accordance with the Reliability Standard development process. NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC Standard Processes Manual.[8] NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus satisfies certain of the criteria for approving Reliability Standards. The development process is open to any person or entity with a legitimate interest in the reliability of the Bulk-Power System. NERC considers the comments of all stakeholders, and a vote of stakeholders and the NERC Board of Trustees is required to

[8] The NERC Rules of Procedure are available at http://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx. The NERC Standard Processes Manual is available at http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf.

approve a Reliability Standard before the Reliability Standard is submitted to the applicable governmental authorities for approval.

B. Overview of Power System Models

Bulk-Power System planning and operating decisions are based on the results of power system studies. These studies rely on power system models to predict system performance. In modeling a large power system (e.g., the Western or Eastern Interconnections in North America), there are three general categories of models that need to be developed:

1. *Transmission Systems*: This category consists of equipment needed to transmit power from generation to load, including, but not limited to, transmission lines, power transformers, and reactive power devices. The models often include equipment controls such as voltage pick-up and drop-out levels for shunt reactive devices.

2. *Generating Unit*: This category includes the entire spectrum of supply resources, such as hydro, steam, and gas generators along with rapidly emerging wind and solar power plants. There is also a need for modeling distributed generation (e.g., solar, microturbines, fuel-cells, etc.).

3. *Load*: This category consists of modeling the electrical load on the system, which ranges from simple light-bulbs to large industrial facilities.[9]

As described in the Power System Model Validation White Paper, each of the above categories (transmission systems, generators, and load) can be represented by a steady-state (a.k.a powerflow) model to evaluate how those components perform under static conditions. This component level model development is accomplished by an accurate calculation of the impedances, ratings, and other parameters that will be incorporated into the full steady-state network model. Flexible AC transmission system ("FACTS") and high-voltage dc ("HVDC") transmission system facilities have steady-state model structures that can vary with the vintage of

[9] *See Power System Model Validation, A White Paper by the NERC Model Validation Task Force of the Transmission Issues Subcommittee*, at 6 (December 2010) (the "Power System Model Validation White Paper"), available at http://www.nerc.com/comm/PC/Model%20Validation%20Working%20Group%20MVWG/MV%20White%20Paper_Final.pdf.

technology of the device being modeled and the operating mode of the device. For generation units, steady-state models represent impedance parameters, real and reactive power limits, and settings for voltage control at either the generator terminal bus or a nearby high-voltage bus. These models should use data, including the generator reactive capability, that have been validated through field tests or empirical evidence. Load is typically represented as constant real and reactive power. Constant current and constant impedance loads are also sometimes represented in steady-state models.

The individual component models are then combined into a complete system model for representing the steady-state behavior of an entire Interconnection (i.e., Interconnection-wide cases).[10] Powerflow models of transmission systems usually represent only positive sequence quantities. Steady-state network models are also used for short circuit studies. These models include negative sequence and zero sequence network data in addition to positive sequence data.

Beyond the need for analyses of the steady-state behavior of the power system, it is crucial that the dynamic behavior of the system be analyzed as well. Models that represent the dynamics of components can also be developed for the categories listed above. The dynamics models represent the behavior of power plants and their controls, certain components of loads, power electronic transmission devices (i.e., FACTS and HVDC), and, for some studies, on-load tap changers, control schemes on shunt devices, remedial action schemes, and other similar control devices. The components in the powerflow model need to be matched with their corresponding dynamics models.[11]

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[10] For some studies, remote parts of a large Interconnection sufficiently distant from the area of interest are represented using reduced-size models known as "equivalents."

[11] For additional information on power system models, see the Power System Model Validation White Paper at 6-8.

Additionally, it is important to construct short circuit models to perform system protection analyses and support analysis at the seams between neighboring regions. Short circuit models are also used in conjunction with power flow and dynamics applications, for example, to calculate unbalanced fault shunt admittance for three-phase faults in dynamics simulations.

Models are used in both operating studies for setting real-time power transfer limits and planning studies for analyzing conditions at some time – possibly many years – in the future. Because of the importance of power system models, the models, including all of their data, must be accurate and up to date. As noted above, the use of inaccurate models could result in grid under-investment, unsafe operating conditions, and ultimately widespread power outages, such as occurred in the summer of 1996 in the Western Interconnection,[12] or, conversely, overly conservative grid operation and under-utilization of network capacity. Therefore, accurate models are vital to reliable power system operation.

C. The Existing MOD B Standards

The Existing MOD B Standards are designed to address data requirements and reporting procedures for power system planning models for use in reliability analysis. In particular, they specify steady-state and dynamics data necessary to model and analyze the steady-state conditions and dynamics behavior of the power system within each Interconnection. The following is a brief description of each of the Existing MOD B Standards:

- *MOD-010-0* requires Transmission Owners, Transmission Planners, Generator Owners, and Resource Planners to provide steady-state data, such as equipment characteristics, system data, and existing and future interchange schedules to the Regional Reliability Organization, NERC, and other specified entities.

- *MOD-011-0* requires the Regional Reliability Organizations to develop comprehensive steady-state data requirements and reporting procedures needed to model and analyze the steady-state conditions for each Interconnection.

[12] *See* Power System Model Validation White Paper at 9-14.

- *MOD-012-0* requires Transmission Owners, Transmission Planners, Generator Owners, and Resource Planners to provide dynamics system modeling and simulation data, such as equipment characteristics and system data, to the Regional Reliability Organization, NERC, and other specified entities.

- *MOD-013-1* requires the Regional Reliability Organizations within an Interconnection to develop comprehensive dynamics data requirements and reporting procedures needed to model and analyze the dynamic behavior and response of each Interconnection.

- *MOD-014-0* requires the Regional Reliability Organizations within each Interconnection to coordinate and jointly develop and maintain a library of solved Interconnection-specific steady-state models.

