

June 24, 2022

**VIA ELECTRONIC FILING**

Michael Law  
President and Chief Executive Officer  
Alberta Electric System Operator  
2500, 330 - 5 Avenue SW  
Calgary, Alberta  
T2P 0L4

RE: *North American Electric Reliability Corporation*

Dear Mr. Law:

The North American Electric Reliability Corporation (“NERC”) hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standards FAC-001-4 and FAC-002-4. NERC requests, to the extent necessary, a waiver of any applicable filing requirements with respect to this filing.

NERC understands the AESO may adopt the proposed reliability standards subject to Alberta legislation, principally as established in the *Transmission Regulation* (“the T Reg.”). Briefly, it is NERC’s understanding that the T Reg. requires the following with regard to the adoption in Alberta of a NERC Reliability Standard:

1. The AESO must consult with those market participants that it considers are likely to be directly affected.
2. The AESO must forward the proposed reliability standards to the Alberta Utilities Commission for review, along with the AESO’s recommendation that the Commission approve or reject them.
3. The Commission must follow the recommendation of the AESO that the Commission approve or reject the proposed reliability standards unless an interested person satisfies the Commission that the AESO’s recommendation is “technically deficient” or “not in the public interest.”

Further, NERC has been advised by the AESO that the AESO practice with respect to the adoption of a NERC Reliability Standard includes a review of the NERC Reliability Standard for applicability to Alberta legislation and electric industry practice. NERC has been advised that, while the objective is to adhere as closely as possible to the requirements of the NERC Reliability Standard, each NERC Reliability Standard approved in Alberta (called an “Alberta reliability standard”) generally varies from the similar and related NERC Reliability Standard.

1325 G Street NW Suite 600  
Washington, DC 20005  
202-400-3000 | [www.nerc.com](http://www.nerc.com)

NERC requests the AESO consider the adoption of Proposed Reliability Standards FAC-001-4 and FAC-002-4 as set forth in the filing in Alberta as an “Alberta reliability standard(s),” subject to the required procedures and legislation of Alberta.

Please contact the undersigned if you have any questions concerning this filing.

Sincerely,

/s/ Lauren Perotti

Lauren Perotti  
*Senior Counsel for the North American Electric  
Reliability Corporation*

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**BEFORE THE  
ALBERTA ELECTRIC SYSTEM OPERATOR**

**NORTH AMERICAN ELECTRIC )  
RELIABILITY CORPORATION )**

**NOTICE OF FILING OF THE  
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF PROPOSED  
RELIABILITY STANDARDS  
FAC-001-4 and FAC-002-4**

Lauren A. Perotti  
Senior Counsel  
North American Electric Reliability Corporation  
1325 G Street, N.W., Suite 600  
Washington, D.C. 20005  
(202) 400-3000  
(202) 644-8099 – facsimile  
lauren.perotti@nerc.net

*Counsel for the North American Electric  
Reliability Corporation*

June 24, 2022

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## TABLE OF CONTENTS

I.	OVERVIEW.....	2
II.	NOTICES AND COMMUNICATIONS .....	3
III.	BACKGROUND.....	3
	A.    NERC Reliability Standards Development Procedure .....	3
	B.    History of the FAC-001 and FAC-002 Reliability Standards.....	4
	C.    Project 2020-05 Modifications to FAC-001 and FAC-002 .....	5
IV.	JUSTIFICATION.....	6
	A.    The Need to Revise Currently Effective Reliability Standards FAC-001-3 and FAC-002-3.....	8
	B.    New Requirement to Develop a Definition of “Qualified Change” for Facility Interconnection (FAC-002-4 Requirement R6) .....	10
	C.    Revised Requirements to Address “Qualified Changes” in Facility Interconnection Requirements and Interconnection Studies.....	15
V.	EFFECTIVE DATE .....	18

<b>Exhibit A</b>	The Proposed Reliability Standards
<b>Exhibit A-1</b>	FAC-001-4 Clean
<b>Exhibit A-2</b>	FAC-001-4 Redline to Last Approved
<b>Exhibit A-3</b>	FAC-002-4 Clean
<b>Exhibit A-4</b>	FAC-002-4 Redline to Last Approved
<b>Exhibit B</b>	Implementation Plan
<b>Exhibit C</b>	Technical Rationale
<b>Exhibit D</b>	Reliability Standards Criteria
<b>Exhibit E</b>	Analysis of Violation Risk Factors and Violation Severity Levels
<b>Exhibit F</b>	Summary of Development and Complete Record of Development
<b>Exhibit G</b>	Standard Drafting Team Roster, Project 2020-05 Modifications to FAC-001 and FAC-002

**BEFORE THE  
ALBERTA ELECTRIC SYSTEM OPERATOR**

**NORTH AMERICAN ELECTRIC )  
RELIABILITY CORPORATION )**

**NOTICE OF FILING OF THE  
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF PROPOSED  
RELIABILITY STANDARDS  
FAC-001-4 and FAC-002-4**

The North American Electric Reliability Corporation (“NERC”) hereby submits proposed Reliability Standards FAC-001-4 (Facility Interconnection Requirements) and FAC-002-4 (Facility Interconnection Studies).

