

August 14, 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 Five-Year Electric Reliability Organization Performance Assessment Report. 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/ Nina H. Jenkins-Johnston

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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**

**FIVE-YEAR  
ELECTRIC RELIABILITY ORGANIZATION  
PERFORMANCE ASSESSMENT REPORT**

**OVERVIEW OF NERC ACTIVITIES AND ACCOMPLISHMENTS  
IN THE FIVE-YEAR PERIOD**

**AUGUST 14, 2014**

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**Attachment 5:** Status of Areas for Improvement Identified in the Order on the Three-Year ERO Performance Assessment

**Attachment 6:** NERC's Plan and Initiatives for Improving Coordinated Operations Across the ERO Enterprise

## I. INTRODUCTION

### A. Contents of Five-Year ERO Performance Assessment

The North American Electric Reliability Corporation (NERC) hereby submits this *Five-Year Electric Reliability Organization (ERO) Performance Assessment Report*. On December 17, 2009, NERC filed its initial, Three-Year ERO Performance Assessment Report. NERC now submits this *Five-Year ERO Performance Assessment Report*.

In this *Five-Year ERO Performance Assessment Report*, NERC describes its activities and accomplishments during the assessment period<sup>1</sup> in carrying out its statutory and regulatory responsibilities as the ERO, with a particular focus on the latter part of the assessment period and on NERC's current and planned initiatives. This report: (i) describes how NERC continues to meet the Federal Energy Regulatory Commission (FERC) certification criteria of 18 C.F.R. §39.3(b); (ii) evaluates of the effectiveness of each Regional Entity in carrying out its delegated functions;<sup>2</sup> and (iii) addresses stakeholder comments on NERC's performance that were collected in the preparation of this report. As noted, this report identifies actions that NERC and the Regional Entities are currently taking and plan to take to continue to improve their operations to enhance the reliable operation of the bulk power system (BPS). Unlike the three-year performance assessment report, NERC has not presented a program area-by-program area discussion of activities because NERC's annual business plan and budgets (and those of the Regional Entities) provide the applicable governmental authorities with an annual, detailed look at NERC's and each Regional Entity's current and planned activities by program area. Instead, this *Five-Year ERO Performance Assessment Report* highlights activities and accomplishments

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<sup>1</sup> NERC defines the assessment period as January 1, 2009 through May 31, 2014.

<sup>2</sup> The eight Regional Entities are: (i) Florida Reliability Coordinating Council, Inc.; (ii) Midwest Reliability Organization; (iii) Northeast Power Coordinating Council, Inc.; (iv) ReliabilityFirst Corporation; (v) SERC Reliability Corporation; (vi) Southwest Power Pool Regional Entity; (vii) Texas Reliability Entity, Inc.; and (viii) Western Electricity Coordinating Council (WECC).

in support of the ERO Enterprise<sup>3</sup> Strategic Plan (Strategic Plan) initiatives applicable to this assessment period. These initiatives include: (i) Reliability Standards reform (both as to the number and content of Reliability Standards and the processes for developing them); (ii) the Reliability Assurance Initiative (RAI) which involves identifying risks to reliability and reformulating the compliance monitoring and enforcement processes to have a risk-based focus; and (iii) the revision of the bulk electric system (BES) definition.

In this *Five-Year ERO Performance Assessment Report*, NERC also demonstrates how the ERO is improving the performance of, and mitigating risks to, the BPS as related to avoidable outages. As detailed in NERC's *State of Reliability 2014* report, the number of BPS transmission-related events resulting in loss of firm load, other than events caused by factors external to the transmission system's actual performance (i.e., weather-initiated events), decreased from an average of ten per year over a ten year period (2002 through 2011) to seven in 2013. The daily severity risk index value (SRI), a metric created by NERC that measures risk impact or "stress" from events resulting in the loss of transmission, generation, and load, has been stable from 2008 to 2013. Including weather-initiated events, 2013 had no high-stress days, which is within the range of zero to seven days experienced during 2008 through 2013. The availability of the bulk transmission system, as measured by the SRI and other metrics, continues to remain high with no statistically significant change from 2008 to 2013.<sup>4</sup>

Despite the progress made to date in improving the reliability of the BPS and reducing the risks to reliability, opportunities remain for enhancements to ensure that the BPS remains reliable. NERC describes these opportunities, and its initiatives designed to pursue them, in this

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<sup>3</sup> NERC uses the term "ERO Enterprise" to encompass both NERC and the eight Regional Entities.

<sup>4</sup> NERC's *State of Reliability 2014* report is available at:  
[http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/2014\\_SOR\\_Final.pdf](http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/2014_SOR_Final.pdf).



*Five-Year ERO Performance Assessment Report*. Additionally, in this assessment report, NERC evaluates the effectiveness of each Regional Entity in performing its delegated functions, drawing from NERC's ongoing oversight activities, the Regional Entities' self-assessments, and feedback solicited from industry through an industry survey and posting the Regional Entity self-assessments for stakeholder comment.

Finally, NERC describes how its compliance monitoring and enforcement efforts have matured into a robust program providing industry with greater certainty on actions, outcomes, and reliability consequences. The actions taken by the ERO to identify, correct, and prevent violations of NERC's Reliability Standards have promoted the reliability of the BPS. For example, the adoption, modification, and rigorous enforcement of NERC's transmission vegetation management Reliability Standard (FAC-003), which became mandatory and enforceable in 2007, has dramatically reduced the number of outages caused by vegetation growing into high voltage lines. From 2004 through 2008, there were 58 reported outages. By contrast, from 2009 through 2013, only six instances were reported.<sup>5</sup>

## **B. Industry Engagement**

The electric industry has made tremendous strides towards improving reliability since the August 2003 Northeast blackout, which left 50 million customers without power. Enactment of §215 of the U.S. Federal Power Act (FPA), NERC's certification as the ERO by FERC, and the adoption of mandatory and enforceable Reliability Standards renewed the industry's focus on reliability. This focus, which includes proactive steps by the ERO to identify and address risks and avoid preventable events, has had a demonstrable and positive impact on reliability.

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<sup>5</sup> NERC's quarterly *Vegetation-Related Transmission Outage Reports* are available at: <http://www.nerc.com/pa/comp/CE/Pages/vegetation-management-reports.aspx>.

In passing the U.S. Energy Policy Act of 2005, which included the enactment of §215, Congress recognized the importance of an international ERO across North America to ensure the reliability of the BPS. As the ERO, NERC plays a unique role in facilitating industry engagement to create effective approaches for reliability initiatives. For example, industry participation in Reliability Standards development from start to finish is critical. Industry stakeholders participate in Reliability Standards development with increasing frequency since changes to the *Standard Processes Manual* (SPM) became effective June 26, 2013.<sup>6</sup> Stakeholders participate directly by joining standard drafting teams or participating as observers; attending and discussing Reliability Standards at webinars, committee meetings or technical conferences with standard drafting team members and NERC staff; communicating technical opinions directly to standard drafting teams or NERC staff; and commenting and voting on proposed Reliability Standards. As of May 2014, 858 stakeholder representatives had registered their eligibility to vote on proposed Reliability Standards as members of the Registered Ballot Body, and in 2013 alone NERC hosted 43 Reliability Standard industry webinars attended by an average of 360 participants. During the last six months of 2013, standard drafting teams and five-year review teams made up of 195 industry volunteers participated in 60 team meetings to advance standard development activities.<sup>7</sup>

Industry engagement is also a critical component of NERC's strategic initiatives, such as RAI. Through RAI, NERC and the Regional Entities are adopting a risk-based approach to compliance monitoring and enforcement activities.<sup>8</sup> NERC and the Regional Entities are

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<sup>6</sup> The SPM is Appendix 3A to the NERC Rules of Procedure (NERC ROP) and is available at: [http://www.nerc.com/pa/Stand/Documents/Appendix\\_3A\\_StandardsProcessesManual.pdf](http://www.nerc.com/pa/Stand/Documents/Appendix_3A_StandardsProcessesManual.pdf).

<sup>7</sup> As described later in this *Overview of NERC Activities and Accomplishments in the Five-Year Period*, five-year review teams are engaged in the five-year reviews of those Reliability Standards that have been adopted by the American National Standards Institute (ANSI) as national standards, in accordance with §13.0 of the SPM.

<sup>8</sup> NERC expects to submit an informational filing in 2014 fully describing RAI.

spearheading RAI, with substantial input from industry representatives on important RAI projects. For example, the ERO Enterprise is examining information flow requirements for registered entity self-reporting and is developing criteria to evaluate the various approaches to reliability risk assessments and internal controls review and testing. Similarly, industry played an important role in the development and implementation of NERC's Find, Fix, Track and Report (FFT) process, an enforcement mechanism that differentiates and processes noncompliance occurrences according to their significance to the reliability of the BPS.

Preparation of this *Five-Year ERO Performance Assessment Report* has benefited from considerable input from industry. On October 31, 2013, NERC distributed a 36-question online survey soliciting numerical ratings and free-form responses from registered entities regarding the performance of NERC and the Regional Entities in carrying out their responsibilities. On March 3, 2014, NERC posted a draft statement of its activities and accomplishments, as well as drafts of the Regional Entities' self-assessments, on NERC's website for industry comment. On June 17, 2014, NERC posted a complete draft of the *Five-Year ERO Performance Assessment Report* on its website for stakeholder comment. A compilation of the responses to the survey questions and of the comments received on the March 3, 2014 and June 17, 2014 postings, are included as **Attachment 4** to this report.<sup>9</sup>

This *Five-Year ERO Performance Assessment Report* includes the following attachments:

**Attachment 1:** Discussion of How NERC Meets the ERO Certification Criteria of 18 C.F.R. §39.3(b)

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<sup>9</sup> Issues raised by stakeholders, and the responses of NERC and the Regional Entities, are addressed in this report. Industry responses to the survey were discussed at the February 28, 2014 NERC Member Representatives Committee (MRC) meeting, and industry responses to the survey and comments received on the March 3, 2014 posting were discussed at the May 6, 2014 NERC Board of Trustees (NERC Board) meeting.

**Attachment 2:** Joint Regional Entity Self-Assessment<sup>10</sup>

**Attachment 3:** NERC Assessment of Regional Entity Delegated Functions

**Attachment 4:** NERC Consideration of Industry Feedback

**Attachment 5:** Status of Areas for Improvement Identified in the Order on the Three-Year ERO Performance Assessment

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## **II. NERC ACTIVITIES AND ACCOMPLISHMENTS**

This section describes activities and initiatives that NERC has completed during the assessment period, has in progress, or plans to commence in the near future, to enhance the reliability of the BPS and to increase the effectiveness and efficiency of the operations of the ERO Enterprise. NERC focuses this discussion on the following five areas: (i) development of clear, reasonable and technically sound Reliability Standards; (ii) registration of entities with functional responsibilities for the reliability of the BPS; (iii) monitoring and enforcing compliance with Reliability Standards; (iv) identification, prioritization and dissemination of information on risks to the reliability of the BPS; and (v) collecting and sharing information on cybersecurity and threats to the cyber and physical security of the BPS.

### **A. The ERO Is Transitioning NERC Reliability Standards to a Steady-State**

Since the three-year performance assessment, NERC has made great strides in transforming Reliability Standards to a steady-state, which NERC defines as a stable set of clear, concise, high-quality, and technically sound Reliability Standards. Steady-state Reliability Standards are results-based and include requirements that promote reliability. They are sustainable (stable), necessary for accountability, and sufficient to maintain the reliability of the

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<sup>10</sup> **Attachment 2** contains both an overall self-assessment of the Regional Entities' collective performance during the assessment period, and individual discussions of how each Regional Entity satisfied the applicable statutory and regulatory criteria including those specified in FERC's regulations at 18 C.F.R. §39.8.

BPS. After a set of steady-state Reliability Standards is fully developed, it is expected that Reliability Standards will only need to be amended in response to changes in risks, technology, practices, and similar changes. In support of this objective, during the assessment period, NERC focused on addressing FERC directives and conducting periodic reviews of Reliability Standards. NERC expects to complete the development of a set of steady-state Reliability Standards in 2015.

NERC's efforts to arrive at steady-state Reliability Standards would not have been possible without strong participation from industry stakeholders, FERC staff, the NERC Standards Committee (SC), and other NERC committees and working groups, including the Reliability Issues Steering Committee (RISC) and the Standards Process Improvement Group (SPIG), the NERC Board, and the NERC MRC. Arriving at a set of steady-state Reliability Standards required changes in NERC's Reliability Standards development process. The SPIG identified needed changes to the process. These changes were implemented through amendments to the SPM that became effective on June 26, 2013.

The currently effective *Reliability Standards Development Plan 2014-2016* (RSDP), approved by the NERC Board in November 2013, endorses the objective of arriving at steady-state Reliability Standards.<sup>11</sup> It specifically defines "steady-state" as a stable set of clear, concise, high quality, and technically sound Reliability Standards that are results-based and that exclude requirements that do little to promote reliability. The 2014-2016 RSDP prioritizes future Reliability Standards projects as high, medium, low or pending technical committee input based on a series of inputs, which include the Standards Independent Expert Review Panel's (IERP or Panel) content and quality assessments (discussed later in this document). Prioritization

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<sup>11</sup> *Reliability Standards Development Plan 2014-2016* is available at: <http://www.nerc.com/pa/Stand/Pages/ReliabilityStandardsDevelopmentPlan.aspx>.

considerations were influenced by: (i) RISC category rankings (also described later in this document); (ii) outstanding regulatory directives; (iii) regulatory deadlines; (iv) Paragraph 81 retirement candidates (also described below); (v) content and quality assessments by the IERP (also described below); and (vi) additional considerations such as fill-in-the-blank status and five-year review assessment commitments.

During the assessment period, NERC launched several initiatives to improve Reliability Standards, including: (i) the results-based Reliability Standards initiative; (ii) the Paragraph 81 project; (iii) the reorganization of the Reliability Standards department; and (iv) the establishment of the IERP. Each of these initiatives built upon the prior initiative, resulting in a comprehensive set of criteria by which to evaluate whether a Reliability Standard has reached its steady-state.

Since the three-year performance assessment, NERC initiated the results-based concept for developing the content of Reliability Standards. Each requirement of a results-based Reliability Standard identifies a measurable outcome such as: (i) a stated level of reliability performance; (ii) a reduction in a specified reliability risk (prevention); or (iii) a necessary competency. In 2011, NERC began training standard drafting teams to write results-based Reliability Standards. In 2013, NERC submitted the first Reliability Standard that resulted from that effort, FAC-003-2 – Transmission Vegetation Management. NERC is in the process of converting major families of Reliability Standards into results-based Reliability Standards.<sup>12</sup> These Reliability Standards include those dealing with long-term planning, reliability

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<sup>12</sup> The terms “families of standards” refers to groupings of Reliability Standards that address a common subject matter area, e.g., Emergency Preparedness and Operations (EOP), Personnel Performance, Training and Qualifications (PER), and Protection and Controls (PRC).

coordination, and real-time operations.<sup>13</sup>

In 2012, in response to FERC's invitation to NERC in a March 15, 2012 Order, NERC and industry conducted the Paragraph 81 project, which identified and retired requirements from Reliability Standards that did little to support reliability.<sup>14</sup> The criteria developed to scrutinize existing requirements in Reliability Standards in response to FERC's Paragraph 81 invitation continue to be used by standard drafting teams to evaluate the need for proposed requirements in new Reliability Standards development projects.<sup>15</sup>

In further support of the development of steady-state Reliability Standards, NERC reorganized its Standards department in 2013 to focus resources on addressing FERC directives, conducting periodic reviews of Reliability Standards, and completing ongoing Reliability Standards development projects. NERC also conducted a parallel effort to identify future work necessary to transform the Reliability Standards to steady-state, by establishing the IERP to evaluate the content and quality of every requirement in the NERC Reliability Standards. The Panel established its own criteria, which included those developed in the Paragraph 81 project, to determine whether a requirement was steady-state or needed further revisions. The Panel's recommendations set the course for arriving at high quality, results-based Reliability Standards with sustainable requirements. NERC is preparing training materials for standard drafting teams

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<sup>13</sup> NERC revised the Transmission Planning (TPL) Reliability Standards and a single consolidated Reliability Standard; revisions to the Transmission Operations (TOP), Interconnection Reliability Operations and Coordination (IRO), Modeling (MOD), and Voltage and Reactive (VAR) standards are pending.

<sup>14</sup> "Paragraph 81" refers to P 81 of FERC's March 15, 2012 Order on NERC's FFT process, in which FERC invited NERC (as well as the Regional Entities and other stakeholders) to identify specific standards requirements that could be revised or removed because they provide little protection for BPS reliability or are redundant. *Order Accepting with Conditions the Electric Reliability Organization's Petition Requesting Approval of New Enforcement Mechanisms and Requiring Compliance Filing*, 138 FERC ¶ 61,193 (2012) (March 2012 FFT Order), at P 81. See §II.A.3 below for a more detailed description of the Paragraph 81 initiative.

<sup>15</sup> The Paragraph 81 criteria are outlined in the Phase I *Paragraph 81 Project Technical White Paper* available at: [http://www.nerc.com/pa/Stand/Project%20201302%20Paragraph%2081%20RF/P81\\_Phase\\_I\\_technical\\_white\\_paper\\_FINAL.pdf](http://www.nerc.com/pa/Stand/Project%20201302%20Paragraph%2081%20RF/P81_Phase_I_technical_white_paper_FINAL.pdf).

to highlight the use of the Panel's methods for content and quality assessments of Reliability Standards.

NERC has also been diligent in assessing the need for Reliability Standards that address reliability gaps. Sections II.A.8.a through e below discuss five important areas of Reliability Standards development focusing on reliability risk: (i) the Critical Infrastructure Protection (CIP) Version 5 Reliability Standards; (ii) vegetation management (formerly a top ten cause of outage events); (iii) protection system maintenance and testing; (iv) geomagnetic disturbances (GMD) (a high-impact, low-frequency risk to the BPS which does not readily manifest in reliability performance data, but nonetheless represents a significant risk to the BPS); and (v) the physical security Reliability Standard.

A more recent initiative to assist with the achievement of steady-state Reliability Standards is the development of a template for enhanced periodic reviews of Reliability Standards that have not yet been revised through other Reliability Standards development projects. NERC is working with industry stakeholders to develop the necessary criteria for determining which Reliability Standards will be subject to these enhanced periodic reviews as well as whether the Reliability Standards have reached their steady-state. NERC expects the criteria to include those from the results-based Reliability Standards initiative, the Paragraph 81 project and the IERP. Upon reaching a consensus with industry on the criteria for evaluating whether a requirement is steady-state, and after completing the projects identified in the ERO's 2014-2016 RSDP and the ERO's 2015-2017 RSDP, NERC will apply the criteria to the Reliability Standards through enhanced periodic reviews beginning in 2015.<sup>16</sup>

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<sup>16</sup> The 2014-2016 RSDP identified 18 Reliability Standard development projects completed in 2013 or scheduled to be completed by the first quarter of 2014. It also identified 13 projects that were to be completed thereafter.

On June 20, 2014, the draft 2015-2017 RSDP was posted for industry comment. Currently, it identifies 27 projects that have been completed or are in progress, many of which were newly introduced in 2014. Eight of these 27



## **1. Completing FERC Directives**

During this assessment period, NERC made significant progress in reducing the number of FERC directives involving Reliability Standards. Addressing these directives is a priority to facilitate the transformation to steady-state.<sup>17</sup> The status of NERC's efforts in addressing Reliability Standards-related directives is reported on a quarterly basis to the NERC Standards Oversight and Technology Committee (SOTC). At the February 2014 SOTC meeting, NERC reported that 128 directives had been addressed by year-end 2013, with 107 directives remaining to be addressed. NERC continues to report the status of completion at every SOTC meeting and anticipates that 90% of FERC directives issued to date will be resolved during the first half of 2015.

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projects have been approved by the Registered Ballot Body, approved by the NERC Board, and filed with the applicable governmental authorities, and 12 are anticipated to be completed in 2014. The draft 2015-2017 RSDP identifies the remaining seven projects that will extend into 2015, with completion anticipated in the first half of the year. Additionally, four new projects for 2015 are identified. Completion of these projects will position NERC to begin enhanced periodic reviews in late 2015.

<sup>17</sup> Directives may be addressed by: (i) completing the directive as assigned; (ii) addressing the reliability concern of the directive in an equally effective and efficient manner; or (iii) providing persuasive reasoning as to why the directive is no longer necessary.



