

March 12, 2014

**VIA ELECTRONIC FILING**

Ms. Erica Hamilton, Commission Secretary  
British Columbia Utilities Commission  
Box 250, 900 Howe Street  
Sixth Floor  
Vancouver, B.C.  
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Re: *North American Electric Reliability Corporation*

Dear Ms. Hamilton:

The North American Electric Reliability Corporation (“NERC”) hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PER-005-2 and Retirement of Reliability Standard PER-005-1. 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  
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Enclosure

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**BEFORE THE  
BRITISH COLUMBIA UTILITIES COMMISSION  
OF THE PROVINCE OF BRITISH COLUMBIA**

**NORTH AMERICAN ELECTRIC )  
RELIABILITY CORPORATION )**

**NOTICE OF FILING OF  
THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION  
OF PROPOSED RELIABILITY STANDARD PER-005-2 AND RETIREMENT OF  
RELIABILITY STANDARD PER-005-1**

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March 12, 2014

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<b>Exhibit A</b>	Proposed Reliability Standard
<b>Exhibit B</b>	Implementation Plan
<b>Exhibit C</b>	Reliability Standards Criteria
<b>Exhibit D</b>	Mapping Document
<b>Exhibit E</b>	Analysis of Violation Risk Factors and Violation Security Levels
<b>Exhibit F</b>	Summary of Development History and Record of Development
<b>Exhibit G</b>	Standard Drafting Team Roster

**BEFORE THE  
BRITISH COLUMBIA UTILITIES COMMISSION  
OF THE PROVINCE OF BRITISH COLUMBIA**

**NORTH AMERICAN ELECTRIC )  
RELIABILITY CORPORATION )**

**NOTICE OF FILING OF  
THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION  
OF PROPOSED RELIABILITY STANDARD PER-005-2 AND RETIREMENT OF  
RELIABILITY STANDARD PER-005-1**

The North American Electric Reliability Corporation (“NERC”) hereby submits proposed Reliability Standard PER-005-2 – Operations Personnel Training. Proposed Reliability Standard PER-005-2 (Exhibit A) is just, reasonable, not unduly discriminatory or preferential, and in the public interest.<sup>1</sup> 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 E), (iii) the proposed NERC Glossary definitions for the terms “System Operator” and “Operations Support Personnel,” and (iv) the retirement of currently effective Reliability Standard PER-005-1, as detailed in this filing.

This filing presents the technical basis and purpose of proposed Reliability Standard PER-005-2, a summary of the development history (Exhibit F) and a demonstration that the proposed Reliability Standard meets the Reliability Standards criteria (Exhibit C). The NERC Board of Trustees approved proposed Reliability Standard PER-005-2 and the retirement of PER-005-1 on February 6, 2014.

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

## I. EXECUTIVE SUMMARY

The Personnel Performance, Training, and Qualifications (“PER”) group of Reliability Standards is intended to help ensure the safe and reliable operation of the interconnected grid through the retention of suitably trained and qualified personnel in positions that can impact the reliable operation of the Bulk-Power System. Reliability Standard PER-005-1 requires Reliability Coordinators, Balancing Authorities, and Transmission Operators to: (1) establish a training program for their System Operators using a systematic approach to training, (2) verify each of their System Operators’ capability to perform reliability-related tasks, and (3) provide emergency operations training to every System Operator. As System Operators have primary responsibility for the Real-time operation of the Bulk Electric System (“BES”), Reliability Standard PER-005-1 serves the important reliability goal of helping to ensure that System Operators performing Real-time, reliability-related tasks on the BES are adequately trained to competently perform those tasks and reliably operate the BES.

Consistent with Federal Energy Regulatory Commission (“FERC”) directives from Order Nos. 693<sup>2</sup> and Order No. 742,<sup>3</sup> the purpose of proposed Reliability Standard PER-005-2 is to improve upon PER-005-1 by expanding the scope of the Reliability Standard to include training requirements for the following personnel:

- i. personnel of a Transmission Owner, excluding field switching personnel, who can act independently to operate or direct the operation of the Transmission Owner’s BES transmission facilities in Real-time (i.e., local transmission control center operator personnel);
- ii. Operations Support Personnel, which are proposed to be defined as “[i]ndividuals who perform current day or next day outage coordination or assessments, or who determine [System Operating Limits (“SOLs”), [Interconnection Reliability Operating Limits

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<sup>2</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, 72 FR 16416 (Apr. 4, 2007), FERC Stats. & Regs. ¶ 31,242, *order on reh’g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

<sup>3</sup> *See System Personnel Training Reliability Standards*, Order No. 742, 133 FERC ¶ 61,159 (2010).

(“IROLs”)], or operating nomograms, in direct support of Real-time operations of the Bulk Electric System;” and

- iii. Generator Operator dispatch personnel at a centrally located dispatch center who receive direction from the Generator Operator’s Reliability Coordinator, Balancing Authority, Transmission Operator, or Transmission Owner, and develop specific dispatch instructions for plant operators under their control.

As FERC discussed in Order Nos. 693 and 742, these personnel perform or support Real-time operations on the BES and, in turn, could have a direct impact on BES reliability. Accordingly, it is important to expand the scope of the mandatory training requirements to require that such personnel receive adequate training to help maintain the reliable operation of the BES.

As is already required for System Operators, proposed Reliability Standard PER-005-2 requires the use of a systematic approach to develop and implement training requirements for local transmission control center operator personnel, Operations Support Personnel and the applicable Generator Operator dispatch personnel. As FERC stated in Order No. 742, “[a] systematic approach to training is a widely-accepted methodology that ensures training is efficiently and effectively conducted.”<sup>4</sup> The concept of using a “systematic approach to training” refers to the use of a systematic method for establishing and maintaining training requirements that are directly related to the needs of the particular position. There are different models for using a systematic approach to training but any effective systematic approach to training method will determine: (1) the skills and knowledge necessary for the position in question; (2) the type of training needed to provide the trainee the identified skills and/or knowledge; (3) whether the trainee can competently perform his/her job function; and (4) whether the training is effective or requires adjustment.<sup>5</sup> Like PER-005-1, proposed Reliability Standard PER-005-2 does not

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<sup>4</sup> Order No. 693 at P 1382; Order No. 742 at P 25.

<sup>5</sup> Systematic approaches to training are generally characterized by five distinct, yet interrelated phases: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation.

mandate the use of a particular systematic approach to training model; rather it provides entities the discretion to determine the manner in which they will apply the principles of a systematic approach to training to develop and implement training requirements for their applicable personnel.

The proposed Reliability Standard also addresses FERC's directive from Order No. 742 to develop an implementation period for those entities that may, at some time in the future, become subject to the requirement to provide emergency operations training using simulation technology.<sup>6</sup> Requirement R4, part 4.1 of the proposed Reliability Standard provides Reliability Coordinators, Balancing Authorities, Transmission Operators, and Transmission Owners 12 months from the date that they (1) gain operational authority or control over Facilities with established IROLs, or (2) establish protection systems or operating guides to mitigate IROL violations, to comply with the requirement to provide emergency operations training to their applicable personnel using simulation technology. The 12-month period is designed to provide such entities sufficient time to acquire the necessary simulation technology and modify their training programs to account for the use of simulation technology.