- *MOD-015-0.1* requires the Regional Reliability Organizations within each Interconnection to coordinate and jointly develop and maintain a library of initialized (with no faults and disturbances) Interconnection-specific dynamics system models.

In Order No. 693, FERC directed NERC to modify the Existing MOD B Standards, as follows:

- Modify MOD-010-0 through MOD-013-1 to include the Planning Coordinator as an applicable entity because the Planning Coordinator is "responsible for the coordination and integration of transmission facilities and resource plans, as well as one of the entities responsible for the integrity and consistency of the data."[13]

- Modify MOD-010-0 to require the filing of all of the contingencies that are used in performing steady-state system operation and planning studies.[14]

- Modify MOD-010-0 to include Transmission Operators as an applicable entity because Transmission Operators are usually responsible for compiling the operational contingency lists for both normal and conservative operation.[15]

- Modify MOD-012-0 by adding a new requirement to provide a list of the faults and disturbances used in performing dynamics system studies for system operation and planning.[16]

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[13] *Id*. at P 1155, 1162, 1184, 1199. Order No. 693 refers to Planning Authorities rather than Planning Coordinators. As explained above, a Planning Coordinator is the same functional entity as a Planning Authority and the proposed Reliability Standards use the term Planning Coordinator instead of Planning Authority. S*ee* s*upra* at n. 13.

[14] Order No. 693 at P 1148.

[15] *Id*. at PP 1154.

[16] Order No. 693 at P 1178.

- Modify MOD-012-0 to require the Transmission Planner to provide the fault and disturbance lists.[17]

- Modify MOD-013-1 to permit entities to estimate dynamics data if they are unable to obtain unit specific data but require that the results of these dynamics models be compared with actual disturbance data to verify the accuracy of the models.[18]

- Modify MOD-014-0 and MOD-015-0.1 to (1) include a requirement that the models be validated against actual system responses,[19] and (2) require that actual system events be simulated and, if the model output is not within the accuracy required, the model shall be modified to achieve the necessary accuracy.[20]

Additionally, in Order No. 890, FERC directed public utilities, working through NERC, to modify Reliability Standards MOD-010 through MOD-025 to "incorporate a requirement for the periodic review and modification of models for (1) load flow base cases with contingency, subsystem, and monitoring files, (2) short circuit data, and (3) transient and dynamic stability simulation data, in order to ensure that they are up to date."[21] FERC stated that "[t]his means that the models should be updated and benchmarked to actual events."[22]

In addition to these directives, in November 2012, the NERC Planning Committee's System Analysis and Modeling Subcommittee issued the SAMS Whitepaper recommending several improvements to the Existing MOD B Standards, including: (1) streamlining the Existing MOD B Standards; (2) adding short circuit data; (3) clearly identifying responsibility to provide and receive data (i.e., who provides what data to whom); (4) including a provision on the acceptability of the data; (5) requiring specification and standardization of data format; (6)

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17 *Id*. at P 1183.

18 *Id*. at P 1197.

19 *Id*. at P 1210, 1220.

20 *Id*. at P 1211, 1220.

21 Order No. 890 at P 290.

22 *Id*.

drafting the standard to be flexible enough to accommodate the development of new technology; and (7) ensuring that the data is shareable.

D. History of Project 2010-03 - Modeling Data (MOD B)

In February 2013, NERC initiated an informal development process to (i) address the outstanding directives from FERC Order Nos. 890 and 693 to modify the Existing MOD B Standards, and (ii) consider the recommendations from the SAMS Whitepaper. Participants in this informal process were industry subject matter experts, NERC staff, and staff from FERC's Office of Electric Reliability. The informal group met numerous times between February 2013 and July 2013 to discuss the outstanding FERC directives, the recommendations from the SAMS Whitepaper, and, in light of their experience with the Existing MOD B Standards, ways to improve those standards. The informal group also conducted industry outreach to obtain feedback on possible improvements to the Existing MOD B Standards.

The participants in the informal development process proposed two new Reliability Standards to replace the Existing MOD B Standards: (1) a modeling data Reliability Standard that consolidates and improves upon the Existing MOD B Standards (MOD-032-1); and (2) a validation Reliability Standard to address FERC's directives to include a requirement that models be validated against actual system responses (MOD-033-1). In drafting these proposed Reliability Standards, the informal participants sought to draft results-based standards that considered the improvements recommended in the SAMS Whitepaper.

Project 2010-03 - Modeling Data (MOD B) was formally initiated on July 18, 2013 with the posting of a Standard Authorization Request along with the draft Reliability Standards developed by the informal participants for a 45-day formal comment period and ballot. Following this posting, the standard drafting team of industry experts was formed, many of

whom were participants in the informal process. As described further in Exhibit G, after an additional comment and ballot period for MOD-032-1 and two additional comment and ballot periods for MOD-033-1, the proposed Reliability Standards received the requisite approval from NERC stakeholders. The proposed Reliability Standards were approved by the NERC Board of Trustees on February 6, 2014.

IV. JUSTIFICATION

As discussed in Exhibit C, the proposed Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The following section provides (1) the basis and purpose of the proposed Reliability Standards; (2) a description of the requirements in each of the proposed Reliability Standards; (3) a discussion of how the proposed Reliability Standards satisfy the outstanding FERC directives associated with the Existing MOD B Standards; and (4) a discussion of the enforceability of the proposed Reliability Standards.

A. Basis and Purpose of Proposed Reliability Standards

Proposed Reliability Standards MOD-032-1 and MOD-033-1 are designed to replace, consolidate, and improve upon the "Existing MOD B Standards" in addressing modeling data and validation requirements necessary for building planning models and the Interconnection-wide cases. As discussed above, to effectively study the reliability of the Bulk-Power System, the devices, equipment, and systems that comprise the Bulk-Power System must be modeled to capture how those devices, equipment, and systems perform under both static (i.e., steady-state) and dynamic conditions. Additionally, it is important to construct short circuit models to perform system protection analyses and support analysis at the seams between neighboring regions.