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RELIABILITY | ACCOUNTABILITY

FERC has been instrumental in reducing the number of outstanding directives, as well. On November 21, 2013, in its order addressing the Paragraph 81 project, FERC withdrew 41 directives, 24 of which were related to Reliability Standards, effective January 21, 2014.<sup>18</sup> FERC identified Reliability Standards-related directives for withdrawal based on the following three guidelines:

- (1) Whether the reliability concern underlying the outstanding directive has been addressed in some manner, rendering the directive stale;
- (2) Whether the outstanding directive provides general guidance for Reliability Standards development rather than a specific directive; and
- (3) Whether the outstanding directive is redundant with another directive.

<sup>18</sup> *Electric Reliability Organization Proposal to Retire Requirements in Reliability Standards*, 145 FERC ¶ 61,147 (2013).

FERC staff participation on standard drafting teams has also been instrumental in addressing Reliability Standards directives. Increased participation by FERC staff allows their concerns to be raised early in the Reliability Standard development process and for issues to be vetted with industry. This open dialogue translates into fewer directives in FERC orders.

## **2. The Standards Independent Experts Review Panel**

To set the foundation for a steady-state body of Reliability Standards, NERC established the IERP to evaluate the existing families of Reliability Standards and requirements. The Panel consisted of five independent industry experts and a sixth participant from FERC staff. Their areas of experience and competence included power systems engineering, relaying, transmission system planning, transmission and power system operations (including control center operations and dispatching, generation operations, transmission operations, and maintenance). The independent consultants brought executive leadership, experience from all three U.S. interconnections, experience with investor-owned utilities and public power as well as with vertically integrated and regional transmission organizations/independent system operator (RTO/ISO) market environments and small entities. The Panel also had experience working with Canadian provinces and Mexico. FERC participant offered thorough knowledge of previous FERC orders and an understanding of the contributions of the requirements of various Reliability Standards to BPS reliability.

Due to the ongoing evolution of NERC's Reliability Standards, the Panel addressed requirements from two groups of Reliability Standards: (i) Reliability Standards that were, or would become, enforceable in 2013 (Enforceable in 2013 Standards); and (ii) Reliability Standards that will be enforceable in the future (Future Enforceable Standards). The Future Enforceable Standards and requirements included both Enforceable in 2013 Reliability Standards and those that, at the time of the Panel's report, had been approved by the NERC Board or by the

FERC and were currently pending enforceability.<sup>19</sup> Requirements pending replacement by approved Reliability Standards were not included in this group.

The Panel issued its report in June 2013 and presented the report to the NERC Board in August 2013. In the report, the Panel outlined a vision for how to transform the NERC Reliability Standards to steady-state. The Panel made seven short-term recommendations, three longer-term recommendations and seven additional recommendations.<sup>20</sup> The Panel's main recommendation was to retire 147 existing requirements of Reliability Standards, address seven areas (high-level gaps) not currently addressed by the Reliability Standards, and complete Reliability Standards development projects to address gaps within individual requirements. The Panel also made recommendations regarding compliance monitoring, prioritization for addressing the identified gaps, using risk to determine whether a future Reliability Standard is needed, and use of the Panel's identified criteria to determine quality and content as future Reliability Standards are developed. Finally, the Panel recommended a new construct to further consolidate Reliability Standards and required actions.

In evaluating whether a requirement should be retired, the Panel assessed whether each requirement: (i) did not support a reliability principle; (ii) met the Paragraph 81 criteria for retirement; or (iii) was better suited as a guideline rather than as a part of a Reliability Standard. For the requirements that the Panel did not recommend for retirement, the Panel applied content and quality criteria to examine whether they were steady-state or needed additional work. Specifically, the Panel examined the following content criteria: (i) whether the content of the

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<sup>19</sup> The June 2013 report, *Standards Independent Experts Review Project – An Independent Review by Industry Experts*, is available at: [http://www.nerc.com/pa/Stand/Standards%20Development%20Plan%20Library/Standards\\_Independent\\_Experts\\_Review\\_Project\\_Report.pdf](http://www.nerc.com/pa/Stand/Standards%20Development%20Plan%20Library/Standards_Independent_Experts_Review_Project_Report.pdf).

<sup>20</sup> *Id.*, p. 16-17.

requirement is technically correct, including identifying who does what and when; (ii) whether the requirement identifies the correct functional entities; and (iii) whether there are appropriate actions for which there should be accountability included or there is a gap. Additionally, the Panel examined the following quality criteria:

- (1) Whether the requirement should stand alone or be consolidated with other Reliability Standards;
- (2) Whether the requirement was drafted as a results-based standard;
- (3) Whether a requirement is technologically neutral;
- (4) Whether the requirement aligns with the purpose of the Reliability Standard;
- (5) Whether the requirement is a higher solution than the lowest common denominator;
- (6) Whether the requirement is measurable;
- (7) Whether the requirement has a technical basis in engineering and operations;
- (8) Whether the requirement is complete and self-contained;
- (9) Whether the language is clear and does not contain ambiguous or outdated terms;
- (10) Whether the requirement can be practically implemented; and
- (11) Whether the requirement uses consistent terminology.

The Panel evaluated whether these remaining requirements addressed a risk to reliability by examining: (i) the ranking developed by the NERC RISC; (ii) the violation risk factor (VRF) for each requirement; and (iii) the Panel members' professional judgment.

These recommendations have been pivotal in NERC's evaluations of the Reliability Standards by standard drafting team subject matter experts (SME). Furthermore, the Panel's recommendations have been used to inform standard drafting teams and NERC's annual RSDPs, including the current, 2014-2016 RSDP. The potential reliability gaps identified by the IERP have been evaluated by the RISC and are assigned in some cases to active drafting projects. The

IERP recommendations that apply to Reliability Standards that are not part of active drafting projects are assigned to teams that conduct periodic reviews of Reliability Standards in the future for consideration.<sup>21</sup>

### **3. Implementation of the Paragraph 81 Project**

The Paragraph 81 project was a separate project, carried out during the assessment period, in which requirements were recommended for retirement. This project stemmed from paragraph 81 of FERC's March 15, 2012 FFT Order, in which FERC invited NERC (and other interested entities) to propose specific Reliability Standards or requirements for revision or retirement if they did not provide meaningful benefit to BPS reliability. In response, NERC began the Paragraph 81 project to identify and retire Reliability Standards requirements that have little or no effect on reliability. As discussed above, the project established a set of criteria for evaluating whether a requirement should be considered for retirement.<sup>22</sup>

This initiative is reducing and simplifying the set of Reliability Standards with which registered entities must comply and which the ERO must monitor and enforce. This reduction in the body of requirements enables both the ERO and registered entities to redirect resources to matters posing greater risks to the reliability of the BPS and to ensure that the costs of reliability are proportionate to the benefits.

In March 2013, NERC filed a filing for the retirement of 34 requirements or sub-requirements within 19 Reliability Standards. In its June 20, 2013 notice of proposed rulemaking (NOPR), FERC indicated agreement that the requirements proposed for retirement either: (i) provided little protection for BPS reliability; or (ii) were redundant with other aspects

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<sup>21</sup> These future periodic reviews are required by §13 of the SPM.

<sup>22</sup> For a detailed discussion of criteria used to determine if a Reliability Standard requirement should be retired, *see Paragraph 81 Project Technical White Paper* (December 20, 2012), available at: [http://www.nerc.com/pa/Stand/Project%20201302%20Paragraph%2081%20RF/P81\\_Phase\\_I\\_technical\\_white\\_paper\\_FINAL.pdf](http://www.nerc.com/pa/Stand/Project%20201302%20Paragraph%2081%20RF/P81_Phase_I_technical_white_paper_FINAL.pdf).

of Reliability Standards. In addition, in the NOPR, FERC proposed to withdraw several outstanding FERC directives relating to Reliability Standards.<sup>23</sup> On November 21, 2013, FERC issued an order approving, as proposed in the NOPR, the retirement of 34 requirements and sub-requirements within 19 Reliability Standards, and withdrawing the identified directives effective January 21, 2014 (the Retirement Effective Date).<sup>24</sup> As noted above, the retirement of these requirements is enabling both the ERO and registered entities to redirect resources to matters posing greater risks to the reliability of the BPS and to ensure that the costs of reliability are proportionate to the benefits.

In the period leading up to the Retirement Effective Date, Regional Entities did not actively monitor compliance with the 34 retired requirements, nor did they process any new or existing possible violations of these retired requirements. Regional Entities also documented removal of any of the 34 retired requirements from Compliance Audit scopes in the final Compliance Audit reports for those audits. Within 30 days of the Retirement Effective Date, Regional Entities dismissed existing possible violations of the requirements being retired and issued dismissal letters to the registered entities.

In addition to the 34 requirements that FERC approved for retirement, stakeholders submitted an additional 217 requirements for consideration for retirement. NERC is examining whether to retire these requirements through individual Reliability Standards development projects. Progress on this retirement effort is reported to the SOTC on a quarterly basis. As of the February 2014 SOTC meeting, 179 out of 281 recommendations had been addressed, 79

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<sup>23</sup> *Electric Reliability Organization Proposal to Retire Requirements in Reliability Standards*, Notice of Proposed Rulemaking, 143 FERC ¶ 61,251 (2013).

<sup>24</sup> *Electric Reliability Organization Proposal to Retire Requirements in Reliability Standards*, 145 FERC ¶ 61,147 (2013).

were under consideration in either a current project or in a periodic review, and 23 had not yet been assigned to a project.

#### **4. Development of Compliance Assessment Tools Concurrently with Reliability Standards Development**

Over time, one of the key improvement opportunities identified for NERC Reliability Standards has been to strengthen the connection between standard drafting teams and the compliance program, in order to clarify the expectations of Reliability Standard requirements. Two efforts at clarifying Reliability Standard requirements, but which ultimately illustrated the need for greater involvement of the Compliance department in the Reliability Standards development process, were the Compliance Application Notice (CAN) initiative and the Reliability Standard Audit Worksheets (RSAWs). CANs were notices drafted to respond to questions regarding how to assess compliance with specific Reliability Standards. CANs were posted on the NERC website to provide transparency to industry; however, since they were drafted well after the Reliability Standard was developed, the compliance assessment positions articulated in the CANs often varied from industry's perspective of the intent of the Reliability Standard or requirement. Similarly, prior to 2013, NERC developed RSAWs after regulatory approval of a Reliability Standard.

The CAN process demonstrated the need for concurrent development and dialogue between standard drafting teams and NERC Compliance Operations staff. As a result, in 2013, NERC began incorporating the development of compliance assessment information into the Reliability Standards development process. After June 2013, informal development project teams began posting documents during standards development titled "compliance input." These documents provided questions from industry and answers developed by Compliance staff regarding how to assess compliance for specific requirements, or phrases in the requirements.



This basic tool opened the door for conversation between the standard drafting teams and Compliance staff. It also allowed for conversation regarding the wording of requirements and the effect of that wording on how compliance would be assessed.

NERC then created an inter-departmental team to examine the development of RSAWs, which resulted in an internal policy on the development of RSAWs concurrent with Reliability Standards development projects. The policy included the following provisions:

- (1) Coordinating input between standard drafting teams and NERC Compliance staff;
- (2) Posting a draft RSAW during the formal comment period and prior to the ballot period for a Reliability Standard, allowing stakeholders to provide comments or to raise concerns at that time;<sup>25</sup> and
- (3) Continuing to involve Regional Entity Compliance staffs in drafting RSAWs to strengthen compliance consensus throughout the ERO and capture additional subject matter expertise.

Today, RSAWs are written concurrently with new Reliability Standard development projects. They provide information regarding compliance assessment and testing. Reliability Standards staff leads coordination between the Standards and Compliance departments. Each Reliability Standards project is assigned dedicated staff support led by Compliance staff. Additionally, NERC Compliance staff are coordinating with Regional Entity Compliance staffs. This increased and ongoing coordination will help ensure that standard drafting teams, NERC and Regional Entity Compliance staffs and RSAWs are aligned as to the intent of Reliability Standards. By creating a uniform understanding of compliance expectations for each Reliability Standard early in the development process, the need for interpretations or other forms of subsequent compliance guidance should be reduced.

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<sup>25</sup> The RSAWs themselves are not subject to the ballot.

NERC Compliance staff will continue to supply standard drafting teams with compliance and enforcement information, statistics, and perspectives to help develop Reliability Standards that provide an increased reliability benefit and clarify compliance risks. Compliance staff will continue collaborating with industry and Reliability Standards staff early in the Reliability Standards development process in order to understand the intent of Reliability Standards under development and provide feedback on the proposed language of Reliability Standards. Finally, as described in greater detail in §II.C.2 and 4 below, NERC is working to provide training to auditors and industry on how to assess compliance with a new or revised Reliability Standard. This training is provided following FERC approval of a Reliability Standard, but well before its effective date.

## **5. Review of Regional Reliability Standards**

A Regional Entity can propose adoption of a regional Reliability Standard to implement requirements that are more stringent than the continent-wide requirement, and/or to address a reliability concern that is unique to that Regional Entity and not addressed in a continent-wide Reliability Standard.<sup>26</sup> Today, a regional Reliability Standard requirement may be developed as a separate regional Reliability Standard or as an addendum to a continent-wide Reliability Standard. NERC is considering, based on the recommendations from the Panel, commissioning a team to evaluate regional Reliability Standards to identify candidates for retirement, consolidation with continent-wide Reliability Standards, or incorporation as variances within continent-wide Reliability Standards. The regional Reliability Standards that are not identified as candidates for retirement or consolidation should align with continent-wide Reliability Standards.

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<sup>26</sup> **Attachment 3**, NERC Assessment of Regional Entity Delegated Functions, contains a discussion of each Regional Entity's regional Reliability Standards development activity during the assessment period.

## **6. Improvements in the Reliability Standards Development Process**

Transforming NERC Reliability Standards to a steady-state required changes to how NERC identified and resolved issues through the Reliability Standards development process. Implementing these changes was possible due to strong participation from industry stakeholders, the NERC SC and other NERC committees and workgroups, specifically the RISC, the SPIG, and the NERC technical committees, as well as FERC staff. The NERC Board and the NERC MRC also provided strong support to implement the changes.

### **a. Revisions to the *Standard Processes Manual* and Related Improvements**

NERC's Reliability Standards development process is defined in the SPM, Appendix 3A to the NERC ROP. The SPM governs all NERC activities related to the development, approval, revision, reaffirmation, and withdrawal of Reliability Standards, interpretations, VRFs, violation severity levels (VSLs), definitions, variances, and reference documents developed to support Reliability Standards. It also addresses the respective roles of the NERC SC, standard drafting teams, and Registered Ballot Body members in the stakeholder process. Upon FERC's approval of revisions to the SPM in June 2013, NERC, the NERC SC, and stakeholders began implementing the approved changes into the Reliability Standards development process.

The revisions to the SPM were initiated in February 2012, when the NERC Board, in consultation with the NERC MRC, formed the SPIG.<sup>27</sup> The NERC Board tasked the SPIG with achieving the following objectives: (i) provide clarity on the reliability objectives, technical parameters, scope and relative priority of Reliability Standards; (ii) review the Reliability

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<sup>27</sup> The SPIG is composed of the MRC chair and vice chair, other MRC members, two members of the NERC Board, the NERC chief executive officer (CEO), and the NERC SC chair.

Standard drafting process to ensure that Reliability Standards contain specific technical content; and (iii) assess Reliability Standards project management.

After gathering input from stakeholders, the SPIG made five recommendations to modify the way NERC develops Reliability Standards.<sup>28</sup> Based on these recommendations, NERC worked with stakeholders to develop revisions to the SPM. In these revisions, NERC:

- (1) Revised the composition of standard drafting teams to ensure that they are appropriately equipped to meet reliability objectives, namely by adding legal and compliance experts;
- (2) Incorporated references to compliance assessment tool development, such as RSAWs, cooperatively and in parallel with Reliability Standard drafting;
- (3) Streamlined commenting and balloting provisions as follows:
  - (a) Allowing summary responses to comments;
  - (b) Eliminating the obligation to respond in writing at every stage of the comment process; and
  - (c) Eliminating negative votes without comments in the calculation of consensus.
- (4) Incorporated the following provisions:
  - (a) Quality review conducted in parallel with Reliability Standards development;
  - (b) Guidance for the appropriate role and scope of interpretations, to be consistent with guidance from the NERC Board; and
  - (c) A waiver provision to allow for modifications to the Reliability Standards development process for good cause, with five days' notice and reporting of the exercise of a waiver to the NERC SOTC.
- (5) Reduced the requirement for periodic reviews to be consistent with ANSI minimum requirements.

These improvements provide a balanced flexibility to the process, enabling NERC and industry to address pressing reliability issues on accelerated timeframes if necessary. Further, with the

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<sup>28</sup> The SPIG's *Recommendations to Improve the NERC Standards Development Process* report is available on the NERC website at: [http://www.nerc.com/pa/Stand/Standards%20Processes%20Manual%20revisions%20SPIG%20Recommendations/Standards\\_Process\\_Input\\_Group\\_04.24.12\\_ver\\_8\\_FINAL.pdf](http://www.nerc.com/pa/Stand/Standards%20Processes%20Manual%20revisions%20SPIG%20Recommendations/Standards_Process_Input_Group_04.24.12_ver_8_FINAL.pdf).

changes, the Reliability Standards development process continues to meet ANSI requirements. FERC approved the proposed revisions on June 26, 2013, agreeing that these changes enable greater flexibility and efficiency.<sup>29</sup> Reliability Standards development projects initiated and completed after FERC's approval of the SPM changes have shown both significant increases in efficiency and improvements in the quality of the product.

In addition to the revisions to the SPM, NERC has implemented additional enhancements to the Reliability Standards development process. In conjunction with implementing changes to the SPM, in 2013, NERC spearheaded an "informal development" effort, which uses informal groups composed of industry subject matter experts to conduct early outreach to industry stakeholders prior to initiating formal development of new or revised Reliability Standards. This early outreach encourages stakeholder conversations to obtain inputs on the proposed Reliability Standards development project. This approach is positively affecting how standard drafting teams are conducting their work. The periodic reviews conducted in 2013 followed this same approach, acting as a tool for gathering stakeholder input. Recommendations from each periodic review team are then implemented through subsequently-formed standard drafting teams.

The most significant improvement from the changes to the Reliability Standards development process has been in the amount of time required to develop a quality Reliability Standard. As reported in the *Analysis of NERC Standards Process Results, Fourth Quarter 2013* filing,<sup>30</sup> the baselines for the amounts of time to revise an existing Reliability Standard and to develop a new Reliability Standard were approximately 27 months and 40 months, respectively.

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<sup>29</sup> *Order Approving Revisions to Electric Reliability Organization's Standard Processes Manual*, 143 FERC ¶ 61,273 (2013), at P 18.

<sup>30</sup> Available at: [http://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/Analysis\\_of\\_NERC\\_Standards\\_Process\\_Results\\_Q4\\_FINAL.pdf](http://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/Analysis_of_NERC_Standards_Process_Results_Q4_FINAL.pdf).

The amount of time to produce each of the Reliability Standard development projects that began formal development under the revised SPM was dramatically reduced.<sup>31</sup> Approximately six projects completed formal development, from posting the standard authorization request to being adopted by the NERC Board, in less than seven months.<sup>32</sup> Two other projects completed formal development in ten months.<sup>33</sup>

The changes to the standard development process have provided benefits in terms of standard drafting team management and staffing. The reduced time needed to develop a Reliability Standard combined with the fact that standard drafting team meetings are held closer together in time provide registered entities and other participants with increased flexibility in staffing standard drafting teams. As a result, standard drafting team members are able to stay more focused on the Reliability Standard development project.

The speed and efficiency of the process, particularly at the standard drafting team stage, have also benefited from the following process improvements:

- Smaller standard drafting teams with appropriate expertise have increased the ability to conduct activities and respond to stakeholders in a more-timely and effective manner;
- Open communication and concurrent development of compliance assessment tools have addressed compliance questions and allowed for clarification of compliance intentions during Reliability Standards development;
- Summary responses to comments has allowed standard drafting teams to consider stakeholder inputs, modify the draft Reliability Standard in response to those inputs, and repost it for industry review more quickly (as short as 1.5 weeks);

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<sup>31</sup> The projects were: (i) 2010-01 – Training (PER); (ii) 2010-03 – Modeling Data (MOD B); (iii) 2010-04 – Demand Data (MOD C); (iv) 2012-05 – ATC Revisions (MOD A); and (v) 2013-04 – Voltage and Reactive Control (VAR).

<sup>32</sup> The six projects were: (i) GMD Phase 1; (ii) INT; (iii) Physical Security (CIP-014); (iv) MOD A; (v) MOD B; and (vi) PER projects; one of the two Reliability Standards in the VAR project (VAR-001) also met this benchmark.