Proposed Reliability Standard PER-005-2 also improves upon the prior version of the Reliability Standard by clarifying language in certain requirements and eliminating redundant or unnecessary requirements. For instance, PER-005-2 does not retain the obligation in Requirement R3 of PER-005-1 that Reliability Coordinators, Balancing Authorities, and Transmission Operators provide their System Operators at least 32 hours of emergency operations training every 12 months. As further explained below, the frequency and amount of emergency operations training for System Operators is most appropriately determined by each

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<sup>6</sup> Order No. 742 at P 24.

entity's training program developed in accordance with Requirement R1, rather than a uniform requirement applied to each entity regardless of its unique characteristics or reliability risk to the Bulk-Power System.

Finally, NERC proposes modifications to the definition of "System Operators" in the NERC Glossary. The purpose of the proposed modifications is to properly limit the definition to those operations personnel that have the independent authority to operate the BES in Real-time.

## **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 Standard was developed in an open and fair manner and in accordance with Reliability Standard development process.<sup>7</sup> NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of

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<sup>7</sup> *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672 at P 334, FERC Stats. & Regs. ¶ 31,204, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).



Procedure and the NERC Standard Processes Manual.<sup>8</sup> 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 approve a Reliability Standard before the Reliability Standard is submitted for applicable governmental authority approval.

## **B. History of PER Training Reliability Standards**

### **1. PER-002-0**

NERC submitted four PER Reliability Standards: PER-001-0, PER-002-0 and PER-003-0 on April 4, 2006, and PER-004-1 on December 5, 2006. PER-002-0, which has since been replaced by PER-005-1, as explained below, required each Transmission Operator and Balancing Authority to be staffed with adequately trained operating personnel. Specifically, PER-002-0 (1) directed each Transmission Operator and Balancing Authority to have a training program for all operating personnel who occupy positions that either have primary responsibility, directly or indirectly, for the Real-time operation of the Bulk-Power System or who are directly responsible for complying with the NERC Reliability Standards; (2) listed criteria that must be met by the training program; and (3) required that operating personnel receive at least five days of training in emergency operations each year using realistic simulations.

In Order No. 693, FERC directed NERC to develop the following modifications to PER-002-0:

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<sup>8</sup> 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](http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf).

- identify the expectations of the training for each job function;
- develop training programs tailored to each job function with consideration of the individual training needs of the personnel;
- expand the applicability of the training requirements to include: (i) reliability coordinators, (ii) local transmission control center personnel, (iii) generator operators centrally-located at a generation control center with a direct impact on the reliable operation of the Bulk-Power System, and (iv) operations planning and operations support staff who carry out outage planning and assessments and those who develop SOLs, IROLs, or operating nomograms for Real-time operations;
- use a systematic approach to training methodology for developing new training programs; and
- include the use of simulators by Reliability Coordinators, Transmission Operators, and Balancing Authorities that have operational control over a significant portion of load and generation.<sup>9</sup>

FERC also directed the ERO to determine whether it is feasible to develop meaningful performance metrics associated with the effectiveness of a training program required by currently effective Reliability Standard PER-002-0 and to consider whether personnel who support Energy Management System (“EMS”) applications should be included in mandatory training pursuant to the Reliability Standard.<sup>10</sup>

While PER-002-0 addressed training requirements for Transmission Operators and Balancing Authorities, PER-004-1 applied to Reliability Coordinators. Specifically, PER-004-1 required:

- each Reliability Coordinator to be staffed with adequately trained, NERC-certified operators, 24 hours a day, seven days a week (Requirement R1); and
- Reliability Coordinator operating personnel to: (i) complete a minimum of five days of training in emergency operations each year using realistic simulations (Requirement R2), (ii) have a comprehensive understanding of the area of the Bulk-Power System for which they are responsible (Requirement R3), (iii) have an extensive understanding of the Balancing Authorities, Transmission Operators, and Generation Operators within their

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<sup>9</sup> Order No. 693 at P 1393.

<sup>10</sup> *Id.* at P 1394.

area (Requirement R4), and (iv) place particular attention on SOLs and IROLs and intertie facility limits (Requirement R5).

In Order No. 693, FERC directed NERC to include formal training requirements for Reliability Coordinators similar to those in PER-002-0.<sup>11</sup>

2. PER-005-1

In response to FERC's directives in Order No. 693, NERC submitted on November 2, 2009 proposed Reliability Standards PER-005-1 (System Personnel Training) and PER-004-2 (Reliability Coordination – Staffing) to replace PER-002-0 and PER-004-1, respectively. Reliability Standard PER-005-1, which superseded all of PER-002-0 as well as Requirements R2, R3, and R4 of PER-004-1, was designed to help ensure that System Operators performing reliability-related tasks on the North American BES are competent to perform those reliability-related tasks. PER-005-1 applies to Reliability Coordinators, Balancing Authorities, and Transmission Operators and contains the following three requirements:

1. Requirement R1 mandates that Reliability Coordinators, Balancing Authorities, and Transmission Operators “use a systematic approach to training to establish a training program for the BES company-specific reliability-related tasks performed by System Operators and implement the program.” The requirement further requires applicable entities to create a list of company-specific, reliability-related tasks performed by their System Operators (R1.1); update the task list every calendar year (R1.1.1); and design and develop learning objectives and training materials based on the task list (R1.2). Finally, the requirement mandates that training be delivered (R1.3) and that the training program be evaluated on at least an annual basis to assess its effectiveness (R1.4).
2. Requirement R2 requires that Reliability Coordinators, Balancing Authorities, and Transmission Operators verify each of their System Operator's ability to perform the tasks identified in Requirement R1.1. The requirement also mandates that within six months of a modification to the task list, each System Operator's ability to perform those new or modified tasks must be verified.
3. Requirement R3 identifies the number of hours of emergency operations training (at least 32 hours) that a System Operator is required to receive every twelve months. Requirement R3.1 further requires that applicable entities that have operational authority or control over Facilities with established IROLs or have established operating guides or

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<sup>11</sup> *Id.* at P 1415.

protection systems to mitigate IROL violations provide their System Operators emergency operations training using simulation technology, such as a simulator, virtual technology, or other technology that replicates the operational behavior of the BES during normal and emergency conditions.

Reliability Standard PER-004-2 modified PER-004-1 by deleting Requirements R2, R3, and R4, as these three requirements were incorporated into proposed PER-005-1. PER-004-2 simply carried forward, unchanged, the remaining provisions from PER-004-1.

FERC approved Reliability Standards PER-005-1 and PER-004-2 in Order No. 742.<sup>12</sup> As discussed in that order, while Reliability Standard PER-005-1 addressed most of FERC's directives from Order No. 693, NERC designated certain directives to be addressed in a subsequent Reliability Standards development project. In particular, Reliability Standard PER-005-1 did not address FERC's directives to expand the applicability of the training requirements to include: (1) local transmission control center operator personnel;<sup>13</sup> (2) certain Generator Operator dispatch personnel centrally-located at a generation control center;<sup>14</sup> and (3) operations and planning support personnel who carry out outage planning and assessments and those who develop SOLs, IROLs, or operating nomograms for real-time operations.<sup>15</sup> NERC also had yet to consider whether personnel who support EMS applications should be included in mandatory training requirements.<sup>16</sup> Consistent with NERC's commitment to address these directives in a future development project, FERC directed NERC to satisfy these unaddressed directives.<sup>17</sup> Additionally, FERC directed NERC to consider the necessity of developing an implementation

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<sup>12</sup> Order No. 742 at P 1.

<sup>13</sup> *Id.* at PP 61-64.

<sup>14</sup> *Id.* at PP 74, 81, 83-85.

<sup>15</sup> *Id.* at PP 74, 81-2.

<sup>16</sup> Order No. 693 at P 1373.