The purpose of the proposed Reliability Standards is to provide a mechanism for the collection and validation of the information required to effectively model the interconnected

transmission system for both the Near-Term Transmission Planning Horizon and Long-Term Transmission Planning Horizon. The proposed Reliability Standards help ensure that power system models, including all of their data, are complete, accurate, and up to date. Collectively, proposed MOD-032-1 and MOD-033-1 improve upon the Existing MOD B Standards by: (1) clarifying and updating the data requirements and reporting procedures; (2) expanding the coverage of the Existing MOD B Standards to include short circuit data; (3) providing a mechanism for addressing technical concerns with the modeling data collected; and (4) requiring the validation of steady-state and dynamics models against actual system responses.

The following is a discussion of each of the proposed Reliability Standards and the requirements therein.

B. Requirements of the Proposed Reliability Standards

1. Proposed Reliability Standard MOD-032-1

Proposed Reliability Standard MOD-032-1, which merges the Existing MOD B Standards,[23] contains four requirements that collectively provide the framework for the collection of steady-state, dynamics, and short circuit modeling data that is necessary for building planning models and the Interconnection-wide cases. Proposed MOD-032-1 provides clear expectations for "who" provides "what" data to "whom" while also providing entities the flexibility to develop data requirements and reporting procedures that are appropriate to their specific circumstances and Interconnection. Proposed Reliability Standard MOD-032-1 creates the following framework:

- *Requirement R1* requires Planning Coordinators and Transmission Planners to jointly develop data requirements and reporting procedures for steady-state, dynamics, and short circuit modeling data for entities in their planning area.

[23] Exhibit D to this Petition is a mapping document showing the translation of the existing MOD B Standards to proposed Reliability Standard MOD-032-1.

- *Requirement R2* requires the registered entities that have the modeling data (i.e., data owners) to provide their data to their Planning Coordinator(s) and Transmission Planner(s) in accordance with the data requirements and reporting procedures developed pursuant to Requirement R1.

- *Requirement R3* provides Planning Coordinators and Transmission Planners an opportunity to coordinate with the data owners to address any technical concerns with the data provided under Requirement R2.

- Finally, *Requirement R4* obligates Planning Coordinators to make available models for its planning area reflecting the data provided to it under Requirements R2 to the ERO, or its designee, for use in creating the Interconnection-wide cases.

The following is a discussion of each requirement in proposed Reliability Standard MOD-032-1.

Requirement R1 sets forth the framework for developing the data requirements and reporting procedures necessary to support the model building process. Requirement R1 provides as follows:

> **R1.** Each Planning Coordinator and each of its Transmission Planners shall jointly develop steady-state, dynamics, and short circuit modeling data requirements and reporting procedures for the Planning Coordinator's planning area that include:
>
> **1.1** The data listed in Attachment 1;
>
> **1.2** Specifications of the following items consistent with procedures for building the Interconnection-wide case(s):
>
> **1.2.1** Data format;
>
> **1.2.2** Level of detail to which equipment shall be modeled;
>
> **1.2.3** Case types or scenarios to be modeled; and
>
> **1.2.4** A schedule for submission of data at least once every 13 calendar months.
>
> **1.3** Specifications for distribution or posting of the data requirements and reporting procedures so that they are available to those entities responsible for providing the data.

Requirement R1 consolidates the concepts from the original data requirements from Reliability Standards MOD-011-0 and MOD-013-0 but establishes Planning Coordinators and

Transmission Planners, as opposed to Regional Reliability Organizations, as the functional entities obligated to develop data requirements and reporting procedures that applicable registered entities in their planning area must follow.[24] Consistent with FERC's directives in Order No. 693, the Planning Coordinator is the appropriate entity for developing the data requirements and reporting procedures "because [it] is the entity responsible for the coordination and integration of transmission facilities and resource plans, as well as one of the entities responsible for the integrity and consistency of the data."[25] The inclusion of Transmission Planners is intended to ensure that Transmission Planners are able to participate in the development of the data requirements and reporting procedures given their role in maintaining planning models to assess reliability.[26]

Attachment 1 identifies (1) the type of steady-state, dynamics, and short circuit modeling data that must be provided to effectively model the interconnected transmission system, and (2) the functional entity responsible for providing each type of modeling data. Attachment 1 carries forward the types of steady-state and dynamics modeling data included in MOD-011-0 and MOD-013-0, respectively, covering the modeling data necessary to support the model building process for transmission systems, generating units, and load that are used to develop the Interconnection-wide cases.

Compared to the Existing MOD B Standards, however, Attachment 1 adds specificity and clarity to the modeling data requirements, consistent with the recommendations in the SAMS

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[24] By establishing Planning Coordinators and Transmission Planners, rather than Regional Reliability Organizations, as the entities responsible for developing the modeling data requirements and reporting procedures, proposed MOD-032-1 addresses FERC's concern related to the "fill-in-the-blank" nature of certain of the Existing MOD B Standards.

[25] Order No. 693 at PP 1155, 1162, 1184, 1199.

[26] NERC's Reliability Functional Model lists the "maintenance of transmission system models (steady state, dynamics, and short circuit) to evaluate Bulk Electric System performance" as a task performed by Transmission Planners. *See Reliability Functional Model* at 24.

Whitepaper.[27] Attachment 1 explicitly lists data items that are fundamental to powerflow analysis and notes which items vary with system operating states or conditions such that those items may have different data provided for different modeling scenarios. Similarly, Attachment 1 also lists fundamental data requirements of dynamics models and specifies that if a user written dynamics model is submitted in place of a generic or library model, the entity must include the characteristics of the model, including block diagrams, values, and names of all model parameters, and a list of all state variables. Attachment 1 also includes updated terminology and types of modeling data, such as modeling data on wind turbines and photovoltaic systems, which were not explicitly listed in the Existing MOD B Standards but are important for modeling purposes moving forward.