<sup>33</sup> The two other projects were: (i) the remaining Reliability Standard in the VAR project (VAR-002); and (ii) the MOD C project.

summary responses are more concise while still addressing the issues, and provide visibility into the concerns in an easily digestible format;

- Not considering negative votes without comments in the calculation of consensus encourages entities to provide constructive comments, providing better insight into the issues for the standard drafting teams;
- Coordinating quality review in parallel with standard development has eliminated an additional step (that previously could require 4 to 6 weeks) from the process and improved focus on quality at an earlier stage; and
- Granting the NERC SC authority to waive provisions in the SPM for good cause gives the SC the ability to respond to urgent reliability issues. A recent example, discussed in §II.A.8.e below, is the development of Reliability Standard CIP-014-1 – Physical Security, in less than 90 days.

Another improvement resulting from the SPM revisions, which is also associated with increased outreach and communication, is the partnership created between NERC staff, standard drafting teams, and the NERC SC. Additionally, FERC staff has been providing early input regarding their perspectives during the standards development process, thereby giving standard drafting teams the opportunity to weigh those inputs early in the process. Based on experience to date, NERC anticipates that this open dialogue will result in FERC orders with either no directives or a significantly reduced number of directives.

The NERC SC, under the NERC Board's direction, also developed a strategic plan and work plan, as well as a revised charter, all of which were approved by the NERC Board on February 6, 2014.<sup>34</sup> These actions were designed to increase the NERC SC's effectiveness, efficiency, and ability to deliver high quality Reliability Standards. The *Standards Committee Strategic Plan* is a five-year plan that sets the vision and mission for the NERC SC, describes the guiding principles for the NERC SC, and sets the foundation for refocusing the activities of the NERC SC. The *Standards Committee Strategic Work Plan* is the tactical implementation of the

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<sup>34</sup> The *Standards Committee Strategic Work Plan 2014-2016*, *Standards Committee Strategic Plan*, and amended *Standards Committee Charter* are available at: <http://www.nerc.com/comm/SC/Pages/default.aspx>.

*Standards Committee Strategic Plan.* The revised *Standards Committee Charter* clarifies the NERC SC's role in the development of steady-state Reliability Standards that provide for the reliability of the BPS, and ensures that the NERC SC develops a multi-year strategic vision that describes the goals and direction for the development of Reliability Standards consistent with the strategic and business plans of NERC.

Additionally, the NERC SC created a new subcommittee, the Process Management and Oversight Subcommittee (PMOS), that acts as an industry and standard drafting team partner. This subcommittee assigns a representative to each standard drafting team for the purpose of oversight. The oversight includes such actions as assisting the standard drafting team in understanding any stakeholder concerns, reaching out to stakeholders if they do not understand the actions being taken by the standard drafting team, being partners in reviewing the Reliability Standards for quality, and assisting with advice on a range of topics from direction to posting schedules. The PMOS has assisted standard drafting teams in avoiding or overcoming hurdles during the process.

The revisions made to the SPM and other changes made to the Reliability Standards development process, including strengthened partnerships among standard drafting teams, the NERC SC, and NERC staff, are showing great promise as improvements to the process, in terms of improving efficiency, speed and quality. These improvements have allowed the ERO to make significant progress towards achieving a body of steady-state Reliability Standards. The 2015-2107 RSDP will reflect that most, if not all, FERC directives and recommendations for retirement (both from the Paragraph 81 project and the IERP review) will be addressed in 2015, and it will provide an opportunity for a strategic review of the Reliability Standards.



## **b. Formation and Work of the Reliability Issues Steering Committee**

In response to the SPIG's recommendations, the NERC Board formed the NERC RISC in August 2012 to establish a collaborative effort at the industry leadership level to set priorities on issues of importance to the BPS. The RISC is composed of industry executives and thought leaders, including representatives from the NERC Operating, Planning, Standards, Critical Infrastructure Protection, and Compliance and Certification Committees. The RISC is an advisory committee that reports directly to the NERC Board, focusing on triaging and providing front-end, high-level leadership and accountability for issues of strategic importance to BPS reliability. The RISC assists the NERC Board, NERC technical committees, NERC staff, regulators, Regional Entities, and industry stakeholders in establishing a common understanding of the scope, priority, and goals for the development of solutions to address these issues. In doing so, the RISC provides a framework for steering, developing, formalizing, and organizing recommendations to help NERC and the industry effectively focus their resources on the critical means to improve the reliability of the BPS. In some cases, that includes recommending reliability solutions other than the development of new or revised Reliability Standards and offering high-level stakeholder leadership engagement and input on issues that enter the Reliability Standards process. In other cases, the development of a new Reliability Standard or modification of an existing Reliability Standard may be the best way to address a particular issue.

The NERC SC works closely with the RISC and the NERC technical committees, creating an alignment of focus on specific issues. The chairs of the technical committees and NERC SC are members of the RISC, which strengthens the needed coordination.

The RISC is developing a triage process to address other reliability issues that are brought to the NERC SC, whether through a standards authorization request or another

mechanism. This process will include a review by the RISC to determine whether the issue is a risk to the reliability of the BPS and, if so, the priority of investing ERO and stakeholder resources to resolve the issue. This review will aid in focusing resources on the resolution of the most important issues.

The RISC also provides input into prioritizing Reliability Standards development activities by providing input to the RSDP in two ways: first, by considering whether the projects identified in the RSDP address areas of risk for the BPS; and second, by developing a priority rank for each of the projects.

In considering whether each of the projects addresses an area of risk for the BPS, the NERC RISC considers whether there are outstanding FERC directives or any recommendations for retirement, either from the Paragraph 81 project or the IERP, that could be addressed by the project.

In reviewing the priority of each project, the RISC provides a mechanism for addressing any scheduling conflicts between projects through the development process.<sup>35</sup> In its initial analysis, the RISC identified four high-priority focus areas for Reliability Standards: (i) cyber attacks; (ii) workforce capability and human error; (iii) protection systems; and (iv) monitoring and situational awareness. The RISC presented these priorities to the NERC Board in February 2013. In response, the NERC Board directed the RISC to conduct further analysis of the issues identified as high and medium priority. The NERC Board also directed that the RISC's input be integrated into the overall ERO planning process. NERC staff is implementing process steps to

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<sup>35</sup> RISC reviewed and provided input on the use of RISC's rankings in project prioritization.

meet this objective. Subsequently, the RISC issued an updated report in August 2013 identifying a fifth area of focus: adaptation and planning for change.<sup>36</sup>

In addition to the activities described above, in November 2012, the RISC participated in a NERC-sponsored conference in which reliability topics were discussed with technical experts. The conference, conducted as a series of panel discussions, highlighted several existing and emerging reliability risks and created an opportunity for informed dialogue about technical topics. A second conference, the Reliability Leadership Summit, was held in October 2013, with key industry decision-makers gathering to discuss reliability priorities and industry trends.<sup>37</sup>

Efforts to review the risk areas identified by the RISC and to develop appropriate risk management strategies are ongoing. Integrating these priorities into the annual business plan and budget process will be a cornerstone of NERC's annual planning process going forward. To effect this change in planning, NERC has developed the Reliability Risk Management (RRM) process, a multi-year strategy development method that uses industry expertise through the RISC and other standing committees to develop actionable, measureable efforts to manage reliability risk. The RRM process is discussed in detail below in §II.D.1.

### **c. Realignment of Resources in the Reliability Standards Program**

NERC is constantly assessing the alignment of resources to be responsive to the changes necessary to move the NERC Reliability Standards to a steady-state. In 2013, NERC realigned resources in its Reliability Standards department by creating multiple small teams of Reliability Standards developers and one team focused on information management. This realignment focused resources on the production of Reliability Standards rather than on executing and

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<sup>36</sup> *ERO Priorities – RISC Updates and Recommendations* is available at: [http://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC\\_Priority\\_Recommendations-Jul\\_26\\_2013.pdf](http://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC_Priority_Recommendations-Jul_26_2013.pdf).

<sup>37</sup> NERC intends for this summit meeting to be an annual event; the next Reliability Leadership Summit is scheduled for September 2014.

monitoring the development process, thereby increasing the throughput to complete outstanding projects and resolve outstanding directives. In 2013, each of the three “developer” teams was assigned one of the following high-level goals:

- (1) Resolving directives;
- (2) Conducting the required five-year reviews for current Reliability Standards;<sup>38</sup> or
- (3) Overseeing emerging issue projects and the completion of remaining open projects.

The small developer teams closely coordinate with one another to ensure a balance in workload and to create an expertise in each of the major work areas.

Additionally, NERC has improved the composition of standard drafting teams by enhancing the selection process to identify, for each project, the necessary technical, writing, and project management expertise to form a balanced team that will foster improved effectiveness and enhanced efficiency. Standard drafting teams also now receive increased NERC staff support, including dedicated legal support, for each project. Each standard development project is staffed by a lead standard developer, and many projects have a second supporting standard developer. Standard developers provide project management and facilitation experience as well as additional skills, including technical writing, legal skills, and outreach/consensus-building skills, to the standard drafting team, which contributes to the development of high-quality Reliability Standards. With this enhanced staffing, standard drafting teams are better able to reach milestones and build consensus among industry stakeholders in advance of balloting. Further, NERC now provides facilitation training to all newly appointed standard drafting team leaders. Finally, NERC has developed a Standards Development Process Participant Conduct

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<sup>38</sup> Section 13.0 of the revised SPM now requires periodic reviews every five years for those Reliability Standards that have been adopted by ANSI as an American national standard, and every ten years for all other Reliability Standards.

Policy to ensure that the Reliability Standards development process is conducted in a professional and constructive environment.

**d. Developing and Implementing Procedures for the Cost-Effective Analysis Process**

NERC has developed the Cost-Effective Analysis Process (CEAP) in response to requests by registered entities and regulators to incorporate consideration of costs more directly into Reliability Standard development activity.<sup>39</sup> The CEAP affords stakeholders an opportunity to share projected cost information regarding implementation of draft Reliability Standards and provides the opportunity to offer alternatives that would be equally, or more, efficient at achieving the reliability objective of the draft Reliability Standard while also taking into consideration implementation costs. CEAP has been used for a limited number of new and revised Reliability Standards projects, with limited success. NERC continues to explore options for improving both the process and the quality of the resulting information.

The current CEAP process provides for a two-phase process for identifying projected implementation costs. The first phase of the CEAP, identified as the Cost Impact Analysis, is conducted during the standard authorization request stage of Reliability Standard development. It provides an opportunity to identify approximate implementation costs associated with a proposed Reliability Standard prior to its development. Information related to the mission and forecasted implementation costs of the proposed Reliability Standard is collected from the industry during the initial standard authorization request comment period. The information collected is shared with the NERC SC and the standard drafting team, and is posted on the NERC website.

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<sup>39</sup> This was an issue raised in response to the five-year performance assessment survey.

The second phase of the CEAP, identified as the cost effective analysis, typically comes after the draft Reliability Standard is developed by the standard drafting team and is ready for the first combined formal comment period and ballot. During this phase, NERC again solicits industry to provide forecasted implementation costs of the proposed requirements and to propose alternative methods to achieve the proposed Reliability Standard's reliability objective more efficiently. Any alternative proposals provided by industry during this phase should contain sufficient technical justification, and if possible, cost comparison data for consideration.

## **7. Improved Stakeholder Access to Reliability Standards Information**

All Reliability Standards are available to stakeholders through NERC's public website, including: (i) Reliability Standards that are currently enforceable in specific jurisdictions (i.e., in the U.S. and Canadian provinces); (ii) Reliability Standards pending regulatory approval; (iii) Reliability Standards approved by the NERC Board and pending regulatory filing; and (iv) Reliability Standards no longer subject to enforcement. In 2012, NERC launched an improved interface to allow stakeholders to filter the complete set of Reliability Standards so that they could identify which Reliability Standards are applicable to their respective registered functions. Work is ongoing to improve the completeness and timeliness of this information for non-U.S. jurisdictions (i.e., Canadian provinces or Mexico).

Additionally, beginning in 2013, interested entities can track current Reliability Standards development projects in a publicly posted spreadsheet, the *Project Tracking Spreadsheet*.<sup>40</sup> NERC updates this spreadsheet monthly. The spreadsheet also provides a link to the projects page, the deliverables, the number of Paragraph 81 requirements, the number of regulatory directives or guidance, the PMOS liaison assigned to the project, the NERC standards developer,

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<sup>40</sup> NERC regularly updates the *Project Tracking Spreadsheet: 2014 Project Work Plan* and the link to the file is located on the left side of NERC's Standards webpage available at: <http://www.nerc.com/pa/Stand/Pages/Default.aspx>.

and a month-by-month timeline. Also in 2013, NERC began posting the *Projected Standards Posting Schedule*, which provides the industry with an outlook of near term postings.

## **8. Specific Reliability Standards Projects**

### **a. Critical Infrastructure Protection Version 5 Reliability Standards**

On November 22, 2013, FERC issued Order No. 791 approving the Critical Infrastructure Protection Version 5 (CIP Version 5) Reliability Standards.<sup>41</sup> The CIP Version 5 Reliability Standards provide a cybersecurity framework for the categorization and protection of BES cyber systems to support the reliable operation of the grid. NERC worked with industry to ensure that the CIP Version 5 Reliability Standards address the differing roles of each registered entity in the operation of the BES, the criticality and vulnerability of the BES cyber systems needed to support BES reliability, and the risks to which the BES cyber systems are exposed. In Order No. 791, FERC found that CIP Version 5 is an improvement over the currently approved CIP Reliability Standards. FERC also determined that categorizing BES cyber systems based on their impact on the reliable operation of the BES (Low, Medium, or High), with all BES cyber systems categorized as at least Low Impact, offers more comprehensive protection of the BES.<sup>42</sup> FERC directed NERC to address several new directives, some of which must be addressed within a year. To meet these directives, NERC has established a standard drafting team and set an aggressive schedule to address all FERC's concerns, consistent with the timeline set by FERC.

In Order No. 791, FERC also approved NERC's proposal to bypass CIP Version 4 and move directly to implement CIP Version 5. Recognizing that registered entities are in various

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<sup>41</sup> *Version 5 Critical Infrastructure Protection Reliability Standards*, Order No. 791, 145 FERC ¶ 61,160 (2013).

<sup>42</sup> In Order No. 791, FERC directed NERC to develop modifications to address specified concerns with the CIP Version 5 standards, including: (i) the "identify, assess, and correct" language; (ii) protections for Low Impact BES Cyber Systems; (iii) the risks posed by transient devices; and (iv) the protection of communication networks.

stages of implementation of CIP Versions 3 and 4, NERC tackled the need for flexibility as well as the need to identify and address the associated transition challenges for industry. In October 2013, NERC launched the CIP Version 5 Transition Implementation Study (CIP Version 5 Study) to collect and to evaluate relevant data from select responsible entities regarding their experience in implementing CIP Version 5 requirements. Through this study, NERC is identifying successful implementation methods and challenges that the industry faces in transitioning to CIP Version 5. On October 11, 2013, NERC submitted an informational filing to FERC that described how the CIP Version 5 Study would assist responsible entities in making the transition to CIP Version 5.<sup>43</sup> As part of the CIP Version 5 Study, NERC selected a group of six responsible entities, based on factors including willingness to participate, past performance under the CIP Reliability Standards, and expected relevance to the CIP Version 5 Study's goals. NERC is sharing the experience and information obtained through the CIP Version 5 Study with industry throughout the study period. NERC will also prepare a final report that synthesizes the study participants' experiences in applying CIP Version 5. The report will focus on the effectiveness of meeting the CIP Version 5 requirements and the methods employed during implementation. The report will also focus on the following:

- (1) Methods, approaches, and policies that were effective in implementing the technical controls of CIP Version 5;
- (2) Tools, policies, and training that were effective in aligning employees' skills and cooperation with the responsible entity's mission and the CIP Version 5 Reliability Standards;
- (3) Hurdles encountered by the participating responsible entities and the relevant outcomes; and
- (4) Requirements and concepts of CIP Version 5 that the responsible entities had difficulty implementing and why.

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<sup>43</sup> *Informational Filing of the North American Electric Reliability Corporation Regarding the CIP Version 5 Reliability Standards Implementation Study*, Docket No. RM13-5-000 (Oct. 11, 2013).



## **b. Transmission Vegetation Management**

During the assessment period, FERC approved two new versions of the FAC-003 Reliability Standard. In Order No. 777,<sup>44</sup> FERC approved NERC's proposed FAC-003-2, a Reliability Standard that requires responsible entities to minimize encroachments from vegetation located adjacent to transmission rights-of-way and within a transmission owner's control. Historically, vegetation-related outages have been a recurring contributor to blackouts. In fact, inadequate vegetation management practices causing tree contact was one of the initiating causes of the 2003 Northeast blackout. Industry compliance with FAC-003-2, together with a continued industry focus on best practices for vegetation management, enhances the reliability of the BPS.

FAC-003-2 is the first results-based Reliability Standard approved by FERC, and contains several improvements over FAC-003-1. For example, while FAC-003-2 continues to apply to overhead transmission lines operated at or above 200 kV, it additionally applies to any lower voltage overhead transmission line that is either an element of an interconnection reliability operating limit or a major WECC transfer path. Another improvement is that FAC-003-2 makes explicit a transmission owner's obligation to prevent an encroachment into the minimum vegetation clearance distance for a line subject to this standard, regardless of whether that encroachment results in a sustained outage or fault. FAC-003-2 also requires transmission owners, for the first time, to annually inspect all transmission lines subject to the Reliability Standard and complete 100 percent of their annual vegetation management work plan.

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<sup>44</sup> *Revisions to Reliability Standard for Transmission Vegetation Management*, Order No. 777, 142 FERC ¶ 61,208 (2013) (Order No. 777).

On September 19, 2013, FERC approved FAC-003-3,<sup>45</sup> which extends FAC-003-2 vegetation management requirements to certain generator interconnection facilities to address a reliability gap that existed when the requirements only applied to transmission owners. Certain generator owners with overhead lines, particularly those with generator interconnection facilities longer than one mile and which run through areas that may be densely populated with trees and other plants, are now also required to perform vegetation management of those lines. For purposes of this Reliability Standard, these lines are treated as transmission lines.

NERC is conducting additional research relating to vegetation management issues in response to FERC directives in Order No. 777. FERC directed NERC to conduct or contract testing to develop empirical data regarding the flashover distances between conductors and vegetation.<sup>46</sup> To carry out this project, NERC is contracting support to conduct the necessary research and testing that will provide empirical evidence to statistically validate the calculation of the minimum vegetation clearance distances (MVCD), as specified in Reliability Standard FAC-003-3. Significant industry support for the application of the Gallet Equation, which uses the gap factor to calculate MVCD, was a key factor in achieving approval for this NERC Reliability Standard. A final report summarizing this research will be filed with the applicable governmental authorities in June 2015 and will advise the applicable governmental authorities about the issues encountered and how best to address them.

### **c. Protection System Maintenance and Testing**

NERC has identified protection systems, and in particular reduction of protection system misoperations, as a top reliability priority. Likewise, the RISC has named protection systems as one of four high priority areas to be addressed in Reliability Standards. In particular, properly

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<sup>45</sup> *Generator Requirements at the Transmission Interface*, 144 FERC ¶ 61,221 (2013).

<sup>46</sup> Order No. 777 at P 59.

maintaining protection systems supports the ERO's goal of reducing protection systems misoperations. By reducing misoperations, maintenance and testing of protection systems helps provide reliable system performance when responding to abnormal system conditions.

In 2007, NERC initiated Project 2007-17 – Protection System Maintenance and Testing – to consolidate four currently enforceable Reliability Standards<sup>47</sup> that pertain to various aspects of maintenance and testing of protection and control systems into a single Reliability Standard, PRC-005-2. This project also seeks to address: (i) certain FERC directives from Order No. 693 related to these four Reliability Standards;<sup>48</sup> and (ii) fundamental issues identified by the NERC System Protection and Control Task Force (SPCTF) in its assessment of these four Reliability Standards.

On December 19, 2013, FERC approved Reliability Standard PRC-005-2,<sup>49</sup> Protection System Maintenance, which establishes requirements for a time-based maintenance program,

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<sup>47</sup> The four Reliability Standards at issue were PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0. *See NERC SPCTF Assessment of Standards: PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing, PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs, PRC-011-0 — UVLS System Maintenance and Testing, PRC-017-0 — Special Protection System Maintenance and Testing*, Mar. 8, 2007 (SPCTF Assessment), available at: [http://www.nerc.com/docs/standards/sar/PRC-005-008-011-017\\_Report\\_Approved\\_by\\_PC.pdf](http://www.nerc.com/docs/standards/sar/PRC-005-008-011-017_Report_Approved_by_PC.pdf).