<sup>17</sup> Order No. 742 at PP 64, 81-86.

period for those entities that may become subject to the requirement to provide emergency operations training using simulation technology.<sup>18</sup>

The following section provides additional background on these outstanding FERC directives.

### 3. Outstanding FERC Directives

#### *i. Local Transmission Control Center Operator Personnel*

In Order No. 693, FERC directed NERC to expand the applicability of Reliability Standard PER-002-0 to include local transmission control center operator personnel.<sup>19</sup> FERC noted that decision making and implementation may be performed by separate groups in an Independent System Operator (“ISO”) or Reliability Transmission Organization (“RTO”) context, as well as other organizations that pool resources.<sup>20</sup> FERC stated that the personnel of control centers and organizations that are necessary for the actual implementation of the decision or are needed for operation and maintenance made by the ISO, RTO or pooled resource organization should receive training under the standard.<sup>21</sup> Specifically, FERC stated:

Clearly, in a region where an RTO or ISO performs the transmission operator function, its personnel with primary responsibility for real-time operations must receive formal training pursuant to PER-002-0. In addition, personnel who are responsible for implementing instructions at a local control center also affect the reliability of the Bulk Power System. These entities may take independent action under certain circumstances, for example, to protect assets, personnel safety and during system restorations. Whether the RTO or the local control center is ultimately responsible for compliance is a separate issue addressed above, but regardless of which entity registers for that responsibility, these local control center employees must receive formal training consistent with their roles, responsibilities and tasks. Thus, while we direct the ERO to develop

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<sup>18</sup> *Id.* at P 24.

<sup>19</sup> Order No. 693 at PP 1342-48.

<sup>20</sup> *Id.* at P 1342.

<sup>21</sup> *Id.* At 1342-43.

modifications to PER-002-0 to include formal training for local control center personnel, that training should be tailored to the needs of the positions.<sup>22</sup>

FERC further explained which type of control centers and personnel were subject to the directive. FERC clarified that where a large utility within an RTO or ISO footprint has one centrally-located control center whose function is to supervise several distributed control centers, each with remote monitoring and control capability, the personnel of the centrally-located control center, not the personnel at the distributed control center, should receive formal training under the Reliability Standard.<sup>23</sup> Similarly, FERC stated that where smaller entities have a single control center that implements operating instructions from its Transmission Operator (e.g., an RTO, ISO or pooled resource), the operators at these control centers should be trained under the Reliability Standards as they may also may take independent action to protect assets, safety and system restoration.<sup>24</sup> FERC noted, however, that individuals who carry out field switching operations and station inspections at the direction of the local control center operators are not subject to the directive.<sup>25</sup> Lastly, FERC noted that local control center operators need not be trained in the same manner, or to the same extent as System Operators at a Transmission Operator, Balancing Authority or Reliability Coordinator. Rather, the training program should be tailored to the functions of local control center operators.<sup>26</sup>

In Order No. 742, FERC reiterated its conclusion that omitting such local transmission control center operator personnel from mandatory training requirements creates a reliability gap:

The Commission understands that local transmission control center personnel exercise control over a significant portion of the Bulk-Power System under the

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<sup>22</sup> *Id.* at P 1343.

<sup>23</sup> Order No. 693 at P 1344.

<sup>24</sup> *Id.* at P 1345.

<sup>25</sup> *Id.* at P 1346.

<sup>26</sup> *Id.* at P 1348.

supervision of the personnel of the registered transmission operator. This supervision may take the form of directing specific step-by-step instructions and at other times may take the form of the implementation of predefined operating procedures. For example, ISO New England, Inc., PJM Interconnection, L.L.C., and New York Independent System Operator, Inc., are registered transmission operators who issue operating instructions that are carried out by local transmission control centers such as PSE&G, PPL Electric Utilities Corp., PECO Energy Company, Baltimore Gas and Electric Co., Consolidated Edison of New York, Inc., National Grid USA, and Long Island Power Authority, which are not registered transmission operators. The combined peak load of these three RTOs is in excess of 200 gigawatts. In all cases, the local transmission control center personnel must understand what they are required to do in the performance of their duties to perform them effectively on a timely basis. Thus, omitting such local transmission control center personnel from the PER-005-1 training requirements creates a reliability gap. The Commission believes that identifying these entities would be a valuable step in delineating the magnitude of that gap.<sup>27</sup>

Accordingly, in Order No. 742 FERC reiterated its directive to develop training requirements for, and develop a definition of, local transmission control center operator personnel.<sup>28</sup>

*ii. Generator Operator Dispatch Personnel*

In Order No. 693, FERC concluded that because a Generator Operator has the potential to directly impact the reliable operation of the Bulk-Power System, its personnel should be trained under NERC's Reliability Standards.<sup>29</sup> FERC asserted that although Generator Operators take directions from Balancing Authorities and others, which limits their ability to impact reliability, it is essential that Generator Operator personnel have appropriate training to understand those instructions, particularly in an emergency situation in which instructions may be succinct and require immediate action.<sup>30</sup>

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<sup>27</sup> Order No. 742 at P 62.

<sup>28</sup> *Id.* at PP 63-64.

<sup>29</sup> Order No. 693 at P 1359.

<sup>30</sup> *Id.* at P 1359.

FERC limited the directive to personnel of a Generator Operator that perform dispatch activities, namely, those dispatch personnel at a “centrally-located dispatch center that receive[] direction and then develop[] specific dispatch instructions for plant operators under their control.”<sup>31</sup> This group of personnel would include a Generator Operator’s dispatch personnel where a single generator and dispatch center are located at the same site.<sup>32</sup> FERC clarified that while plant operators located at the generator plant site also need to be trained, the responsibility for this training is outside the scope of the Reliability Standard.<sup>33</sup>

FERC recognized, however, that “the experience and knowledge required by Transmission Operators about Bulk-Power System operations goes well beyond what is needed by Generation Operators.”<sup>34</sup> Accordingly, FERC stated that (1) the training for the applicable Generator Operator personnel “need not be as extensive as that required for Transmission Operators;” and (2) “the training requirements developed by the ERO should be tailored in their scope, content and duration so as to be appropriate to generation operations personnel and the objective of promoting system reliability.”<sup>35</sup>

### *iii. Operations and Planning Support Personnel*

FERC also directed NERC to extend the training requirements to certain operations planning and operations support staff.<sup>36</sup> FERC clarified that the applicable support staff are “those [individuals] who carry out outage coordination and assessments in accordance with Reliability Standards IRO-004-1 and TOP-002-2, and those who determine SOLs and IROLs or

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<sup>31</sup> Order No. 693 at P 1360; Order No. 742 at P 83.

<sup>32</sup> Order No. 693 at P 1361; Order No. 742 at P 83.

<sup>33</sup> *Id.* at PP 1360-61.

<sup>34</sup> Order No. 693 at P 1363.

<sup>35</sup> *Id.* at P 1363.

<sup>36</sup> *Id.* at P 1372.



operating nomograms in accordance with Reliability Standards IRO-005-1 and TOP-004-0.”<sup>37</sup> FERC concluded that the Reliability Standard should apply to these operations planning and operations support staff because they have a direct impact on the reliable operation of the Bulk-Power System. FERC noted, however, that such personnel need not be trained on the responsibilities of System Operators; rather the training should be tailored to the needs of their functions, the tasks performed and personnel involved.<sup>38</sup>

*iv. EMS Personnel*

In its discussion of support personnel in Order No. 693, FERC also stated that it “is aware that the personnel responsible for ensuring that critical reliability applications of the EMS, such as state estimator, contingency analysis and alarm processing packages, are available, up-to-date in terms of system data and produce useable results can also have an impact on the Reliable Operation of the Bulk-Power System.”<sup>39</sup> Because FERC was uncertain about the impact of EMS personnel on reliable operations, however, FERC only directed NERC to consider whether EMS personnel should be included in a mandatory training requirement.