As discussed more fully herein, the proposed Reliability Standards would advance the reliability of the Bulk-Power System (“BPS”)<sup>1</sup> by helping to ensure that changes to existing interconnected Facilities that can have reliability impacts are properly addressed in interconnection requirements and studies. The proposed Reliability Standards, as shown in **Exhibit A**, is just, reasonable, not unduly discriminatory or preferential, and in the public interest. NERC also provides notice of: (i) the associated Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) (**Exhibit E**); (ii) the retirement of currently effective Reliability Standards FAC-001-3 and FAC-002-3; and (iii) the proposed implementation plan (**Exhibit B**).

This filing presents the technical basis and purpose of the proposed Reliability Standards, a demonstration that the proposed Reliability Standards meet the Reliability Standards criteria

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<sup>1</sup> Unless otherwise indicated, all capitalized terms shall have the meaning used in the *Glossary of Terms Used in NERC Reliability Standards*, [https://www.nerc.com/files/glossary\\_of\\_terms.pdf](https://www.nerc.com/files/glossary_of_terms.pdf) [hereinafter “NERC Glossary”].

(**Exhibit D**), and a summary of the standard development history (**Exhibit F**). The NERC Board of Trustees adopted the proposed Reliability Standards on May 12, 2022.

This filing is organized as follows: Section I provides a summary of NERC’s filing. Section II provides the individuals to whom notices and communications related to the filing should be provided. Section III provides relevant background regarding: (i) the regulatory structure governing the Reliability Standards approval process; (ii) the history of the FAC-001 and FAC-002 Reliability Standards; and (iii) information on the development process for the proposed Reliability Standards. Section IV provides an overview and justification for the proposed Reliability Standards. Section V provides a summary of the proposed implementation plan, and Section VI provides the conclusion.

## **I. OVERVIEW**

Currently effective Reliability Standards FAC-001-3 (Facility Interconnection Requirements) and FAC-002-3 (Facility Interconnection Studies) work together to ensure that that the proper coordination and studies are done to evaluate the reliability impacts of newly interconnecting Facilities and existing interconnected Facilities that will undergo certain changes. In the currently effective standards, these changes are referred to as ones that “materially modify”<sup>2</sup> the Facility. As part of a broader project to assess the Reliability Standards for improvements to address the growth of inverters on the BPS, the NERC Inverter-Based Resource Performance Task Force recommended that this “materially modify” language be revised to provide needed clarity to applicable entities on the types of changes that must be addressed.

As discussed more fully in this filing, proposed Reliability Standards FAC-001-4 and FAC-002-4 contain new and revised requirements that would establish the Planning Coordinator as the

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<sup>2</sup> The phrases “materially modifying” and “materially modified” are used throughout the two Reliability Standards and are intended to have the same meaning.

entity responsible for defining the types of changes to existing interconnected Facilities that would need to be addressed in interconnection procedures and studies for its area. The proposed Reliability Standards would resolve the uncertainty and confusion that has arisen regarding the meaning of “materially modify” under the currently effective standards. The proposed Reliability Standards would advance the reliability of the BPS by helping to ensure that changes to existing interconnected Facilities that can have reliability impacts are properly addressed in interconnection requirements and studies.

The proposed Reliability Standards FAC-001-4 and FAC-002-4 and the associated elements are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

## **II. NOTICES AND COMMUNICATIONS**

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

Lauren A. Perotti  
Senior Counsel  
North American Electric Reliability  
Corporation  
1325 G Street, N.W.  
Suite 600  
Washington, D.C. 20005  
(202) 400-3000  
(202) 644-8099 – facsimile  
lauren.perotti@nerc.net

Howard Gugel  
Vice President and Director of Engineering  
and Standards  
North American Electric Reliability  
Corporation  
3353 Peachtree Road, N.E.  
Suite 600, North Tower  
Atlanta, GA 30326  
(404) 446-2560  
(404) 446-2595 – facsimile  
howard.gugel@nerc.net

## **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.<sup>3</sup>

NERC's rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards, and thus satisfy several 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 BPS. NERC considers the comments of all stakeholders. Stakeholders must approve, and the NERC Board of Trustees must adopt, a new or revised Reliability Standard before NERC submits the Reliability Standard to the applicable governmental authorities for approval.

#### **B. History of the FAC-001 and FAC-002 Reliability Standards**

On April 4, 2006, NERC submitted the first set of Facilities Design, Connections, Maintenance, and Transfer Capabilities (FAC) Reliability Standards, including “version zero” of the FAC-001 and FAC-002 Reliability Standards.<sup>4</sup> The standards have been revised several times since they were submitted in 2006, including revisions submitted in 2011 (FAC-002-1)<sup>5</sup> and in 2012 (FAC-001-1).<sup>6</sup>

On August 27, 2014, NERC submitted an additional set of revisions in Reliability Standards FAC-001-2 and FAC-002-2.<sup>7</sup> Relevant to this filing, Reliability Standards FAC-001-2

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<sup>3</sup> The NERC Rules of Procedure, including Appendix 3A, NERC Standard Processes Manual, are available at <https://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx>.