A supplement to the SPCTF Assessment was also considered. *See NERC SPCTF Supplemental Assessment Addressing FERC Order 693 Relative to PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing, PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs, PRC-011-0 — UVLS System Maintenance and Testing, PRC-017-0 — Special Protection System Maintenance and Testing*, May 17, 2007, available at: [http://www.nerc.com/docs/pc/spctf/Supplemental\\_Report\\_on\\_PRC-005-008-011-017\\_Approved\\_by\\_PC\\_2.pdf](http://www.nerc.com/docs/pc/spctf/Supplemental_Report_on_PRC-005-008-011-017_Approved_by_PC_2.pdf).

<sup>48</sup> FERC approved Reliability Standard PRC-005-1 in Order No. 693 and directed NERC “to develop a modification ... through the Reliability Standards development process that includes a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System.” FERC also directed NERC to consider suggestions made by commenters to “combine PRC-005, PRC-008, PRC-011, and PRC-017 into a single Reliability Standard.” Order No. 693 at P 1475.

<sup>49</sup> On April 13, 2011, NERC submitted a filing of a proposed modification to the definition of “Protection System” to close a reliability gap created by an omission in the prior definition. The modified definition is used in PRC-005-2

where all relevant devices are maintained according to prescribed maximum intervals.<sup>50</sup> It also establishes requirements for a condition-based maintenance program, where the hands-on maintenance intervals are adjusted to reflect the known and reported condition of the relevant devices. For a performance-based maintenance program, the hands-on maintenance intervals are adjusted to reflect the historical performance of the relevant devices. PRC-005-2 also provides a comprehensive set of requirements that define a strong protection systems maintenance program. It also includes detailed tables of minimum maintenance activities and maximum maintenance intervals for all five component types addressed within the NERC definition of protection system. Functional entities that monitor the actual condition of their protection system components are further empowered to utilize monitoring to improve the efficiency and effectiveness of their protection systems maintenance program. With the benefit of extensive protection system performance data, these entities will improve the efficiency and effectiveness of their programs.

This Reliability Standard will go into effect on April 1, 2015, and implementation will continue over a twelve-year phased-in period, which includes milestones for implementation during the implementation timeframes. In furtherance of the important issues surrounding the maintenance and testing of protection systems, the System Protection and Control Subcommittee (SPCS) issued a report that suggested improving commissioning practices through: (i) analysis of protection system misoperations; (ii) sharing of lessons learned; and (iii) development of an industry reference document on protection system commissioning practices.<sup>51</sup>

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<sup>50</sup> *Protection System Maintenance Reliability Standard*, 145 FERC ¶ 61,253 (2013)

<sup>51</sup> See the Planning Committee-approved final report, *SPCS Response to Standards Committee Request for Research*, (Mar. 5, 2013), available at: [http://www.nerc.com/docs/pc/spctf/SPCS%20Commissioning%20Testing%20Response\\_Final.pdf](http://www.nerc.com/docs/pc/spctf/SPCS%20Commissioning%20Testing%20Response_Final.pdf).

#### **d. Geomagnetic Disturbances**

As high-impact, low-frequency (HILF) events, severe GMDs pose a unique threat to BPS reliability. NERC is committed to working with stakeholders and the applicable governmental authorities to mitigate the risks posed by such events. The science concerning GMDs is still maturing and there is significant disagreement in the scientific and manufacturing communities about the most likely effects of a GMD event on the BPS, but NERC recognizes the potential for GMDs to adversely affect the BPS. Occurrences such as the 1989 event in Hydro-Québec demonstrate that severe solar storms have potential to cause loss of reactive power support, voltage instability, relay misoperations, and possibly equipment loss of life or damage to the BPS.

Through the efforts of the Geomagnetic Disturbance Task Force (GMDTF), NERC released the *2012 Special Reliability Assessment Interim Report: Effects of Geomagnetic Disturbances on the Bulk Power System* in February 2012.<sup>52</sup> The GMDTF identified four recommendations for industry in the report:

- (1) Improve tools for industry planners to develop geomagnetic mitigation strategies;
- (2) Improve tools for system operators to manage geomagnetic impacts;
- (3) Develop education and information exchanges between researchers and industry;  
and
- (4) Review the need for enhanced NERC Reliability Standards.

With implementation of these recommendations well underway, FERC issued Order No. 779 concerning Reliability Standards for GMDs on May 16, 2013.<sup>53</sup> In Order No. 779, FERC directed NERC to submit for approval proposed Reliability Standards that address the impact of

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<sup>52</sup> Available at: <http://www.nerc.com/pa/stand/pages/geomagnetic-disturbance-resource.aspx>.

<sup>53</sup> *Reliability Standards for Geomagnetic Disturbances*, Order No. 779, 143 FERC ¶ 61,147 (2013).

GMD on the reliable operation of the BPS, in two stages. In the first stage, NERC was directed to develop one or more Reliability Standards that require owners and operators of the BPS to implement operational procedures to mitigate the effects of GMDs consistent with the reliable operation of the BPS. On November 26, 2013, NERC submitted a filing of the first GMD Reliability Standard. The proposed standard, EOP-010-1, requires entities to develop tailored operating plans, processes, and procedures.

In the second stage, NERC was directed to submit one or more Reliability Standards that require owners and operators of the BPS to conduct initial and on-going assessments of the potential impact of benchmark GMD events on BPS equipment and the BPS as a whole. NERC and the standard drafting team assigned to develop GMD Reliability Standards have completed development of a technically justified benchmark GMD event during the first half of 2014 in preparation for completion of Reliability Standard development in late 2014.

The following efforts resulting from implementation activities have been important in supporting development of technically sound Reliability Standards, as ordered by FERC:

- (1) Development of operating procedure templates for transmission operators that reflect best practices and consensus among technical experts;
- (2) Improved ground conductivity models that represent the geological regions of North America and a published guidance for modeling geomagnetically-induced current; and
- (3) Initiation of a transformer modeling and testing project to validate models used to assess the effects of geomagnetically-induced current on transformers.

NERC is continuing efforts to expand the technical foundation for understanding the potential impact of GMD by supporting the work of the GMDTF and collaborative research with the Electric Power Research Institute, U.S. Geological Survey, Natural Resources Canada, and other public and private research organizations. The GMDTF and the Electric Power Research Institute are giving focused attention toward improving the suite of publicly available and

technically valid tools, guidelines, and transformer models to evaluate potential impacts of GMD. The results of this work will support registered entities in conducting vulnerability assessments as required by the second stage Reliability Standards being developed in response to Order No. 779.

**e. Physical Security Reliability Standard**

On March 7, 2014, FERC issued an order directing NERC to submit for approval, within 90 days of the order, one or more Reliability Standards to address physical security risks and vulnerabilities of critical facilities on the BPS. FERC's order focused on critical facilities, directing steps to evaluate physical security threats and implement security plans that continues NERC's ongoing physical security efforts. In the order, FERC stated, among other things, that the proposed Reliability Standard(s) should require entities to take at least the following three steps:

- (1) Perform a risk assessment to identify facilities that, if damaged or rendered inoperable, could result in instability, uncontrolled separation, or cascading failures on the BPS;
- (2) Evaluate the potential threats and vulnerabilities to those identified facilities; and
- (3) Develop and implement a security plan designed to protect against physical attacks to those identified facilities based on the assessment of the potential threats and vulnerabilities to their physical security.

FERC's order also specified that the Reliability Standard should require procedures for a third party to verify the list of identified facilities and add or remove facilities from the list, procedures for a third party to review the evaluation of threats and vulnerabilities and the physical security plan, and that the three steps listed above be periodically re-evaluated and revised.

In response to the order, NERC staff and the NERC SC worked together to develop an action plan for meeting the June 5, 2014 deadline. The NERC SC approved several waivers to facilitate meeting the required timelines and formed the eleven member standard drafting team

on March 21, 2014. Also on March 21, 2014, the NERC SC approved waivers to support drafting activities to meet the June 5, 2014 deadline. Additionally, on March 21, 2014, the NERC SC also accepted the Project 2014-04 standard authorization request for a seven calendar-day informal comment period posting, pursuant to the NERC SC-approved waiver. On April 1, 2014, NERC staff convened a technical conference to focus stakeholder discussion on developing a draft of a Physical Security Reliability Standard, with the intent of assisting the standard drafting team to quickly develop and post a Reliability Standard for comment and ballot. The conference provided a forum for industry input on the concepts in the draft Reliability Standard, to include criteria for determining applicable entities, identification of critical facilities, evaluation of potential threats and vulnerabilities, development and implementation of physical security plans, and the proposed standard's implementation plan. NERC Compliance staff also provided an overview of the RSAW approach.

The Physical Security standard drafting team developed the proposed Reliability Standard, CIP-014-1, through the Reliability Standards development process. The Reliability Standard was posted under a NERC SC-approved waiver for a 15-day concurrent comment and initial ballot period from April 10, 2014 through April 24, 2014. The initial ballot achieved a quorum of 88.60 percent and an industry approval of 82.07 percent. The final ballot was posted, under an SC-approved waiver, for a 5-day period from May 1, 2014 through May 5, 2014 and achieved a quorum of 92.53 percent and an industry approval of 85.61 percent. The NERC Board adopted the standard on May 13, 2014, and it was filed by NERC on June 4, 2014.

**B. The ERO Is Implementing Processes to Register Entities Commensurate with Risk to the Bulk Power System**

The starting point for the ERO's program for monitoring and enforcing compliance with Reliability Standards is its processes for comprehensively identifying and registering owners,



operators and users of the BPS that are responsible for performing reliability-related functions in accordance with the approved Reliability Standards. This section discusses major enhancements to the registration process initiated during the assessment period.

### **1. Improved Registration Processes, Information Systems, and Methods Across Regional Entities**

NERC's organization registration process identifies entities that are responsible for compliance with the Reliability Standards. Entities that are registered are included on the NERC Compliance Registry (NCR) and are responsible for compliance with all applicable Reliability Standards. Pursuant to Section 500 of the NERC ROP and the terms of the approved Regional Entity delegation agreements (RDAs), the Regional Entities are responsible to provide timely and accurate information to NERC relating to registrations to enable NERC to maintain a NCR that is accurate and up-to-date.<sup>54</sup> To further consistency and increase transparency in registrations across the Regional Entities, as well as to address the problem of obtaining timely updates of registration information from entities, NERC developed a Common Registration Form (CRF) which registered entities use to provide the Regional Entities with real-time updates of the information recorded in the NCR pertaining to ownership, operations, contact information, asset lists and other information that may affect registration status. A corollary benefit of the CRF is that it serves as a check for the Regional Entities to ensure that owners, users, and operators of the BPS are appropriately registered. NERC is also undertaking an effort to map all the inter-relationships between registered entities on the NCR, to ensure that all owners, users and operators of the BPS are registered in the NCR.

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<sup>54</sup> The amended and restated RDAs, effective January 1, 2011, included revisions to the provisions concerning the Regional Entities' responsibilities in the registration process. In addition, revisions to the registration criteria and registration processes were effectuated through amendments to NERC ROP Section 500, Appendix 5A, *Organization Registration and Certification Manual*, and Appendix 5B, *Statement of Compliance Registry Criteria*, during the assessment period.

In January 2014, NERC launched the Risk-based Registration Assessment Initiative to enhance the compliance registration and certification program to be more efficient and better aligned with reliability benefit. Through this initiative, NERC will register entities and assign appropriate Reliability Standard requirements commensurate with the need to mitigate the risk that each entity poses to the BES, by scaling registration criteria based on their contributions to reliability. NERC will also develop tools that will enhance registered entities' understanding of the relevant Reliability Standards and requirements that apply to them. Scoping compliance responsibilities according to BPS reliability risks equates to better use of resources at both the registered entity level in the implementation of compliance programs, and at the Regional Entity level in their overall compliance monitoring efforts.

## **2. BES Definition**

During the assessment period, NERC revised the definition of the BES in the NERC *Glossary of Terms Used in Reliability Standards*, in response to FERC directives in Order Nos. 743 and 743-A.<sup>55</sup> The objective of the revisions is to ensure consistent inclusion or exclusion of entities and elements that are subject to Reliability Standard requirements. With the strong support and participation of industry representatives and the Regional Entities, NERC delivered a technically grounded and legally supportable foundation for identifying the elements and facilities that comprise the BES.

In Phase 1 of this process, NERC proposed to eliminate regional discretion and establish a bright-line threshold that includes in the BES all facilities operated at or above 100 kV. FERC

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<sup>55</sup> *Revision to Electric Reliability Organization Definition of Bulk Electric System*, Order No. 743, 133 FERC ¶ 61,150 (2010), *order on reh'g*, Order No. 743-A, 134 FERC ¶ 61,210 (2011).

accepted the revised definition in Order No. 773.<sup>56</sup> NERC also identified specific categories of facilities and configurations as inclusions and exclusions to the BES definition. These inclusions and exclusions are set forth in the revised BES definition. The process for requesting an inclusion or exclusion in or from the BES, is set forth in Appendix 5C, *Procedure for Requesting and Receiving an Exception from the Definition of the Bulk Electric System*, of NERC's ROP, which FERC has also approved.<sup>57</sup> Appendix 5C establishes an exception process to bring elements within, or remove elements from, the BES definition on a case-by-case basis.

In Phase 2 of the BES definition process, NERC addressed additional regulatory directives from Order Nos. 773 and 773-A, as well as industry comments received during Phase 1. As part of Phase 2, and with industry input, NERC proposed substantive changes to Inclusion I4 (dispersed power producing resources), Exclusion E1 (radial systems), Exclusion E3 (local networks), and Exclusion E4 (reactive power devices). FERC approved the additional proposed revisions to the BES definition in an order issued March 20, 2014.<sup>58</sup>

The revised BES definition enables NERC and the Regional Entities to identify assets that are material to the reliability of the interconnected transmission network. By using a set of continent-wide, "bright line" criteria that eliminates regional discretion, the revised definition effectively ensures that the users, owners and operators of BES assets are identified and registered on a consistent basis in order to comply with applicable Reliability Standards. The revised BES definition provides improved clarity for industry by identifying specific categories

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<sup>56</sup> *Revisions to Electric Reliability Organization Definition of Bulk Electric System and Rules of Procedure*, Order No. 773, 141 FERC ¶ 61,236 (2012); *order on reh'g*, Order No. 773-A, 143 FERC ¶ 61,053 (2013), *order on reh'g and clarification*, 144 FERC ¶ 61,174 (2013).

<sup>57</sup> Available at:

[http://www.nerc.com/FilingsOrders/us/RuleOfProcedureDL/Appendix\\_5C\\_ProcForReqAndRecExFromAppOfNERCDefBES\\_20140701.pdf](http://www.nerc.com/FilingsOrders/us/RuleOfProcedureDL/Appendix_5C_ProcForReqAndRecExFromAppOfNERCDefBES_20140701.pdf).

<sup>58</sup> *North American Electric Reliability Corporation, Order Approving Revised Definition*, 146 FERC ¶ 61,199 (2014).

of facilities and configurations as inclusions and exclusions to the BES. Additionally, the case-by-case exception process to add elements to, and to remove elements from, the BES provides transparency and uniformity to the determinations of what constitutes the BES.

To implement the revised BES definition, which became effective on July 1, 2014, NERC developed a web-based, ERO Enterprise-wide application, the BESnet Enterprise Application Tool (BESnet tool), to provide a consistent platform for registered entities to submit self-determined notifications and to submit exception requests for inclusions in or exclusions from the BES. Once a registered entity applies the BES definition to a specific element within its system, it must notify its applicable Regional Entity of any newly identified system elements that are inclusions or exclusions (i.e., system elements with changed BES classifications under the revised BES definition). Inclusion and exception decisions on the self-determined notifications are made by the Regional Entity through the BESnet tool in order to support uniform reviews and evaluations by the Regional Entity and NERC. If a Regional Entity receives notification of a self-determined exclusion, then it must evaluate whether that registered entity can stop its compliance obligations for that excluded system element. If a Regional Entity receives notification of a self-determined inclusion, then the Regional Entity must evaluate whether that registered entity should take steps to bring that system element into compliance with applicable Reliability Standard requirements within a fixed implementation period. NERC will also use the BESnet tool to manage associated support materials and records related to technical reviews by the Regional Entities and NERC.

NERC is finalizing implementation materials that will guide the consistent evaluation of inclusions, exclusions and self-notifications of BES elements across the ERO Enterprise. NERC has created a single portal location to provide a central site to obtain useful materials to support

registered entities' review of their BES elements. Additionally, the BES exception process was identified by NERC and the Regional Entity Management Group as having sufficient similarities in business processes and function across the ERO to be deemed an ERO Enterprise application, which will be used by both NERC and the Regional Entities to eliminate disparate applications across the ERO. NERC is also developing a Reliability Standard reference document to explain the intended application of the BES definition to yield consistent results. Development of additional reference documents to promote further consistency across the ERO Enterprise includes:<sup>59</sup>

- (1) *BES Definition Reference Document*, which addresses how to apply the BES definition using several examples;
- (2) *BES Definition Implementation Guidance*, which shows how the Regional Entities and NERC will review self-determined notifications and includes a high-level summary of notification requirements; and
- (3) *BES Exception Request Evaluation Guideline*, which demonstrates how the Regional Entities and NERC will evaluate exception requests, and provides a high-level summary of the exception request evidentiary requirements.

During the first two quarters of 2014, NERC held communications and training sessions for Regional Entities, registered entities, and NERC staff to address, among other things: (i) evidentiary requirements for BES determinations; (ii) review and appeal mechanisms; and (iii) Reliability Standards applicability. These sessions included workshops and webinars.

**C. The ERO Monitors and Enforces Compliance with Reliability Standards in an Efficient and Transparent Manner Using Enforcement Processes that Match the Risk and Importance of Possible Violations to BPS Reliability**

A key, strategic transformation that NERC, in collaboration with the Regional Entities and stakeholders, embarked upon during the assessment period is the construction of a risk-based model for compliance monitoring and enforcement. This risk-based approach enables NERC to

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<sup>59</sup> See the Bulk Electric System (BES) Definition, Notification, and Exception Process Page at: <http://www.nerc.com/pa/rapa/pages/bes.aspx>.

focus ERO and industry resource investment on the most important issues to BPS reliability. In this section of the assessment report, NERC highlights initiatives to improve the Compliance Monitoring and Enforcement Program (CMEP) during the assessment period, including the FFT program. The FFT program and its subsequent enhancements began to implement this risk-based approach. The FFT program enables the ERO Enterprise to achieve major efficiencies in enforcement. Through the use of FFT, the ERO resolves noncompliances that pose a lesser risk to BPS reliability more efficiently, recognizing that efficient disposition of such issues allows the ERO Enterprise and industry to devote its emphasis and resources to more important reliability matters. Further, through careful planning and coordination and collaboration between NERC and the Regional Entities, NERC has achieved major enforcement efficiencies. These efforts have also resulted in a drastically reduced NERC caseload; for the past two years, NERC and the Regional Entities have worked to eliminate all items in the caseload which are older than 24 months. In 2012, that effort resulted in a reduction of those items by 80%. In 2013, the ERO Enterprise reduced those items by 93%. By the end of 2013, only 65 violations in inventory were older than 24 months. Additionally, taking advantage of the FFT process, which provides incentives for self-reporting, registered entities continue to aggressively self-identify, self-report and mitigate reliability issues.

Building upon the success of FFT through the RAI, NERC and the Regional Entities created additional incentives to discourage poor performance and encourage positive behaviors that contribute to higher accountability and improved reliability performance. RAI processes that promote more effective reliability risk mitigation by encouraging development and

enhancement of internal management controls and corrective action programs at registered entities began to be implemented in 2013.<sup>60</sup>

### **1. Compliance Enforcement Initiative and Find, Fix, Track and Report**

Recognizing the need and the importance of ensuring that reliability risks are addressed properly through a scaled approach, NERC devised the FFT initiative in 2011 as a risk control strategy that differentiates and addresses compliance issues according to their significance to the reliability of the BPS. FFT emphasizes proportionality and enforcement discretion. The FFT process enables NERC to report lesser-risk possible violations of Reliability Standards through a streamlined process that results in the posting of a minimal record associated with the noncompliance on NERC's website.<sup>61</sup> The FFT initiative illustrates that NERC continually reevaluates, redirects and rebalances its CMEP implementation efforts.

NERC developed FFT in conjunction with the Regional Entities. The development of the process benefited from collaboration with representatives of registered entities through a series of focus groups. During these focus group sessions, participants indicated that registered entities typically allocated time and resources equally among violations, regardless of the risk to reliability posed by each violation. Implementation of the FFT initiative was the first step towards addressing this mis-allocation of resources.

Since the launch of FFT in 2011, NERC has implemented additional enhancements to the process. Specifically, NERC expanded FFT treatment to: (i) a limited pool of possible moderate risk violations; and (ii) some unmitigated possible violations so long as mitigation occurs within 90 days from the date the FFT item is filed or posted. To streamline processing of FFT items,

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<sup>60</sup> As noted previously, NERC will submit a separate informational filing to the applicable governmental authorities describing these processes.