*v. Implementation Period for Simulation Training*

As noted above, Requirement R3.1 of PER-005-1 identifies the entities that must use simulation technology when providing emergency operations training. While the implementation plan for PER-005-1 addressed lead times for compliance based on governmental approval, the standard does not provide any lead times for compliance when an entity becomes subject to the requirement after the regulatory effective date of the standard. In Order No. 742, FERC directed NERC to consider the necessity of developing an implementation period for

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<sup>37</sup> Order No. 693 at P 1372; Order No. 742 at P 82.

<sup>38</sup> Order No. 693 at P 1375.

<sup>39</sup> *Id.* at 1373.

those entities that may become, in the future, subject to the simulator training requirement in Requirement R3.1 of PER-005-1.

### **C. Procedural History of NERC Project 2010-01 Training**

The proposed Reliability Standard was developed as part of NERC Project 2010-01 Training, which was initiated to address the outstanding FERC directives from Order Nos. 693 and 742 related to Reliability Standard PER-005-1. Project 2010-01 Training arose from an informal development process that NERC began in February 2013 to review the outstanding directives. Participants in this informal development 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 and, given their experience with Reliability Standard PER-005-1, ways to improve the standard. The informal group also conducted industry outreach to obtain feedback on approaches for responding to the outstanding directives and improving the standard. After considering this feedback, the informal participants drafted a revised Reliability Standard, PER-005-2, to address FERC's outstanding directives and improve the quality and content of the standard.

Project 2010-01 Training was formally initiated on July 18, 2013 with the posting of a Standard Authorization Request along with the draft of proposed PER-005-2 developed by the informal participants for a 45-day formal comment period and ballot. Following the July 18, 2013 posting, a standard drafting team was formed. As further described in Exhibit F hereto, drafts of the proposed Reliability Standard were posted for two additional comment periods and ballots. The third ballot received a quorum of 79.12% and an approval of 74.63%. Following approval of the proposed standard in a Final Ballot, the NERC Board of Trustees approved

proposed PER-005-2, the proposed new and modified definitions used therein, and the retirement of PER-005-1 on February 6, 2014.

#### **IV. JUSTIFICATION**

As discussed below and in Exhibit C, proposed Reliability Standard PER-005-2 satisfies the Reliability Standards criteria and is 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 Standard; (2) a discussion of the requirements in the proposed Reliability Standard, including an explanation of how each requirement improves upon the prior version of the Reliability Standard and, where applicable, satisfies outstanding FERC directives; (3) a discussion of the enforceability of the proposed Reliability Standard; and (4) an explanation of the proposed modifications to the definition of the term “System Operator.”

##### **A. Basis and Purpose of the Proposed Reliability Standard**

The proposed Reliability Standard serves the vital reliability goal of helping to ensure that personnel who perform or support Real-time operations on the BES are adequately trained to maintain the reliable operation of the BES. Training individuals that both perform and support Real-time operations is an integral step in enhancing the reliability of the Bulk-Power System. It is important to train operators and their support personnel to, among other things, understand what they are required to do in the performance of their duties, particularly in emergency circumstances, and to perform those duties effectively and on a timely basis in support of reliable operations.

Proposed Reliability Standard PER-005-2 replaces and improves upon the prior version of the standard by addressing outstanding FERC directives from Order Nos. 693 and 742, clarifying language in certain requirements, and eliminating redundant or unnecessary requirements. First, the proposed Reliability Standard improves upon Reliability Standard PER-

005-1 by expanding the scope of the Reliability Standard to include training requirements for: (1) local transmission control center operator personnel; (2) Operations Support Personnel; and (3) certain Generator Operator dispatch personnel centrally-located at a generation control center. As noted above, currently effective Reliability Standard PER-005-1 is limited to requiring Reliability Coordinators, Balancing Authorities and Transmission Operators to train and verify the capabilities of their System Operators. As FERC recognized in Order No. 693, however, while System Operators have primary responsibility for Real-time operations, there are other personnel – namely, local transmission control center operator personnel, certain planning and operations support personnel, and certain Generator Operator dispatch personnel – that perform or support Real-time operations on the BES and could directly impact BES reliability. As such, including mandatory training requirements for these personnel under NERC’s Reliability Standard will serve to enhance the reliability of the BES.

As is already required for System Operators, proposed Reliability Standard PER-005-2 requires the use of a systematic approach to develop and implement training requirements for local transmission control center operator personnel, certain planning and operations support personnel, and certain Generator Operator dispatch personnel. The proposed Reliability Standard requires, consistent with the principles of an effective systematic approach to training, that the training for these personnel be tailored to the needs of the respective positions and their impact to BES reliability.

As explained further below, however, the standard drafting team determined, based on research conducted by the NERC Operating Committee’s Event Analysis Subcommittee, that there was insufficient evidence at this time to warrant an extension of the mandatory training

requirements to personnel that support EMS applications. The ERO will continue to assess the need for mandatory training of these personnel.

The proposed Reliability Standard further modifies the prior version of the standard to include an implementation period for those entities that may become subject, at some point in the future, to the requirement to provide emergency operations training using simulation technology. Consistent with FERC's directive, the implementation period is designed to provide such entities sufficient time to acquire the appropriate simulation technology and modify their training programs before they are required to comply with the requirement to use simulation technology.

In addition to modifying Reliability Standard PER-005-1 to address FERC directives, the standard drafting team sought to modify the standard to improve the clarity, quality and content of the Reliability Standard. The most substantive modification was the removal of the obligation from Requirement R3 of PER-005-1 that Reliability Coordinators, Balancing Authorities, and Transmission Operators provide their System Operators at least 32 hours of emergency operations training every 12 months. As further explained below, the frequency and amount of emergency operations training for System Operators is most appropriately determined by each entity's systematic approach to developing and implementing a training program tailored to the needs of its organization, rather than a uniform requirement applied to each entity regardless of the entity's unique characteristics or reliability risk to the Bulk-Power System.

#### **B. Requirements of Proposed Reliability Standard PER-005-2**

The proposed Reliability Standard contains six requirements that comprehensively address training requirements for System Operators, local transmission control center operators, Operations Support Personnel and applicable Generator Operator dispatch personnel. With the exception of removing the 32-hour emergency operations training requirement, the proposed

Reliability Standard carries over all of the requirements of Reliability Standard PER-005-1 and includes three new requirements to address FERC directives, as follows:<sup>40</sup>

- *Requirement R1* covers training requirements for System Operators and includes the same substantive requirements as those provided in PER-005-1, Requirement R1. The only modifications to Requirement R1 were non-substantive and designed to increase the clarity of the requirement.
- *Requirement R2* is a new requirement that covers training requirements for local transmission controls center operators. The requirements in Requirement R2 mirror those in Requirement R1 for System Operators.
- *Requirement R3*, which maps to Requirement R2 of PER-005-1, requires the verification of a System Operator's and a local transmission control center operator's ability to perform Real-time, reliability-related tasks. The only differences between proposed PER-005-2, Requirement R3 and PER-005-1, Requirement R2 is the inclusion of local transmission control center operators and certain minor changes to the language to provide additional clarity.
- *Requirement R4*, which maps to Requirement R3.1 of PER-005-1, identifies those entities that must provide emergency operations training using simulation technology. In contrast to Requirement R3.1 of PER-005-1, Requirement R4 of proposed PER-005-2, includes local transmission control center operators as personnel that may be required to receive emergency operations training using simulation technology. Additionally, Requirement R4, part 4.1 includes a 12-month implementation period for those entities that may become subject to the requirement at some point in the future.
- *Requirement R5* is a new requirement that requires Reliability Coordinators, Balancing Authorities and Transmission Operators to use a systematic approach to develop and implement training for Operations Support Personnel on how their job function(s) impact the Real-time reliability-related tasks which they support.
- *Requirement R6* is a new requirement that requires Generator Operators to use a systematic approach to develop and implement training for dispatch personnel at a centrally located dispatch center who receive direction from the Generator Operator's Reliability Coordinator, Balancing Authority, Transmission Operator or Transmission Owner, and develop specific dispatch instructions for plant operators under their control.