<sup>4</sup> *Application for Recognition of Reliability Standards*, (Apr. 6, 2002).

<sup>5</sup> *Notice of Filing of the North American Electric Reliability Corporation of Proposed Modifications to Reliability Standards BAL-002-1; EOP-002-3; FAC-002-1; MOD-021-2; PRC-004-2; and VAR-001-2*; (Mar. 4, 2011).

<sup>6</sup> *Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standards FAC-001-1, FAC-003-3, PRC-004-2.1a and PRC-005-1.1b*, (Aug. 27, 2012).

<sup>7</sup> *Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standards*

and FAC-002-2 introduced the term “materially modify” to refer to the changes to existing interconnections that would need to be addressed in interconnection procedures and studies.

On May 3, 2016, NERC submitted currently effective Reliability Standard FAC-001-3 as part of a broader project to clarify and consolidate then-existing requirements related to frequency control.<sup>8</sup> Relevant to this filing, Reliability Standard FAC-001-3 added Requirement R3 Part 3.3 and Requirement R4 Part 4.4 to require the inclusion of procedures for confirming with those responsible for the reliability of affected systems of new or materially modified transmission or generation Facilities are “within a Balancing Authority Area’s metered boundaries.”

On February 27, 2020, NERC submitted currently effective Reliability Standard FAC-002-3, which was developed as part of a broader effort to align the standards with compliance registry changes that were previously approved by the Federal Energy Regulatory Commission (“FERC”).<sup>9</sup>

### **C. Project 2020-05 Modifications to FAC-001 and FAC-002**

In its March 2020 white paper, the NERC Inverter-Based Resource Performance Task Force (“IRPTF”) identified potential gaps and areas for improvements in several Reliability Standards to address the growth of inverters on the BPS.<sup>10</sup> With respect to Reliability Standards FAC-001 and FAC-002, the IRPTF recommended revisions to address industry confusion and potential reliability issues arising from the use of the undefined phrase “materially modify” to refer

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*for Facility Connection Requirements FAC-001-2 and FAC-002-2, (Aug. 27, 2014).*

<sup>8</sup> *Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standards BAL-005-1 and FAC-001-3, (May 3, 2016).* NERC filed supplemental information to that filing on June 16, 2016 and additional supplemental information on April 12, 2017.

<sup>9</sup> *Notice of Filing of the North American Electric Reliability Corporation of Reliability Standards Developed Under the Standards Alignment with Registration Project, (Feb. 27, 2020).*

<sup>10</sup> NERC IRPTF, *IRPTF Review of NERC Reliability Standards* (Mar. 2020), [https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Review\\_of\\_NERC\\_Reliability\\_Standards\\_White\\_Paper.pdf](https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Review_of_NERC_Reliability_Standards_White_Paper.pdf) [hereinafter IRPTF White Paper].

to the changes to existing interconnected Facilities that must be addressed as part of interconnection studies.<sup>11</sup> NERC initiated Project 2020-05 Modifications to FAC-001 and FAC-002 in late 2020 to address the IRPTF's recommendations.

The Project 2020-05 standard drafting team developed proposed Reliability Standards FAC-001-4 and FAC-002-4 to provide needed clarity to applicable entities regarding the changes to existing Facilities that must be studied for interconnection purposes. The proposed Reliability Standards and implementation plan were posted for formal comment period and ballot from December 7, 2021 through January 31, 2022. The proposed Reliability Standards, balloted together, received 85.19% approval, with 93.33% quorum. The proposed implementation plan received 78.97% approval with 93.31% quorum. The proposed Reliability Standards were posted for final ballot from April 13, 2022 through April 22, 2022. The proposed Reliability Standards, balloted together, received 85.64% approval, with 94.86% quorum. The proposed implementation plan received 88.29% approval, with 94.84% quorum.

The NERC Board of Trustees adopted the proposed Reliability Standards on May 12, 2022. A summary of the development history and the complete record of development is attached to this filing as **Exhibit F**.

#### **IV. JUSTIFICATION**

In this filing, NERC submits proposed Reliability Standards FAC-001-4 (Facility Interconnection Requirements) and FAC-002-4 (Facility Interconnection Studies). The purpose of proposed FAC-001-4, which remains unchanged from the currently effective version, is to ensure

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<sup>11</sup> *Id.* at 1.

that Transmission Owners and applicable Generators document Facility interconnection requirements and make them available so entities seeking to interconnect will have the necessary information.<sup>12</sup> The purpose of proposed FAC-002-4 is “to study the impact of interconnecting new or changed Facilities on the Bulk Electric System.” The two standards work together to ensure that that the proper coordination and studies are done to evaluate the reliability impacts of new interconnecting Facilities and changes at existing interconnecting Facilities.