<sup>61</sup> In contrast, NERC submits violations that pose a greater risk to reliability or do not otherwise meet the FFT criteria to FERC in a spreadsheet Notice of Penalty (SNOP) or full Notice of Penalty (NOP) format.

NERC now posts FFTs collected by the Regional Entities on its website at the end of each month without prior review of such items. This replaces the prior procedure in which NERC submitted monthly informational filings to FERC describing FFT items. While the Regional Entities post FFT items on a monthly basis, NERC maintains its enforcement oversight by reviewing a representative sample of FFTs during the 60-day window following the Regional Entities' monthly postings and by conducting an annual spot check of FFTs.

The FFT program has been highly successful in promoting a risk-based approach to resolving noncompliance. All Regional Entities utilize FFT to resolve a large number of minimal risk issues. Further, through its monthly reviews and annual spot checks, NERC verifies that the parameters for identifying minimal risk issues are consistently applied throughout the ERO Enterprise.

## **2. Reliability Assurance Initiative**

In November 2012, NERC management proposed RAI as a multi-year effort to identify and implement changes to enhance the effectiveness of the ERO Enterprise's compliance and enforcement functions. RAI will help NERC foster consistency and efficiency in its compliance monitoring and enforcement processes. NERC expects RAI to improve BPS reliability by refocusing efforts on serious and substantial reliability risks and promoting the development and enhancement of the internal controls that mitigate those risks. Increased consistency in the ERO Enterprise's compliance and enforcement efforts yields a level of predictability for registered entities to understand how Reliability Standards are applied and enforced and to model positive behaviors.

To foster dialogue and seek industry feedback on the various aspects of RAI, NERC hosted a series of workshops in 2013 that addressed defining internal controls, conducting risk assessment, launching pilot programs, enhancing the FFT process, and improving self-reporting.



### **a. RAI Improvements to Compliance Monitoring Processes**

The core concept of risk-based compliance monitoring is intended to guide Regional Entities in allocating resources for compliance monitoring activities and methods based on a registered entity's potential impact on the BPS. Compliance-related activities under the RAI program will help achieve a risk-based approach for compliance monitoring by evaluating current compliance monitoring practices, identifying improvements, and addressing the consistent application of audit techniques and the use of uniform tools to carry out compliance monitoring activities.

In 2013, NERC and the Regional Entities began to develop and implement tools that will define techniques and methods to perform compliance monitoring in a consistent manner across the ERO Enterprise. The Regional Entities began using the first of these tools, the *Compliance Auditor Checklist*, in August 2013. In December 2013, NERC and the Regional Entities completed the first draft of a companion document for the *Compliance Auditor Checklist*, specifically, the *Compliance Auditor Handbook*, as found in the *ERO Enterprise Compliance Auditor Manual* (Auditor Manual). NERC disseminated the Auditor Manual and provided initial training to Regional Entity auditors during the first quarter of 2014. In the second quarter of 2014, the Regional Entities began to use the Auditor Manual and its related processes and procedures on a select number of audits. Throughout 2014, NERC and the Regional Entities will revise and expand the Auditor Manual to address additional audit topics, reflect additional processes developed through RAI activities, and include lessons learned.

A second key RAI compliance activity, the Prototypes and Pilot program, focuses on the development and implementation of a formalized approach to risk assessments and testing of management controls. NERC and the Regional Entities initiated the first phase of the Prototypes

and Pilot program during 2013. This phase explored different approaches to applying risk-based auditing concepts (e.g., audit scoping, reliability risk assessments, and management controls review and testing). For 2014 and beyond, a team consisting of NERC, Regional Entity, and industry representatives as well as an independent audit consultant will evaluate the findings and determine the best audit approach to implement throughout the ERO Enterprise.

NERC and the Regional Entities are also developing and implementing activities that will address the transition to CIP Version 5 and redesign the tools and information available for compliance monitoring. In addition, and as discussed in further detail below, NERC and the Regional Entities have consolidated the annual CMEP Implementation Plans with the goal of implementing certain risk-based compliance enhancements.

#### **b. RAI Improvements to Compliance Enforcement Processes**

The enforcement aspect of the RAI builds on the success of FFT to develop incentives for registered entities to distinguish between poor performance and positive behaviors that contribute to higher accountability and improved reliability performance. The RAI calls for NERC to do the following by 2016: (i) exercise discretion to focus resources on the most serious and substantial risks to the reliability of the BPS; and (ii) empower registered entities to self-identify, mitigate and record noncompliance subject to NERC and Regional Entity oversight.

Similar to the RAI compliance monitoring effort, the enforcement element of RAI seeks to align the ERO's enforcement processing activities with levels of risk to the reliability of the BPS. Achieving this alignment will promote efficiencies for both the ERO Enterprise and registered entities by eliminating undue regulatory burdens, streamlining documentation and filing requirements, and substantially improving the processing of noncompliance and related mitigating activities.

In 2013, NERC began implementing a series of activities in connection with RAI. These activities consisted of both short-term and long-term solutions to address registered entity concerns and improve enforcement processes. For example, in 2013, NERC and the Regional Entities developed the *ERO Self-Report User Guide*. This document explains the type and quality of information that a registered entity should submit with a self-report in order to allow for a prompt evaluation of noncompliance, and, if appropriate, a prompt disposition of the noncompliance if it poses a minimal risk to the reliability of the BPS. A companion *ERO Mitigation Plan Guide* document was also developed. NERC posted the draft guides in January 2014 for public review and comment. The final user guides are now available on the RAI page on the NERC website.<sup>62</sup>

Second, NERC and the Regional Entities began two pilot programs to test RAI enforcement concepts. The first pilot, the Aggregation of Minimal Risk Issues program, tests selected registered entities' ability to proactively self-address, identify, and mitigate minimal risk issues. The second pilot is testing the application of enforcement discretion; the purpose of this pilot is to identify minimal risk issues that would be recorded and mitigated without triggering an enforcement action. These pilot programs began a six-month testing cycle in October 2013. NERC and the Regional Entities are gradually expanding the programs to include additional registered entities.

In addition, as of January 2014, all Registered Entities implemented the triage process. Under this process, all Regional Entities will review instances of noncompliance and make an initial determination as to whether an issue will proceed through enforcement or whether additional information is needed.

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<sup>62</sup> Available at: <http://www.nerc.com/pa/comp/Pages/Reliability-Assurance-Initiative.aspx>.

Going forward, NERC will continue to implement and evaluate these enforcement concepts. These processes will be further discussed in an informational filing on the RAI that NERC will submit to the applicable governmental authorities in 2014.

### **3. Development of a Consolidated CMEP Implementation Plan**

NERC and the Regional Entities no longer create nine separate CMEP Implementation Plans, but rather have consolidated these documents into a single integrated CMEP Implementation Plan for the ERO Enterprise. The consolidated CMEP Implementation Plan uses a streamlined format that eliminates redundant information, improves the transparency of CMEP activities, and promotes consistency among the Regional Entities' Implementation Plans.

During the implementation year, NERC or a Regional Entity (with NERC approval) may update the Implementation Plan to change the *Actively Monitored List of Reliability Standards*, compliance monitoring processes, Regional Entity processes, or to provide updates. When updates occur, NERC will post a revised Implementation Plan to its website and issue a compliance communication. A Regional Entity may also update its Implementation Plan, with NERC approval. NERC is responsible for updating the ERO CMEP Implementation Plan to reflect any Regional Entity's changes and for posting the updated plan to its website and issuing compliance communications.

Following each implementation year, the Regional Entities will complete a CMEP Implementation survey due in January of the following implementation year (e.g., the 2014 CMEP Implementation Plan survey is due in January 2015). This survey will provide Regional Entity-specific information on compliance monitoring, outreach, enforcement, CMEP program effectiveness, and other regional activities. NERC will use this information to monitor Regional Entity CMEP implementation and to plan for the following implementation year.

**4. Improvements in Processing of Compliance and Enforcement Items by NERC and the Regional Entities**

**a. NERC and the Regional Entities Have Improved the Speed and Efficiency of Processing Enforcement Items**

During the assessment period, NERC and the Regional Entities have continued to hold industry accountable for violations that create serious risk to the BPS, and to implement improvements to ensure that enforcement actions are timely and transparent to industry. As discussed in further detail in the “Enforcement” section of the NERC Assessment of Regional Entity Delegated Functions (**Attachment 3**), by the end of 2013, NERC had reduced the number of active violations older than 24 months (excluding those held by appeal, a regulator, or a court)<sup>63</sup> so that only 65 such active violations remained. There has been consistent progress since 2012 in achieving the goal of processing all violations within 24 months following discovery.

By working to reduce the number of aging violations while improving the processing speed for newer violations, NERC and the Regional Entities reduced the average age of violations in the ERO caseload by six percent in 2013, from 11.86 months in 2012 to 11.2 months.

NERC’s successes in improving the efficiency of violation processing can be attributed to several factors, including the implementation and use of streamlined enforcement processing mechanisms, such as FFT and the SNOP. The use of streamlined enforcement processing mechanisms has allowed NERC to increase substantially the number of violations filed in a given year, reducing the caseload and in turn, improving processing times.

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<sup>63</sup> “Held by appeal, a regulator or a court” (or “on hold”) refers to violations that are not currently being processed by NERC or the Regional Entities as a result of a court or administrative proceeding that will impact the resolution of the violation.

In 2009 and 2010, NERC filed NOPs with FERC for a combined total of 1,540 violations. In 2011, after implementing the use of streamlined enforcement processing mechanisms, NERC filed a total of 1,697 violations – more than the two previous years combined. In 2012, NERC filed a total of 1,767 violations. In 2013, NERC filed a total of 1,862 violations. NERC processed approximately 43 percent of the violations filed in 2013 using the FFT mechanism.

In addition to the use of streamlined enforcement mechanisms, NERC has dedicated substantial resources to improving its enforcement processing activities and performance. In fact, during the period covered by this *Five-Year ERO Performance Assessment Report*, NERC has more than doubled the size of its enforcement processing staff, going from four full time equivalent personnel (FTEs) in 2010 to nine FTEs as of January 1, 2014.

Lastly, NERC has taken several steps to enhance collaboration and consistency across the entire ERO Enterprise. NERC enforcement processing has assigned staff to work closely with each Regional Entity to enhance the relationships with each Regional Entity and to develop greater knowledge and expertise concerning each Regional Entity and identify areas for collaboration and process enhancement. In addition, NERC is continuing to provide training to the Regional Entities with the goal of increasing the consistency of enforcement processes and documents. Through collaboration with the Regional Entities, NERC expects to build on its past successes and continue to work toward reducing aging caseload, reducing enforcement processing times, and ensuring consistency in enforcement processes and procedures.

NERC and the Regional Entities have continued to work collaboratively to develop and implement a set of metrics to measure the efficiency with which enforcement items are processed. Development of these performance items was an area for improvement identified in

FERC's order on NERC's Three-Year ERO Performance Assessment.<sup>64</sup> A set of final metrics has been agreed upon and a set of common parameters was developed to ensure that metrics measurements by NERC and the Regional Entities remain consistent. To that end, in the third quarter of 2013, NERC and the Regional Entities developed a set of business rules to ensure integrity and alignment across NERC and Regional Entity data. Ensuring the integrity of this data is important for analyzing trends and calculating processing metrics.

The four metrics developed to monitor the performance of NERC and the Regional Entities in processing enforcement items are:

- (1) Caseload Index – computes the number of months it would take to clear the violations in a Compliance Enforcement Authority's (CEA, i.e., NERC or a Regional Entity) inventory based on the CEA's average monthly processing rate for the preceding twelve month period;
- (2) Violations in Inventory – reports the number of violations in the CEA's caseload;
- (3) Violation Aging – reports, by Regional Entity, the number of violations discovered in each year beginning with 2007 that have not been filed with the Commission or otherwise resolved;<sup>65</sup> and
- (4) Mitigation Activity Aging – identifies the status of mitigation activity based upon age of violations.

NERC will continue to analyze and evaluate violation processing data. The purpose of analyzing violations and violation processing information is to identify trends and emerging risks. This analysis will provide NERC with insight into the effectiveness of NERC's and the Regional Entities' processes and programs. The analysis informs the development of enforcement policies and processes and offers feedback for other departments such as Standards.

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<sup>64</sup> *Order on the Electric Reliability Organization's Three-Year Performance Assessment*, 132 FERC ¶ 61,217 (2010) at PP 138 and 217.

<sup>65</sup> NERC also monitors Violation Aging by Disposition Method. This includes the average turnaround time for each disposition method for violations discovered within a specified time horizon (i.e., discovery to date filed with NERC, date filed with NERC to date filed with FERC, and discovery to date filed with FERC).

NERC's departments collaborate to leverage analytics as a risk management and resource allocation tool. As an example of this effort, NERC is closely monitoring the status of mitigation activity completion, regardless of whether or not the violation is on hold. NERC aims to work with the Regional Entities to reduce the amount of time from discovery of a violation to completion of the mitigating activity, thereby reducing the ongoing risk that these violations may pose to reliability.

#### **b. Oversight of Regional Entity Processes and Actions**

NERC is continuously evaluating and improving its methods of overseeing the Regional Entities' implementation of CMEP processes and procedures. During the assessment period, NERC adopted a more methodical approach to evaluating Regional Entity performance with respect to enforcement activities. NERC has also enhanced its approach to evaluating Regional Entity compliance activities. These oversight activities ensure that the Regional Entities are meeting their obligations under the NERC ROP and the RDAs. These oversight activities also promote transparency and consistency, and drive the identification and implementation of best practices across the ERO Enterprise.

For additional information regarding NERC's oversight of Regional Entity enforcement program and processes, see the "Enforcement" section of the NERC Assessment of Regional Entity Delegated Functions, **Attachment 3** to this *Five-Year ERO Performance Assessment Report*.

#### **c. Developing Common Compliance Auditor Qualifications Across the ERO Enterprise**

NERC and the Regional Entities are developing common ERO auditor qualification requirements and auditor job descriptions that will be consistently used across the ERO Enterprise. Establishing common ERO auditor qualifications is an initiative specified in the



2013-2016 ERO Strategic Plan.<sup>66</sup> NERC and the Regional Entities will establish key attributes and skill sets that audit team members should possess to ensure the audit team composition includes competencies needed to complete an effective audit. Establishing common ERO job descriptions promotes a consistent approach in attracting and retaining the necessary talent for auditor positions. Common auditor qualification criteria, training, and audit approach help promote high-quality audits and consistency in CMEP implementation activities across the ERO Enterprise.

**d. Enhancing the Training Program for Auditors so that Processes and Procedures Developed in the RAI are Implemented Consistently Across the ERO Enterprise**

As part of its Regional Entity Assurance and Oversight function, NERC is responsible for supporting the development of qualified and trained compliance operations and auditing staffs at both NERC and the Regional Entities. In addition to the development of a common set of auditor qualifications, described in the immediately preceding subsection, NERC ensures the proper qualifications of personnel for auditing and other essential compliance roles through training. As noted above, NERC and the Regional Entities collaborated to create the *Compliance Auditor Checklist* and *Compliance Auditor Handbook*, as found in the Auditor Manual.<sup>67</sup> These documents will be reviewed and revised to incorporate lessons learned from the RAI pilots. NERC will train auditors to ensure that Regional Entities are consistently applying the procedures and methodologies of these documents. Auditor training will also incorporate relevant changes related to enforcement processing, including changes to the self-reporting

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<sup>66</sup> The *Electric Reliability Organization Enterprise Strategic Plan 2013-2016* is available at: <http://www.nerc.com/gov/bot/FINANCE/Documents/ERO%20Enterprise%20Strategic%20Plan%202013-2016%20FINAL%2005%2009%2013.pdf>

<sup>67</sup> Available at: [http://www.nerc.com/pa/comp/ERO%20Enterprise%20Compliance%20Auditor%20Manual%20DL/ERO\\_Enterprise\\_Compliance\\_Auditor\\_Manual\\_version\\_1.pdf](http://www.nerc.com/pa/comp/ERO%20Enterprise%20Compliance%20Auditor%20Manual%20DL/ERO_Enterprise_Compliance_Auditor_Manual_version_1.pdf).

process and enhancements to the FFT process. Setting clear expectations for registered entities regarding audit practices and procedures should also allow registered entities to increase the efficiency and effectiveness of their pre-audit preparation.

**D. Identification, Prioritization, and Dissemination of Information on Risks to the BPS**

NERC is an expert resource for industry on reliability risks and information because it is uniquely positioned to assess potential impacts to reliability and raise awareness of threats to reliability. NERC draws upon a plethora of resources, discussed below, to make its assessments, including the RISC priorities, robust databases of information on transmission, generator and demand-response availability, the annual NERC *State of Reliability* report, and other assessments and reports, as well as internal core analyses of events. In its risk-informed approach, NERC uses performance analysis, solid technical foundation, sophisticated statistical analyses, and integrated validation with actual system events to enhance BPS reliability. As described in §II.D.1 below, at the direction of its Board of Trustees, NERC has developed and is implementing a specific RRM process to create and execute plans for managing reliability risks.

As an example of risk identification, NERC's *2013 Long-Term Reliability Assessment* (LTRA) identified significant emerging reliability issues that industry will face over the next decade.<sup>68</sup> These challenges stem from, among other things, a changing resource mix comprised of significant increases in variable energy resources to meet renewable portfolio standards, increased reliance on natural gas-fired generation and demand-side management primarily driven by economics, and the retirement of nearly 10% of North America's generation capacity.

Another resource for identifying and prioritizing risks is NERC's Event Analysis process. This process, which is described in greater detail in §II.D.3 below, establishes a systematic

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<sup>68</sup> Available at: [http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2013\\_LTRA\\_FINAL.pdf](http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2013_LTRA_FINAL.pdf).

approach to capturing details about all BPS events, from minor Category 1 Events that typically do not have a significant impact on electricity users, to Category 4 and 5 Events that result in widespread customer outages.

Collectively, these resources provide an independent and complete picture of risks to reliability and key BPS reliability indicators such as resource adequacy, peak demand, energy forecasts and transmission developments. These efforts and well-developed resources are critical to how NERC approaches reliability, learns from events on the BPS, and prioritizes resources.

NERC draws upon these resources to inform industry and policymakers about trends and challenges to reliability. One example is the work of the NERC Integration of Variable Generation Task Force (IVGTF), which developed several recommendations that support the reliability considerations for accommodating large amounts of variable generation.<sup>69</sup> These recommendations guided the California Independent System Operator (CAISO) in finding solutions to how it will ensure reliability given the significant development of variable energy resources in that region of the country. Another example is the *Accommodating an Increased Dependence on Natural Gas for Electric Power* report that examined the different risks, arising out of the interdependence of the BPS and the natural gas delivery system, which can affect reliability.<sup>70</sup> Recommendations from this report are being used by WECC, the CAISO, and the Midcontinent Independent System Operator, among others, to identify approaches to minimize vulnerabilities due to electric system-gas system interdependence.

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<sup>69</sup> Information about the IVGTF is available at: [http://www.nerc.com/comm/PC/Pages/Integration-of-Variable-Generation-Task-Force-\(IVGTF\)-2013.aspx](http://www.nerc.com/comm/PC/Pages/Integration-of-Variable-Generation-Task-Force-(IVGTF)-2013.aspx).

<sup>70</sup> Available at: [http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC\\_PhaseII\\_FINAL.pdf](http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_PhaseII_FINAL.pdf)

## 1. Establishing a Structured Reliability Risk Management Process

In response to direction from the NERC Board in February 2013, NERC has developed a RRM process to create and execute plans for managing reliability risk and to integrate these plans with the business planning and budgeting process. The RRM process leverages: (i) the business acumen of the RISC; (ii) the technical knowledge of the NERC Operating Committee, Planning Committee, and CIP Committee (CIPC); (iii) the diverse set of tools that can be employed by the ERO to manage risk; and (iv) the open and transparent nature of the ERO. The RRM process is comprised of the following stages:

- (1) Strategic Planning: In this phase, the RISC works to collection information and to identify broad areas of reliability risk to be recommended to the NERC Board for further analysis and study.
- (2) Analysis: In this phase, members of the RISC work with the technical committees they represent to identify specific risks within the broad areas accepted by the NERC Board. This phase includes problem definition, gap analysis, and selection of measurement approaches.
- (3) Solution Design: In this phase, members of the RISC develop potential solutions to the problems identified in the previous stage. NERC uses this information to develop the *ERO Top Priority Reliability Risks* for the upcoming business planning and budget cycle.
- (4) Business Planning and Budgeting: In this phase, NERC staff and the Regional Entities work together to include in the annual business plans and budgets descriptions of the reliability risks that are to be addressed in the coming year and the resources needed to support those efforts.
- (5) Preparation: In this phase, ERO staff, stakeholders, and third parties<sup>71</sup> discuss the plans identified in the latest business plan and budget. At this stage, NERC's committees have an opportunity to align their work plans with the business plan and budget.
- (6) Execution: In this phase, stakeholders, staff, and third parties execute the detailed plans developed in the prior phase.