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<sup>40</sup> Exhibit D to this Petition is a mapping document showing the translation of PER-005-1 to proposed PER-005-2. Additionally, Exhibit A includes a redline of the Reliability Standard comparing PER-005-1 and proposed PER-005-2.

The following is a more detailed discussion of each requirement in proposed Reliability Standard PER-005-2, including an explanation of how each requirement improves upon the prior version of the Reliability Standard and, where applicable, satisfies outstanding FERC directives.

Requirement R1 covers the development and implementation of training programs for System Operators, as follows:

- R1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall use a systematic approach to develop and implement a training program for its System Operators as follows:
  - 1.1. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall create a list of Bulk Electric System (BES) company-specific Real-time reliability-related tasks based on a defined and documented methodology.
    - 1.1.1. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall review, and update if necessary, its list of BES company-specific Real-time reliability-related tasks identified in part 1.1 each calendar year.
  - 1.2. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall design and develop training materials according to its training program, based on the BES company-specific Real-time reliability-related task list created in part 1.1.
  - 1.3. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall deliver training to its System Operators according to its training program.
  - 1.4. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall conduct an evaluation each calendar year of the training program established in Requirement R1 to identify any needed changes to the training program and shall implement the changes identified.

The language and structure of Requirement R1 are virtually the same as Requirement R1 of PER-005-1. There were no substantive changes to the obligations imposed upon Reliability Coordinators, Balancing Authorities, and Transmission Operators by the prior version of the requirement. Requirement R1 continues to require the training of System Operators using a systematic approach to training, which is a proven approach to: identify System Operator tasks and the associated skills and knowledge necessary to accomplish those tasks; determine the

competency levels of each System Operator to carry-out those tasks; determine the competency gaps; and design, implement and evaluate a training plan to address each System Operator's competency.

The standard drafting team, however, sought to modify certain language in the requirement to provide additional clarity. Among others, the standards drafting team made the following modifications:

- Replacing the phrase “shall use a systematic approach to training to establish a training program” with “shall use a systematic approach to develop and implement a training program” to make the provision more readable and clarify the performance obligation (“develop and implement” vs. establish).
- Including the term “Real-time” before the phrase “reliability-related task” to clarify that the relevant tasks are those performed in Real-time.
- Including the phrase “based on a defined and documented methodology” in part 1.1 to clarify that the task list to be created must, consistent with a systematic approach to training, be based on a defined and documented methodology.
- Clarifying part 1.2 to state that the training material to be developed must be designed and developed based on the entity's BES company-specific Real-time reliability-related tasks, rather than some generic training materials.
- Replacing the phrase “an annual evaluation” with “an evaluation every calendar year” in part 1.4 to clarify the timeline for performing evaluations of the training program.

These modifications are designed to improve the strength and quality of the training delivered to System Operators in accordance with Requirement R1.

Requirement R2 is a new requirement designed to satisfy FERC's directive to expand the training requirements to include local transmission control center operators. Requirement R2 mirrors the obligations in Requirement R1, as follows:

**R2.** Each Transmission Owner shall use a systematic approach to develop and implement a training program for its personnel identified in Applicability Section 4.1.4.1 of this standard as follows:

2.1. Each Transmission Owner shall create a list of BES company-specific Real-time reliability-related tasks based on a defined and documented methodology.



- 2.1.1. Each Transmission Owner shall review, and update if necessary, its list of BES company-specific Real-time reliability-related tasks identified in part 2.1 each calendar year.
- 2.2. Each Transmission Owner shall design and develop training materials according to its training program, based on the BES company-specific Real-time reliability-related task list created in part 2.1.
- 2.3. Each Transmission Owner shall deliver training to its personnel identified in Applicability Section 4.1.4.1 of this standard according to its training program.
- 2.4. Each Transmission Owner shall conduct an evaluation each calendar year of the training program established in Requirement R2 to identify any needed changes to the training program and shall implement the changes identified.

Applicability Section 4.1.4.1 identifies Transmission Owner “[p]ersonnel, excluding field switching personnel, who can act independently to operate or direct the operation of the Transmission Owner’s Bulk Electric System transmission Facilities in Real-time.” The standard drafting team identified these personnel as the “local transmission control center operators” described in Order No. 693 and Order No. 742.<sup>41</sup> As provided in Order No. 742, it is Transmission Owners in RTO/ISO or other pooled resource contexts, “such as PSE&G, PPL Electric Utilities Corp., PECO Energy Company, Baltimore Gas and Electric Co., Consolidated Edison of New York, Inc., National Grid USA, and Long Island Power Authority, which are not registered transmission operators,” that have local transmission control centers whose operators carry out the instructions issued by RTOs/ISOs or other pooled resource organization.<sup>42</sup>

As FERC stated in Order No. 693, these personnel “may take independent action under certain circumstances, for example, to protect assets, personal safety and during system restorations.”<sup>43</sup> As such, Applicability Section 4.1.4.1 focuses on Transmission Owner personnel

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<sup>41</sup> Order No. 693 at pp 1342-46; Order No. 742 at p 62.

<sup>42</sup> Order No. 742 at P 62.

<sup>43</sup> Order No. 693 at P 1343. *See also* Order No. 693 at P 1347 (“...these operators maintain authority to act independently to carry out tasks that require real-time operation of the Bulk-Power System, including protecting

that may “act independently to operate or direct the operation” of the Transmission Owner’s transmission facilities in Real-time. Field switching personnel are properly excluded in accordance with Order No. 693 as these personnel “are not involved with the transmission operator at the ISO or RTO or at organizations with pooled resources.”<sup>44</sup>

Because of their authority to take independent action to carry out tasks that require Real-time operation of the Bulk-Power System, local transmission controls center operators are treated similarly to System Operators under the proposed Reliability Standard. Specifically, the training requirements in Requirement R2 mirror those required for System Operators under Requirement R1. Additionally, like System Operators, Transmission Owners must (i) verify the capabilities of their local control center operators under Requirement R3 and, (ii) for those Transmission Owners that meet the criteria specified in Requirement R4, provide emergency operations training to their local control center operators using simulation technology.

Consistent with the requirement to use a systematic approach to training, however, the actual training program for local transmission control center operators must be consistent with their roles, responsibilities and tasks, and would not necessarily cover the same topics, or be structured in the same manner, as the programs developed for System Operators pursuant to Requirement R1. As FERC stated in Order No. 742, training local control center operator personnel will further the reliability goal of helping to ensure that local transmission control center operators “understand what they are required to do in the performance of their duties to perform them effectively on a timely basis.”<sup>45</sup>

Requirement R3 provides as follows:

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assets, protecting personal safety, adhering to regulatory requirements and establishing stable islands during system restorations.”)