Additionally, Attachment 1 also includes short-circuit modeling data, consistent with FERC's directive from FERC Order No. 890[28] and the recommendation from the SAMS Whitepaper. As stated in the SAMS Whitepaper, because short circuit analysis is required by other Reliability Standards,[29] the Existing MOD B Standards should require that neighboring entities share a sufficient level of short-circuit data to enable the studies required by those other Reliability Standards.[30] Further, as noted above, it is important to construct short circuit models to perform system protection analyses and support analysis at the seams between neighboring regions.

Because not all essential data items can be explicitly listed, particularly in light of ongoing technological developments, Attachment 1 specifically allows the Planning Coordinator

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[27] Lack of specificity in the Existing MOD B Standards was cited in the SAMS Whitepaper as an issue, especially for dynamics models.

[28] *See* Order No. 890 at P 290.

[29] *See* FAC-002-1, Requirement R1.1.4; TPL-001-4, Requirement R2.

[30] SAMS Whitepaper at 4.

or Transmission Planner to request any additional information not explicitly listed in Attachment 1 but that is necessary for modeling purposes. As industry modeling needs may change over time due to, among other things, newly developed technology, this provision allows Planning Coordinators and Transmission Planners to request the appropriate data to match their modeling needs without having to modify Attachment 1 through NERC's standards development process. For the same reason, the modeling data requirements in Attachment 1 reflect basic equipment characteristics that are independent of the specific technology used in a particular installation.

Proposed Reliability Standard MOD-032-1 also recognizes that operational disparities exist across North America, providing Planning Coordinators and Transmission Planners the flexibility to tailor their data requirements and reporting procedures to their specific circumstances and Interconnection. Requirement R1 does not prescribe all of the technical details associated with the preparation and submittal of model data because, in large part, it is dependent upon evolving industry modeling needs. In accordance with part 1.2 of Requirement R1, Planning Coordinators and Transmission Planners may specify the data format, level of detail, and case types or scenarios that are most appropriate to their needs and circumstances, so long as they are consistent with the procedures for building the Interconnection-wide cases.[31] Similarly, Attachment 1 specifies, consistent with the recommendation in the SAMS Whitepaper,

[31] The entities that currently build the Interconnection-wide cases for each Interconnection have procedural manuals for developing the cases. The Eastern Interconnection Reliability Assessment Group ("ERAG"), a construct of the six Regional Entities in the Eastern Interconnection which builds the Eastern Interconnection cases, uses its Multiregional Modeling Working Group (MMWG) Procedural Manual, available at: https://rfirst.org/reliability/easterninterconnectionreliabilityassessmentgroup/mmwg/Pages/default.aspx. The Western Electricity Coordinating Council ("WECC"), which builds the Western Interconnection cases, uses its Data Preparation Manual for Power Flow Base Cases and Dynamic Stability Data, available at: http://www.wecc.biz/committees/StandingCommittees/PCC/TSS/SRWG/Shared%20Documents/Forms/AllItems.aspx. Finally, the Electric Reliability Council of Texas ("ERCOT"), which builds the ERCOT Interconnection cases uses the ERCOT Steady State Working Group Procedural Manual and the ERCOT Dynamics Working Group Procedural Manual, available at http://www.ercot.com/committees/board/tac/ros/sswg/ and http://www.ercot.com/committees/board/tac/ros/dwg/, respectively.

that the modeling data to be collected must be shareable on an Interconnection-wide basis so that it could be used in the Interconnection-wide cases.

Requirement R1 also does not mandate the exact reporting procedures that Planning Coordinators and Transmission Planners must use, allowing them to create efficiencies in their processes based on their particular circumstances. Requirement R1 is drafted to provide Planning Coordinators and Transmission Planners the flexibility to continue their existing practices or develop new practices so long as certain data requirements and reporting procedures are included and are consistent with the procedures for building the Interconnection-wide cases.[32]

Lastly, Requirement R1, part 1.3 mandates that the Planning Coordinator and Transmission Planners specify when they will make available their data requirements and reporting procedures to the applicable data owners. This obligation will help ensure that an entity responsible for providing such data under Requirement R2 has proper notice of the data requirements and reporting procedures.

Requirement R2 obligates applicable data owners to provide modeling data to their Planning Coordinator and Transmission Planner according to the data requirements and reporting procedures developed pursuant to Requirement R1. Requirement R2 provides:

> Each Balancing Authority, Generator Owner, Load Serving Entity, Resource Planner, Transmission Owner, and Transmission Service Provider shall provide steady-state, dynamics, and short circuit modeling data to its Transmission Planner(s) and Planning Coordinator(s) according to the data requirements and reporting procedures developed by its Planning Coordinator in Requirement R1. For data that has not changed since the last submission, a written confirmation that the data has not changed is sufficient.

[32] The proposed Reliability Standard allows Planning Coordinators whose areas are interrelated to enter into agreements to establish a common data collector for their planning areas.

Requirement R2 helps ensure that data owners supply their data to support the model building process. Requirement R2 is drafted to accommodate arrangements in which the Planning Coordinator collects all the data directly or instances in which Transmission Planners serve as conduits for the collection of data, per agreement with the Planning Coordinator. The intent of the requirement is not to change established practices or mandate the specific arrangement for data collection but to reinforce and emphasize accountability for those entities that are in the best position to have and provide the necessary modeling data.

Requirement R3 provides Planning Coordinators, Transmission Planners, and the data owners the opportunity to collaboratively address any technical concerns with the data provided under Requirement R2. Requirement R3 provides:

> Upon receipt of written notification from its Planning Coordinator or Transmission Planner regarding technical concerns with the data submitted under Requirement R2, including the technical basis or reason for the technical concerns, each notified Balancing Authority, Generator Owner, Load Serving Entity, Resource Planner, Transmission Owner, or Transmission Service Provider shall respond to the notifying Planning Coordinator or Transmission Planner as follows:
>
> 3.1. Provide either updated data or an explanation with a technical basis for maintaining the current data;
>
> 3.2 Provide the response within 90 calendar days, unless a longer time period is agreed upon by the notifying Planning Coordinator or Transmission Planner.