The proposed Reliability Standards would advance the reliability of the BPS by helping to ensure that changes to existing interconnected Facilities that can have reliability impacts are properly addressed in interconnection requirements and studies. The proposed Reliability Standards improve upon the currently effective versions by eliminating reference to the undefined phrase “materially modify,” a phrase which entities have found to be confusing and potentially inadequate for identifying the types of changes to existing Facilities that must be studied for reliability. Instead, the proposed Reliability Standards would identify the Planning Coordinator as the entity responsible for developing a uniform definition of what types of changes to existing interconnected Facilities must be addressed in interconnection requirements and studies for its area. Applicable entities in the Planning Coordinator’s Area would then be required to adhere to this uniform definition in their interconnection procedures and studies.

As discussed in **Exhibit D**, the proposed Reliability Standards meet the Reliability Standards criteria and are just, reasonable, not unduly discriminatory, and in the public interest. The proposed Reliability Standards are to become effective in accordance with the proposed implementation plan discussed in Section V.

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<sup>12</sup> The purpose statement provides, “To avoid adverse impacts on the reliability of the Bulk Electric System, Transmission Owners and applicable Generator Owners must document and make Facility interconnection requirements available so that entities seeking to interconnect will have the necessary information.”

**A. The Need to Revise Currently Effective Reliability Standards FAC-001-3 and FAC-002-3**

NERC established the IRPTF in 2017 to explore the performance characteristics of utility-scale inverter-based resources and address recommendations from NERC’s analysis of the 2016 Blue Cut Fire event.<sup>13</sup> As part of its work, the IRPTF performed a comprehensive review of all NERC Reliability Standards to identify areas where the current standards may not be sufficient to address the growth in the use of inverter-based resources on the BPS. In March 2020, the IRPTF published a white paper providing Reliability Standards recommendations.<sup>14</sup> The IRPTF recommended, among other things, that the FAC-001 and FAC-002 Reliability Standards be revised to provide clarity to the term “materially modify” in the standards. The IRPTF noted that both standards imply that the term “materially modify” should be used to distinguish between Facility changes that are required to be studied and those that are not, but the lack of responsibility for any one entity to define what constitutes a “materially modifying” change has led to confusion and could potentially lead to reliability issues if changes that affect the electrical performance of an inverter-based resource are not studied. As an example of such a situation, the IRPTF stated that a planning entity may consider a change to an inverter-based resource’s control system software to be a “materially modifying” change requiring study, but the owner of that resource may not and therefore would not provide any notification it is making the change. The change would therefore go unstudied, and its potential reliability impacts unassessed. As another example,

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<sup>13</sup> During this event, nearly 1,200 MW of solar capacity went offline unexpectedly. NERC, *1,200 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report: Southern California 8/16/2016 Event* (Jun. 2017), [https://www.nerc.com/pa/rrm/ea/1200\\_MW\\_Fault\\_Induced\\_Solar\\_Photovoltaic\\_Resource\\_/1200\\_MW\\_Fault\\_Induced\\_Solar\\_Photovoltaic\\_Resource\\_Interruption\\_Final.pdf](https://www.nerc.com/pa/rrm/ea/1200_MW_Fault_Induced_Solar_Photovoltaic_Resource_/1200_MW_Fault_Induced_Solar_Photovoltaic_Resource_Interruption_Final.pdf).

<sup>14</sup> IRPTF White Paper, *supra*, at 2-3.

the IRPTF cited the potential for confusion regarding the circumstances under which a re-power of a wind plant would need to be studied.<sup>15</sup>

Additionally, the IRPTF identified that the undefined phrase “materially modify” is similar to the defined term “material modification” used in FERC interconnection procedures, and this similarity has led to confusion among entities responsible for complying with the FAC-001 and FAC-002 Reliability Standards. In the FERC interconnection context, the term “material modification” refers to a change that has impacts on other generators in the interconnection queue.<sup>16</sup> The IRPTF noted that the confusion regarding the apparent similarities of the NERC phrase and the FERC defined term could result in Facility changes that are potentially significant for reliability not being studied under the FAC standards because the changes would not have a “material impact” on other generators in the interconnection queue.<sup>17</sup> The IRPTF cited the situation of a solar plant changing its inverters as an example where the change may not be considered a “material modification” for FERC interconnection purposes, but could have reliability impacts on the system that should be studied.<sup>18</sup>

To address these issues, the IRPTF recommended that NERC revise the FAC-001 and FAC-002 Reliability Standards to: (i) clarify which entity is responsible for determining which facility changes are “materially modifying,” and therefore require study under the standards; (ii) clarify that a Generator Owner should notify the affected entities before making a change that is

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<sup>15</sup> See *id.* at 2-3.

<sup>16</sup> See FERC, *Pro Forma* Large Generator Interconnection Procedures at Section 1 (defining Material Modification as “those modifications that have a material impact on the cost or timing of any Interconnection Request with a later queue priority date.”); see also *Pro Forma* Small Generator Interconnection Procedures at Section 1 (same).

<sup>17</sup> See IRPTF White Paper, *supra*, at 3.