<sup>44</sup> Order No. 693 at P 1346.

<sup>45</sup> Order No. 742 at P 62.

**R3.** Each Reliability Coordinator, Balancing Authority, Transmission Operator, and Transmission Owner shall verify, at least once, the capabilities of its personnel, identified in Requirement R1 or Requirement R2, assigned to perform each of the BES company-specific Real-time reliability-related tasks identified under Requirement R1 part 1.1 or Requirement R2 part 2.1.

3.1. Within six months of a modification or addition of a BES company-specific Real-time reliability-related task, each Reliability Coordinator, Balancing Authority, Transmission Operator, and Transmission Owner shall verify the capabilities of each of its personnel identified in Requirement R1 or Requirement R2 to perform the new or modified BES company-specific Real-time reliability-related tasks identified in Requirement R1 part 1.1 or Requirement R2 part 2.1.

As noted above, Requirement R3 carries over the obligation from Requirement R2 of PER-005-1 that Reliability Coordinators, Balancing Authorities and Transmission Operators verify the capabilities of each of their System Operators assigned to perform the Real-time reliability-related tasks identified in accordance with Requirement R1. Requirement R3 improves upon PER-005-1, Requirement R2 by requiring that Transmission Owners also verify the capabilities of each of their local transmission control center operators assigned to perform the Real-time reliability-related tasks identified in accordance with Requirement R2. In addition, the standard drafting team modified the language from the prior version of the standard to provide clarity.

Part 3.1 of Requirement R3 mirrors Requirement R2.1 of PER-005-1 in that it provides applicable entities six months to verify their applicable personnel's capability to perform a new or modified task added to the Real-time reliability related task list required by Requirement R1 part 1.1 or Requirement R2 part 2.1.

Requirement R4 identifies those entities that must provide emergency operations training using simulation technology, as follows:

**R4.** Each Reliability Coordinator, Balancing Authority, Transmission Operator, and Transmission Owner that (1) has operational authority or control over Facilities with established Interconnection Reliability Operating Limits (IROLs), or (2) has established protection systems or operating guides to mitigate IROL violations, shall

provide its personnel identified in Requirement R1 or Requirement R2 with emergency operations training using simulation technology such as a simulator, virtual technology, or other technology that replicates the operational behavior of the BES.

4.1. A Reliability Coordinator, Balancing Authority, Transmission Operator, or Transmission Owner that did not previously meet the criteria of Requirement R4, shall comply with Requirement R4 within 12 months of meeting the criteria.

Requirement R4 carries over the obligation from Requirement R3.1 of PER-005-1 that Reliability Coordinators, Balancing Authorities, and Transmission Operators that have (1) operational authority or control over Facilities with established IROLs, or (2) established protection systems or operating guides to mitigate IROL violations, provide their System Operators emergency operations training using simulation technology. Requirement R4 improves upon Requirement R3.1 of PER-005-1 by also requiring that Transmission Owners that meet the above described criteria also use simulation technology when providing emergency operations training to their local transmission control center operators. While it is unlikely for a Transmission Owner to have operational authority or control over Facilities with an IROL, certain applicable Transmission Owners may have established protection systems or operating guides to mitigate IROL violations. In addition, the standard drafting team modified the language from the prior version of the standard to provide clarity.

Consistent with FERC directives, part 4.1 of Requirement R4 includes a 12-month implementation period for those entities that may, at some future time after the effective date of the proposed Reliability Standard, meet the criteria for having to comply with Requirement R4. The 12-month implementation period is necessary to provide such entities sufficient time to acquire the necessary simulation technology and modify their training programs before they are required to comply with the requirement to use simulation technology.

The proposed Reliability Standard does not retain the obligation from PER-005-1, Requirement R3 that Reliability Coordinators, Balancing Authorities, and Transmission

Operators provide their System Operators at least 32 hours of emergency operations training every 12 months. The standard drafting team concluded that such a requirement is unnecessary and inconsistent with the obligation in Requirement R1 to use a systematic approach to develop and implement a training program for System Operators. As discussed above, inherent in any systematic approach to training method is an analysis of the skills and knowledge necessary for the position in question and the design, development and implementation of a training program based on that analysis. Because emergency operations are a significant component of many of the BES company-specific Real-time reliability-related tasks performed by System Operators, emergency operations training must be an integral part of any training program developed in accordance with Requirement R1. Specifically, Requirement R1 obligates Reliability Coordinators, Balancing Authorities, and Transmission Operators to:

- include all BES company-specific Real-time reliability-related tasks performed by System Operators, including those tasks involving emergency operations, in their list of tasks required by part 1.1;
- analyze the skills and knowledge necessary for their System Operators to competently perform those tasks;
- design and develop, in accordance with part 1.2, training materials and requirements for their System Operators, which must include the frequency and amount of emergency operations training necessary for System Operators to competently perform the tasks involving emergency operations.;
- provide emergency operations training to their System Operators in accordance with their training program, as required by part 1.3; and
- evaluate the effectiveness of their training program, including their emergency operations training, every calendar year to identify and implement any necessary changes, as required by part 1.4.<sup>46</sup>

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<sup>46</sup> These same obligations would apply to Transmission Owners in developing training programs for their local control center operators under Requirement R2. Transmission Owners will be required to identify any Real-time reliability-related tasks involving emergency operations that are performed by their local control center operators and then design, develop and implement a training program that include emergency operations training. The frequency and amount of such training would be dictated by the analysis of the skills and knowledge necessary

The standard drafting team thus concluded that a generally applicable requirement mandating a minimum amount of emergency operations training, irrespective of the entity's unique characteristics or reliability risk to the Bulk-Power System, is unnecessary and inconsistent with the requirement to use a systematic approach to training methodology. To comply with Requirement R1, Reliability Coordinators, Balancing Authorities, and Transmission Operators will determine the frequency and amount of emergency operations training necessary to support reliable operation of the Bulk-Power System based on an analysis of the needs and risks of their particular organization and the position in question. As noted above, using a systematic approach to training methodology is a widely-accepted approach for developing efficient and effective training programs tailored to the needs and characteristics of the organization and personnel in question.

The proposal to remove the obligation to provide 32 hours of emergency operations training every 12 months does not eliminate the obligation to provide continual emergency operations training to System Operators. As FERC recognized in Order No. 742, continual or repeated training is a fundamental part of any systematic approach to training and an enforceable requirement of the Reliability Standard:

Based on NERC's and the majority of commenters' affirmation that continual training is a fundamental part of a systematic approach to training and an enforceable requirement of under PER-005-1, we find that any systematic approach to training, including the systematic approach to training mandated by Reliability Standard PER-005-1, would entail continual training to refresh System Operators' knowledge and to cover any new tasks relevant to the operation of the Bulk-Power System.<sup>47</sup>

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to help ensure that the local control center operators are competent to perform the tasks involving emergency operations.

<sup>47</sup> Order No. 742 at P 34.

The deletion of Requirement R3 of PER-005-1 simply recognizes that the frequency and amount of emergency operations training is most appropriately determined by an entity as part of its systematic approach to developing and implementing a training program for its System Operators.

Requirement R5 addresses FERC’s directive to expand the scope of the Reliability Standard to include training requirements for “those [individuals] who carry out outage coordination and assessments in accordance with Reliability Standards IRO-004-1 and TOP-002-2, and those who determine SOLs and IROLs or operating nomograms in accordance with Reliability Standards IRO-005-1 and TOP-004-0.”<sup>48</sup> Requirement R5 provides:

**R5.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall use a systematic approach to develop and implement training for its identified Operations Support Personnel on how their job function(s) impact those BES company-specific Real-time reliability-related tasks identified by the entity pursuant to Requirement R1 part 1.1.