As noted above, in order to maintain accuracy in the representation of a power system, the data that is submitted must be correct, periodically checked, and updated. Data used to perform power flow, dynamics, and short circuit studies can change, for example, as a result of newly planned transmission construction (in comparison to as-built information). Another example is load forecasts, which can change frequently. Updates to load modeling data are needed when new forecasts are developed. Requirement R3 provides a mechanism for the Planning Coordinator and Transmission Planner to ensure that the data being collected is correct

and updated. It also allows them to address concerns about the usability of data, including whether the data is in the correct format and shareable on an Interconnection-wide basis. This type of feedback loop is not provided in the Existing MOD B Standards and represents a significant improvement to reliability.

Requirement R4 obligates Planning Coordinators to provide models for its planning area reflecting the data provided under Requirement R2 to the ERO (or its designee) for use in building the Interconnection-wide cases. Requirement R4 provides:

> Each Planning Coordinator shall make available models for its planning area reflecting data provided to it under Requirement R2 to the Electric Reliability Organization (ERO) or its designee to support creation of the Interconnection-wide case(s) that includes the Planning Coordinator's planning area.

Requirement R4 completes the data collection framework for the Interconnection-wide case building process. Once the Planning Coordinator receives all of the modeling data requested pursuant to Requirement R1, it will develop planning models for its entire planning area. These models form the basis for constructing the Interconnection-wide cases necessary to study the reliability of each Interconnection. Because NERC and the Regional Entities have the wide area view necessary to facilitate the building of the Interconnection-wide cases, it is appropriate to require Planning Coordinators to make available the model data for their planning areas to the ERO (or its designee) to support the Interconnection-wide case building process.

Currently, in collaboration with NERC, the six Regional Entities in the Eastern Interconnection, through ERAG, build the Eastern Interconnection cases, WECC builds the Western Interconnection cases, and ERCOT builds the ERCOT Interconnection cases. While ERAG and ERCOT build seasonal models on an annual basis, WECC builds models on a continuous basis throughout the year. Requirement R4 does not require any changes to those practices. The intent of the requirement is to support both existing practices and any future

modifications to those practices. The requirement for Planning Coordinators to submit their models to the "ERO or its designee" supports a framework whereby NERC, in collaboration with the Regional Entities and/or any other organization, has the necessary information to build the Interconnection-wide cases.

2. Proposed Reliability Standard MOD-033-1

Proposed Reliability Standard MOD-033-1 is a new Reliability Standard that requires each Planning Coordinator to implement a documented process to perform model validation within its planning area. Because of the importance of models in analyzing the reliability of the Bulk-Power System, comparing the performance of power system models against actual measured power system data (i.e., model validation) is an essential procedure for measuring the accuracy of power system models and, ultimately, maintaining system security and reliability. The Existing MOD B Standards, however, did not contain any validation requirements. Consistent with FERC directives, the addition of proposed Reliability Standard MOD-033-1 will serve the important reliability goal of monitoring and improving the accuracy of the models used in power system studies.

Proposed Reliability Standard MOD-033-1 contains two requirements. Requirement R1 requires Planning Coordinators to implement a validation process for (i) comparing the performance of the Planning Coordinator's portion of the existing system in a planning power flow model to actual system behavior; and (ii) comparing the performance of the Planning Coordinator's portion of the existing system in a planning dynamics model to actual system response. Because the Planning Coordinator will need actual system behavior data to perform the validations, Requirement R2 requires Reliability Coordinators and Transmission Operators to supply actual system data to any requesting Planning Coordinator for purposes of model validation. Validation of the Interconnection-wide cases is not covered by proposed Reliability

Standard MOD-033-1. As the ERO facilitates the construction of the Interconnection-wide cases, it will also facilitate the validation of those cases to help ensure they are accurate and up to date.

The following is a discussion of each requirement in proposed Reliability Standard MOD-033-1.

Requirement R1 provides as follows:

> R1. Each Planning Coordinator shall implement a documented data validation process that includes the following attributes:
>
> 1.1. Comparison of the performance of the Planning Coordinator's portion of the existing system in a planning power flow model to actual system behavior, represented by a state estimator case or other Real-time data sources, at least once every 24 calendar months through simulation;
>
> 1.2. Comparison of the performance of the Planning Coordinator's portion of the existing system in a planning dynamic model to actual system response, through simulation of a dynamic local event, at least once every 24 calendar months (use a dynamic local event that occurs within 24 calendar months of the last dynamic local event used in comparison, and complete each comparison within 24 calendar months of the dynamic local event). If no dynamic local event occurs within the 24 calendar months, use the next dynamic local event that occurs;
>
> 1.3. Guidelines the Planning Coordinator will use to determine unacceptable differences in performance under Part 1.1 or 1.2; and
>
> 1.4. Guidelines to resolve the unacceptable differences in performance identified under Part 1.3.

As noted, implementation of these validation processes will result in more accurate power flow and dynamics models. The increased accuracy should provide for better correlation between system flows and voltages seen in power flow studies and the actual values observed by system operators. For dynamics studies, it is expected that the results of such studies will more closely match the actual responses of the power system to disturbances.

Requirement R1 focuses on the results-based outcome of developing a process for performing a validation. While it does not prescribe a specific method or procedure for the validation, it does specify common criteria that must be included in the process. The standard drafting team concluded that Planning Coordinators should have the discretion to develop processes that best suit their planning areas, so long as those processes satisfy parts 1.1 through 1.4 of Requirement R1.