<sup>18</sup> See *id.* at 3.

considered “materially modifying”; and (iii) revise the term “materially modifying” so as not to cause confusion between the FAC standards and the FERC interconnection process.<sup>19</sup> In November 2020, NERC initiated Project 2020-05 to revise the FAC-001 and FAC-002 Reliability Standards to address the IRPTF’s recommendations. The proposed revisions are discussed in detail in the following two sections.

**B. New Requirement to Develop a Definition of “Qualified Change” for Facility Interconnection (FAC-002-4 Requirement R6)**

The proposed Reliability Standards would resolve the uncertainty associated with the use of the undefined phrase “materially modify” by requiring that interconnection procedures and studies address all changes to existing interconnected Facilities that meet the Planning Coordinator’s definition of “qualified change.” To that end, proposed Reliability Standard FAC-002-4 contains a new requirement, Requirement R6, which would require the Planning Coordinator to develop a definition of “qualified change” for the purposes of the FAC-001 and FAC-002 Reliability Standards, and to make the definition publicly available. The proposed requirement reads as follows:

**R6.** Each Planning Coordinator shall maintain a publicly available definition of qualified change for the purposes of facility interconnection.

Other requirements in proposed FAC-001-4 and FAC-002-4, discussed in the following sections of this filing, would require applicable entities to include procedures for coordinating the impacts of qualified changes in their interconnection requirements (FAC-001-4), and would require applicable entities seeking to make qualified changes to coordinate and cooperate in the necessary interconnection studies (FAC-002-4).

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<sup>19</sup> *Id.* at 1.

In developing proposed Reliability Standard FAC-002-4 Requirement R6, the standard drafting team determined that it was appropriate to replace the undefined phrase “materially modify” with a new phrase “qualified change.” The term “materially modify” is confusingly similar to the FERC-defined term “material modification” that addresses generator interconnection and impacts on other generators in the interconnection queue, but does not address either the transmission or end-user interconnections that must be addressed under Requirement R1 of the FAC-001 Reliability Standard or reliability more generally. The new phrase “qualified change” is not used in any other relevant document and refers to the types of changes to an existing interconnected Facility that, in the judgment of the Planning Coordinator, must be addressed in interconnection requirements and studied under the FAC-001 and FAC-002 Reliability Standards. Under proposed Requirement R6, the Planning Coordinator must make its definition of “qualified change” publicly available to ensure that all potentially affected entities would have access to it.

The standard drafting team determined that the Planning Coordinator should be the sole entity responsible for defining what “qualified change” means for its Planning Coordinator Area, as the Planning Coordinator is “the responsible entity that coordinates and integrates transmission Facilities and service plans, resource plans, and Protection Systems.”<sup>20</sup> As such, the Planning Coordinator is in the best position to identify the kinds of changes to existing interconnected Facilities that could have adverse reliability impacts in the Planning Coordinator Area (as well as neighboring areas), and should therefore be studied.

In developing proposed Requirement R6, the standard drafting team determined that the most reasonable approach for a continent-wide standard was one that provided flexibility to the Planning Coordinator to develop an appropriate definition of “qualified change” for its area, taking

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<sup>20</sup> See definition of “Planning Coordinator,” NERC Glossary, *supra*.



into account the Planning Coordinator’s unique system characteristics. Planning Coordinator Areas vary in size, generation amount, generation mix, transmission or short circuit strength, and load patterns. Further, each of the North American interconnections in which they are contained has distinct physical and operational characteristics. The variability in characteristics across Planning Coordinator Areas across North America presents substantial challenges to developing a single “qualified change” definition or a list of minimum requirements for such definitions that would be appropriate and sufficiently complete for each Planning Coordinator Area. In developing its own definition of “qualified change,” the Planning Coordinator should consider how Facility changes affect the steady-state, short circuit, and dynamic performance of that Facility, and that advancements in technology (particularly for inverter-based resources) may call for additional consideration.<sup>21</sup>

It is possible that there may be some generator Facility changes that are required to be studied as both “qualified changes” for purposes of the FAC-001 and FAC-002 Reliability Standards and “material modifications” under FERC interconnection requirements. For example, a significant change at one generator Facility meeting the Planning Coordinator’s definition of “qualified change” may also materially impact a nearby generator Facility’s position in the interconnection queue and thus require analysis under that measure.

To aid Planning Coordinators in developing their own definitions of “qualified change,” the standard drafting team developed a non-exhaustive list of examples of Facility changes that may be considered “qualified changes” depending on the specific facts and circumstances present

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<sup>21</sup> See Technical Rationale, Exhibit C, at 8.

in an area. Several of these examples are provided for illustration purposes below; please refer to Exhibit F (item 36) for additional examples of potential “qualified changes” for generator, end-user, and transmission Facilities.<sup>22</sup>

*Generation Facilities.* For generation, the standard drafting team provided examples of “qualified changes” that would apply regardless of resource type, as well as examples of changes that would apply specifically to inverter-based resources and specifically to synchronous generators. One example of a generator “qualified change” could be a change in generator output, such as one that affects the generator’s seasonal Real Power or Reactive Power capability by more than 10% of the last reported or verified capability and the change is expected to last more than six months, or a change in power factor capability. Another example of a “qualified change,” specific to an inverter-based resource, could be a change in inverters or inverter settings, such as a change of 10% or more of the inverter units that are not replacement in kind, or a change in any inverter control setting that results in a difference in frequency or voltage support or in how the resource injects current into the grid. A third example of a “qualified change,” specific to a synchronous resource, could be a change to the inertia of the generator by more than 10%.