5.1. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall conduct an evaluation each calendar year of the training established in Requirement R5 to identify and implement changes to the training.

The proposed definition for Operations Support Personnel mirrors FERC’s description of the type of support personnel that may have a direct impact on reliable operations. Specifically, the term Operations Support Personnel is proposed to be defined as “[i]ndividuals who perform current day or next day outage coordination or assessments, or who determine SOLs, IROLs, or operating nomograms, in direct support of Real-time operations of the Bulk Electric System.”

Requirement R5 serves the important reliability goal of helping to ensure that individuals that support the Real-time operation of the Bulk Electric System, even if not directly responsible for operating any BES Facilities, receive adequate training on how their job functions impact the

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<sup>48</sup> Order No. 693 at P 1372; Order No. 742 at P 82.

Real-time reliability related tasks they support. To be clear, this requirement does not require that Operations Support Personnel be trained on the System Operator's responsibilities; rather, the requirement mandates that training be based on how the roles, responsibilities and tasks of Operations Support Personnel affect the tasks performed by System Operator. This approach is consistent with the use of a systematic approach to training because it requires the training to be directly related to the needs of the position in question.

As noted above, the standard drafting team concluded that it was not necessary, at this time, to expand the scope of the Reliability Standard to include personnel who support EMS applications. The standard drafting team relied on a May 2013 report provided by the NERC Operating Committee's Event Analysis Subcommittee. The report was issued in response to a request by NERC's Standards Committee that the Event Analysis Subcommittee consider which personnel, including EMS support personnel, should be trained under NERC's Reliability Standards. The Event Analysis Subcommittee concluded there was insufficient evidence to warrant extending mandatory training requirements of PER-005-1 to EMS support personnel.<sup>49</sup>

Specifically, the Event Analysis Subcommittee reviewed the reportable events in NERC's Event Analysis database to determine whether there was any evidence demonstrating a need to include EMS support personnel in NERC's mandatory training Reliability Standard. The Event Analysis database included the reportable events on the Bulk-Power System beginning in October 2010. As of May 2013, when the report was issued, the database included over 263 events, 208 of which were cause-coded to allow for trending and cluster analysis. The Event Analysis Subcommittee and NERC Event Analysis staff queried the 208 events for cause-codes that pertained to human error or lack of training. The query produced 44 events that identified

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<sup>49</sup> The Event Analysis Subcommittee is available at <http://www.nerc.com/pa/Stand/PER%20Informal%20Development/NERC%20Event%20Analysis%20Subcommittee%20Response%20to%20Request%20for%20Research%20Updated%2010%20May%202013.pdf>.



human error or lack of training as a possible contributing factor in the event. A further analysis of those 44 events, however, indicated that human error or lack of training was a contributing factor in only 10 of those events. Six of those 10 events were related to the loss of EMS or Supervisory Control and Data Acquisition (SCADA) applications. The report also indicates that out of those six events, only two were deemed to be due to a lack of training. Based on that information, the Event Analysis Subcommittee concluded that while EMS support personnel should receive training, the evidence does not support a need for such personnel to be trained under Reliability Standard PER-005.

Requirement R6 addresses FERC's directive to expand the scope of the Reliability Standard to include training requirements for certain Generator Operator dispatch personnel.

Requirement R6 provides:

**R6.** Each Generator Operator shall use a systematic approach to develop and implement training to its personnel identified in Applicability Section 4.1.5.1 of this standard, on how their job function(s) impact the reliable operations of the BES during normal and emergency operations.

6.1. Each Generator Operator shall conduct an evaluation each calendar year of the training established in Requirement R6 to identify and implement changes to the training.

Applicability Section 4.1.5.1 identifies Generator Operator “[d]ispatch personnel at a centrally located dispatch center who receive direction from the Generator Operator’s Reliability Coordinator, Balancing Authority, Transmission Operator, or Transmission Owner, and may develop specific dispatch instructions for plant operators under their control.” The description of the personnel identified in Applicability Section 4.1.5.1 mirrors FERC’s description of the type of Generator Operator dispatch personnel that may have a direct impact on reliable operations and should be included in the mandatory training Reliability Standard.<sup>50</sup> As FERC recognized,

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<sup>50</sup> Order No. 693 at PP 1360-62; Order No. 742 at P 83.

although Generator Operators take directions from Balancing Authorities and others, which limits their ability to impact reliability, it is essential that these Generator Operator dispatch personnel have appropriate training to understand those instructions, particularly in an emergency situation in which instructions may be succinct and require immediate action.<sup>51</sup> Applicability Section 4.1.5.1 clarifies that, consistent with FERC's directive in Order No. 693, these personnel do not include plant operators located at a generator plant site or personnel at a centrally located dispatch center who simply relay dispatch instructions without making any modifications.<sup>52</sup>

Because of the more limited impact that these Generator Operator dispatch personnel have on the reliable operation of the BES, Requirement R6 only requires that Generator Operators use a systematic approach to develop and implement training for its applicable personnel on how their job function(s) impact the reliable operations of the BES during normal and emergency operations. While an entity may choose to develop a reliability-related task list and other documents typically developed as part of a systematic approach to training methodology, proposed Requirement R6 does not explicitly require them to do so. Nevertheless, applicable Generator Operators must be able to show that their training complies with the principles of a systematic approach to training, such as whether the entity assessed training needs, provided training based on that assessment, and evaluated the training activity.

### **C. Enforceability of the Proposed Reliability Standards**

The proposed Reliability Standard includes VRFs and VSLs. The VRFs and VSLs provide guidance on the way that NERC will enforce the requirements of the proposed Reliability Standard. The VRFs and VSLs for the proposed Reliability Standard comport with

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<sup>51</sup> Order No. 693 at P 1359.

<sup>52</sup> *Id.* at PP 1360-61.

NERC and FERC guidelines related to their assignment. Exhibit E provides a detailed review of the VRFs, the VSLs, and the analysis of how the VRFs and VSLs were determined using these guidelines.

The proposed Reliability Standard also includes 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.<sup>53</sup>

#### **D. Proposed Modifications to the Definition of “System Operator”**

As part of NERC Project 2010-01 Training, the standard drafting team sought to respond to industry requests to modify the NERC Glossary definition of “System Operator” to more accurately describe the personnel the industry generally considers to be System Operators.<sup>54</sup> The current definition of “System Operator is as follows:

An individual at a control center (Balancing Authority, Transmission Operator, Generator Operator, Reliability Coordinator) whose responsibility it is to monitor and control that electric system in real time.

NERC is proposing the following definition:

An individual at a Control Center of a Balancing Authority, Transmission Operator, or Reliability Coordinator who operates or directs the operation of the Bulk Electric System in Real-time.

The purpose of the proposed modification is to properly limit the definition to those operations personnel that have the independent authority to operate the Bulk Electric System in Real-time.

The following is a discussion of each of the modifications to the definition.

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<sup>53</sup> Order No. 672 at P 327 (“There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.”).

<sup>54</sup> See Standard Authorization Request submitted by Thomas J. Bradish of RRI Energy on October 5, 2010 and accepted by the NERC Standards Committee on October 13, 2010, *available at* [http://www.nerc.com/pa/Stand/Project%20201016%20Definition%20of%20System%20Operator%20DL/Project\\_2010-16\\_System\\_Op\\_Definition\\_SAR\\_approved\\_by\\_SC-Clean\\_UPDATED.pdf](http://www.nerc.com/pa/Stand/Project%20201016%20Definition%20of%20System%20Operator%20DL/Project_2010-16_System_Op_Definition_SAR_approved_by_SC-Clean_UPDATED.pdf).