Specific documentation or other aids to assist in the implementation of the RRM

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<sup>71</sup> "Third parties" in this context might refer to industry manufactures and service vendors, who might be asked to work on a specific problem, tool or application.

process,<sup>72</sup> document templates, and detailed instructions and training are being developed to support the execution of this process. NERC intends that the RRM process will become an integral part of ERO operations.

NERC will continue the work of the RISC to develop risk profiles (including HILF issues) for the ERO. These profiles of the BPS will inform how the ERO prioritizes and ranks reliability risks. For high priority risks, NERC will develop project plans and business case assessments outlining initiatives to address those risks.

## **2. ERO Top Priority Reliability Risks for 2014-2017**

As described immediately above, the RRM process includes the identification of the *ERO Top Priority Reliability Risks* for each upcoming business planning and budget cycle. The development of the list of top ten high priority reliability risks is intended to focus the efforts of the ERO Enterprise program areas, including training and education, Reliability Standards development, and compliance. NERC developed a set of the ten top priority reliability risks to be focused on in the development of the *ERO Enterprise Strategic Plan 2014-2017*. The development of this list started with a reliability gap analysis that the RISC presented to the NERC Board in August 2013. NERC staff then undertook further review and analysis to identify any additional reliability risk areas of strategic importance for the ERO. Next, qualitative estimates of probability, consequence, and current level of risk management were prepared for each of the identified reliability risks within the chosen areas. NERC used this information to identify ten top priority reliability risks requiring increased attention or additional activity. Following this analysis, recommendations were developed based on previous committee discussions; industry dialogue at the Reliability Leadership Summit; and past work products such

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<sup>72</sup> This documentation and other aids may include worksheets, diagrams, task descriptions, and similar items.

as the LTRA, the *State of Reliability* report, and various special reports and assessments. The ten high priority reliability risks are:

- (1) Changing Resource Mix: As the generation and load on the power system changes (e.g., integrated variable resources, increased dependence on natural gas, increased demand-side management, new technologies deployed), the system is being brought into states that are significantly different than those considered when the system was designed and planned, exposing new vulnerabilities not previously considered. Fundamental operating characteristics and behaviors are no longer a certainty.
- (2) Resource Planning: Plant retirements (largely due to implemented environmental regulations; increased uncertainty in future resources due to other potential environmental regulations; and lower natural gas prices, which significantly affect power plant economics) are leading to cases where resources may be inadequate to ensure firm demand is served at all times. As the system continues to change, some regional assessments identify concerns with insufficient reserve margins as early as 2014 and 2015 in the ERCOT and Midcontinent ISOs.
- (3) Protection System Reliability: A fault accompanied by a failure of any protection system component could in some cases result in instability, violation of applicable thermal or voltage ratings, unplanned or uncontrolled loss of demand or curtailment of firm transfers, or cascading outages.
- (4) Uncoordinated Protection Systems: A lack of protection system coordination has the potential to increase the size and magnitude of events due to unnecessary trips. Uncoordinated protection systems were identified as contributing to the September 8, 2011, and August 14, 2003 events.
- (5) Extreme Physical Events: While the probability of extreme physical events (such as physical attack, GMD, or severe weather) that lead to extensive damage is low, the potential consequences are significant enough that risk avoidance (reducing the probability) is insufficient as a sole risk management strategy.<sup>73</sup>
- (6) Availability of Real-Time Tools and Monitoring: Not having the right tools and monitoring available to manage reliability in real time is a latent problem waiting for the right combination of events to exploit it.
- (7) Protection System Misoperations: NERC's 2012 and 2013 *State of Reliability* reports identified protection system misoperations as a significant threat to BPS reliability.
- (8) Cold Weather Preparedness: Lack of generator preparedness for cold weather extremes may result in forced outages, de-ratings, and failures to start.

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<sup>73</sup> Additional strategies may incorporate factors like improving resiliency and reducing restoration times.

Insufficient availability of intra-regional generation and limits on import transfer capability may result in insufficient generation to serve forecasted load, resulting in load shedding.

- (9) Right-of-Way Clearances: Transmission owners and applicable generation owners may have established incorrect ratings based on design documents, rather than on the actual facilities built. Managing to stay within system operating limits and interconnection reliability operating limits that are based on incorrect ratings may be inadequate to prevent equipment damage and/or instability, cascading outages, or separation. Ensuring clear right-of-ways can reduce adverse impacts to reliability even when SOLs and IROLs are based on incorrect ratings.
- (10) 345-kV Breaker Failures: NERC has identified a potential trend of 345 kV SF6 puffer type breakers failing. Circuit breaker failures, in conjunction with another fault, may lead to more BES facilities removed from service than required to clear the original fault.

### **3. NERC Event Analysis Process and How it is Used to Identify Risks to the BPS and Disseminate Lessons Learned**

NERC has developed a voluntary Event Analysis process that delivers quality, timely and actionable lessons learned to registered entities. Development of the Event Analysis process was led by the Event Analysis Subcommittee (EAS), a cross-functional group of industry experts.<sup>74</sup>

The Event Analysis process begins with a registered entity making an initial assessment of an occurrence and determining if the occurrence falls within one of five qualifying event categories.<sup>75</sup> The event category is determined by weighing the level of significance of a qualifying event and its impact on the interconnected BPS. After a qualifying event occurs, the applicable Regional Entity holds a planning meeting with all involved parties, including other registered entities. If a qualifying event is categorized as Category 3 or higher, the registered entity will prepare an Event Analysis Report (EAR), in which the registered entity describes the

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<sup>74</sup> The EAS is a subcommittee of the NERC Operating Committee.

<sup>75</sup> A description of each event category is included in the *Electric Reliability Organization Event Analysis Process – Version 2* report, available at: <http://www.nerc.com/pa/rm/ea/Pages/EA-Program.aspx>.

sequence of events and identifies causal factors and appropriate corrective actions. The registered entity then submits the EAR to the applicable Regional Entity(ies) for review, and then to NERC. The registered entity, in collaboration with the ERO, drafts the proposed lessons learned from the event and submits them to the applicable Regional Entity. Once the event analysis is complete, NERC shares any lessons learned with industry by publishing them as soon as practical. NERC staff analyzes EARs to identify reliability risks, trends, and potential gaps in Reliability Standards, compliance, and other programs. NERC also reviews the EARs to assign descriptive cause codes, which assist in identifying trends and corrective actions that will prevent recurrence of similar events.

Since initial implementation of the Event Analysis process in 2010, there have been more than 388 qualified events reported to the ERO and more than 77 lessons learned produced, including 14 published in 2013.

NERC NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION		Event Counts	
Event Category	Count (Total)	Count (2013)	Comments
CAT 1	256	91	
CAT 2	114	33	
CAT 3	14	6	
CAT 4	3	0	SW Winter Weather (2011) SW Blackout (2011) Derecho (2012)
CAT 5	1	0	Hurricane Sandy (2012)
<b>Total CAT 1-5 Events</b>	<b>388</b>	<b>130</b>	
<b>Non-Qualified Occurrences reported</b>	<b>1711</b>	<b>338</b>	

RELIABILITY | ACCOUNTABILITY



Participation in the voluntary Event Analysis process does not relieve registered entities of their obligation to comply with NERC Reliability Standards. While performing the steps of the Event Analysis process, the registered entity is encouraged to continue performing critical self-assessments of compliance with Reliability Standards in connection with the event and to conduct compliance self-assessments for review by applicable Regional Entities. If a registered entity discovers a possible violation in the process of analyzing an event, it is encouraged to self-report that possible violation to the applicable Regional Entity.

NERC is continuously improving how it defines, catalogs and trends the causes of system events. NERC assesses every event submitted through the voluntary Event Analysis process to identify and share possible risks to reliability with industry. Further, the cause code assignment allows for greater historical trending and predictive analysis.

NERC provides Regional Entity and registered entity staff with cause analysis training. As of December 2013, 164 personnel from all eight Regional Entities and over 600 people from 115 different registered entities have received more than 4,000 hours of cause analysis training, with 432 hours of continuing education hours awarded to 54 NERC-certified system operators in connection with this training. NERC is adding a training and education component to the Event Analysis process to increase the relevance and impact of lessons learned for the Regional Entities, industry, and other stakeholders. Through the Event Analysis process, NERC continues to establish the appropriate balance of data reporting for analysis and use by industry.

NERC continues to work with the Regional Entities to obtain from and review with registered entities information regarding qualifying events and disturbances. The primary goal of this process is to identify reliability risks through robust data gathering, validation, rigorous analysis, and rapid dissemination to industry of information on identified risks and remediation

options. NERC is working collaboratively with the Regional Entities to prioritize analytical efforts based on the Event Analysis process categories. Determining root and contributing causes for each event allows for trend and risk identification. NERC plans to further facilitate event analysis by merging its event-driven databases and defining the relationships between various system cause codes. This analysis of system events will inform NERC of gaps in Reliability Standards, compliance monitoring and enforcement effectiveness, registration, and risk controls effectiveness.

Additionally, NERC is collaborating with the North American Transmission Forum and the North American Generator Forum to further enhance the Event Analysis process and lessons learned dissemination in identifying risks to the BPS. Further, NERC plans to improve the timeliness of the availability of and access to final event reports by creating a secure portal that will be accessible by industry to obtain these reports.

#### **4. Reports on Reliability**

In May 2012, NERC released its first *State of Reliability* report assessing grid reliability based on performance trends identified through data and analysis of system disturbance events. The report presented NERC's integrated view of ongoing BPS reliability and performance trends. It assessed 18 reliability performance metrics that measure whether an adequate level of reliability exists in North America. The report also included an analysis from the frequency response initiative, the 2011 demand response availability assessment, event analysis trends, and post-seasonal assessments. The initial *State of Reliability* report included the following key findings:

- (1) Reliability of the BPS remains adequate with little change in trends between 2008 and 2011;
- (2) Frequency response is stable with no deterioration;

- (3) Protection system misoperations are a significant reliability issue;
- (4) Equipment failure warrants further analysis; and
- (5) Resource mix changes necessitate new metrics.

Subsequently, *State of Reliability* reports have been issued for 2013 and 2014.<sup>76</sup> Going forward, NERC will continue to prepare its annual *State of Reliability* report and the associated reliability metrics.

As noted earlier, for many years NERC has prepared and issued an annual 10-year LTRA Report for the North American BPS. The LTRA provides an independent view of the reliability of the BPS and identifies trends, emerging issues, and potential concerns. Recent LTRAs have focused on a variety of emerging issues expected to impact BPS reliability. Most notably, a rapidly changing resource mix with substantial retirements of coal-fired and nuclear capacity, paralleled by a growing reliance on natural gas-fired generation that has created fuel transportation concerns in certain areas. Ongoing unit retirements are also contributing to diminishing reserve margins that fall below reference reserve margin levels during the 10-year outlook. Finally, continued penetration of variable resources and a growing dependence on demand-side management programs create uncertainties for system planners and operators. Each LTRA report also provides high-level recommendations for each emerging issue and tracks ongoing industry progress.

In addition to the annual LTRA, NERC issues two seasonal (i.e., summer and winter) assessment reports each year in which it identifies, assesses, and reports on the industry's preparations to manage potential seasonal issues such as significant generation or transmission

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<sup>76</sup> NERC's *State of Reliability 2014* report is available at: [http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/2014\\_SOR\\_Final.pdf](http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/2014_SOR_Final.pdf).

constraints or potential fuel-related impacts. NERC also issues other, special reports from time to time that focus on current or emerging technical or other reliability concerns, such as changing resource mix (increasing amounts of variable generation and potential retirements of fossil-fueled generation), misoperations, HILF event concerns, and smart grid considerations.

NERC has implemented several enhancements to the LTRA processes and reports in response to areas for improvement identified in the three-year ERO performance assessment. NERC has revised its reliability assessment guidelines to establish a requirement for an annual scenario analysis.<sup>77</sup> Scenario analyses are typically included in separate special assessments prepared by the Reliability Assessment program, including the following reports that NERC issued during the assessment period:

- *Reliability Impacts of Climate Change Initiatives: Technology Assessment and Scenario Development* (2010);
- *Special Reliability Scenario Assessment: Potential Reliability Impacts of Swift Demand Growth After a Long-Term Recession* (2010);
- *Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations* (2010);
- *Potential Impacts of Future Environmental Regulations* (2011); and
- *Special Reliability Assessment: Accommodating an Increased Dependence on Natural Gas for Electric Power* (2013).

## **5. Bulk Power System Awareness Department**

Previously a functional responsibility of the Electricity Sector Information Sharing and Analysis Center (ES-ISAC),<sup>78</sup> NERC created the Bulk Power System Awareness department

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<sup>77</sup> See *Order on the Electric Reliability Organization's Three-Year Performance Assessment*, 132 FERC ¶ 61,217 (2010), at P 180.

<sup>78</sup> The activities of ES-ISAC are described in §II.E.2 below.

(BPSA) in 2012 to improve NERC's capability to monitor BPS conditions, significant events, and emerging risks to reliability across the 15 reliability coordinator regions in North America.

BPSA develops and disseminates timely, accurate and complete information regarding the status of the BPS from a near-term operational reliability perspective, complementary to RAPA's seasonal and long-term assessments and ES-ISAC's cyber and physical security perspective. BPSA shares this continuous assessment across NERC, the eight Regional Entities and FERC staff through a number of channels, including a *System Awareness Daily Report* that highlights current day potential risks to wide-area reliability, significant operational and security occurrences for the previous day, and high-level information on forecasted loads and reserves.

During major system disturbances, BPSA facilitates information sharing and a common operational picture of BPS status with a broader audience of industry and governmental agencies. BPSA provides ES-ISAC operational reliability information in support of its government and cross-sector coordination activities, and hosts periodic update conference calls for technically oriented government agencies including FERC, the Department of Energy, the Nuclear Regulatory Commission, the Department of Homeland Security, and the Federal Emergency Management Agency.

BPSA administers the NERC Alerts program, which is used to disseminate important reliability and security information to industry, pursuant to §810 of the NERC ROP. Additionally, BPSA actively participates in the Event Analysis Process described in §II.D.3 above, by identifying qualifying events and other items of interest for further trending and analysis.

**E. The ERO Facilitates Information Sharing on Cybersecurity and Cyber and Physical Threats to the BPS among Industry, Regional Entities, and Government**

Section 215(a) of the FPA and FERC's regulations at 18 C.F.R. §39.1 define "reliable operation" of the BPS as "operating the elements of the Bulk-Power System within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a Cybersecurity Incident, or unanticipated failure of system elements." The FPA and the regulations define "Cybersecurity Incident" as "a malicious act or suspicious event that disrupts, or was an attempt to disrupt, the operation of those programmatic electronic devices and communications networks including hardware, software and data that are essential to the Reliable Operation of the Bulk-Power System." Identifying, assessing, and preventing threats and risks to both the physical security and the cybersecurity of the BPS, while always matters of concern, have attained increasing significance in the last three to four years.

Two of NERC's principal programs focused on these areas are the Critical Infrastructure department (CID) and the ES-ISAC. The CID supports efforts to develop and administer critical infrastructure standards, conducts security and reliability outreach visits, provides training and exercise opportunities, and coordinates between industry and governmental entities on CIP matters. The CID accomplishes these activities through active CIP standards drafting team participation, and programs such as the Sufficiency Review Program (SRP),<sup>79</sup> the annual Grid Security Conference (GridSecCon), and the biennial Grid Security Exercise (GridEx). The CID also leverages public-private partnerships to examine CIP policy issues, and it provides staff-level support to NERC's CIPC, an industry-led committee comprised of industry experts in the

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<sup>79</sup> In 2014, CID renamed the SRP to "Security Readiness Program" to reflect the program's focus.

areas of cybersecurity, physical security, and operational security. The ES-ISAC monitors the physical security and cybersecurity of the electricity sub-sector, gathers information on threats to the physical security and cybersecurity of the sub-sector, and actively disseminates information on such threats and means to avoid or mitigate them to users, owners, and operators of the BPS as well as to applicable government entities and other stakeholders.

Both programs focus significant attention on public-private partnerships, which are critical to effective information sharing. CID and the ES-ISAC work closely with NERC entities, industry trade associations, national and international government departments and agencies, and other sectors to share information, discuss sector priorities, and respond to legislative and executive branch requests. Recent partnership activity includes sector responses to Executive Order (EO) 13636, *Improving Critical Infrastructure Cybersecurity*, and Presidential Policy Directive (PPD) 21, *Critical Infrastructure Security and Resilience*. This work included coordinating with government and across sectors to develop a voluntary cybersecurity framework, based on existing standards, guidelines, and practices, for reducing cyber risks to critical infrastructure. In addition, NERC worked closely with government and industry to rewrite the *National Infrastructure Protection Plan*, which outlines how government and private sector participants in the critical infrastructure community work together to manage risks and achieve security and resilience outcomes.

This section of this *Five-Year ERO Performance Assessment Report* describes NERC's activities in these areas during the assessment period, with an emphasis on activities during the latter part of the period. Included in this section are descriptions of CID programs, such as the CIPC, the SRP, the GridSecCon, and the GridEx, as well as ES-ISAC activities, including the Cyber Risk Preparedness Assessment (CRPA) program.

## **1. Critical Infrastructure Department Activities**

### **a. Critical Infrastructure Protection Committee**

NERC's CIPC focuses on advancing the physical and cybersecurity of the critical electricity infrastructure of North America. The committee consists of both NERC-appointed regional representatives and technical subject matter experts. The CIPC coordinates NERC's security initiatives and serves as an expert advisory panel to the NERC Board, to the ES-ISAC, and to NERC standing committees, in the areas of cybersecurity and physical security. During quarterly CIPC meetings, CIPC members receive security training and participate in briefings regarding the latest security issues. To address issues related to cybersecurity and physical security, the CIPC establishes working groups or task forces comprised of subject matter experts who review and examine specific issues and develop reports and recommendations.

In 2012, the CIPC reorganized and expanded to allow it to produce more deliverables. This reorganization established new subcommittees and created new task forces and working groups to address emerging issues and initiative requests from the NERC CEO and NERC Board. The reorganization included forming task forces to address cybersecurity-related subjects identified in the 2010 *High-Impact, Low-Frequency Event Risk to the North American Bulk Power System* report.<sup>80</sup> One CIPC task force, the Cyber Attack Task Force, considered the impact of a coordinated cyber-attack on the BPS and developed flexible options for detecting, operating, and recovering from such an attack. A key component of the resulting Cyber Attack Task Force report was the development and use of an attack tree tool that provides key insight into the attack surface of the interconnected BPS of North America.

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<sup>80</sup> Available at: [http://www.nerc.com/pa/ci/resources/documents/hilf\\_report.pdf](http://www.nerc.com/pa/ci/resources/documents/hilf_report.pdf).



Following NERC Board approval of the Cyber Attack Task Force report, the CIPC established a High-Impact, Low-Frequency Implementation Task Force to review the recommendations in this and other related reports, and to determine which recommendations the CIPC should address. The High-Impact, Low-Frequency Implementation Task Force determined that the CIPC should continue its analysis of cyber attack trees and analyze issues relating to information sharing, security clearances, security metrics, and physical security guidelines. The CIPC established task forces for all of these issue areas, and most groups have completed their reviews and issued recommendations.

#### **b. Security Readiness Program**

NERC conducts SRP visits, which consist of visits to registered entities to focus on the sufficiency of industry implementation of the CIP Standards. An SRP visit both examines CIP Version 3 compliance in a retrospective review and helps registered entities address transitioning from CIP Version 3 to CIP Version 5 in a prospective view. While compliance with CIP Version 3 and its risk-based assessment methodology remains mandatory until March 31, 2016, many registered entities are concerned about how to transition their compliance and security efforts to Version 5 to meet the April 1, 2016, compliance deadline. Registered entities are exploring how to best manage the transition process to CIP Version 5 while remaining compliant with CIP Version 3. NERC invites Regional Entity representatives to participate in SRP discussions; however, no content from those discussions may be used during a subsequent audit or compliance action unless that content reveals an imminent threat to the BES. NERC staff, Regional Entity representatives, and outside consultants sign non-disclosure agreements to ensure strict confidentiality of all discussions and materials.

### **c. Grid Security Conferences**

In 2011, NERC hosted the first GridSecCon focusing on physical security and cybersecurity issues facing the electricity sub-sector. NERC has continued to hold these conferences annually to achieve the following objectives:

- Build on NERC's mission to ensure the reliability of the North American BPS through education and training;
- Discuss and provide solutions to emerging industrial control system security issues;
- Deliver expert analysis on social engineering and phishing attacks;
- Focus strategically on public-private partnerships; and
- Provide an update on ES-ISAC activities and issue a call for increased industry participation and communication.