*End-user Facilities.* An example of a “qualified change” for an end-user Facility could be an increase in demand, such as an annual increase exceeding 10%, an increase of 75 MW or greater

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<sup>22</sup> See Exhibit F (Record of Development) at item 36, Draft Implementation Guidance for FAC-002-4. In this filing, NERC includes the Draft Implementation Guidance for FAC-002-4 as it was prepared by the standard drafting team and posted to the project page during the final ballot of the proposed Reliability Standards. The ERO Enterprise reviews draft implementation guidance prepared by standard drafting teams and other organizations for potential endorsement in accordance with its established policies for such reviews. If endorsed, the ERO Enterprise would give deference to the approach during Compliance Monitoring and Enforcement Activities with consideration of the specific facts and circumstances for each applicable entity. See NERC, *Compliance Guidance Policy* (Nov. 5, 2015), available at <https://www.nerc.com/pa/comp/guidance/Pages/default.aspx>.

As the Draft Implementation Guidance for FAC-002-4 proceeds through the ERO Enterprise endorsement process, it may be further revised or clarified to conform to the requirements of this process or to provide further guidance to applicable entities on examples of “qualified changes.” If endorsed, the final version would be posted to the NERC Compliance Guidance page at the link provided above.

within the next two years, or an increase of 20 MW or greater within the next two years for a third-party Facility interconnected to a Generator Owner's facility.

*Transmission Facilities:* An example of a “qualified change” for a transmission Facility could include a change in rating, such as a change in thermal rating or impedance by more than 5% or a change in voltage class.

It is the expectation of the ERO Enterprise that, regardless of the specific approach taken, each Planning Coordinator would develop and make available a definition of “qualified change” that reflects and is supported by its sound engineering judgment about the types of Facility changes that may have reliability impacts within its area and should be addressed in interconnection procedures and studies.

Having one entity responsible for defining the types of “qualified changes” to existing interconnected Facilities that must be studied in a given area, as compared to an entity-by-entity determination of what constitutes a “materially modifying” change,<sup>23</sup> would promote consistency as well as certainty for applicable entities in the application of the standards. In so doing, it would help ensure that the types of changes that could impact reliability are studied. The standard drafting team considered whether proposed Requirement R6 should require coordination with other entities and determined that the Planning Coordinator should be the sole entity responsible for defining “qualified change” for its area. Planning Coordinators, however, are encouraged to coordinate with other entities in developing their definitions.

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<sup>23</sup> See Reliability Standards FAC-001-3 and FAC-002-3, Guidelines and Technical Basis (“Entities should have documentation to support the technical rationale for determining whether an existing interconnection was ‘materially modified.’ Recognizing that what constitutes a ‘material modification’ will vary from entity to entity, the intent is for this determination to be based on engineering judgment.”)

**C. Revised Requirements to Address “Qualified Changes” in Facility Interconnection Requirements and Interconnection Studies**

Proposed Reliability Standards FAC-001-4 and FAC-002-4 contain a number of revisions intended to implement the “qualified change” definition established in proposed Reliability Standard FAC-002-4 Requirement R6, which is discussed in the previous section of this filing. These revisions are discussed below.

**1. Proposed FAC-001-4 Requirements R3 and R4**

Proposed Reliability Standard FAC-001-4 would revise the currently effective standard by removing reference to the undefined phrase “materially modified” in Requirement R3 Parts 3.1-3.3 and Requirement R4 Part 4.3, and replacing it with reference to the definition of “qualified change” as developed by the Planning Coordinator under proposed Reliability Standard FAC-002-4 Requirement R6.

The proposed changes to Requirements R3 and R4 are shown below and in Exhibit A-2 (redline):

- R3.** Each Transmission Owner shall address the following items in its Facility interconnection requirements:
- 3.1.** Procedures for coordinated studies ~~of~~ for new interconnections or materially modified existing interconnections seeking to make a qualified change as defined by the Planning Coordinator and their impacts on affected systems.
  - 3.2.** Procedures for notifying those responsible for the reliability of affected system(s) of new interconnections or ~~materially modified~~ existing interconnections seeking to make a qualified change.
  - 3.3.** Procedures for confirming with those responsible for the reliability of affected systems that new ~~or materially modified~~ Facilities seeking to make a qualified change are within a Balancing Authority Area’s ~~metered boundaries~~.
- R4.** Each applicable Generator Owner shall address the following items in its Facility interconnection requirements:

- 4.1. Procedures for coordinated studies of new interconnections and their impacts on affected system(s).
- 4.2. Procedures for notifying those responsible for the reliability of affected system(s) of new interconnections.
- 4.3. Procedures for confirming with those responsible for the reliability of affected systems that ~~new or materially modified~~ Facilities or existing Facilities seeking to make a qualified change as defined by the Planning Coordinator are within a Balancing Authority Area's ~~metered boundaries~~.