Similarly, the proposed Reliability Standard does not specify numeric accuracy thresholds for what constitutes an unacceptable difference within the proposed Reliability Standard. Specifying a generally applicable accuracy threshold is potentially problematic, as it may unintentionally exaggerate the degree of mismatch (e.g., 10 MW v. 20 MW (100% error) on a 345 KV line is not generally significant). The standard drafting team determined that each Planning Coordinator is best suited to define what constitutes an unacceptable difference for its system(s). Requirement R1 only requires that the Planning Coordinator develop guidelines for (1) evaluating discrepancies between actual system behavior or response and the system performance indicated in the planning models, and (2) resolving any unacceptable differences.[33]

The Guidelines and Technical Basis section of the proposed Reliability Standard, however, provides guidance for Planning Coordinators in the development and implementation of their validation processes. For instance, the Guidelines and Technical Basis section states, among other things, that for the steady-state model validation required by part 1.1, the state estimator case or other Real-time data should be taken as close to system peak as possible but acknowledges that other snapshots of the system should be used if deemed to be more appropriate by the Planning Coordinator. It also notes that, in performing the comparison

[33] For instance, Requirement R3 of proposed MOD-032-1 can serve as a mechanism to address any issues identified during model validation.

required in part 1.1, the Planning Coordinator should consider, among other criteria: (1) system load; (2) transmission topology and parameters; (3) voltage at major buses; and (4) flows on major transmission elements.

The dynamics model validation required under part 1.2 is limited to the Planning Coordinator's planning area, and the focus is on local events or local phenomena. The Guidelines and Technical Basis section notes that the validation required in part 1.2 may include simulations that are to be compared with actual system data and may include comparisons of: (1) voltage oscillations at major buses, (2) system frequency (for events with frequency excursions), and (3) real and reactive power oscillations on generating units and major inter-area ties.

Because the occurrence of dynamic local events is unpredictable, part 1.2 specifies that the Planning Coordinator shall use a dynamic local event that occurs within 24 calendar months of the dynamic local event used in the last comparison. If no dynamic local event occurs within the 24 calendar months from the last dynamic local event used, however, the requirement specifies that the Planning Coordinator shall use the next dynamic local event that occurs. In all cases, the requirement mandates that the Planning Coordinator complete its comparison within 24 months of the event being used.

Requirements R2 is designed to help ensure that the Planning Coordinator has the actual system behavior data necessary to perform the validations required by Requirement R1. Requirement R2 provides:

> Each Reliability Coordinator and Transmission Operator shall provide actual system behavior data (or a written response that it does not have the requested data) to any Planning Coordinator performing validation under Requirement R1 within 30 calendar days of a written request, such as, but not limited to, state estimator case or other Real-time data (including disturbance data recordings) necessary for actual system response validation.

The standard drafting team identified Reliability Coordinators and Transmission Operators as the entities that are in the best position to have this data given their role in operating the Bulk-Power System.

C. The Proposed Reliability Standards Satisfy Outstanding FERC Directives

As noted above, in FERC Order Nos. 693 and 890, FERC issued directives to NERC to modify certain aspects of the Existing MOD B Standards. Exhibit E of this Petition provides a list of the directives and an explanation of the standard drafting team's consideration of each directive. The following is a discussion of each of the outstanding directives.

Applicability to Planning Coordinators: As discussed above, FERC directed NERC to modify Reliability Standards MOD-010-0 through MOD-013-1 to include the Planning Coordinator as an applicable entity.[34] Consistent with that directive, the Planning Coordinator has a central role under the proposed Reliability Standards. Proposed Reliability Standard MOD-032-1 establishes the Planning Coordinator as the entity that (1) develops the modeling data requirements and reporting procedures and (2) makes available planning models for its planning area to the ERO for use in the development of the Interconnection-wide cases. The Planning Coordinator is also tasked with validating the models for its planning area under proposed Reliability Standard MOD-033-1.

Listing Contingencies: FERC directed NERC to modify MOD-010-0 to require the filing of all of the contingencies that are used in performing steady-state system operation and planning studies.[35] FERC asserted that "access to such information will enable planners to accurately study the effects of contingencies occurring in neighboring systems on their own systems, which

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[34] Order No. 693 at P 1155, 1162, 1184, 1199.

[35] *Id*. at P 1148.

will benefit reliability."[36] The standard drafting team did not explicitly include a requirement to file contingencies in the proposed Reliability Standards because this directive has been addressed by Reliability Standards filed after the issuance of Order No. 693. Specifically, Reliability Standard TPL-001-4, Requirements R3 and R4 [37] require Planning Coordinators and Transmission Planners to identify Contingencies as part of performing the planning assessments required by that Reliability Standard. Those planning assessments must be distributed to adjacent Planning Coordinators, Transmission Planners, and to any other functional entity with a reliability need. Additionally, from an operations horizon perspective, the sharing of contingencies is covered by Reliability Standard MOD-001-1a and pending Reliability Standard MOD-001-2.

Applicability to Transmission Operators: FERC directed NERC to include Transmission Operators as an applicable entity because Transmission Operators are usually responsible for compiling the operational contingency lists for both normal and emergency operation.[38] Because the identification of contingencies is addressed by other reliability standards, as discussed above, the standard drafting team did not include Transmission Operators as applicable entities for proposed Reliability Standards MOD-032-1 and MOD-033-1.

List of Faults and Disturbances: FERC directed NERC to modify MOD-012-0 by (1) adding a new requirement to provide a list of the faults and disturbances used in performing dynamics studies for system operation and planning[39] and (2) require the Transmission Planner to provide the fault and disturbance lists.[40] The standard drafting team did not explicitly include

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36 *Id*.

37 Reliability Standard TPL-001-4 was filed on March 19, 2013.

38 Order No. 693 at P 1154.

39 *Id*. at P 1178.

40 *Id*. at P 1183.

a requirement to list faults and disturbances in the proposed Reliability Standards because this directive has been addressed by Reliability Standard TPL-001-4. As part of performing the planning assessments required by that Reliability Standard, Planning Coordinators and Transmission Planners will identify the faults and disturbances used in performing dynamics studies for system operation and planning. Further, as noted above, those planning assessments must be distributed to adjacent Planning Coordinators, Transmission Planners, and to any other functional entity with a reliability need. Accordingly, FERC's concern with respect to transparency has been addressed by Reliability Standard TPL-001-4 and need not be duplicated in the proposed Reliability Standards.