Over 300 industry and government stakeholders attended the most recent GridSecCon in October 2013. More than 20 speakers led discussions focused on industry being transformational, strategic, and tactical in its approach to securing systems. Participants were asked to consider different information sharing techniques; determine if their organizations are resilient through self-assessments; test response activities through exercises; work to ensure that security is built into operations; and enhance the workforce by recruiting, training, and retaining individuals who can address these and other issues. Additionally, almost 200 stakeholders attended credentialed training sessions in cybersecurity and physical security.

#### **d. Grid Security Exercises**

In 2011, NERC hosted the first GridEx, which focused on analyzing industry's response to a physical and cybersecurity scenario. NERC now holds a biennial distributed play exercise and executive tabletop discussion to achieve the following:

- Exercise the current readiness of the electricity industry to respond to a security incident, incorporating lessons learned;
- Review existing command, control, and communication plans and tools for NERC and its stakeholders;
- Identify potential improvements in cybersecurity and physical security plans, programs, and responder skills; and
- Explore senior leadership policy decisions and triggers in response to a coordinated cyber and physical event of national significance with long-term grid reliability issues.

Over 200 organizations participated in GridEx II, which took place November 13, 2014 through November 14, 2013. During the exercise, participants identified five key lessons learned:

- Information sharing has increased;
- NERC has improved ES-ISAC and BPSA coordination functions;
- Simultaneous cyber and physical attacks pose significant challenges;
- Industry continues to refine and enhance its all-hazard incidence response plans and protocols; and
- Industry and government information-sharing stakeholders can better inform incident response through coordination and consolidation of content.

GridEx II included an executive tabletop exercise involving about 30 participants, including electricity industry executives representing a broad cross-section of the industry and senior officials from the federal government. Participants considered a severe cyber and physical

attack scenario of national and international significance, and discussed the policy-level challenges that would need to be addressed by industry and government.

#### **e. Electricity Sub-sector Coordinating Council**

NERC established the Electricity Sub-sector Coordinating Council (ESCC) in 1998 at the request of the Department of Energy to foster and facilitate the coordination of sector-wide, policy-related activities and initiatives designed to improve the reliability and resilience of the Electricity Sub-sector, including physical and cyber infrastructure. In 2010, NERC restructured the ESCC to consist of industry senior executives with NERC's CEO as the ESCC chair. The ESCC provided advice to the NERC Board on policy-level matters related to critical infrastructure, developed a Critical Infrastructure Strategic Roadmap, and provided oversight on several NERC and industry initiatives to address HILF events and other critical infrastructure risks to the BPS.

In August 2013, the NERC Board approved a new ESCC charter, which amended, superseded, and terminated the existing charter. The new charter provides for a total of 30 CEO-level representatives, including members of the ESCC Steering Committee. NERC's CEO continues to serve on the ESCC and its Steering Committee. The transition formally recognized the significant increased CEO interest and participation on cybersecurity issues, focused industry association activities through an existing channel recognized by government agencies, and provided a unified industry framework upon which to build in response to President-issued orders and directives, such as EO-13636 and PPD-21.

## **2. ES-ISAC Tools and Activities**

### **a. ES-ISAC Portal**

The ES-ISAC has seen a tremendous leap in its user base since its inception in 1998, with

more reporting from organizations and more information sharing between members of industry. The ES-ISAC portal, which became functional in April 2012, is the industry's first and often primary interface with the ES-ISAC. The portal is continuously updated with technical and trend reports, watch lists, advanced sector information sharing tools, and other relevant resources. The portal receives "Indicators of Compromise" from various sources, including U.S. government departments and agencies, and NERC distributes this information to electricity sector entities. The portal allows the ES-ISAC to reach thousands of users and hundreds of organizations across industry to discuss and exchange security-related information. The ES-ISAC is concentrating its efforts on increasing the user base of this important portal. The success of this effort relies on the value of information available on the portal as well as the timeliness with which information reaches users. To achieve this goal, the ES-ISAC is enhancing portal capabilities to improve the ease of use and to improve analytic collaboration across the sub-sector.

Current capabilities of the portal include publishing alerts and other informational products, exchanging threat indicator information, and providing self-service access to portal users. Upgrades underway will increase flexibility to support additional functionality and capacity using a cloud-based, secure platform solution. The improved portal will facilitate direct data exchange with other ISACs and government partners. The portal will also support ES-ISAC analysts in their information analysis functions and tie the ES-ISAC analysts together with their counterparts in other sectors and in national laboratories. Finally, the portal will add private social media information sharing tools, automated access to enhanced cybersecurity information flows, and predictive analytics.

#### **b. Analytics**

The ES-ISAC has also improved its analytic capabilities by building out its operations

room to include data feeds from multiple sources, such as NERC's situation awareness monitoring tool, and procuring services that deliver cyber awareness information. As a result, the ES-ISAC is uniquely positioned to enhance grid and sector-level resilience by quickly evaluating and addressing potential cybersecurity impacts to BPS operations.

### **c. Industry and Government Coordination**

The ES-ISAC was initiated to gather information from industry participants about security-related events, disturbances, and off-normal occurrences in the electricity sub-sector. The ES-ISAC shares that information with industry as a whole and with government partners. In turn, government entities provide information regarding risks, threats, and warnings to the ES-ISAC. The ES-ISAC adds analytic value to shared information and coordinates with other sectors. It is also responsible for developing industry and government products, including the NERC crisis action plan and the U.S. Department of Homeland Security incident response analysis. In addition, the ES-ISAC co-hosts annual cleared briefings to industry to ensure the electricity sub-sector maintains awareness of new and ongoing threats to the BPS.

Most recently, the ES-ISAC collaborated with the Department of Homeland Security, the Department of Energy, and the Federal Bureau of Investigation to host a series of briefings focused on tactics and tools of emerging cyber threat actors. In addition, in the wake of the April 16, 2013 Metcalf substation incident in California, the ES-ISAC worked with these agencies and other organizations and governmental partners to raise awareness of physical attack threats, to increase local, regional and federal security partnerships, and to support mitigation efforts. These briefings continued through the first quarter of 2014.

### **d. Cyber Risk Preparedness Assessments**

The ES-ISAC conducts CRPAs to assess the cybersecurity capabilities of registered

entities through facilitated tabletop exercises. Conducting these assessments allows the ES-ISAC staff to gain a better understanding of industry capabilities, identify key sector level areas for improvement, and share best practices across industry. Through CRPA exercises, participants gain an improved understanding of their cybersecurity programs and capabilities. These exercises also help participants identify areas for improvement and enhance their abilities to respond to and recover from cybersecurity events. The CRPA also educates participants through defined deliverables and best practices. During 2013, the ES-ISAC incorporated elements of the Electricity Sub-sector Cybersecurity Capability Maturity Model program into the CRPA. Additionally, the ES-ISAC has developed a CRPA kit for entities to use in developing and running their own CRPAs. The kit allows more entities to leverage the CRPA methodology to enhance their preparedness. In February 2013, ES-ISAC staff hosted initial training and education sessions on the kit to accelerate adoption of the methodology across the sector and move the program towards self-sustainment within industry.

### **III. NERC CONTINUES TO MEET THE §39.3(b) CRITERIA**

An explicit requirement for the five-year ERO performance assessment is that it include an explanation of how the ERO satisfies the requirements of 18 C.F.R. §39.3(b). Section 39.3(b) sets forth the requirements for certification as the ERO, which specify that the entity:

- (1) Has the ability to develop and enforce, subject to 18 C.F.R. §39.7, Reliability Standards that provide for an adequate level of reliability of the BPS;<sup>81</sup> and
- (2) Has established rules that:
  - (a) Assure its independence from users, owners and operators of the BPS while assuring fair stakeholder representation in the selection of its directors and balanced decisionmaking in any ERO committee or subordinate organizational structure;

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<sup>81</sup> 18 C.F.R. §39.7 sets forth FERC's regulations concerning the enforcement of Reliability Standards by the ERO, including provisions pertaining to the imposition of penalties for violations of Reliability Standards.

- (b) Allocate equitably reasonable dues, fees, and charges among end users for all activities under Part 39;
- (c) Provide fair and impartial procedures for enforcement of Reliability Standards through the imposition of penalties in accordance with 18 C.F.R. §39.7, including limitations on activities, functions, operations, or other appropriate sanctions or penalties;
- (d) Provide reasonable notice and opportunity for public comment, due process, openness, and balance of interests in developing Reliability Standards and otherwise exercising its duties; and
- (e) Provide appropriate steps to gain recognition in Canada and Mexico.

**Attachment 1** to this *Five-Year ERO Performance Assessment Report* shows in detail that NERC continues to satisfy the requirements of §39.3(b).

With respect to the requirements of §39.3(b)(1), NERC continues to have the ability to develop and enforce, subject to 18 C.F.R. §39.7, Reliability Standards that provide for an adequate level of reliability of the BPS. This requirement encompasses two distinct functions of the ERO: (i) the ability to develop reliability Standards that provide for an adequate level of reliability of the BPS, and (ii) the ability to enforce those Reliability Standards. NERC develops Reliability Standards pursuant to §300 of its ROP and its SPM, Appendix 3A to the ROP. These documents have been revised since NERC was certified as the ERO, including during the current assessment period, and the current versions of §300 and Appendix 3A have been approved by FERC as ERO Rules. Further, NERC's SPM has been accredited by the ANSI as meeting ANSI's essential requirements for standards development. Moreover, as shown in detail in **Attachment 1**, NERC's Reliability Standards development process contains the essential attributes of the standards development process as set forth in prior FERC orders. As noted, during this assessment period, NERC has made improvements to its SPM, which FERC has approved.

Further, NERC systematically manages the development of new Reliability Standards



and revisions to standards, in areas of highest need and importance, through its rolling three-year RSDP. The RSDP is revised annually and identifies and prioritizes Reliability Standards development projects in the immediate three-year time horizon, taking into account, among other information, perceived gaps in the Reliability Standards, proposals for closing those gaps, and timing priorities for standards development projects.

NERC enforces compliance with approved Reliability Standards through its CMEP, which is embodied in §400 and Appendix 4C of the ROP; its Organization Registration and Certification Program, which is embodied in §500 and Appendices 5A and 5B of the ROP; and its *Sanction Guidelines*, Appendix 4B of the ROP (all of the foregoing have been approved by FERC as ERO Rules), as well as through its RDAs with the Regional Entities, which have also been approved by FERC. Through the organization registration provisions of its ROP, NERC and the Regional Entities identify the users, owners, and operators of the BPS that are obligated to comply with Reliability Standards.

Monitoring and enforcement of compliance with Reliability Standards is conducted primarily by the eight Regional Entities pursuant to §401.4 of the ROP and the RDAs, subject to NERC oversight. Provisions of the ROP describe in detail the required attributes of Regional Entity compliance programs, including compliance program structure, resources and design. The controlling document for NERC's compliance monitoring and enforcement activities is the *Compliance Monitoring and Enforcement Program*, Appendix 4C to the ROP. Appendix 4C specifies compliance monitoring methods to be used and the detailed process steps for each method. Additionally, Appendix 4C specifies the process steps to be followed when a potential violation of a Reliability Standard by a registered entity is identified; as well as the actions required of the registered entity if it is found to be in violation of a Reliability Standard. The

*Sanction Guidelines*, which were significantly revised during this assessment period, specify the factors to be taken into account by the ERO in determining the financial penalty to be assessed for a violation of a Reliability Standard.

Pursuant to the RDAs, each Regional Entity has either adopted the NERC CMEP or a modified version of the CMEP as its compliance monitoring and enforcement program. Compliance monitoring and enforcement activities are further guided by the annual NERC and Regional Entity CMEP Implementation Plans (as described earlier, now combined into a single annual CMEP Implementation Plan document).

As detailed in **Attachment 1**, over this assessment period, NERC and the Regional Entities have continued to increase the resources devoted to compliance monitoring and enforcement activities. In their approved business plans and budgets for 2009, NERC and the Regional Entities provided for, collectively, 158.25 FTE staff and approximately \$32.5 million of direct expenditures in their CMEPs. In their business plans and budgets for 2014, NERC and the Regional Entities provided for, collectively, 303.40 FTE staff and approximately \$57.1 million of direct expenditures in their CMEPs.

With respect to the requirements of §39.3(b)(2)(i), NERC continues to have in place rules that assure its independence from users, owners, and operators of the BPS while assuring fair stakeholder representation in the selection of its directors and balanced decision-making in any ERO committee or subordinate organizational structure. This criterion encompasses three distinct considerations: (i) independence of NERC from users, owners and operators of the BPS; (ii) fair stakeholder representation in the selection of NERC's directors (i.e., its trustees); and (iii) provision for balanced decision-making in any NERC committee or organizational structure.

As described in detail in **Attachment 1**, provisions of NERC's Bylaws,<sup>82</sup> along with several NERC policy documents<sup>83</sup> assures NERC's independence from users, owners, and operators of the BPS. Provisions of the NERC Bylaws also assure fair stakeholder representation in the selection of NERC's trustees. Finally, provisions of the NERC Bylaws and of §1300 of the ROP specify requirements for selection of members for and voting procedures on, NERC committees and sub-groups, that provide for balanced decision-making.

With respect to the requirements of §39.3(b)(2)(ii), NERC's Bylaws and §1102 of its ROP provide for equitable allocation of reasonable dues, fees and charges among end users for all of the ERO's statutory activities. Section 1102 provides for the assessments to recover NERC's approved funding requirements to be allocated among countries, regions, and load-serving entities in the North American BPS based on Net Energy for Load (NEL), except where direct assignment of costs to a specific country or region(s) is appropriate. The NEL-based allocation of the annual assessments to cover NERC's and the Regional Entities' annual funding requirements is provided to FERC for approval in NERC's annual business plan and budget filing.

With respect to the requirements of §39.3(b)(2)(iii), NERC's rules also continue to provide fair and impartial procedures for enforcement of Reliability Standards through the imposition of penalties in accordance with 18 C.F.R. §39.7. These rules and procedures include §400 of the ROP; Appendix 4B, *Sanction Guidelines*, of the ROP; and Appendix 4C, the *Compliance Monitoring and Enforcement Program*, of the ROP, which includes the Hearing

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<sup>82</sup> NERC's Bylaws are considered "ERO Rules." 18 C.F.R. §39.1.

<sup>83</sup> NERC's *Governance Guidelines* is available at: <http://www.nerc.com/gov/Annual%20Reports/Governance%20Guidelines%20-%20Approved%202.6.14.pdf>; NERC's *Employee Code of Conduct* is available at: <http://www.nerc.com/gov/Annual%20Reports/Employee-Code-of-Conduct.pdf>; and NERC's *Policy on Reporting Complaints Regarding Accounting and Code of Conduct Matters*, is available at: [http://www.nerc.com/gov/Annual%20Reports/Whistleblower\\_Policy\\_Final-May%202014.pdf](http://www.nerc.com/gov/Annual%20Reports/Whistleblower_Policy_Final-May%202014.pdf).

Procedures to be followed by Regional Entity Hearing Bodies in presiding over and ruling on disputes raised by a registered entity with respect to a Regional Entity's proposed finding of a violation or the proposed amount of penalty for a violation. All of these provisions have been approved by FERC as ERO Rules. All of these provisions have been extensively revised, and the revisions approved by FERC, during this assessment period. **Attachment 1** to this report describes in detail NERC's rules and procedures for the determination and imposition of penalties for violations of Reliability Standards and how they comply with the requirements of §215(e)(6) of the FPA and §39.3(b)(2)(iii) and §39.7 of FERC's regulations.

With respect to the requirements of §39.3(b)(2)(iv), NERC continues to maintain rules that provide reasonable notice and opportunity for public comment, due process, openness, and balance of interests in developing Reliability Standards and otherwise exercising its duties. NERC's Bylaws require that Reliability Standards be developed through an open, transparent, and public process that provides for reasonable notice and opportunity for public comment, due process, and balancing of interests; and that participation in the Reliability Standards development process shall not be limited to NERC members but rather shall be open to all persons and entities with an interest in the reliable operation of the BPS. As noted in the discussion of the first §39.3(b)(1) criterion, above, NERC's Reliability Standards development process is embodied in §300 and Appendix 3A of the ROP. The ROP specify "Essential Principles for the Development of Reliability Standards," which include openness, transparency, consensus-building, fair balance of interest, due process, and timeliness. With respect to balance of interests, the ROP provide for balloting on proposed Reliability Standards to be conducted on the basis of a broad set of ten industry segments, which collectively encompass persons and entities with an interest in the reliable operation of the BPS. The detailed process steps for

developing and approving new or revised Reliability Standards, set forth in the NERC SPM, is based on the procedures of the ANSI and other standards-setting organizations in the U.S. and Canada.

In addition to its rules and procedures for the development of Reliability Standards, NERC's rules provide for reasonable notice and opportunity for public comment, due process, openness, and balance of interests in the exercise of NERC's other duties, including in the appointment and election of trustees, meetings of trustees, approving amendments to the Bylaws and amendments to the ROP, selection of members for and the conduct of business by committees and subgroups, development and approval of annual business plans and budgets, and the conduct of compliance monitoring and enforcement activities.

Finally, with respect to the requirements of §39.3(b)(2)(v), NERC continues to engage in substantial efforts to gain and maintain recognition as the ERO in Canada and Mexico. One of NERC's corporate purposes, as set forth in its Certificate of Incorporation, is "to act as the electric reliability organization for the United States as certified by the Federal Energy Regulatory Commission and for Canada and Mexico as recognized by applicable government and regulatory authorities in Canada and Mexico, all pursuant to law." In Canada, where by its Constitution the regulation of electricity is primarily within the jurisdiction of each province rather than the national government, NERC's activities to obtain and maintain recognition are conducted on a province-by-province basis. **Attachment 1** details NERC's efforts and accomplishments in the provinces of Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Québec, and Saskatchewan, as well as at the National Energy Board. Depending on the particular circumstances of each province, NERC has gained recognition through statutes or other provisions of provincial law, or through a memorandum of

understanding with appropriate entities in the province. As described in **Attachment 1**, NERC's efforts in each province fall into three areas: recognition of NERC Reliability Standards; provisions for sharing of information on issues related to compliance with NERC Reliability Standards; and monitoring and enforcement of compliance with Reliability Standards.

With respect to Mexico, the Comisión Federal de Electricidad (CFE), through the Centro Nacional de Control de Energía (CENACE), and the Area de Control Baja California (ACBC), have entered into a membership and operating agreement (MOA) with WECC. The MOA provides for WECC to assist CENACE and ACBC in monitoring compliance by Designated Entities (the Mexican equivalent of U.S. registered entities) with Mexico Reliability Standards for Baja California, Mexico. CENACE has approved ten Mexico Reliability Standards. Pursuant to the MOA, WECC monitors compliance with Mexico Reliability Standards, but does not have enforcement or registration (designation) authority for CFE. WECC provides compliance monitoring, reviews proposed and completed mitigation plans, and provides assessment recommendations with respect to alleged violations.

#### **IV. REGIONAL ENTITY PERFORMANCE AND EFFECTIVENESS CONTINUES TO IMPROVE**

**Attachment 3** provides NERC's evaluation of the performance of the Regional Entities in carrying out their delegated authorities and responsibilities during the assessment period.

FERC's regulation specifying the required contents of the ERO's periodic performance assessment reports states that the performance assessment must include, among other subjects, the ERO's evaluation of the effectiveness of each Regional Entity and recommendations by the ERO for improvement of the Regional Entity's performance of delegated functions.<sup>84</sup> In its September 16, 2010 Order on NERC's *Three-Year ERO Performance Assessment Report*, FERC

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<sup>84</sup> 18 C.F.R. §39.3(c)(1)(iii).

stated that future assessments should include, among other things, separate sections addressing each Regional Entity's satisfaction of statutory and regulatory criteria.<sup>85</sup>

In this five-year performance assessment, NERC organized its evaluation of the Regional Entities' performance based on their principal delegated authorities and responsibilities under the RDAs and the NERC ROP. These segments also correspond to the programmatic organization structures generally followed by NERC and the Regional Entities:

- Regional Reliability Standards Development (**Attachment 3**, §I)
- Compliance Monitoring and Enforcement (**Attachment 3**, §II)
  - Organization Registration and Certification (**Attachment 3**, §II.A)
  - Compliance Monitoring<sup>86</sup> (**Attachment 3**, §II.B)
  - Compliance Investigations (**Attachment 3**, §II.C)
  - Compliance Enforcement (**Attachment 3**, §II.D)
- Reliability Assessments (**Attachment 3**, §III)
- Reliability Risk Management (Situation Awareness and Event Analysis) (**Attachment 3**, §IV)
- Business Planning and Budgeting, Finance and Accounting (**Attachment 3**, §V).