As shown above, each Transmission Owner and applicable Generator Owner shall address in its Facility interconnection requirements procedures that address Facilities seeking to make a qualified change as defined by the Planning Coordinator.

In addition to the above-described revisions, language regarding the Balancing Authority Area's "metered boundaries" is struck from Requirement R3 Part 3.3 and Requirement R4 Part 4.3 as it is redundant with the NERC Glossary definition of Balancing Authority Area. The NERC Glossary defines Balancing Authority Area as "the collection of generation, transmission, and loads within the *metered boundaries* of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area" (emphasis added). These revisions do not change the substance or meaning of the underlying Requirement Parts.

## **2. Proposed FAC-002-4 Requirements R1, R2, and R4**

Proposed Reliability Standard FAC-002-4 would revise the currently effective version of the standard by removing reference to the undefined phrases "materially modified" and "materially modify" in Requirement R1 Part 1.1; Requirement R2, Requirement R3, and Requirement R4. These references are replaced with references to the definition of "qualified change" as developed by the Planning Coordinator under proposed Requirement R6. The proposed changes to these requirements are shown below and in Exhibit A-4 (redline).

- R1.** Each Transmission Planner and each Planning Coordinator shall study the reliability impact of: (i) interconnecting new generation, transmission, or electricity

end-user Facilities and (ii) ~~materially modifying~~ existing interconnections of generation, transmission, or electricity end-user Facilities seeking to make a qualified change as defined by the Planning Coordinator under Requirement R6. The following shall be studied:

- 1.1. The reliability impact of the new interconnection, or ~~materially modified~~ existing interconnection seeking to make a qualified change as defined by the Planning Coordinator under Requirement R6, on affected system(s);
  - 1.2. Adherence to applicable NERC Reliability Standards; regional and Transmission Owner planning criteria; and Facility interconnection requirements;
  - 1.3. Steady-state, short-circuit, and dynamics studies, as necessary, to evaluate system performance under both normal and contingency conditions; and
  - 1.4. Study assumptions, system performance, alternatives considered, and coordinated recommendations. While these studies may be performed independently, the results shall be evaluated and coordinated by the entities involved.
- R2.** Each Generator Owner seeking to interconnect new generation Facilities, or ~~to materially modify~~ existing interconnections of generation Facilities seeking to make a qualified change as defined by the Planning Coordinator under Requirement R6, shall coordinate and cooperate on studies with its Transmission Planner or Planning Coordinator, including but not limited to the provision of data as described in R1, Parts 1.1-1.4.
- R3.** Each Transmission Owner and each Distribution Provider seeking to interconnect new transmission Facilities or electricity end-user Facilities, or ~~to materially modify~~ existing interconnections of transmission Facilities or electricity end-user Facilities seeking to make a qualified change as defined by the Planning Coordinator under Requirement R6, shall coordinate and cooperate on studies with its Transmission Planner or Planning Coordinator, including but not limited to the provision of data as described in R1, Parts 1.1-1.4. [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]
- R4.** Each Transmission Owner shall coordinate and cooperate with its Transmission Planner or Planning Coordinator on studies regarding requested new or ~~materially modified interconnections~~ existing interconnections seeking to make a qualified change as defined by the Planning Coordinator under Requirement R6, to its Facilities, including but not limited to the provision of data as described in R1, Parts 1.1-1.4.

These changes are intended to implement new Requirement R6, which is addressed in Section IV.B., *supra*. No further changes are proposed to the currently effective standard.

## V. EFFECTIVE DATE

The implementation plan is attached to this filing as **Exhibit B**. The proposed implementation plan provides that, where approval by an applicable governmental authority is required, the standards shall become effective on the first day of the first calendar quarter that is twelve (12) months after the effective date of the applicable governmental authority's order approving the standards, or as otherwise provided for by the applicable governmental authority. Where approval by an applicable governmental authority is not required, the standards shall become effective on the first day of the first calendar quarter that is twelve (12) months after the date the standards are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction. The currently effective versions of the standards would be retired immediately prior to the effective date of the revised Reliability Standards. This implementation timeline reflects consideration that Planning Coordinators will need a reasonable period of time to develop a definition of "qualified change" for their respective areas under proposed Reliability Standard FAC-002-4 Requirement R6 and to make that definition publicly available. The proposed implementation plan also provides that, where the Planning Coordinator's definition of "qualified change" differs from what an applicable entity may have considered a "materially modifying" change in Facility Interconnection requirements or studies under the current standards, those entities will have an additional twelve months from the Effective Date to come into compliance with the revised standard. The proposed implementation plan provides a reasonable period of time for entities to comply, considering the new work that would be required, and thus strikes an appropriate balance against the urgency in the need to implement the proposed Reliability Standards.