Use of Estimates and Comparison of Dynamics Models to Actual Disturbance Data: FERC directed NERC to modify MOD-013-1 to permit entities to estimate dynamics data if they are unable to obtain unit specific data but require that the results of these dynamics models be compared with actual disturbance data to verify the accuracy of the models.[41] Requirement R3 of proposed Reliability Standard MOD-032-1 addresses this directive by providing a mechanism to obtain more accurate information in cases where the initial data provided has technical or accuracy concerns. Should an entity estimate dynamics data because they were unable to obtain unit specific data, the Planning Coordinator and Transmission Planner may use Requirement R3 to verify the accuracy of the estimates and request additional data as needed. Furthermore, proposed Reliability Standard MOD-033-1 requires comparison of actual disturbance data to verify the accuracy of dynamics models.

Model Validation: FERC directed NERC to modify MOD-014-0 and MOD-015-0.1 to (1) include a requirement that the models be validated against actual system responses, and (2)

[41] Order No. 693 at P 1197. *See also* Order No. 693-A at P 131

require that actual system events be simulated and if the model output is not within the accuracy required, the model shall be modified to achieve the necessary accuracy.[42] Proposed Reliability Standard MOD-033-1 addresses these directives by adding a validation process requirement that is (1) aimed specifically at ensuring that models are validated against actual system responses and (2) that requires validation through simulation to ensure that the discrepancy between actual system performance and the model is acceptable (i.e., the discrepancy does not exceed the point where conclusions drawn by the Planning Coordinator based on output from the model would be inconsistent with operator action based on actual system response).

Updating and Benchmarking Models: In Order No. 890, FERC directed public utilities, working through NERC, to modify Reliability Standards MOD-010 through MOD-025 to "incorporate a requirement for the periodic review and modification of models for (1) load flow base cases with contingency, subsystem, and monitoring files, (2) short circuit data, and (3) transient and dynamic stability simulation data, in order to ensure that they are up to date."[43] FERC stated that "[t]his means that the models should be updated and benchmarked to actual events."[44] The concept that models should be updated and benchmarked is addressed by the proposed Reliability Standards. Proposed Reliability Standard MOD-033-1 requires entities to validate models by verifying that system behavior predicted by the models acceptably matches actual system response. Further, proposed Reliability Standard MOD-032-1, Requirement R3 provides a mechanism to update modeling data that may have technical issues.

Additionally, proposed Reliability Standard MOD-032-1 covers short circuit data and transient and dynamic stability simulation data by requiring that those items be provided to

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42 Order No. 693 at PP 1210, 1211, 1220.

43 Order No. 890 at P 290.

44 *Id*.

Planning Coordinators and Transmission Planners. The standard drafting team concluded that the portion of the directive related to contingency, subsystem, and monitoring files is addressed by TPL-001-4, Requirements R3 and R4.

D. Enforceability of the Proposed Reliability Standards

The proposed Reliability Standards include VRFs and VSLs, which provide guidance on the way that NERC will enforce the requirements of the proposed Reliability Standards. The VRFs and VSLs for the proposed Reliability Standards comport with NERC and FERC guidelines related to their assignment. Exhibit F provides a detailed review of the VRFs, the VSLs, and an analysis of how the VRFs and VSLs were determined using NERC and FERC guidelines.

The proposed Reliability Standards also include measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. These measures help ensure that the requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

V. EFFECTIVE DATES

As described in the Implementation Plan, attached hereto as Exhibit B, NERC provides notice of the proposed Reliability Standards effective as follows:

- Requirement R1 of proposed Reliability Standard MOD-032-1 shall become effective date on the first day of the first calendar quarter that is 12 months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect.

- Requirements R2, R3 and R4 of proposed Reliability Standard MOD-032-1 shall become effective date on the first day of the first calendar quarter that is 24 months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect.

- Proposed Reliability Standard MOD-033-1 shall become effective date on the first day of the first calendar quarter that is 36 months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect.

The effective dates for the proposed Reliability Standards were developed to maximize opportunities for coordination between entities. These implementation periods will allow for the development of sound data requirements and reporting procedures, accurate submissions from data owners, and effective validation processes. The standard drafting team determined that staggering the effective dates for proposed Reliability Standard MOD-032-1 in this manner was appropriate given the timeframes for complying with the various requirements. Compliance with Requirements R2-R4 is dependent on the data requirements and reporting procedures developed by Planning Coordinators and Transmission Planners in accordance with Requirement R1. Further, to ensure accurate validation of the models, a 36-month implementation period is appropriate as it should provide sufficient time for Planning Coordinators to develop rigorous procedures for validation after entities have had time to comply with the requirements in proposed MOD-032-1.

The retirement of MOD-010-0 and MOD-012-0 and withdrawal of MOD-011-0, MOD-013-1, MOD-014-0, and MOD-015-0.1 shall become effective on midnight of the day immediately prior to the effective date for Requirement R2 of MOD-032-1. The proposed retirement date is appropriate because MOD-010-0 and MOD-012-0 map to Requirement R2 of MOD-032-1, as described in Exhibit D hereto.

Respectfully submitted,

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Date: March 11, 2014

Exhibits A, B, and D – H

(Available on the NERC Website at

http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments_MOD-B_filing.pdf)

Exhibit C

Reliability Standards Criteria

The discussion below explains how the proposed Reliability Standard has met or exceeded the Reliability Standards criteria:

1. **Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.**

Proposed Reliability Standards MOD-032-1 and MOD-033-1 are designed to achieve the specific reliability goal of maintaining the reliable operation of the Bulk Power Supply by setting parameters for the acquisition and analysis of modeling data necessary for the development of planning models and Interconnection-wide cases. Such models provide the basis for nearly all power system studies used to assess the reliability of the Bulk-Power System.