First, the standard drafting team concluded that the phrase “operates or directs the operation of the Bulk Electric System in Real-time” more accurately depicts the function of a System Operator than the phrase “whose responsibility it is to monitor and control that electric system in real time.” Specifically, the duty of a System Operator is to constantly monitor the BES and take the necessary action to operate the system in a reliable and economic manner based on varying system conditions. The System Operator is tasked with, among other things, reacting to varying system conditions by modifying system configurations, generator outputs, and transmission loadings, and directing field personnel to take various actions. The standard drafting team considered the words “monitor” and “control” to be too ambiguous and limiting. The standard drafting team used the phrase “operates or directs the operation” to better capture the duties performed by the System Operator. The standard drafting team also maintains that the phrase “operates or directs the operation” sufficiently limits the definition to the personnel in a Control Center who have the independent authority to operate the BES. Individuals that perform certain tasks under the direct supervision of the NERC-certified System Operator should not be considered to be “operating” the BES.<sup>55</sup>

The other significant change to the definition of System Operator was to remove reference to Generator Operators. The role of a Generator Operator is limited to operating generating units and performing the function of supplying energy and ancillary services to the grid. A Generator Operator is limited in the action it could take without instructions from its Reliability Coordinator, Balancing Authority or Transmission Operator. For instance, a Generator Operator cannot perform contingency analyses, institute switching orders, observe

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<sup>55</sup> As noted in footnote 1 to Reliability Standard PER-003-1, “[n]on-NERC certified personnel performing any reliability-related task of a real-time operating position must be under the direct supervision of a NERC Certified System Operator stationed at that operating position; the NERC Certified System Operator at that operating position has ultimate responsibility for the performance of the reliability-related tasks.”

Real-time transmission line flows and status, or issue Transmission Loading Relief requests. Given this limited scope, the standard drafting team concluded it was not appropriate to categorize Generator Operator personnel as Systems Operators in the same manner as the operating personnel of a Reliability Coordinator, Balancing Authority and Transmission Operator. Removing references to Generator Operators from the definition is consistent with the manner in which the term is used in NERC's Reliability Standards. No Reliability Standard uses the NERC Glossary term "System Operator" to refer to Generator Operator personnel.

Lastly, the definition of System Operator was modified to capitalize the terms "Control Center" and "Real-time" so as to refer to the definition of these terms. Neither "Control Center" nor "Real-time" were defined terms when the current definition of "System Operator" was developed.

## **V. EFFECTIVE DATE**

As described in the Implementation Plan, attached hereto as Exhibit B, the proposed Reliability Standard and new and modified NERC Glossary Terms will become effective the first day of the first calendar quarter that is 24 months beyond the date that this standard is approved by an applicable governmental authority or is otherwise provided for in a jurisdiction where approval by an applicable authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, this standard shall become effective on the first day of the first calendar quarter that is 24 months after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction. . This 24-month implementation period will provide sufficient time for the applicable entities to develop or modify their processes to comply with proposed PER-005-2. The standard drafting team determined that a 24-month implementation period was appropriate because proposed Reliability

Standard PER-005-2 is applicable to functional entities (Transmission Owners and Generator Operators) that are not currently subject to PER-005-1. Transmission Owners and Generator Operators will for the first time be required to develop and implement a systematic approach to training process for their applicable personnel. The standard drafting team concluded that a 24-month implementation period is a sufficient amount of time to allow these entities to develop and implement a systematic approach to training process prior to the enforceability of the proposed standard. The proposed implementation period is consistent with the 24-month implementation period provided to Reliability Coordinators, Balancing Authorities and Transmission Operators under PER-005-1.

The proposed 24-month implementation period is also necessary to provide Reliability Coordinators, Balancing Authorities and Transmission Operators sufficient time to develop training for their Operations Support Personnel. Even though these entities are already subject to PER-005-1, the standard drafting team concluded that these entities will need a 24-month implementation period to modify their processes and training requirements to account for Operations Support Personnel. During the implementation period, Reliability Coordinators, Balancing Authorities and Transmission Operators must continue to comply with the requirements of PER-005-1 applicable to their System Operators.

As described in the proposed Implementation Plan, PER-005-1 will be retired effective 11:59:59 pm of the day immediately prior to the effective date for PER-005-2.

Respectfully submitted,

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Date: March 12, 2014

**Exhibits A, B, and D – G**

**(Available on the NERC Website at**

[http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments\\_PER-005-2\\_filing.pdf](http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments_PER-005-2_filing.pdf))



## 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 Standard PER-005-2 is designed to achieve the specific reliability goal of helping to ensure that personnel who perform or support Real-time operations on the Bulk Power System are adequately trained to maintain the reliable operation of Bulk-Power System. Training individuals that both perform and support Real-time operations is an integral step in enhancing the reliability of the Bulk-Power System. It is important to train operators and their support personnel to, among other things, understand what they are required to do in the performance of their duties, particularly in emergency circumstances, and to perform those duties effectively and on a timely basis in support of reliable operations.

**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 Standard is clear and unambiguous as to what is required and who is required to comply. Proposed Reliability Standard PER-005-2 applies to Reliability Coordinators, Balancing Authorities, Transmission Operators, certain Transmission Owners and certain Generator Operators. The Transmission Owners subject to the proposed Reliability Standard are those that have personnel who can act independently to operate or direct the operation of the Transmission Owner's Bulk Electric System transmission Facilities in Real-time. The Generator Operators subject to the proposed Reliability Standard are those that have dispatch personnel at a centrally located dispatch center who receive direction from the Generator Operator's Reliability Coordinator, Balancing Authority, Transmission Operator, or

Transmission Owner, and may develop specific dispatch instructions for plant operators under their control.

The actions that each entity must take to comply with the proposed Reliability Standard 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 Standard comports 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. These measures 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 Standard achieves the reliability goals effectively and efficiently. The proposed Reliability Standard requires applicable entities to use a systematic

approach to training method. As FERC stated in Order No. 742, “[a] systematic approach to training is a widely-accepted methodology that ensures training is efficiently and effectively conducted.”<sup>1</sup>

**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 Standard does not reflect a “lowest common denominator” approach. To the contrary, the proposed Reliability Standard represents an improvement over existing Reliability Standards by expanding the scope of the Reliability Standard to include training requirements for other individuals that could impact the reliable operation of the Bulk-Power System. In addition, as, noted above, the use of a systematic approach to training is a widely-accepted methodology for providing effective training.

**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 Standard applies throughout North America and does not favor one geographic area or regional model. The proposed Reliability Standard is drafted to accommodate the various practices across the continent.

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<sup>1</sup> Order No. 693 at P 1382; Order No. 742 at P 25.

**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 Standard PER-005-2 has no undue negative effect on competition. The proposed Reliability Standard requires the same performance by each of the applicable Functional Entities in training its applicable personnel. The proposed Reliability Standard does 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 date for the proposed Reliability Standard is just and reasonable and appropriately balances the urgency in the need to implement the proposed Reliability Standard against the reasonableness of the time allowed for those who must comply to develop the necessary training materials. The proposed implementation periods will allow applicable entities adequate time to ensure compliance with the requirements. The proposed effective date is 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 Standard was 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 proceeding, 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 Standard. 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.