Respectfully submitted,

/s/ Lauren A. Perotti

Lauren A. Perotti  
Senior Counsel  
North American Electric Reliability Corporation  
1325 G Street, N.W., Suite 600  
Washington, D.C. 20005  
(202) 400-3000  
(202) 644-8099 – facsimile  
lauren.perotti@nerc.net

*Counsel for the North American Electric  
Reliability Corporation*

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**EXHIBITS A - C and E - G**

## **Exhibit C — Reliability Standards Criteria**

The discussion below explains how the proposed Reliability Standards have 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.**

Currently effective Reliability Standards FAC-001-3 (Facility Interconnection Requirements) and FAC-002-3 (Facility Interconnection Studies) work together to ensure that the proper coordination and studies are done to evaluate the reliability impacts of newly interconnecting Facilities and existing interconnected Facilities that will undergo certain changes. Proposed Reliability Standards FAC-001-4 and FAC-002-4 revise the currently effective versions to provide clarity regarding the types of Facility changes that must be addressed in interconnection studies. Under the proposed standards, the Planning Coordinator would be the entity responsible for defining the types of changes to existing interconnected Facilities that would need to be addressed in interconnection procedures and studies for its area and for making that information publicly available so all affected entities will have access to it. The Planning Coordinator is in the best position to identify which Facility changes could have reliability impacts for its area. The proposed Reliability Standards would advance the reliability of the BPS by helping to ensure that changes to existing interconnected Facilities that can have reliability impacts are properly addressed in interconnection requirements and studies. As such, the proposed Reliability Standards are designed to achieve a specified reliability goal and contain a technically sound means to achieve that goal.

- 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 applicable only to users, owners, and operators of the BPS and are clear and unambiguous as to what is required and who is required to comply. The revisions reflected in the proposed standards would promote consistency and clarity regarding the types of Facility changes that must be addressed in interconnection procedures and studies in a given Planning Coordinator Area.

- 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 assignment of the severity level for each VSL is consistent with the corresponding requirement and the VSLs should ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standards include clear and understandable consequences.

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

The proposed Reliability Standards contain measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. 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 their reliability goals effectively and efficiently. The proposed Reliability Standards provide the Planning Coordinator with flexibility to develop an appropriate definition of “qualified change” for interconnection purposes, taking into account the unique characteristics of its system. Such “qualified changes” must then be addressed in interconnection procedures and studies. The proposed Reliability Standards achieve their reliability goal by having the Planning Coordinator establish the types of Facility changes that must be addressed in studies in a given Planning Coordinator Area and thereby resolve an ambiguity relating to the term “materially modify” in the currently effective standards.

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 Standards provide flexibility to the Planning Coordinator to define the types of Facility changes that must be studied in its area, based on the unique system characteristics of the area.

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 continue to apply consistently throughout North America and do not favor one geographic area or regional model. The proposed Reliability Standards provide flexibility to the Planning Coordinator to define the types of Facility changes that must be studied in its area, based on the unique system characteristics of the area.

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

The proposed Reliability Standards have no undue negative effect on competition and do not unreasonably restrict the available transmission capacity or limit the use of the BPS in a preferential manner. The proposed Reliability Standards simply clarify the types of Facility changes that must be studied for interconnection purposes.

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

The proposed effective date for the proposed Reliability Standards is just and reasonable and appropriately balances the urgency in the need to implement the standards against the reasonableness of the time allowed for those who must comply to develop necessary procedures, software, facilities, staffing, or other relevant capability. Where approval of an applicable governmental authority is required, the proposed implementation plan provides that the proposed Reliability Standards would become effective on the first day of the first calendar quarter that is twelve (12) months after applicable regulatory approval, or as otherwise provided for by the applicable governmental authority; this is the date by which Planning Coordinators must have a publicly available definition of “qualified change.” Where approval by an applicable governmental authority is not required, the standards shall become effective on the first day of the first calendar quarter that is twelve (12) months after the date the standards are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction. Where the Planning Coordinator’s definition of “qualified change” differs from what an applicable entity may have considered “materially modified” in Facility Interconnection requirements or studies under the current standards, those entities will have an additional twelve months from the Effective Date to come into compliance with the revised standard (i.e. to reflect the Planning Coordinator’s definition of “qualified change”). The currently effective versions of the standards

would be retired immediately prior to the effective date of the revised Reliability Standards. This implementation timeline reflects consideration that Planning Coordinators will need time to develop and make publicly available a definition of “qualified change” for purposes of Facility interconnection. This implementation timeline also reflects consideration that, to the extent the Planning Coordinator’s definition of “qualified change” is different from what an entity may have considered a “materially modifying” change, they will need time to reflect that new definition in its interconnection procedures or studies. The proposed implementation plan is attached as **Exhibit B** to this filing.

**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 F** includes a summary of the Reliability Standard development proceedings, and details the processes followed to develop the proposed Reliability Standards. These processes included, among other things, comment periods, pre-ballot review periods, and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public.

**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 proposed Reliability Standards. No comments were received that indicated that one or more of the proposed Reliability Standards conflicts with other vital public interests.

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

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