To evaluate the Regional Entities' performance during the assessment period, NERC believed it to be important to use assessment criteria that were well-known to the Regional Entities and that were established at the beginning of, or early in, the assessment period. Accordingly, NERC has generally used the Regional Entities' obligations and responsibilities under the RDAs and the NERC ROP as the basis for evaluating the Regional Entities'

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<sup>85</sup> *North American Electric Reliability Corporation, Order on the Electric Reliability Organization's Three-Year Performance Assessment*, 132 FERC ¶ 61,217 (2010), at P 36.

<sup>86</sup> The evaluation of the Regional Entities' performance in Compliance Monitoring includes evaluation of their efforts in providing training, education, and outreach to registered entities and other industry stakeholders on compliance-related matters.

performance or as the source for more specific assessment criteria. Although, during the assessment period, the RDAs were significantly revised through a collaborative process among NERC and the Regional Entities, with the revised RDAs going into effect on January 1, 2011 (i.e., approximately 18 months into the assessment period), the Regional Entities' fundamental delegated authorities and responsibilities under the RDAs were not changed in the revised RDAs.

Further, in evaluating the Regional Entities' performance during the assessment period, NERC placed greater emphasis on each Regional Entity's performance during the latter half of the assessment period rather than earlier in the assessment period. Although the assessment is intended to cover the entire five-year period, NERC views the success of a Regional Entity in improving its programs over the course of the period – particularly where improvements have been implemented in response to specific comments, criticisms or recommendations from NERC, FERC, or the Regional Entity's stakeholders – as especially important to the evaluation. The quality of a Regional Entity's programs and performance as of the end of the assessment period is much more important to the objectives of this review than is a historical review of the Regional Entity's programs and performance at the start of, or in the early portion of, the assessment period. Further, a Regional Entity's willingness to cooperate in implementing new ERO Enterprise initiatives and improvements intended to improve the reliability of the BPS and increase consistency and efficiency across the ERO Enterprise is particularly important to the evaluation. This focus on improvements, responses to comments and recommendations, and the state of the Regional Entities' programs and performance as of the end of the assessment period, is consistent with the emphasis in FERC's applicable regulation on comments and recommendations from stakeholders for improvements and the Regional Entity's responses to such comments and recommendations.



In this evaluation of the Regional Entities' performance in the various program areas, NERC has also provided a significant amount of description of NERC's oversight activities of the Regional Entities. NERC's oversight of the Regional Entities' programs and activities provides important context for the performance assessment because, for almost all of the Regional Entities' delegated authorities and responsibilities, NERC's oversight is frequent, and in some areas, virtually continuous. NERC's oversight activities are a significant component of the informational and observational basis for NERC's evaluation of the Regional Entities' performance. Moreover, although this *Five-Year ERO Performance Assessment Report* is appropriately required by FERC's regulations, it is NERC's ongoing oversight of the Regional Entities' activities that gives NERC both an up-to-date basis for evaluation, and a continuous platform to evaluate the need for and make recommendations for improvements, both in the performance of discrete tasks by individual Regional Entities and on a programmatic, ERO Enterprise-wide basis.

#### **V. NERC HAS SURVEYED STAKEHOLDERS FOR COMMENTS AND SUGGESTIONS FOR IMPROVEMENTS**

One of the components of the ERO's periodic assessment reports as specified in 18 C.F.R. §39.3(c) is that the assessment include "[r]ecommendations by Regional Entities, users, owners, and operators of the Bulk-Power System, and other interested parties for improvement of the ERO's operations, activities, oversight and procedures, and the ERO's response to such recommendations."<sup>87</sup> NERC has addressed this component by soliciting comments and recommendations through (i) a stakeholder survey conducted for purposes of the five-year ERO performance assessment, and (ii) posting drafts of the five-year performance assessment report for stakeholder comment.

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<sup>87</sup> 18 C.F.R. §39.3(c)(1)(ii).

The stakeholder survey was initiated on October 31, 2013, near the end of the five-year assessment period, when NERC distributed an online survey seeking stakeholder responses. The survey contained 36 specific questions on topics relating to (i) Reliability Standards development; (ii) compliance monitoring; (iii) compliance enforcement; (iv) organization registration and certification; (v) reliability assessment; (vi) performance analysis and metrics; (vii) training, education and personnel certification; (viii) event analysis; (ix) critical infrastructure protection; (x) shareholder communications, public relations and information technology; (xi) business plan and budget; and (xii) independence and stakeholder input. Stakeholders were invited to respond to the questions using a numerical scoring system and, more importantly, to provide free-form narrative comments on the topics covered by the survey. A total of 326 registered entity responses were received. The respondents were located in all Regional Entities, ranging from a low of 23 responses to a high of 97 responses from respondents located within particular Regional Entities. **Attachment 4** provides the text of the questions that were asked in the survey and also provides summary data on the numbers and distribution of respondents.

With respect to posting drafts of the five-year performance assessment for stakeholder comment, on March 3, 2014, NERC posted a draft statement of its activities and accomplishments during the five-year assessment period, as well as drafts of the Regional Entities' self-assessments, on the NERC website for stakeholder comment. Subsequently, on June 17, 2014, NERC posted a draft of the *Five-Year ERO Performance Assessment Report* and attachments on its website for stakeholder comment.<sup>88</sup>

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<sup>88</sup> The June 17, 2014 posted draft of **Attachment 4** was incomplete, since completion of that attachment required receipt of the stakeholder comments in response to the posting of the draft report and the preparation of responses to the comments for inclusion in the attachment.

**Attachment 4** to this *Five-Year ERO Performance Assessment Report* provides the content specified by 18 C.F.R. §39.3(c)(1)(ii). As noted above, **Attachment 4** provides the questions included in the stakeholder survey, reports the average scores from the responses, and provides summary information on the number and distribution of respondents.<sup>89</sup> More importantly, **Attachment 4** provides the significant narrative comments and recommendations submitted by stakeholders and NERC's responses to those comments. To focus on the key issues, questions and recommendations posed or raised by commenters, and for simplicity, NERC has attempted to summarize the comments and to combine them where appropriate, in order to report the gist of the comments and recommendations. The comments are organized in **Attachment 4** in table format by subject matter area: Reliability Standards; Compliance Operations; Enforcement; Registration and Certification; Reliability Assessment & Performance Analysis Metrics; Training, Education and Personnel Certification; Event Analysis; Critical Infrastructure Protection; Stakeholder Communications, Public Relations and IT; and Business Plan and Budget. A separate table, organized into the same topical sections, provides a summary of key stakeholder comments of the Regional Entities. For each stakeholder comment reported in one of the two tables, NERC has provided in the table, opposite the comment, (i) where applicable, the section or sections of the *Overview of NERC Activities and Accomplishments in the Five-Year Period* or of an attachment to this report in which the subject matter of the comment is addressed, and (ii) for most of the comments, a brief narrative response to the comment as well. NERC submits that the tables provided in **Attachment 4** show that NERC has responded to and addressed, or is in the process of responding to and addressing, the key

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<sup>89</sup> Some of the questions by their nature, pertained only to NERC, while others of the questions pertained to both NERC and the Regional Entities. Average scores are reported for NERC or for NERC and the individual Regional Entities as applicable to the particular survey questions.

stakeholder comments and recommendations provided in connection with the development of this *Five-Year ERO Performance Assessment Report*.

**VI. NERC HAS MADE SUBSTANTIAL PROGRESS IN COMPLETING ACTIONS ON ITEMS IN FERC’S ORDER ON THE *THREE-YEAR ERO PERFORMANCE ASSESSMENT REPORT***

NERC’s *Three-Year ERO Performance Assessment Report*, filed on December 17, 2009, identified and listed a number of actions to be taken in response to comments received from stakeholders as part of the three-year assessment process.<sup>90</sup> Additionally, FERC’s Order on the three-year ERO performance assessment, issued on September 16, 2010, identified a number of areas for improvement.<sup>91</sup> NERC was directed to submit an informational report within six months addressing the directives, concerns and requests for information and/or feasibility reports discussed in the Order. NERC filed the Informational Report on March 23, 2011. NERC was able to report either completion or significant progress with respect to many of the items listed in FERC’s Order.

As part of this *Five-Year ERO Performance Assessment Report*, NERC is providing a further report on its progress in addressing the directives, concerns and requests for information and/or feasibility reports discussed in FERC’s Order on the three-year ERO performance assessment that were not discussed in the March 2011 informational filing. This information is provided in a chart format in **Attachment 5** to this report. As noted in the chart provided as **Attachment 5**, NERC’s actions in connection with a number of the items are also discussed in the body of this five-year assessment report.

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<sup>90</sup> These actions were listed in Appendix A to **Attachment 1** of the *Three-Year ERO Performance Assessment Report*.

<sup>91</sup> *Order on the Electric Reliability Organization’s Three-Year Performance Assessment*, 132 FERC ¶ 61,217 (2010). Appendix A to that Order provided an “Index of Directives” in the Order.

## **VII. NERC HAS A VISION AND PLAN FOR IMPROVING COORDINATED OPERATIONS ACROSS THE ERO ENTERPRISE TO REACH THE END STATE OF A HIGHLY EFFECTIVE AND EFFICIENT ERO ENTERPRISE**

As described above and in the Attachments to this report, since being certified as the ERO in 2006 and, in particular, during this five-year assessment period, NERC has made substantial progress and recorded significant accomplishments in structuring the ERO Enterprise organization and improving the reliability of the BPS. Despite the achievements to date, the nine-entity structure of the ERO Enterprise, NERC and the eight Regional Entities, is not without certain challenges and risks. Going forward, NERC needs and intends to focus attention on the actions necessary to reach an end-state of a fully-integrated ERO Enterprise that can exercise effective and well-coordinated reliability oversight that mitigates reliability risks to the BPS. Achieving the end-state of a fully integrated ERO Enterprise entails creating greater clarity about the allocation of roles and responsibilities between NERC and the Regional Entities, achieving improved coordination of goals, and establishing more uniform work processes, tools and performance across the ERO Enterprise.

NERC has a vision and plan for achieving this end state of a fully integrated, highly effective and efficient ERO Enterprise. This vision and plan are described in detail in **Attachment 6** to this report.

Reaching this end state necessitates adherence to certain fundamental principles. The ERO Enterprise must:

- Apply technical expertise that is focused on risks to the BPS and important reliability outcomes;
- Achieve results and methods across the ERO Enterprise that are predictable, consistent and timely;
- Share common goals, objectives and measures of success;

- Build relationships that are founded on candor and mutual trust, openness and cooperation;
- Apply collaborative decision-making;
- Ensure efficiencies while minimizing duplication and any activities not affecting reliability outcomes; and
- Avoid undue burden, discrimination, or capriciousness for affected regulated entities.

As detailed in **Attachment 6**, NERC's plan for achieving excellence in the oversight and execution of its statutory functions and in the mitigation of BPS reliability risks requires actions in five areas relating to the relationships and allocations of responsibilities between and among NERC and the Regional Entities:

(1) Clarifying roles and responsibilities. A clear understanding of the roles and responsibilities of NERC and the Regional Entities is required, as well as a clear set of expectations in the execution of the activities performed across the ERO Enterprise. This in turn will necessitate ERO Enterprise program oversight that includes the following essential oversight elements to be provided by NERC in consultation with the Regional Entities:

- An overall program design indicating the program purpose and goals, and design of controls to manage risks;
- Documentation of common methods, practices and procedures to be applied in the program, and performance expectations for each;
- Statements of necessary qualifications of key positions within the Regional Entities for conducting certain statutory activities, and identification of any standards for critical positions;
- Training of NERC and Regional Entity staff for select positions in the conduct of delegated functions;
- A documented and transparent set of process controls and measures to assure delegated responsibilities are properly completed, and to assess the effectiveness of the delegated activities in managing BPS and ERO Enterprise risk; and

- Periodic reporting of results and feedback to Regional Entities on trends and providing opportunities to enhance consistency and effectiveness of results.

To improve the delegation process, it will be important that NERC and the Regional Entities work together to update and refine the RDAs, due for renewal as of January 1, 2016, to provide a clearer division of responsibilities, both related to the division of performance of statutory functions and oversight of those functions, and to provide effective mechanisms to resolve routine differences.

(2) Coordinating strategic planning. NERC and the Regional Entities have collaboratively made significant progress in developing a shared, rolling three-year strategic plan for the ERO Enterprise. However, adoption of the ERO Enterprise goals and objectives into business plans at all of the Regional Entities has varied. In May 2014, the NERC Board approved the 2014 performance metrics. These performance metrics will be used to assess the overall effectiveness of the ERO Enterprise in addressing risk to the BPS, achieving reliability results, assuring Reliability Standards and compliance effectiveness and improving risk mitigation and program execution. They include four overarching metrics focused on overall effectiveness in addressing BPS risks and improving reliability. They also include a number of supporting measures that assess the effectiveness of the key operational elements of the ERO Enterprise. The intent is to report the results of these metrics on an ERO Enterprise-wide basis, and also as applicable, distinguish results for NERC and individual Regional Entities.<sup>92</sup>

(3) Coordinating operational decision-making. The ERO Enterprise model depends on successful delegation of activities, but also requires coordination of operational decisions that arise in the execution of these activities. To date, coordination of policy and directional

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<sup>92</sup> See <http://www.nerc.com/gov/Annual%20Reports/ERO%20Enterprise%20Strategic%20Plan%202014-2017%20and%20Performance%20Metrics.pdf>.

decisions has been achieved through: (i) coordination meetings between NERC and Regional Entity CEOs, which have become more routinized in recent years and include an agreed-upon protocol for reaching consensus decisions; and (ii) the activities of approximately two dozen working groups collaborating across various functional areas of the ERO Enterprise. The preferred approach going forward is to proactively establish a more collaborative model and recognize that Regional Entity staffs for most functions typically have valuable first-hand experience in implementing the activities on the front lines with registered entities. However, success depends on collaboration that results in timely and effective decisions that all entities in the enterprise agree to implement, and the avoidance of unilateral decision-making that steers portions of the ERO Enterprise into alternative methods and practices for delegated functions.

(4) Achieving consistency. Achieving consistency of methods, practices, procedures and tools has been a challenge throughout the history of the ERO Enterprise. At the outset, given a lack of common processes and procedures from NERC, Regional Entities developed their own methods, practices, procedures and tools. While there has been significant progress made, through the leadership and working groups referred to in the preceding paragraph, in addressing substantive differences, there remain significant variations in methods, practices, procedures and tools across NERC and the eight Regional Entities. Today, the biggest challenge in addressing consistency is gaining common agreement on processes and procedures with the backdrop of years of institutionalized differences among NERC and the Regional Entities.

The ultimate success of the ERO Enterprise depends on there being one compliance program, one enforcement program, one event analysis program, and so forth. Registered entities will have greater confidence and trust in the ERO Enterprise if they believe regulatory oversight is not subject to arbitrary variations and possible discrimination from one region to the



next. Outcomes will be more predictable and consistent if each statutory function is conducted in a unified fashion across the ERO Enterprise. Outcomes will also be more readily measurable to demonstrate the reliability impacts and benefits of the ERO Enterprise programs. In the long term, after the transition from legacy approaches, there will be significant efficiencies.

This transition requires the development of a core set of common methods, practices, procedures, and tools, which NERC is principally responsible to produce, working in collaboration with the Regional Entities. Consistency does not necessarily require identical internal procedures at each Regional Entity, and some flexibility must be maintained to allow for progress through innovation. However, consistency does mean that the approach, methods and practices are the same across the ERO Enterprise and that outcomes produced from application of the local and regional expertise and judgment of the Regional Entity staffs are fair, reasonable and without bias. In other words, the goal is consistent methods, practices, procedures and tools that deliver fair and reasonable outcomes. The move to greater consistency must occur under the close scrutiny of the ERO Executive Management Group, with accountability for progress to the NERC and Regional Entity boards, and all entities must be prepared to adopt changes to drive to more consistent methods, practices, procedures and tools.

(5) Coordinating external and cross-ERO Enterprise communications. Communications are important to the effectiveness of the ERO Enterprise. Communications can help set expectations for registered entities and stakeholders and demonstrate a common and consistent approach for regulators and the public. To facilitate effective communications across the ERO Enterprise, in May 2013 the NERC Board initiated a practice of meeting twice yearly as a group with all the chairs and vice-chairs of the Regional Entities, with a portion of these meetings conducted with the NERC and Regional Entity CEOs also present. Additionally, a NERC-

Regional Entity communications working group has been active for several years, coordinating consistent messaging across the ERO Enterprise. Further, NERC and the Regional Entities have coordinated outreach to FERC Commissioners and staff and to Canadian governments. However, although efforts to coordinate key messages and direction have been successful, areas for improvement remain. Thus, going forward, this area requires further attention to arrive at a desired end-state for the ERO Enterprise.

To reach the desired end-state for the ERO Enterprise in the five areas described above, NERC intends to focus on the following eleven action items:

- (1) NERC includes in its review of Regional Entity business plans adequacy of resources and alignment of the plans for achieving delegated function objectives and outcomes described in the three-year plan.
- (2) NERC, in collaboration with the Regional Entities:
  - (a) Develops a comprehensive overarching design and set of controls, reporting requirements, and feedback mechanisms for each delegated statutory function, including the essential oversight elements listed above;
  - (b) Re-evaluates its organizational structure and leadership qualifications necessary to provide effective design and oversight of statutory activities;
  - (c) Identifies functional qualifications for select delegated activities, such as auditors and investigators;
  - (d) Adopts risk-based approaches to monitoring performance of delegated functions and providing effective feedback and coaching to continuously improve overall ERO Enterprise performance; and
  - (e) Re-evaluates the ERO working group structure to enhance effectiveness.
- (3) Regional Entities:
  - (a) Work in a coordinated fashion to support NERC in the development of comprehensive functional program designs and controls;
  - (b) Adapt existing regional programs for delegated functions to conform with emerging program designs provided by NERC; and
  - (c) Ensure Regional Entity staffs meet qualification and training requirements.

- (4) NERC and the Regional Entities develop and maintain a joint three-year strategic plan for the ERO Enterprise describing the goals and deliverables for statutory functions and this plan should guide the development of each Regional Entity's annual business plans. Additional goals and deliverables that are complimentary or supplemental to the strategic plan may be developed at the Regional Entity level.
- (5) NERC and the Regional Entities transparently report results, based on a common set of performance measures focused on BPS reliability outcomes and effectiveness of the statutory programs. These measures are considered in the performance management program at each entity.
- (6) ERO Enterprise senior leadership continues maturing the collaborative decision-making process and setting the direction and policy for the enterprise as well as driving this collaboration throughout the ERO Enterprise organizations.
- (7) All nine ERO entities abide by the joint enterprise decisions of the ERO Enterprise senior leadership, and the NERC CEO should make final determinations if consensus is not otherwise achievable for an action that is required.
- (8) With NERC leading, the ERO Enterprise develops a core set of methods, practices, procedures, and tools to support unified implementation of the major statutory functions of NERC. In doing so, the ERO Enterprise commits to put the best talent available throughout the collective organizations to achieve this goal.
- (9) The ERO Enterprise senior leadership develops ERO Enterprise Information Technology applications, where appropriate, to support common processes, to enhance the efficiency and effectiveness of Regional Entities' practices, to increase the consistency of the interface with registered entities, and to facilitate NERC's oversight function.
- (10) All parties of the ERO Enterprise, including leadership and staffs, convey shared and consistent messages from the enterprise perspective and communicate together to minimize messages emphasizing self-importance or uniqueness.
- (11) NERC and Regional Entities continue the joint board coordination to ensure oversight and accountability of all elements of the enterprise and should continue to refine and expand coordinated outreach to government entities in the U.S. and Canada, stakeholders, and media.

## **VIII. CONCLUSION**

As detailed in this *Five-Year ERO Performance Report* and its Attachments, NERC has reached an important level of development in identifying, understanding and addressing reliability risks to the BPS. NERC has implemented targeted initiatives that benefit the electric

industry and its customers through improved BPS reliability. These initiatives also allow NERC to measure and be accountable for the effectiveness and value of the investments made by the industry to enhance and maintain reliability. NERC's approach allows it to target results around specific issues that benefit the industry and its customers through improved BPS reliability. Further, NERC's programs are continuing to evolve, thereby sharpening its focus on reliability and accountability through risk-based processes.

## **Attachments 1 – 6**

**Available on the NERC Website at**

[http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments\\_Five\\_Year\\_ERO\\_Perf\\_Report\\_20140814.pdf](http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments_Five_Year_ERO_Perf_Report_20140814.pdf)