The proposed Reliability Standards also satisfy outstanding FERC directives from Order Nos. 693 and 890.

2. **Proposed Reliability Standards must be applicable only to users, owners and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.**

The proposed Reliability Standards are clear and unambiguous as to what is required and who is required to comply. Proposed Reliability Standard MOD-032-1 applies to Balancing Authorities, Generator Owners, Load Serving Entities, Planning Authorities and Planning Coordinators, Resource Planners, Transmission Owners, Transmission Planners, and Transmission Service Providers. Proposed Reliability Standard MOD-033-1 applies to Planning Authorities and Planning Coordinators, Reliability Coordinators, and Transmission Operators. The actions that each entity must take to comply with the proposed Reliability Standards are clearly articulated.

3. **A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.**

The Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs") for the proposed Reliability Standards comport with NERC and FERC guidelines related to their assignment. The assignments of the severity levels for the VSLs are consistent with the corresponding Requirements and will ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, and support uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standard includes clear and understandable consequences.

4. **A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.**

The proposed Reliability Standard contains Measures that support the Requirements by clearly identifying what is required and how the Requirement will be enforced. The proposed Measures for proposed Reliability Standard MOD-032-1 are as follows:

> **M1.** Each Planning Coordinator and Transmission Planner shall provide evidence that it has jointly developed the required modeling data requirement and reporting procedures specified in Requirement R1.
>
> **M2.** Each registered entity identified in Requirement R2 shall provide evidence, such as email records or postal receipts showing recipient and date, that is has submitted the required modeling data to its Transmission Planner(s) and Planning Coordinator(s); or written confirmation that the data has not changed.
>
> **M3.** Each registered entity identified in Requirement R3 that has received written notification from its Planning Coordinator or Transmission Planner regarding technical concerns with the data submitted under Requirement R2 shall provide evidence, such as email records or postal receipts showing recipient and date, that is has provided either updated data or an explanation with a technical basis for maintaining the current data to its Planning Coordinator

> or Transmission Planner within 90 calendar days of receipt (or within the longer time period agreed upon by the notifying Planning Coordinator or Transmission Planner), or a statement that it has not received written notification regarding technical concerned with the data submitted.
>
> **M4.** Each Planning Coordinator shall provide evidence, such as email records or postal receipts showing recipient and date, that is has submitted models for its planning area reflecting data provided to it under Requirement R2 when requested by the ERO or its designee.

The proposed Measures for proposed Reliability Standard MOD-033-1 are as follows:

> **M1.** Each Planning Coordinator shall provide evidence that it has a documented validation process according to Requirement R1 as well as evidence that demonstrates the implementation of the required components of the process.
>
> **M2.** Each Reliability Coordinator and Transmission Operator shall provide evidence, such as email notices or postal receipts showing recipient and date that it has distributed the requested data or written response that it does not have the data, to any Planning Coordinator performing validation under Requirement R1 within 30 days of a written request in accordance with Requirement R2; or a statement by the Reliability Coordinator or Transmission Operator that it has not received notification regarding data necessary for validation by any Planning Coordinator.

These Measures help provide clarity regarding how the Requirements will be enforced, and help ensure that the Requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

5. **Proposed Reliability Standards should achieve a reliability goal effectively and efficiently — but do not necessarily have to reflect "best practices" without regard to implementation cost or historical regional infrastructure design.**

The proposed Reliability Standards achieve the reliability goals effectively and efficiently. The proposed Reliability Standards consolidate several current Reliability Standards, streamlining and updating the processes for the collection of modeling data. The collection of

accurate modeling development supports the development of accurate Interconnection-wide cases, which are necessary for studying the reliability of the Bulk Power System.

6. **Proposed Reliability Standards cannot be "lowest common denominator," *i.e.*, cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.**

The proposed Reliability Standards do not reflect a "lowest common denominator" approach. To the contrary, the proposed Reliability Standard represents a significant improvement over existing Reliability Standards as described herein. In addition to satisfying FERC directives, the Reliability Standards as proposed include a comprehensive process for collecting the information necessary to develop accurate Interconnection-wide cases.

7. **Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.**

The proposed Reliability Standards apply throughout North America and do not favor one geographic area or regional model. The proposed Reliability Standards are drafted to accommodate the various practices across the continent.

8. **Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.**

Proposed Reliability Standards MOD-032-1 and MOD-033-1 have no undue negative effect on competition. The proposed Reliability Standards require the same performance by each of the applicable Functional Entities in requiring the collection of modeling data. The proposed

Reliability Standards do not unreasonably restrict the available generation or transmission capability or limit use of the Bulk-Power System in a preferential manner.

9. The implementation time for the proposed Reliability Standard is reasonable.

The proposed effective dates for the proposed Reliability Standards are just and reasonable and appropriately balance the urgency in the need to implement the proposed Reliability Standards against the reasonableness of the time allowed for those who must comply to develop necessary procedures, software, facilities, staffing or other relevant capability. This will allow applicable entities adequate time to ensure compliance with the requirements. The proposed effective dates are explained in the proposed Implementation Plan, attached as Exhibit B.

10. The Reliability Standard was developed in an open and fair manner and in accordance with the Reliability Standard development process.

The proposed Reliability Standards were developed in accordance with NERC's ANSI-accredited processes for developing and approving Reliability Standards. Exhibit G includes a summary of the Reliability Standard development proceedings, and details the processes followed to develop the Reliability Standard. These processes included, among other things, multiple comment periods and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public. The initial and final ballots both achieved a quorum and exceeded the required ballot pool approval levels.

11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.

NERC has identified no competing public interests regarding the request for approval of the proposed Reliability Standards. No comments were received indicating the proposed Reliability Standard is in conflict with other vital public interests.

12. Proposed Reliability Standards must consider any other appropriate factors.

No other factors relevant to whether the proposed Reliability Standards are just and reasonable were identified.